Development of an observational coding scheme for parental behaviour in a play-based instructional context with 5- to 7-year-olds

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Declaration

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Abstract

This PhD thesis outlines and explains the development of an inductive coding scheme designed for the analysis of parents' behaviour during play-based instructional parent–child interactions with 5- to 7-year-old children. Parents and children were video-recorded collaborating on a problem-solving puzzle in a laboratory for 10 minutes. Five-minute fragments of the same task were selected, and parents' behaviour was analysed inductively (i.e., using a data-driven "bottom-up" approach) to establish sufficient segmentation and coding granularity. This required identifying fine-grained behavioural segments, considering all observable aspects of parents' behaviour, and naming the behaviours appropriately. This thesis explains and illustrates with data examples five stages of the coding scheme development: pre-pilot coding scheme development, pilot coding scheme development, coder training, pilot coding scheme testing and finalising the coding scheme, and implementation of the final coding scheme. Throughout these stages, the coding scheme was tested and improved based on the insights gained through the inter-rater agreement (IRA) assessment and coding disagreement discussions with the independent coders. Satisfactory IRA and the coders' understanding of the coding scheme demonstrated that the final coding scheme was successfully developed, comprising 18 codes (e.g., praise, direct instruction, assistive clue) within 8 distinct categories (e.g., positive, control, guidance). A coding manual was developed for future researchers' use containing the coding and segmentation rules, final coding scheme (code definitions, guiding questions, code differentiation, code examples and non-examples), coder training plan, coding procedures, and recommendations for improving coding accuracy.

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Table of Contents

List of Tables

List of Figures

Chapter 1: General Introduction

This PhD thesis aimed to develop a coding scheme that granularly captures parents' behaviour during play-based instructional parent–child interactions with 5- to 7-year-olds. This chapter explains the background and the rationale of the thesis, reviews literature to introduce behavioural observation and topics of discussion within observational research when examining parent–child interactions, explains the lack of behavioural observation within perfectionism research and the need to develop a novel inductive coding scheme, introduces different coding scheme development approaches and coding scheme characteristics, and reviews several coding schemes to illustrate their unsuitability and to further demonstrate that a novel coding scheme is needed.

1.1 The Leverhulme Project and This Thesis

This thesis was part of a project titled "Development of perfectionism: Early indicators and parental factors" funded by the Leverhulme Trust (consecutively referred to as "the Leverhulme project") that investigated parental factors that may predict the developmental trajectories of perfectionism in young children. This section explains the rationale and the aims of the Leverhulme project and the thesis. The rationale for the Leverhulme project is important to present in this section due to the project's informing the reasons for the need to develop a novel coding scheme and the selection of tasks used during parent–child observations.

1.1.1 Background of the Leverhulme Project

Perfectionism is a personality trait defined by very high standards related to concerns about making mistakes, disappointing others, and others' rejection if perfection is not maintained (Flett & Hewitt, 2002). Many people may occasionally show perfectionistic behaviours (Stoeber & Stoeber, 2009) but constantly seeking perfection may be related to psychological difficulties such as anxiety, depression, and stress, and have adverse effects on one's health and well-being (Sirois & Molnar, 2016). Furthermore, perfectionism may negatively affect people's relationships and be related to the feeling of disconnection (Hewitt et al., 2017).

Some researchers suggest that perfectionism develops during childhood, with parents' playing a crucial role (Flett et al., 2002; Rice et al., 2005; Stoeber et al., 2018), even over and above possible genetic factors. For example, twin studies showed only moderate heritability estimates for perfectionism, suggesting that environmental factors, and parenting in particular, may influence the development of perfectionism the most (Iranzo-Tatay et al., 2015). Furthermore, early childhood experiences (up to age seven in particular) are related to the development of various personality traits, abilities, and dispositions (e.g., Hong et al., 2017; Perlman & Fantuzzo, 2010), and thus may have a much more profound influence on the child's later perfectionistic tendencies than later childhood or adolescence experiences. However, although correlates and consequences of perfectionism are well-researched, little is known about the antecedents of perfectionism (i.e., factors that may lead to developing perfectionism) in young children. Specifically, the parents' role in the development of children's perfectionism is insufficiently understood (Stoeber, 2018), and no contemporary studies examining childhood perfectionism (e.g., Cook & Kearney, 2014) have investigated developmental trajectories of perfectionism in early childhood longitudinally. Thus, the Leverhulme project aimed to address this research gap and to examine possible parental factors that may predict development trajectories of perfectionism in young children, primarily through employing a longitudinal research design.

1.1.2 Aims of the Leverhulme Project

The Leverhulme project employed a longitudinal study design to investigate the parents' role in developmental precursors and predictors of perfectionism in early childhood. Accordingly, parent–child dyads were examined over two years: for the first time when the children were 5 years old, and then invited back a year later when the children were 6 years old. The project employed self-reports of parents' and children's perfectionism, parent-reports of children's perfectionism, observer-reports of children's perfectionistic tendencies during drawing tasks, and observations to examine parents' behaviour during parent–child interactions.

The Leverhulme project sought to address three key questions:

1. What role do parents play in the development of young children's perfectionism?
2. What are the early indicators of perfectionism in young children?
3. How can we predict which children will develop perfectionism over time?

1.1.3 Aim of This Thesis

Within the Leverhulme project, this PhD thesis focused on the observations of parent–child interactions and aimed to develop a novel coding scheme that would capture parents' behaviour during parent–child interactions granularly and allow for a detailed behavioural analysis across both time points, when children were five and six years old. Because the Leverhulme project focused specifically on parental factors that may contribute to the development of perfectionism in young children, the coding scheme sought to capture parents' behaviour only (i.e., children's behaviour was not coded, although its contextual influence on parents' behaviour was considered). The coding scheme was developed inductively (i.e., taking up a "bottom-up" approach where the codes were data-informed) because the previous attempt to develop a coding scheme deductively proved unsuccessful (the attempt by Majewska, 2017, who took part in the Leverhulme project before this thesis; see Section 1.3.3 for a detailed explanation of this unsuccessful attempt and a detailed rationale for the need of an inductive coding scheme). Observational data captured by the coding scheme developed in this thesis was correlated with the data from other measures (i.e., self-reports, parent-reports, and observer-reports) for further analysis within the Leverhulme project (such analyses were not part of this thesis).

1.2 Behavioural Observation in Researching Parent–Child Interactions

This section introduces behavioural observation and presents a historical overview of observational research in developmental psychology and in particular the study of parent–child interaction. Further, this section introduces topics of discussion regarding observational research and coding scheme application when examining parent–child interactions, and explains the difficulties when generalising coding schemes for use across different populations, tasks, and settings.

1.2.1 Behavioural Observation

Behavioural observation refers to “a researcher seeing and/or hearing, and then systematically recording, the behaviours of an individual or group of individuals within a particular social context of interest” (Heyman et al., 2014, p. 345). In many observational systems, a researcher assigns a code to a verbal and/or non-verbal behaviour using a coding scheme that categorises and defines the behaviours (Heyman et al., 2014). Behavioural observation allows investigating participants’ behaviours granularly, in sequences, and during complex fast-paced social situations (Gardner, 2000; Gram, 2010). Furthermore, through observation, data can be reported flexibly, varying from descriptive accounts to quantitative frequencies of behaviours (Hartmann & Wood, 1990).

Behavioural observation has been applied in different areas such as clinical research (e.g., clinicians’ performance is observed to assess the safety and quality of clinical procedures; Siu et al., 2016), sport and exercise psychology (e.g., players’ performance is observed based on observable body movements; Fortington et al., 2015), animal research (e.g., animals’ pain is observed based on behaviours such as restlessness, whining, or shaking; Mathews, 2000), and psychiatric research (e.g., schizophrenic patients’ dysfunctional behaviour is observed to assess their functional capacity; Bagge et al., 2017).

One of such areas is developmental psychology, in which behavioural observation was initially applied to examine children's behaviour in multiple settings, seeking to contribute to knowledge about children's development. Further, the use of behavioural observation extended to examining parent–child interaction, aiming to gain insight into parents' behaviour and its influence on children's behaviour and development.

1.2.2 Historical Overview of Behavioural Observation in Developmental Psychology

The first children observations in the 1920s took a behaviouristic stance, when Watson and Rayner (1920) applied behaviour conditioning techniques to evoke emotional reactions in a child. However, the first observations were lacking systematic and replicable methods to ensure data comparability (Arrington, 1943). Subsequently, researchers developed time-sampling techniques and more detailed and systematic coding schemes (e.g., Arrington, 1939, as cited in Arrington, 1943; Goodenough, 1930; Olson, 1929, as cited in Olson & Cunningham, 1934; Parten, 1932).

Early observational studies were carried out in a naturalistic setting (e.g., a nursery), where researchers observed children's social behaviours such as emotional expressiveness (Robinson & Conrad, 1933), assertiveness (Chittenden, 1942), and aggressive behaviour (Dawe, 1934). However, in the 1940s, researchers' interest shifted towards parent–child interaction. The first systematic parent–child observations were the Fels studies (Baldwin et al., 1945, 1949), where researchers examined parents' behaviour, aiming to clarify some frequently different definitions of observational concepts such as the parent's rejection and ground them in observational data. The Fels Parent Behaviour Rating Scale (Champney, 1941a, 1941b) allowed examining patterns of parents' behaviour and comprised thirty behavioural codes such as general protectiveness, emotionality toward child, severity of penalties, quantity of suggestion, and activeness of the home, that were grouped into eight distinct categories. The Fels studies prompted further development of more reliable and varied coding schemes used during observations of parent–child and adult–child (e.g., teacher–child or clinician–child) interactions in different settings. Having mostly observed parent–child interactions at home, researchers also initiated laboratory observations which allowed observing participants from a booth rather than the same room and thus potentially reduced the researcher's influence on participants' behaviour (Bishop, 1951).

Subsequently, researchers started developing different observational coding schemes. For example, Moustakas et al. (1956) developed a microanalytic coding scheme that captured both adults' (e.g., parents' or teachers') and children's behaviour such as criticism, directing, giving help, recognition, and affection. In comparison, Schaefer and Bayley (1963) developed a global ratings coding scheme that captured mothers' behaviour where each behavioural code was defined by rating a number of questions. For example, "ignoring" was defined by questions such as "does the mother seem to know very little about the child?" and "does she tend to overlook the needs of the child?" Each question was answered on a 7-point scale, and the question rating sum concluded the score for the code.

However, Kogan and Wimberger (1966) criticised Moustakas et al.'s (1956) and Schaefer and Bayley's (1963) studies as lacking appropriate inclusion of non-verbal behaviours, and consequently developed a coding scheme comprising 43 codes that included mothers' and children's both verbal and non-verbal behaviours (e.g., posture, body contact, gestures). As more reliable observational tools were developed, researchers in developmental and educational psychology (e.g., parenting assessment, children's behavioural assessment) started combining observations with psychometric assessment (e.g., personality or intelligence assessment) and parental reports which allowed for a more complete and richer picture of the data—both parents' and children's (Campbell et al., 1982; Dowdney et al., 1984; Mitchell, 1979).

1.2.3 Observational Research of Parent–Child Interactions

1.2.3.1 Coding Scheme Application when Examining Different Constructs

As observational research expanded over the years, parent–child interactions have been studied in various contexts with different research questions in mind, and some researchers have even applied multiple coding schemes within the same study. For example, Pino-Pasternak et al. (2010) applied six coding schemes to examine different dimensions of parent–child interaction and children's self-regulated learning. These coding schemes captured children's self-regulated learning, parental contingency, socioemotional behaviours (two coding schemes to differentiate positive and negative behaviours), and instructional aspects (two coding schemes to differentiate parents' scaffolding behaviours and children's understanding of scaffolding provided by the parents). Similarly, Pino-Pasternak (2014) applied four coding schemes to examine children's homework motivation, parents' socio-emotional behaviours, parents' instructional behaviours, and contingency between parents' demands and children's understanding of demands. These studies illustrate the use of different coding schemes when multiple constructs are analysed within a study. However, such use of multiple coding schemes is expected because parent–child interactions contain multiple behaviours and meanings, and thus various coding schemes capture different constructs of interest (i.e., one coding scheme could not capture all behaviours that could be examined within parent–child interaction in all possible contexts).

In comparison, multiple coding schemes have been developed to capture the same construct. Although such practice has occasionally been questioned as potentially producing too many similar coding schemes, it is also justifiable because one coding scheme is unlikely to capture all that some constructs entail. For example, Funamoto and Rinaldi (2014) reviewed four coding schemes that captured mutuality during parent–child interactions and concluded that although behaviours that represented mutuality in different coding schemes were not identical, they frequently overlapped (e.g., responsiveness, cooperation, reciprocity). This may raise a question about the necessity of multiple coding schemes when capturing mutuality if such an overlap in observed behaviours is reported. However, where Funamoto and Rinaldi's study emphasised coding schemes' similarities when examining mutuality, other researchers have identified more problematic and inconsistent definitions and approaches towards some constructs in observational research of parent–child interaction.

For example, because most coding schemes are theory-informed (i.e., codes are developed based on theoretical definitions of a construct), different theoretical approaches may lead to different definitions of the same construct, with some researchers' even suggesting testing out different theoretical construct definitions in observational research (e.g., Pino-Pasternak, 2014). However, occasionally, a variety of construct definitions employed by researchers may lead to a potentially excessive number of coding schemes. For example, Mesman and Emmen (2013) found over 50 coding schemes that captured parental sensitivity and reviewed eight most frequently used schemes, comparing them to the original definition and coding of sensitivity established by Ainsworth et al. (1974, as cited in Mesman & Emmen, 2013). Mesman and Emmen reported that the eight coding schemes varied in their definition of parental sensitivity, because in different coding schemes new behaviours had been added or some behaviours originally noted by Ainsworth et al. had been excluded. Furthermore, as over 50 schemes had been developed to accommodate for differences in populations, observational settings, and research questions, Mesman and Emmen "wondered whether the field needs that many different instruments, each with their own minor and/or major variations on the original conceptualization of the sensitivity construct" (p. 498). However, Tryphonopoulos and Letourneau (2014) similarly reviewed seven coding schemes that examined attachment during parent–child interactions, noting that the coding schemes varied in procedures, tasks, observation purposes, and training to the extend where no single coding scheme could be recommended as the most suitable when researching attachment. Thus, the need and reasons for a new coding scheme may be considered based on differences in research questions, observational context, and extant coding schemes' suitability.

Furthermore, some constructs have been captured by multiple coding schemes not only due to differences in studies and observational context, but due to the difficulty and complexity of defining certain constructs. For example, Siew et al. (2020) reviewed 38 instruments that assessed father–infant relationship quality which included 16 coding schemes, and concluded that "there is presently no 'gold standard' tool for assessing the father-[infant] relationship" (p. 1). Accordingly, Siew et al.'s review reported differences in how father–infant relationship quality can be measured due to the complexity of this construct (e.g., different elements such as father's involvement, play behaviours, and attachment have been included in different coding schemes as part of examining father–infant relationship quality), and consequently illustrated the inevitable need for multiple coding schemes depending on the elements of relationship quality that are of interest. However, Siew et al. reported that variability in behaviours observed contributed to differences in correlations between father–infant relationship quality and other constructs such as infant outcomes. Thus, Siew et al. emphasised the importance of carefully assessing a coding scheme to ensure its capturing the father–infant relationship quality characteristics that are of interest in a particular study.

Similarly, Madarevic et al. (2021) discussed the conceptualisation of parenting in coding schemes that examine parent–child interactions with autistic children. After reviewing 13 coding schemes, in line with already mentioned other researchers' conclusions, these authors noted that one universal parenting coding scheme could not be recommended. They also noticed that the coding schemes may not be directly comparable due to their capturing different aspects of parenting depending on the research question. Furthermore, Madarevic et al. noted that the coding schemes shared some parenting behaviours such as responsiveness, sensitivity, and intrusiveness, but also raised a question about “the lack of uniformity in the definitions of parenting constructs” (p. 330) because in some coding schemes, constructs with the same names varied in definitions and behaviours that represented the construct.

In summary, the studies discussed above draw attention to the need for a careful consideration of the construct definition and characteristics when selecting a coding scheme. Furthermore, they also demonstrate that a single coding scheme is unlikely to generalise to all studies that examine the same construct because of the inevitable complexity of most constructs that may be captured during parent–child interactions. Accordingly, the decision about developing a new coding scheme will always depend on the construct of interest and the particular background of the research focus.

1.2.3.2 Coding Schemes’ Generalisability to Different Study Contexts

In addition, researchers have discussed and attended to the importance of considering differences in study settings, tasks, population, and research questions when selecting a coding scheme. For example, Oliver and Pike (2021) tested the widely used Parent Child Interaction System (PARCHISY; Deater-Deckard et al., 1997, as cited in Oliver & Pike, 2021) for application during online observations (i.e., conducting observations through a video call software such as Skype) while employing the drawing task “Etch-a-Sketch Online” (ESO), adapted to online setting from “Etch-a-Sketch” that would typically be applied in-person. By moving the observational procedure and the task online, this study aimed to reduce the effect of video cameras and researchers’ presence, and the resources associated with carrying out home observations (e.g., travelling to participants’ homes can be time-consuming and costly). However, it also demonstrated that even well-established coding schemes like the PARCHISY may need testing when applied in different observational contexts (i.e., online observation instead of live home observation, and employing ESO instead of the in-person “Etch-a-Sketch”). Oliver and Pike reported reliable application of the PARCHISY in such different context, and their consideration for different study elements demonstrated appropriate practice in that a coding scheme’s generalisability to different contexts was not assumed.

As another example, Palmer et al. (2021) emphasised the importance of a coding scheme’s ability to tune into behaviours that may be expressed differently depending on the population and the observational tasks. Palmer et al. developed and tested a coding scheme that examined autistic children’s emotional behavioural problems during parent–child interactions after some other coding schemes showed inaccurate results such as autistic children’s showing unusually high level of compliance although the same children’s high rates of emotional behavioural problems were observed in other contexts (e.g., Bearss et al. 2015; Handen et al. 2013). Palmer et al. suggested that the tasks that may evoke emotional behavioural problems in non-autistic children may not show the same effects in autistic children, especially considering research evidence on the idiosyncrasy of triggers for emotional behavioural problems in autistic children. Furthermore, Palmer et al.’s coding scheme included various parental behaviours associated with autistic children’s emotional behavioural problems and employed different approaches to capturing some of autistic children’s behaviours compared to non-autistic children’s behaviours. Yielding accurate results about autistic children’s emotional behavioural problems, Palmer et al.’s study supported the notion about the need to carefully consider multiple study elements such as population and tasks when selecting or developing an appropriate coding scheme. Similarly, Halty and Berástegui (2021) who reviewed 33 coding schemes that examined parents’ responsiveness during parent–child interactions noted that different coding schemes were applied to different populations and that researchers should consider population differences when selecting a suitable coding scheme. After reviewing 12 studies that examined father–child interactions with autistic children, Perzolli et al. (2021) further noted that settings and tasks may influence participants' behaviour and that different coding schemes should be used accordingly.

Where behavioural differences may perhaps be more noticeable between populations such as autistic and non-autistic children, researchers have also noted population differences when observing mothers' and fathers' interaction with children, such as mothers' higher responsiveness compared to fathers (Chiarello et al., 2006) or fathers' more intrusive behaviours during play compared to mothers (Lovas, 2005). Accordingly, Anderson et al. (2013) adapted a coding scheme previously used to code mothers' behaviour to code fathers' behaviour so that such differences in expression and frequency of behaviours could be captured accurately. Anderson et al. (2019) further tested the adapted coding scheme and reported satisfactory psychometric properties which supported its suitability to examine fathers' parenting. However, despite these efforts, researchers have continued to report a lack of studies that investigate father–child interaction and the resulting lack of understanding of constructs such as paternal sensitivity (Mesman & Emmen, 2013), coding schemes' validation with fathers' samples (Lotzin et al., 2015; Siew et al., 2020), and investigation of father–infant relationship quality across different observational contexts (Siew et al., 2020). Such differentiation between mothers' and fathers' behaviour during parent–child interactions yet again illustrates the importance of considering multiple study elements when selecting a coding scheme and suggests that coding schemes may be difficult to generalise across populations, settings, and research questions.

An unsuccessful coding scheme generalisation to different contexts can be illustrated by Larivière et al.'s (2012) study in which the authors applied three selected coding categories of the widely used Child Behaviour Checklist (Achenbach, 1991) to observe adolescents during a wilderness therapy that consisted of five days of outdoor activities. Although such predetermined categories were selected due to their potentially allowing for a more structured and reliable coding, the study revealed significantly different coding data among three coders. Larivière et al. explained this anomaly as related to the inevitably inconsistent observational context because, although observing adolescents during the same activities, different coders frequently attended to different situations and behaviours. That is, the outdoors context differed from better controlled laboratory conditions where the categories from the Child Behaviour Checklist may have been applied more reliably. This study illustrates that even a widely used coding scheme may not be easily adapted and generalised across different contexts, and also draws attention to the importance of coder training when employing a coding scheme in a consistent fashion.

In summary, these studies add to the discussion about coding schemes' generalisability, suggesting that different research questions, observational tasks, settings, and populations require a careful consideration when selecting or developing an appropriate coding scheme. However, a balance needs to be maintained between developing new coding schemes and establishing psychometric properties of extant coding schemes.

1.2.3.3 Lack of Reporting of Coding Schemes' Psychometric Properties

Accordingly, researchers have discussed the issue of lack of reporting coding schemes' psychometric properties and the resulting questionable application of such coding schemes (see Chapter 3, Section 3.4 for the explanation and application of inter-rater agreement as one of the psychometric properties used to test coding schemes' replicability). Furthermore, researchers have critiqued coding schemes' lack of reporting of variables such as the length of tasks or not providing a coding manual. Consequently, such practice may contribute to many newly developed coding schemes that may not be replicable to apply, leading to confusion about the quality of coding schemes and the studies in which they are used.

For example, Wilson and Durbin (2010) reviewed 14 studies that employed behavioural observation to examine fathers' parenting behaviour and reported that most studies employed coding schemes without well-established psychometric properties and some studies did not report important information such as the length of tasks or coding scheme reliability scores. Similarly, Siew et al. (2020) reported that most coding schemes examining father–infant relationship quality lacked well-established psychometric properties. Furthermore, Amodia-Bidakowska et al. (2020) reviewed 37 studies that employed behavioural observation to examine father–child play interactions and concluded that, despite similarities in examining play dimensions such as quantity, quality, and characteristics, "there is nothing resembling a standardised coding scheme that is widely used to assess father–child playful interactions" (p. 14). Similar issues of not being able to recommend one coding scheme over another due to the lack of established psychometric properties have also been attended to when examining parent–child interactions during painful procedures (Bai et al., 2017) or after implementation of parenting programs (Gridley et al., 2019). Although different coding schemes may be employed when examining different aspects of the same construct, establishing coding schemes' psychometric properties would help guide researchers to a coding scheme suitable for their study or a decision to develop a new coding scheme if a suitable one does not exist.

Furthermore, Lotzin et al. (2015) found over 500 coding schemes that examined parent–infant interactions that had been used in none or only one peer-reviewed journal article, and lacked evidence of established validity. Lotzin et al. suggested that, given such a variety of coding schemes, the field may benefit from researchers' investing their time and effort into testing coding schemes' validity rather than creating new coding schemes. Furthermore, Lotzin et al. reviewed 25 of the most frequently used coding schemes and reported that many of them did not provide a coding manual. Without a coding manual, a coding scheme's application may be inaccurate, or researchers may instead develop a new coding scheme because of being unable to accurately apply an existing scheme.

In summary, although multiple coding schemes may be applied for coding different constructs or in different observational contexts, researchers have recommended that some effort should be focused on establishing psychometric properties to ensure a more consistent and reliable use of coding schemes. While some researchers have followed such recommendations (e.g., Larkin et al., 2015), the studies discussed above illustrate that the issue of lack of coding schemes with well-established psychometric properties has remained relevant up to very recently. Thus, better care should be taken to attend to these issues and to other aspects of appropriate observational research practice such as provision of coding manuals.

1.3 Behavioural Observation and Perfectionism Research

As the previous section explained, coding schemes may be difficult to generalise over different populations, tasks, and settings, and should be tested and carefully considered depending on a study. Thus, when selecting a coding scheme, the research area should also be considered. In some research areas within developmental psychology where many coding schemes have been developed to examine the same construct (e.g., over 50 schemes have been developed to examine parental sensitivity; Mesman & Emmen, 2013), it is reasonable to consider extant coding schemes and establish their psychometric properties for further use. However, behavioural observation has rarely been applied in perfectionism research which the Leverhulme project is part of, resulting in a limited number of coding schemes tested in this context. This section explains and illustrates the rare use of behavioural observation in perfectionism research, discusses self-reports as the most frequently used assessment method in perfectionism research and self-reports' correlation with behavioural observation, and provides the rationale for the need to develop a novel inductive coding scheme to use in the Leverhulme project.

1.3.1 Assessment Methods in Perfectionism Research

Although many observational studies in developmental psychology have examined parent–child interaction, behavioural observation has rarely been included in perfectionism research, with self-reports being the most frequent measures. This is not unexpected because an overall decline in the use of behavioural observation in personality research has been reported (Baumeister et al., 2007). Such focus on self-reports may be due to the time-consuming nature of behavioural observation and consequent high stakes in case of a failure, fast-paced academic career with the need to produce a high number of studies quickly, and researchers' frequent perception that participants' reporting of feelings and thoughts produces sufficient data to assess psychological constructs (Baumeister et al., 2007). However, Schofield et al. (2016) argued that self-reports, other-reports, and behavioural observation all provide important contributions when investigating parenting (and the Leverhulme project focused on the parents' role in the development of children's perfectionism), and noted that including and comparing various data collection methods may help assess which measures may be the most suitable for different studies. As Schofield et al. further noted, "constructs worth measuring are worth measuring well" (p. 622). Other researchers have also noted frequent relying on solely self-reports in perfectionism research (with some studies even employing self-report measures that lack well-established validity; Grugan et al., 2021), and argued that such practice may be limiting, recommending that behavioural observation and self-reports should be combined (Cook & Kearney, 2014; Fong & Cai, 2019; Karababa, 2020; Kenney-Benson & Pomerantz, 2005; Smith et al., 2016; Smith et al., 2017).

1.3.2 Behavioural Observation Versus Self-Reports

Both behavioural observation and self-reports have their advantages and disadvantages when employed in different studies but multiple studies within developmental psychology have shown no correlation between the data obtained through these measures (e.g., Missall et al., 2017; Morawska et al., 2015) which further supports combining behavioural observation and self-reports for more detailed and accurate data. Behavioural observation allows observing behaviours directly whereas self-reports require participants to recall events or behaviours which may lead to inaccuracies (Gram, 2010). Furthermore, behavioural observation can contribute to capturing information that may not otherwise be captured through self-reports (Gardner, 2000; Hops et al., 1995; Suen & Ary, 1989). For example, observation may be preferred over self-reports when examining young children's behaviour due to children's insufficiently developed linguistic abilities (Hartmann & Wood, 1990). However, self-reports are valuable in researching "participants' feelings, thoughts and attitudes and their perceptions of their own behaviour and that of others" (Gardner, 2000, p. 187).

Researchers have compared behavioural observation and self-reports in studies within developmental psychology and, although some studies found that observed and self-reported parents' behaviours were correlated (e.g., Duncan et al., 2015; Hawes & Dadds, 2006; Oliver & Pike, 2021), multiple studies also reported no correlation. For example, observed and parent-reported parents' and children's mathematical activities at home were not correlated, with authors' suggesting a careful consideration of the accuracy of data that different measures provide due to parent-reports' potentially contributing to inaccuracies in the data (Missall et al., 2017). Similarly, observed and self-reported parenting behaviours were not correlated, with authors' suggesting that these differences may be related to different ways of assessing parenting behaviour through observation and self-reports (Morawska et al., 2015). That is, through self-reports, parents recall their parenting behaviour based on multiple situations in the past, whereas through observation, parenting behaviour is assessed—that is, observed—in a particular situation and moment in time (Morawska et al., 2015; Palmer et al., 2021). Furthermore, because of inevitable methodological differences between self-reports and behavioural observation, ensuring that a construct examined is identical in both measures may be challenging (Hawes & Dadds, 2006), potentially leading to further differences or inaccuracies in the data.

Moreover, self-reported and observed data may differ due to aspects such as participants' mood or state of mind. For example, Herbers et al. (2017) compared self-reported and observed parenting behaviours and their relation to parents' distress after noticing that many studies rely on solely self-reports when investigating parenting. Herbers et al. reported that observed and self-reported parenting differed depending on parents' distress, where more distressed parents self-reported their parenting as more positive although it was observed as less positive and vice versa, suggesting parents' preoccupation with their own distress and the consequent lack of insight into their own parenting. Furthermore, Wilson and Durbin (2010) reviewed 28 studies that investigated the effects of fathers' depression on their parenting and found that more depressed fathers self-reported their parenting as more negative although it was observed as less negative, suggesting fathers' more negative view of themselves when depressed. Similarly, Potharst et al. (2021) investigated the relationship between mothers' self-reported mindful parenting and observed parenting behaviours, and suggested that mothers who were observed as more mindful may be more aware and critical of their parenting and thus self-report their own parenting more critically. It would seem that such results indicate that parents' mood and well-being may influence their self-reported data, supporting Gardner's (2000) methodological consideration that including self-reports in studies is valuable in that it allows gaining insight into participants' thoughts and perceptions. Similarly, Rostad and Whitaker (2016) agreed that parents' mood or memory may influence self-reported data and suggested including behavioural observation in parent–child relationship studies to gain insight into participants' behaviour and perceptions through varied measures.

Because parent–child interactions are usually complex and fast-paced, behavioural observation may capture behavioural patterns more accurately and informatively than self-reports, and can allow observing even complex and chaotic situations directly, without having to rely on participants' memory (Gardner, 2000; Gram, 2010). Furthermore, because many behavioural patterns develop in relation to family socialisation, family observation "plays a key role in our explorations of human behaviour" (Margolin et al., 1998, p. 196). Such comments lend support to the use of behavioural observation in the Leverhulme project, where play-based instructional parent–child interactions may be fast-paced and complex, and where observing parents' behaviour directly may provide a more detailed and accurate insight into parental factors that would be investigated in relation to children's perfectionism than parental self-reports alone.

Similarly, as Kruglanski's (2017) explained, "whereas thoughts and feelings are undeniably important, it is when they translate into action that they have the greatest impact on individuals and societies" (p. 196). However, as Jetten and Haslam (2018) argued, this should not mean "putting behaviour on a scientific pedestal" (p. 1) but instead focusing on the value that both behavioural observation and self-reports can add to, in the case of the Leverhulme project, perfectionism research. Because psychology rarely if ever offers definite answers to research questions, self-reports, other-reports, and observations each are "uniquely biased by different variables and approximately equally valid" (Schofield et al., 2016, p. 621), and such different yet valid perspectives should be valued and, accordingly, considered including in studies.

1.3.3 Behavioural Observation in Perfectionism Research and the Need for A Novel Inductive Coding Scheme

Considering the lack of behavioural observation use in perfectionism research, some researchers have attended to this limitation and included behavioural observation in their studies. For example, Hong et al. (2017) investigated the development of perfectionism in middle childhood and employed children's self-reports of perfectionism and anxiety, parents' self-reports of parenting behaviour, parents' reports about children's behaviour, children's cognitive assessment tasks, and behavioural observation of parent–child interactions. Such multi-method approach is similar to the one employed by the Leverhulme project, although the population and the measures in Hong et al.'s study differed. That is, children's and parents' self-reports, parent-reports, and observer-reports on children's tasks in the Leverhulme project focused on assessing children's and parents' perfectionism, whereas only children's self-reports in Hong et al.'s study focused on children's perfectionism with other self-reports' focusing on other constructs. However, it is worth noting that Hong et al. employed the same Rush Hour game in their parent–child observations as did the Leverhulme project (see Section 1.4.6 in this chapter for an overview and rationale for the puzzles employed in the Leverhulme project, and see Chapter 2, Section 2.2 for a detailed explanation of each puzzle), although Hong et al. coded parents' intrusiveness only.

Similarly, Affrunti and Woodruff-Borden (2015), who investigated parents' perfectionism and its relation to parents' controlling behaviour and children's anxiety, employed children's self-reports and parent-reports of children's anxiety, parents' self-reports of anxiety and perfectionism, and behavioural observation of parent–child interactions. Although one of the tasks in Affrunti and Woodruff-Borden's study was a challenging puzzle, similarly to Hong et al.'s (2017) study, Affrunti and Woodruff-Borden coded parental overcontrol only, thus limiting the scope of behaviours observed. In comparison, the Leverhulme project aimed to look at yet unknown parental factors that may play a role in the development of children's perfectionism and thus needed a more detailed coding scheme that would capture multiple parental behaviours during parent–child interactions.

Initially, the Leverhulme project aimed to observe specifically perfectionism-related parents' behaviours due to their theoretical basis on influencing the development of children's perfectionism. Although the need to develop new coding schemes has been discussed in this chapter as requiring a careful consideration when examining some constructs, a coding scheme that would capture specifically perfectionism-related parents' behaviours had not been developed. Thus, Majewska (2017), who took part in the Leverhulme project before this thesis, attempted to develop a deductive coding scheme where the codes were informed by perfectionism theory and captured parents' behaviours that may be related to the development of children's perfectionism, such as parental expectations, parental criticism, intrusive overcontrol/parental negative control, positive parental effect, and engaged parental support (see Appendix A for an outline of Majewska's coding scheme).

However, Majewska's (2017) coding scheme showed poor agreement between coders on the assignment of most codes and thus proved unreliable. Furthermore, some codes were assigned to behaviours very few times (e.g., parental criticism was assigned only one and three times by different coders). These results suggested that parents' behaviour may have contained more information than these deductively developed perfectionism-related codes could capture. Indeed, only 66 and 71 out of 347 behaviours were assigned the predetermined codes by the two coders, with other behaviours remaining uncoded (because the coding scheme was not exhaustive, not all behaviours were assigned a code). Furthermore, having to choose from a limited number of predetermined codes implied that the behaviours representing these codes were present in the data, whereas, in fact, the codes were not based on what the data entailed. This may have further contributed to poor agreement between coders due to their attempting to assign the codes that may not have been informative of the actual data.

Thus, Majewska's (2017) deductive coding scheme turned out unsuitable and uninformative of parents' behaviour during parent–child interactions observed in the Leverhulme project. Consequently, the focus of behavioural coding shifted from predetermined perfectionism-related and thus theory-based codes to inductively developed and thus data-based codes. Such inductive stance would allow for a granular exploration of parents' behaviour, the development of codes informed by the data and thus informative of parents' behaviour, and a reliable application of the coding scheme when coding parents' behaviour during parent–child interactions. Accordingly, the need and the aim for this thesis was established: to develop an inductive coding scheme that would granularly capture and define all parental behaviours during play-based instructional parent–child interactions with 5- to 7-year-olds.

1.4 Coding Scheme Characteristics and Development

Having established the rationale for developing an inductive coding scheme within the Leverhulme project and thus in this thesis, this section expands on the characteristics of inductive and deductive coding scheme development approaches, and introduces different observational data segmentation and coding approaches. Furthermore, this section provides the rationale for the observational setting and tasks selected in the Leverhulme project, and explains the appropriateness of coding parents' behaviour only (i.e., the coding scheme needed for the Leverhulme project and developed in this thesis codes parents' behaviour only and children's behaviour is not coded).

1.4.1 Coding Scheme Characteristics

Typically, when conducting behavioural observation, a coding scheme is used to capture and summarise behaviours of interest (Hartmann & Wood, 1990; Heyman et al., 2014). A coding manual includes a coding scheme (e.g., code definitions, examples, and non-examples) and other relevant information, such as coding and segmentation rules and coder training recommendations (Bakeman & Quera, 2011; Chorney et al., 2015; Hartmann & Wood, 1990; Heyman et al., 2014; Yoder & Symons, 2010). Furthermore, when selecting or developing a coding scheme, elements to consider include (a) the coding scheme development approach, (b) coding and segmentation approaches, and (c) setting and tasks employed (Aspland & Gardner, 2003; Margolin et al., 1998; Snyder et al., 2006). Also, when examining parent–child interactions, both participants' or one participant's behaviour may be coded depending on the research question (e.g., Hong et al., 2017; Palmer et al., 2021)

1.4.2 Coding Scheme Development Approaches

When developing a coding scheme, an inductive or deductive approach may be employed. An inductive coding scheme is developed without predetermining behaviours of interest and thus by examining the data without preconceptions or hypotheses about the behaviours and by observing what potential codes may emerge from the data (Liu, 2016; Thomas, 2006; Vuchinich et al., 1992). In contrast, a deductive coding scheme is developed by predetermining behaviours of interest—and thus, the codes—before examining the data (Liu, 2016; Thomas, 2006; Vuchinich et al., 1992). An inductive approach is more exploratory than a deductive approach and allows for the identification of underlying patterns and structures that occur within the data (Liu, 2016; Thomas, 2006).

Although the deductive approach finds its use in confirmatory coding (Vuchinich et al., 1992), Boyatzis (1998) critiqued deductively developed coding schemes as more likely to miss "what the data may be saying" because the codes are developed "out of context" (i.e., outside of the data to be coded; p. 35). Indeed, such critique may be applicable to Majewska's (2017) deductively developed coding scheme where perfectionism-related codes were developed out of context of the observational data, and the coding scheme's proving unreliable informed the decision to develop an inductive coding scheme (see Section 1.3.3 for a more detailed explanation, and Appendix A for an outline of Majewska's coding scheme). When employing the inductive approach, a researcher develops the codes in an attempt to explain what the data may contain, and thus may capture the richness and complexity of behaviours more accurately and informatively (Vuchinich et al., 1992). This further supports the suitability of the inductive approach within the Leverhulme project because the project aimed to examine all parental behaviours at a granular level and thus capture their richness and detail.

1.4.3 Coding Approaches

After selecting an approach for developing a coding scheme, coding and segmentation approaches are selected (Aspland & Gardner, 2003). Two main coding approaches are global (or "molar") ratings and microanalytic (or "molecular") coding. Global ratings use a Likert-type scale to rate dimensions (e.g., intensity) of behaviour observed (Aspland & Gardner, 2003; Hartmann & Wood, 1990; Heyman et al., 2014). For example, in a study examining the relationship between hyperactive children's functioning and mother-child interaction quality, the level of mother's emotionally supportive presence was rated on a 5-point scale according to the criteria such as warmth, praise, emotional support, and positive regard towards the child (Healey et al., 2010). In comparison, microanalytic coding captures the frequency of behaviours, enabling coding of small behavioural units (Aspland & Gardner, 2003; Hartmann & Wood, 1990; Heyman et al., 2014; Seelandt, 2018). As another example, in a study examining the relationship between marital quality and parents' behaviour during parent–child interactions depending on the parent's gender, parents' verbal behaviours were assigned codes from the coding scheme (e.g., praise, complain, ignore; Kerig et al., 1993).

Some researchers have combined both global ratings and microanalytic coding in their studies when examining the same or similar constructs, allowing for the examination of the construct from different perspectives (Bontinck et al., 2018; Funamoto & Rinaldi, 2014 Siew et al., 2020). However, global ratings may be more susceptible to observer bias because assessing behavioural dimensions may require more inference and judgement than microanalytical coding (Alexander et al., 1995; Kent et al., 1974). Furthermore, social and cultural interpretation of some behavioural concepts and dimensions may change over time and thus different coders' coding results may differ when applying the same global ratings coding scheme at different time points (Bell & Bell, 1989). Most importantly, global ratings cannot be applied when developing an inductive coding scheme because they focus on behavioural dimensions, and such dimensions could not be inductively developed based on the specific behaviours within the data.

In contrast, microanalytic coding captures behaviours that are more clearly defined and directly observed, and thus requires less inference than the assessment of behavioural dimensions (Bell & Bell, 1989). However, due to detailed analysis of each behaviour, microanalytic coding may require more resources and a thorough consideration of the number of codes developed to be able to train coders reliably (Heyman et al., 2014; Morawska et al., 2015). Because the Leverhulme project aimed to capture parents' behaviour on a granular level, microanalytic coding would offer a detailed analysis of each behaviour and thus was the approach adopted for the development of the coding scheme in this thesis.

1.4.4 Segmentation Approaches

To segment behaviours into codable units, different approaches may be taken. For example, *time-sampling* allows observing and coding behaviours during predetermined time intervals of the same duration, and each interval is observed to note whether a behaviour of interest occurred or not in microanalytic coding, or to assess behavioural dimensions in global ratings (Margolin et al., 1998). However, because time-sampling may produce orderly yet arbitrary units (Margolin et al., 1998), such arbitrariness may contribute to a less meaningful segmentation (Slee, 1987, as cited in Ostrov & Hart, 2013). In comparison, *event-sampling* allows capturing each instance of a target behaviour but does not reveal other underlying behavioural patterns that may occur during observation (Aspland & Gardner, 2003; Haynes & O'Brien, 2000; Margolin et al., 1998). Depending on the research question, a researcher may combine time-sampling and event-sampling (Clark et al., 2000) or employ other segmentation approaches such as segmentation by idea or purpose (Hadwin et al., 2005), by communicative act (Hennessy et al., 2016), or, more granularly, by identification of the smallest codable units (Kerig et al., 1993). Because the present study aimed to examine all parental behaviours inductively, no predetermined segmentation approach such as time-sampling was employed. Instead, the segmentation was developed inductively, allowing for the exploratory and granular identification of the smallest codable segments within the data (Kerig et al., 1993; Vuchinich et al., 1992; see Chapter 2, Section 2.7 for the inductive segmentation development in the present study).

1.4.5 Observational Setting

Observational details such as population, duration, and setting should be noted in the coding manual for a consistent and reliable application of a coding scheme (Snyder et al., 2006). This further supports the notion discussed in this chapter that different coding schemes may be applied depending on the population, tasks, settings, and research questions. Regarding the observational setting, behavioural observation of parent–child interactions have been carried out in various settings such as museums (Willard et al., 2019), supermarkets (Gram, 2015), or animal exhibits (Geerdts et al., 2015), although most frequently parent–child observations are carried out at home or in a laboratory. Furthermore, behavioural differences may be observed between home and laboratory observations (Abels et al., 2017; Belsky, 1980; Lamm et al., 2014). Although home observations may provide a better insight into natural, daily interactions, laboratory observations may provide better control over environmental differences and thus improve data comparability (Lamm et al., 2014; Margolin et al., 1998). Moreover, home observations may include parents' irrelevant behaviours (e.g., doing chores), resulting in less time interacting with the child which may contribute to a lower frequency of some behaviours at home compared to the laboratory, where irrelevant behaviours are removed (Abels et al., 2017; Margolin et al., 1998).

Some authors have also reported no differences in parents' behaviour observed at home and in the laboratory (e.g., Borduin & Henggeler, 1981; Bornstein et al., 1997). However, different results when investigating the influence of the setting may be related to researchers' investigating different behaviours that may or may not differ between home and laboratory, such as physical contact (Abels et al., 2017; Lamm et al., 2014), play initiation (Bornstein et al., 1997), or maternal instructional behaviour (Borduin & Henggeler, 1981). Furthermore, samples and procedures in these studies also differed. Thus, it may be accurate to consider Bornstein et al.'s (1997) explanation that the influence of home and laboratory setting on behavioural differences may depend on study methodology and behaviours observed. Within the Leverhulme project, the laboratory setting was deemed the most suitable due to better control of the physical environment, participants' better focusing on the tasks due to reduced distractions, and relative ease of the video-recording of interactions.

1.4.6 Observational Tasks

Observational tasks are typically selected depending on the research question and behaviours of interest because some behaviours may be more likely to occur during a particular task (e.g., Bloomquist et al., 1996; Donenberg & Weisz, 1997; Margolin et al., 1998). Accordingly, the Leverhulme project informed the selection of tasks employed during parent–child interactions. Because the project investigated the development of perfectionism in young children and employed various measures to assess parents' and children's perfectionistic tendencies, observations included two problem-solving tasks (i.e., the traffic jam puzzle “Rush Hour® Jr.” and the circle puzzle “GoKi™ Circle Puzzle”; see Chapter 2, Section 2.2 for a detailed explanation of each task, observational setup, and procedure) that had been used in previous parent–child interaction studies and seen as challenging (Hammond et al., 2012; Hong et al., 2017), and thus potentially more likely to elicit parents’ perfectionism-related behaviour, compared to other tasks that do not include problem-solving elements (e.g., an unstructured task of parents’ and children’ building the world in the sand tray together by using play figurines; Kerig et al., 1993). These tasks were selected when the Leverhulme project initially considered coding parents’ perfectionism-related behaviours only, although later Majewska’s (2017) deductively developed coding scheme proved unreliable and unsuitable (see Section 1.3.3 for the explanation and Appendix A for an outline of Majewska’s coding scheme). Thus, this thesis aimed to develop an inductive coding scheme that would capture parents’ behaviour in a play-based instructional context, as such context was informed by the nature of the tasks (i.e., problem-solving puzzles).

1.4.7 Coding Parents’ Behaviour Only

Because the Leverhulme project focused specifically on parental factors that may be related to the development of perfectionism in young children, this informed the focus of the coding scheme developed in this thesis being concentrated on parents’ behaviour only (i.e., the child’s behaviour was not coded). Similarly, when examining parent–child interactions, researchers have coded both participants’ or only one participant’s behaviour depending on research questions. For example, both parents’ and children’s behaviour was coded when researchers investigated children’s challenging behaviour and parents’ responses (Palmer et al., 2021) or mothers’ other-regulatory behaviours and the child’s self-regulation behaviours (Leith, 2017). In comparison, one participant’s—that is, the parent’s—behaviour was coded when researchers investigated mothers’ intrusiveness (Hong et al., 2017), parenting styles

(Sheh, 2013), mothers' parenting behaviour (Oliver & Pike, 2021), or mothers' responsiveness (Levickis et al., 2018). Although it is notable that parent–child interaction always involves both participants, is influenced by the history of participants' communication, and is always bi-directional (i.e., one participant's behaviour is influenced by another participant's behaviour and vice versa; Lollis & Kuczynski, 1997), inductively coding only parents' behaviour does not undermine these interactional elements. Indeed, even when coding only parents' behaviour in this thesis, the child's behaviour was continuously considered as contextual guidance that informed the coding of the parent's behaviour (see Chapter 3, Section 3.3.2 for further explanation of considering the child's behaviour as contextual guidance).

1.5 Review of Extant Parent–Child Interaction Coding Schemes

Having established that an inductive coding scheme needed developing for the Leverhulme project, this section reviews six extant coding schemes to highlight that an appropriate coding scheme does not yet exist. The six coding schemes may have been considered appropriate, however instead the basis for their unsuitability is explained in relation to the coding scheme characteristics required for the Leverhulme project (i.e., inductive coding scheme development approach, microanalytic coding in combination with the segmentation of the smallest identifiable behavioural units, and application to problem-solving tasks in a laboratory setting). The reviewed coding schemes only illustrate various combinations of unsuitable coding scheme characteristics, and other coding schemes that are not reviewed in this section have also been assessed and concluded unsuitable due to characteristics such as differences in tasks and coding schemes' deductive nature (e.g., Dadds et al., 1993, as cited in Dadds et al., 1996; Dumas & Gibson, 1990; Gardner, 1984, as cited in Gardner, 1987; Greco & Morris, 2002; Lunkenheimer et al., 2013; Mondell & Tyler, 1981). Furthermore, family interaction coding schemes that require more than two participants during observation (e.g., Dishion et al., 1987; Roopnarine & Adams, 1987) were excluded from the review.

Dyadic Parent–Child Interaction Coding System (DPICS)

The Dyadic Parent–Child Interaction Coding System (DPICS; Eyberg et al., 2009) is a clinical coding scheme that has been revised and updated multiple times since its initial development in 1981 (Robinson & Eyberg, 1981). This section reviews the 3rd edition of DPICS because it is available at no fee (the most recent 4th edition is available to purchase and includes several amendments).

The DPICS has been used to examine parent–child interaction quality before, during, and after therapeutic intervention (e.g., parent–child interaction therapy and other parenting interventions). Observations are carried out using three tasks that last 25 minutes: child-led play, parent-led play, and clean up. The DPICS contains 21 codes for the parent's behaviour and 16 codes for the child's behaviour such as the parent's negative talk, indirect commands, and positive touch, and the child's compliance, questions, and negative touch. These codes capture behaviours that represent different parenting styles (Baumrind, 1967, 1991, as cited in Eyberg et al., 2009) and different child's behavioural functioning levels. Time-sampling is used to segment 5-minutes of each task into 10-second intervals, coding up to five behaviours within each interval.

Throughout the years, researchers have applied the DPICS to observe different populations (e.g., teacher-child, parent–child with children with disruptive behaviour disorder, oppositional defiant disorder, anxiety disorder, or autism spectrum disorder; e.g., Bagner et al., 2004; McIntosh et al., 2000; Nixon et al., 2003; Solomon et al., 2008; Travis, 2015) and examined different DPICS versions for psychometric properties such as reliability and validity (e.g., Cañas et al., 2021; Cotter, 2016; Schuhmann et al., 1998). Thus, the DPICS illustrates a clinical coding scheme that has been continuously tested and improved, resulting in a detailed coding manual. However, the DPICS was developed deductively, focusing on behaviours that represent predetermined parenting styles, thus not allowing for inductive granular analysis of parents' behaviour and proving unsuitable to use in the Leverhulme project. Furthermore, activities during observations (i.e., the child-led and the parent-led play) did not include any particular task guidelines (and thus no specified problem-solving elements), and so the DPICS may not be able to capture parents' behaviour that may be specific to and informative of the parent–child interactions in a play-based instructional context.

Tutor's Scaffolding Coding Scheme

The Tutor's Scaffolding Coding Scheme (Wood et al., 1976) allows examining the tutor's scaffolding behaviour and the child's response during tutor-child interaction. Scaffolding refers to an expert's (i.e., the tutor) supporting a less knowledgeable learner (i.e., the child) with aspects of the task that the learner would struggle to complete independently. Wood et al. explained that scaffolding enables the learner to improve at a much greater pace compared to learning independently or when all parts of the task—not only the most challenging ones—are supported by the expert.

The tutor and the child are observed collaborating on building a pyramid out of wooden blocks according to the picture of what the pyramid should look like when complete. This task was designed to be engaging yet challenging to the child so that the child's skills could improve with the tutor's help, and thus the tutor's scaffolding behaviour could be observed. The coding scheme comprises three codes: verbal error prompt (the tutor verbally prompts the child to compare the pyramid at a current stage to the picture of a finished pyramid), straightforward verbal attempt (the tutor provides a direct hint about the next move), and direct assistance (the tutor intervenes with a helpful action). The child's behaviour is also noted, such as whether the child's behaviour in the task was assisted or unassisted by the tutor's scaffolding attempts or whether the child reassembled their incorrectly assembled wooden pyramid. During the interaction, the tutor allows the child to complete as much of the task as possible on their own, and only intervenes when the child is struggling, firstly assisting verbally before intervening directly.

Because Wood et al.'s coding scheme focuses on the tutor's scaffolding behaviour only, and the tutor's behaviour is structured (i.e., the tutor provides scaffolding in a particular order), the richness of a naturally occurring tutor–child interaction is limited. Thus, this coding scheme contains too few codes and is too scaffolding interaction-specific to use in the Leverhulme project.

Sequential Parent–Child Interaction Coding Scheme

The Sequential Parent–Child Interaction Coding Scheme (Forehand & McMahon, 1981, as cited in Forehand & Long, 1988) captures the parent's and the child's behaviour sequentially during 30-second intervals. The sequential coding allows examining patterns of parent–child interactions (e.g., the antecedents to the child's behaviour and the parent's responses to the child's behaviour) and the parent's and the child's individual behaviour. This coding scheme comprises nine codes, six for the parent's behaviour (e.g., commands, questions, warnings), and three for the child's behaviour (compliance, non-compliance, and deviant behaviour coded as present or not during a 30-second interval). Each code is assigned by identifying one or several key behaviours. For example, the parent's commands code includes various direct and indirect instructions and suggestions, and the child's compliance code includes the child's appropriate physical response to the parent's prior command.

During the observation, participants engage in the Child's Game, which is a child-led period of play during which the parent engages in any activity that the child initiates, and the Parent's Game, which is a parent-led period play during which the parent sets out activities and rules (Forehand & Long, 1988), with mothers' describing these games as representative of the child's typical behaviour (Rhule et al., 2009). These tasks and their adaptations have been used in a clinical setting during 10-minute observations that included parent–child interactions before and after a parenting intervention (Brumfield & Roberts, 1998; Forehand & Long, 1988; Jenner, 1992, as cited in Jenner, 1997). However, when observations were carried out at home, the Child's Game and the Parent's Game were not employed, and instead, the parent and the child were observed interacting as would be natural at home for 40 minutes (Breiner & Forehand, 1982; Forehand, Brody et al., 1986; Forehand, Lautenschlager et al., 1986; Forehand & Long, 1988).

Although this coding scheme has been applied in both clinical and home settings, the tasks were unspecified, and thus the coding scheme may not capture the behaviours that may occur when completing the problem-solving tasks employed in the Leverhulme project that may elicit perfectionism-related behaviour. Furthermore, some codes capture multiple behaviours which, if differentiated into separate codes, may be more informative of the parent's behaviour (e.g., the commands code includes various instructions and suggestions which may represent different types of the parent's controlling behaviour). Thus, Forehand and McMahon's (1981, as cited in Forehand & Long, 1988) coding scheme may not be detailed enough to capture all parental behaviours in the Leverhulme project. Furthermore, the coding scheme was developed deductively which further supported its unsuitability.

Relationship Process Code (RPC)

The Relationship Process Code (RPC; Jabson et al., 2004) allows examining participants' relationship quality and includes behavioural sequences, duration, and frequency. The RPC was derived from the Interpersonal Process Code (IPC; Rusby et al., 1991) which was developed deductively, based on previous research on family interactions. Consequently, the RPC is a simplified and less costly coding scheme, with some additional codes added based on a detailed analysis of positive parenting strategies.

The RPC can be used to examine each participant's behaviour during family, peer, or sibling interactions of two or more participants, when employing either time-sampling or a more granular segmentation approach. The RPC comprises 13 codes within four distinct categories: verbal behaviour, vocal behaviour, physical behaviour, and compliance behaviour. The codes reflect the topography of behaviours as positive, neutral, and negative. For example, verbal behaviour (the category) can be coded as positive verbal, talk, or negative verbal (the codes). Similarly, physical behaviour can be coded as positive physical contact, physical contact, and negative physical contact. The initiator of behaviour is also noted, allowing capturing of behavioural sequences. Furthermore, coding hierarchy is established according to the topography of codes. For example, if a seemingly positive behaviour appears to have a negative undertone, the negativity may affect the relationship and the positivity may not be acknowledged. Thus, any negative behavioural aspect results in the behaviour's being assigned a negative code.

Observational setting and tasks that the RPC can be applied to are not specified but the IPC (Rusby et al., 1991) from which the RPC was derived indicates potential observation settings and tasks as both home and laboratory, including unstructured and structured activities (e.g., eating, reading, free play, problem-solving). However, researchers have mostly applied the RPC during home observations which included a variety of activities such as free play, clean up, teaching tasks, and meal preparation (e.g., Dishion et al., 2014; Gross et al., 2008; Hardaway et al., 2012; Waller, Gardner, Dishion et al., 2012; Waller, Gardner, Hyde et al., 2012), and less frequently during laboratory observations which included problem-solving tasks (e.g., Li & Li, 2019).

Although the RPC is useful in capturing relationship quality, such approach may omit other behaviours that may not fall under the behavioural topography coding (i.e., coding behaviours as positive, neutral, or negative). Furthermore, the RPC was derived from a deductively developed coding scheme which again indicated that it was unsuitable for the Leverhulme project, given that an inductively developed coding scheme was needed to granularly capture all parental behaviours during parent–child interaction.

Behavioural Coding System

The Behavioural Coding System (Hummel & Gross, 2001) was adapted from Roopnarine and Adams's (1987) coding system that explored parents' instructional styles and included the mother, the father, and the child in the observation. The adapted Hummel and Gross's coding scheme allows observing interactions with one or both parents present and comprises six codes, applicable to both the parent's and the child's verbal behaviour (e.g., command, explanation, positive feedback). The coding scheme focuses on behavioural sequences, and thus the behaviour is only coded when in a sequence with another participant's behaviour. For example, the parent's behaviour is coded if the parent responded to the child, but is not coded if the parent continued speaking after a pause (i.e., the parent's behaviour is not in response to the child). This coding scheme is applied during home observations where the mother, the father, and both parents collaborate on a jigsaw puzzle for three 10-minute intervals.

Hummel and Gross's (2001) coding scheme illustrates researchers' adapting an existing coding scheme to their needs. However, a low number of codes, excluding non-verbal behaviours, and only coding the parent's behaviour that is in response to the child's behaviour may limit the examination of some potentially informative parents' behaviours because the Leverhulme project aimed to employ a coding scheme that would examine all parental behaviours during the interaction. Thus, this coding scheme was unsuitable to use in the Leverhulme project and a more detailed coding scheme was needed.

Parent–Child Interaction Coding Scheme

The Parent–Child Interaction Coding Scheme (Kerig, 1989, as cited in Kerig et al.,

1993) allows examining the parent's and the child's behaviour individually or sequentially. The codes are arranged into three groups: positive responses, negative responses, and assertions. Each of these groups contains three categories and several codes within each category. For example, the positive responses group contains three categories: responses, interpersonal focus, and positive expression. Further, the positive expression category contains three codes: praise, express pleasure, and positive affect. Consequently, the coding scheme contains three groups, nine categories, and 32 codes that code both the parent's and the child's behaviour. Such categorising allows for various levels of coding data analysis granularity. To allow for a granular analysis, the behaviour is segmented into the smallest identifiable codable units.

Kerig (1989, as cited in Kerig et al., 1993) developed this coding scheme based on previous research on parents' and children's interactional gender differences (e.g., conversation patterns, parenting styles). Kerig et al. (1993) applied the coding scheme to observe interactions in a laboratory, where parents and children completed several problem-solving tasks and a relatively unstructured task of building a world in a sand tray by using play figurines. However, only the sand tray task was coded, the analysis thus focusing on the relatively unstructured conversation that such task allowed for.

Other researchers have adapted this coding scheme to examine parents' behaviour in studies that focused on topics other than gender differences such as parent–child interactions between anxious parents and children, and during activities such as problem-solving tasks or potentially anxiety-evoking tasks and conversations (Affrunti & Woodruff-Borden, 2015; Arellano et al., 2018; Luis et al., 2008; Schrock & Woodruff-Borden, 2010; Williams et al., 2012; Woodruff-Borden et al., 2002). Although such coding scheme adaptations to observe tasks resembling the ones employed in the Leverhulme project (i.e., problem-solving and potentially anxiety-evoking) may be considered suitable, the codes were still developed deductively. That is, Kerig's (1989, as cited in Kerig et al., 1993) coding scheme was developed deductively based on previous research of the behaviours of interest, and, where this coding scheme was adapted, researchers further deductively shaped the coding scheme according to their study needs. Thus, as with other schemes reviewed in this section, Kerig's coding scheme does not allow for an inductive exploratory "bottom-up" coding scheme approach required for the Leverhulme project.

1.6 Conclusion

This chapter provided the background rationale and the specific aims of the Leverhulme project and outlined how these related to this thesis. Considerations encompassed behavioural observation, and discussion present within observational research when examining parent–child interactions, alongside the rationale for the need to develop an inductive coding scheme in the Leverhulme project. Further, the elements involved in developing a coding scheme were explained, and several coding schemes were reviewed highlighting their unsuitability.

This chapter concluded that the Leverhulme project required an inductively developed and microanalytic coding scheme that would employ a granular segmentation approach and capture parents' behaviour only, and be applicable to code behaviours during the tasks selected for the Leverhulme project and observed in a laboratory setting. Reviewing several coding schemes in relation to these coding scheme characteristics illustrated the schemes' differences in behaviours of interest, coding and segmentation approaches, settings, and tasks. The review also demonstrated that none of the extant coding schemes were deemed suitable for the Leverhulme project, supporting the conclusion that the development of a novel inductive coding scheme was required.

Such consideration of other coding schemes' suitability was in line with the views of Bakeman and Gottman (1997) who explained that a coding scheme should not be adopted thoughtlessly because it "is the lens with which [the researcher] has chosen to view the world" and "if that lens is thoughtfully constructed and well formed (and aimed in the right direction), a clearer view of the world should emerge" (p. 15). Accordingly, given the previous unsuccessful attempt to develop a deductive coding scheme for the Leverhulme project (Majewska, 2017), the lens through which the present study aimed to examine parents' behaviour was exploratory, which may reveal a clearer and richer view of the patterns of parents' behaviour within the data. Thus, to explore the data, an inductive approach was taken. The next chapters explain each phase of the development of a novel inductive coding scheme that would capture all parental behaviours during play-based instructional parent–child interactions, and could be applied in the Leverhulme project and beyond by future researchers.

1.7 Thesis Overview

Chapter 1 outlined and explained the rationale for the development of an inductive coding scheme development in this thesis. The following chapters will explain each phase of the coding scheme development. Figure 1.1 provides an overview of the coding scheme development phases explained in Chapters 2-6.

Chapter 2 describes the observational setup and procedure, and the tasks participants completed. Furthermore, Chapter 2 explains the pre-pilot coding scheme development including a participant-focused approach to coding, process of familiarising myself with the data, video fragment selection and transcription, preliminary data analysis, and development of pre-pilot segmentation and coding, and illustrates the pre-pilot to pilot coding scheme changes. As a result of this phase, the pre-pilot coding scheme was constructed, and several segmentation and coding rules were developed.

Chapter 3 explains further pre-pilot coding scheme development into the pilot coding scheme. Throughout this phase, the Leverhulme project Research Associate was involved to gain additional insights into segmentation and coding. Further detailed analysis of parents' behaviour alongside discussions and resolving of segmentation and coding disagreements, and multiple coding scheme amendments allowed for the development of the pilot coding scheme and several more segmentation and coding rules.

Chapter 4 explains the coder training which was carried out so that independent coders could be involved in the next phase of the pilot coding scheme testing and finalising the coding scheme explained in Chapter 5. Chapter 4 outlines and explains coder selection, coders' progress, and insights and challenges encountered when training the coders that led to the development of several more coding rules. Chapter 4 also presents a coder training plan that can be employed by future researchers when applying the coding scheme developed in this thesis.

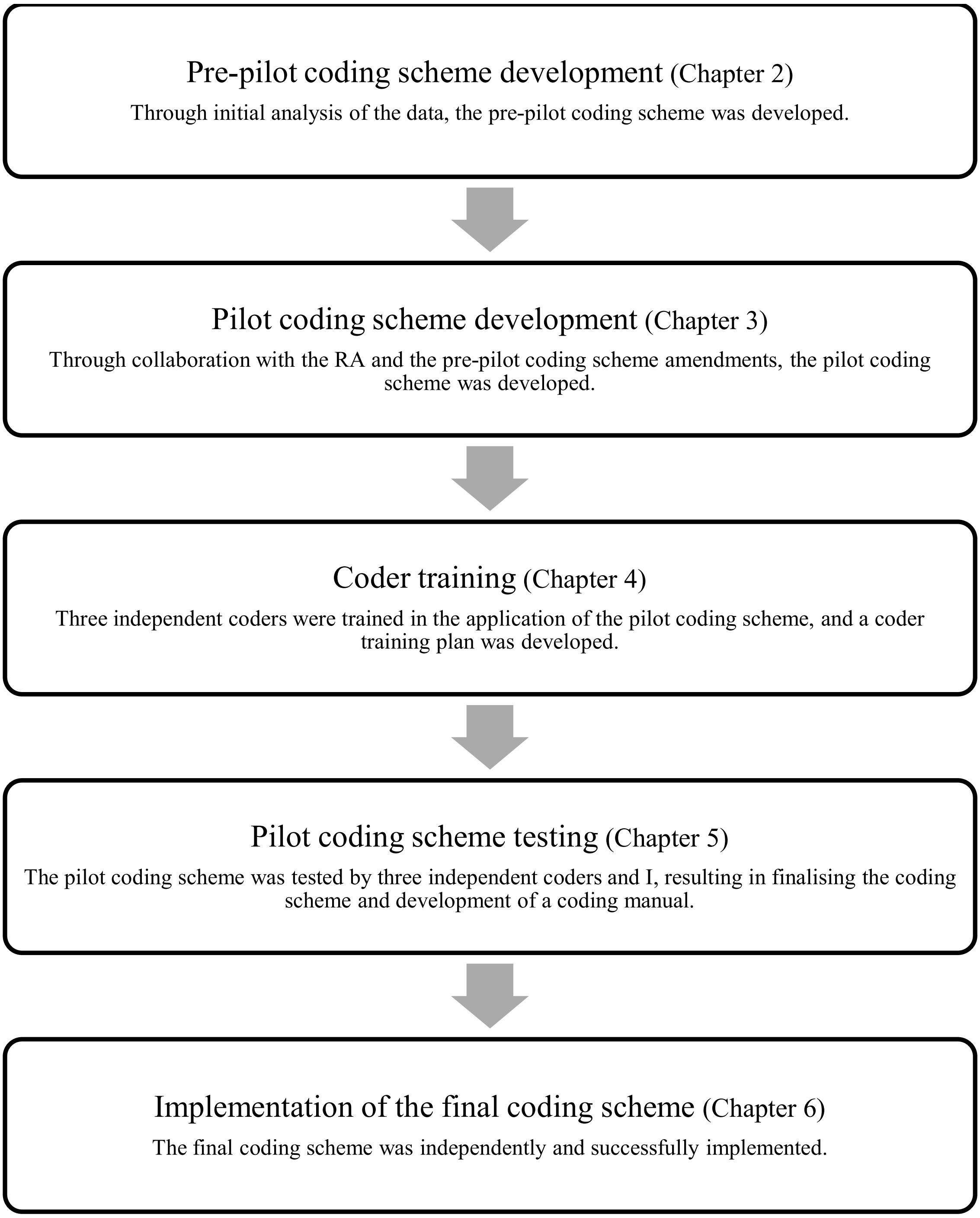
Chapter 5 explains the pilot coding scheme testing during which the independent coders and I tested the pilot coding scheme to assess its replicability and to refine the coding scheme further. Chapter 5 explains the insights and challenges discussed throughout this phase after coding each video fragment that also led to the development of several more coding rules, flowchart (although it proved inefficient to apply beyond its testing), and guiding questions for each code, and illustrates and explains the pilot to final coding scheme changes. As a result of this phase, the coding scheme was finalised and deemed successfully developed for application in the Leverhulme project and by future researchers, and the coding manual was developed (see Appendix E).

Chapter 6 outlines and explains the implementation of the final coding scheme where the Leverhulme project Research Associate and one of the coders applied the final coding scheme to independently code the same video fragments. Inter-rater agreement (IRA) and observer drift were monitored throughout the implementation. Considering the novelty of the coding scheme, successful resolving of coding disagreements when needed, and multiple satisfactory IRA scores, the final coding scheme was concluded to be successfully implemented which further supported its suitability for application in the Leverhulme project and by future researchers.

Chapter 7 summarises and discusses the results and the insights gained throughout this thesis, coding scheme's characteristics and application, the study's limitations and future directions, and theoretical and practical implications.

Figure 1.1

Overview of the Coding Scheme Development Phases Explained in Chapters 2-6



Chapter 2: Pre-Pilot Coding Scheme Development

Chapter 1 explained the rationale and the aim of this thesis, and the characteristics of the coding scheme required for the Leverhulme project. In the present study, the coding scheme was inductively (i.e., using a “bottom-up” approach) developed through several phases during which the codes were continuously amended. These phases comprised the (a) pre-pilot coding scheme development, (b) pilot coding scheme development, (c) coder training, (d) pilot coding scheme testing, and (e) implementation of the final coding scheme. Each of these phases is described in full within individual chapters of this thesis. This chapter describes the observational setup, procedure, and the tasks participants completed, and explains the pre-pilot coding scheme development phase, describing the participant-focused approach in the present study, familiarising myself with the data, video fragment selection and transcription, preliminary data analysis, and pre-pilot segmentation and coding.

The pre-pilot coding scheme development began by familiarising myself with the data through observing the videos and describing the interactional elements in which participants (parents and children) differed (e.g., engagement and support, instructional styles, approach to completing the game). Next, three 5-minute video fragments where the parents demonstrated distinctly different parental styles were selected out of 135 possible recordings, transcribed, and preliminarily analysed. These transcriptions were used throughout the pre-pilot coding scheme development phase. Familiarising myself with the data and preliminary analysis informed the language of description for later pre-pilot coding (e.g., engaging, struggling, instructing, guiding, interfering). Then, the parents’ behaviours were repeatedly segmented and coded, which resulted in developing the segmentation and coding rules and constructing the pre-pilot coding scheme.

The pre-pilot coding scheme comprised 20 codes within seven distinct categories and contained code definitions, operational definitions, and data examples and non-examples.

2.1 Introduction

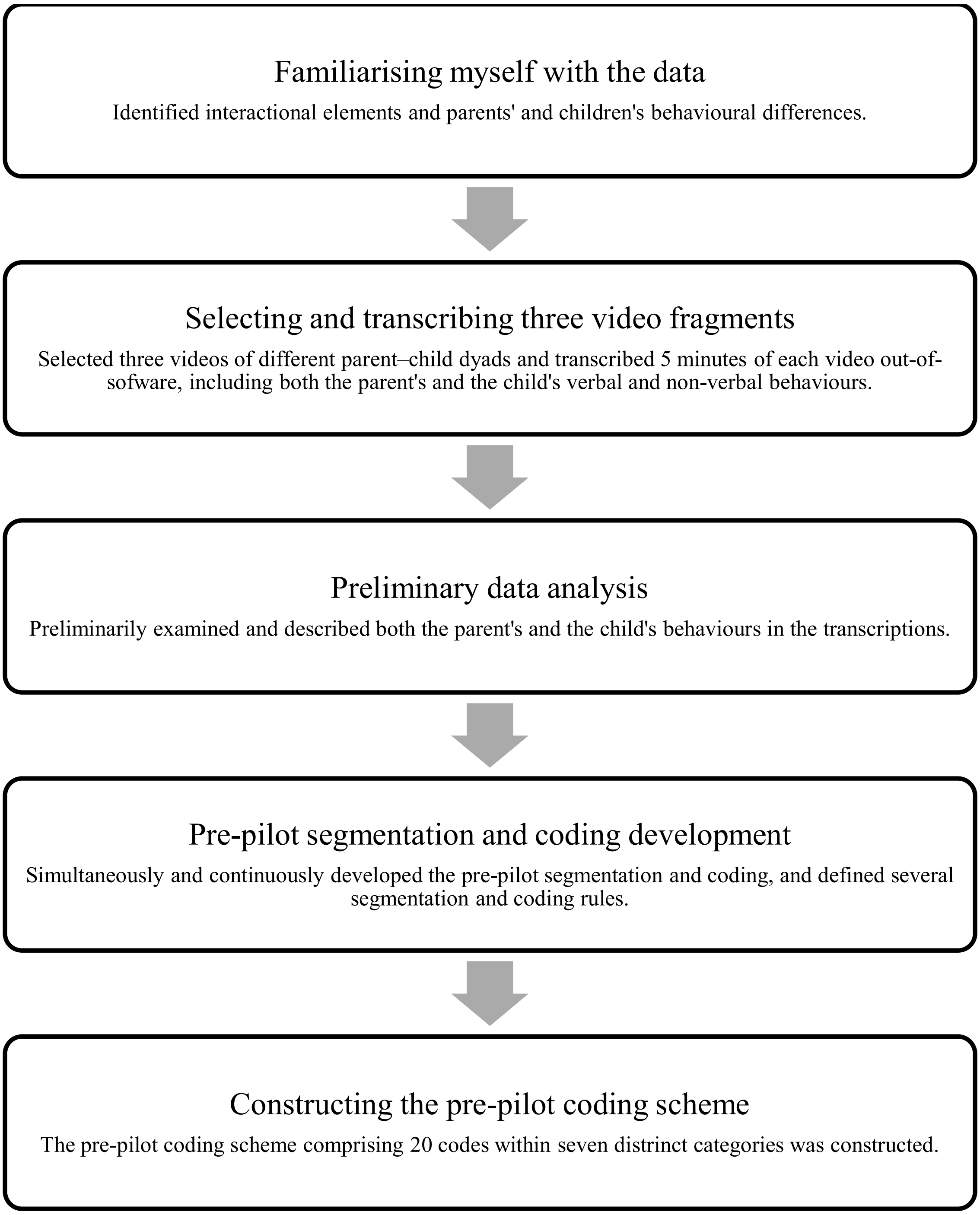
The present study aimed to develop a coding scheme that would capture parents' behaviour during play-based instructional parent–child interactions, given that the previous attempt to develop a deductive coding scheme was unsuccessful (Majewska, 2017, see Chapter 1, Section 1.3.3 for a detailed explanation), and an appropriate coding scheme has not yet been developed (see Chapter 1, Section 1.5 for a review of extant parent–child interaction coding schemes). To explore parents' behaviour during interactions and to develop appropriate and informative codes, an exploratory method was needed, and thus an inductive data analysis approach was employed. An inductive approach is data-driven (i.e., the codes emerge from the data) and is more exploratory compared to a deductive approach which is theory-driven (i.e., theory predetermines the codes) and more confirmatory (Liu, 2016; Thomas, 2006; Vuchinich et al., 1992). Furthermore, an inductive approach allows revealing the structure and patterns of behaviour—in this study, of parents' behaviour—within the data (Thomas, 2006) which would enable the construction of a coding scheme.

When inductively developing a coding scheme, a cyclical and repeated data analysis is necessary to establish sufficient segmentation and coding granularity (Creswell & Poth, 2018; Liu, 2016; Percy et al., 2015; Saldana, 2009; Sipe & Ghiso, 2004; Thomas, 2006). To achieve sufficient granularity in the present study, I familiarised myself with the data, preliminarily analysed, and repeatedly and attentively segmented and coded the data. Through these inductive data analysis steps, the pre-pilot coding scheme that captured parents' behaviours was developed, allowing for further refining and testing during the next coding scheme development phases.

Figure 2.1 presents the stages of the pre-pilot coding scheme development, discussed in more detail in the following sections.

Figure 2.1

Stages of Pre-Pilot Coding Scheme Development



2.2 Observation Procedure and Tasks in the Present Study

After arrival at the study location, the parents signed an agreement to participate in the study, and the parents and children were familiarised with the order and type of tasks. First, the parent–child observations were carried out, and then other assessments (self-reports, other-reports, and observer-reports) relevant for further data analysis within the Leverhulme project. Because this thesis focuses on the parent–child interactions, this section describes the observational setup and the tasks used.

Observations were carried out in a laboratory where the parent–child dyads completed three tasks: a warm-up game that participants brought in from home, the traffic jam puzzle "Rush Hour® Jr.," and the circle puzzle "GoKi™ Circle Puzzle." Each task lasted 10 minutes and was video-recorded using two video-cameras that captured interactions from two angles whilst participants sat at the table and collaborated on the tasks. After introducing and demonstrating the tasks to a parent–child dyad, the experimenter left the room and came back every 10 minutes to inform the dyad to move on to the next task.

Rush Hour® Jr.

The traffic jam puzzle "Rush Hour® Jr." (see Figure 2.2) is suitable for children aged five and above, and consists of 40 cards of four difficulty levels from "easy" to "super hard," a traffic grid, and various vehicles. Vehicles on the traffic grid are set up according to the picture on the card, and the aim of the game is to move vehicles forward and backward on the traffic grid to unblock the exit for the ice cream van.

First, the experimenter used an "easy" card to demonstrate the game to participants. Next, the participants were instructed to complete as many games as they would like in 10 minutes, choosing any cards they wished. The parent was asked to collaborate with the child and offer assistance as would be natural at home.

Figure 2.2

“Rush Hour® Jr.”

Note. From *Rush Hour® Jr.* by Thinkfun, n. d. (https://www.thinkfun.com/products/rush-hour-jr/).

GoKi™ Circle Puzzle

The circle puzzle “GoKi™ Circle Puzzle” (see Figure 2.3) contains multicoloured wooden pieces of different sizes that form a circle mosaic. The participants were instructed to dismantle the puzzle and to collaborate on reassembling it for 10 minutes. The participants were also informed that the puzzle had more than one solution (i.e., the puzzle pieces can be reassembled in multiple ways). The child was reassured to only try their best and that it would not be a problem if the puzzle was not completed in 10 minutes. The parent was asked to collaborate with the child and offer assistance as would be natural at home.

Figure 2.3

"GoKi™ Circle Puzzle"

Note. From *GoKi Wooden Mosaic Circle Puzzle*, by Amazon, n.d. (https://www.amazon.co.uk/GoKi-Wooden-Mosaic-Circle-Puzzle/dp/B000VPF2KW).

2.3 Participant-Focused Approach

Throughout the coding scheme development, I employed a participant-focused approach, inspired by the participant-oriented approach used in conversation analysis where any data interpretations should be based on identifiable data elements (Forrester, 2019). Similarly, Heritage (1984) argued that evidence for behavioural descriptions lie in the data and rest upon what is produced by participants, and data analysis should not turn into speculations about participants' intentions. In their ethnographic fieldnote data coding, Emerson et al. (1995) further supported the participant-focused approach by focusing on processes (i.e., what people were doing) rather than possible cognitions (i.e., what people may be thinking) said to underpin behaviour. Thus, in the present study, I focused on what participants chose to demonstrate in their behaviour, how participants did what they did, how participants chose to address what was happening, and how their behaviour related to the interactional context. Insights and code development were linked to data examples to provide a sound evidence base. Several examples of the over-interpretation of behaviour (i.e., describing the behaviour based on speculations about participants' intentions and cognitions, not identifiable behavioural elements) occurred during the preliminary data analysis but were attended to and avoided later (see Section 2.6).

2.4 Familiarising Myself with the Data

To begin the inductive data analysis, I familiarised myself with the data by analysing both the parents' and the children's behaviour (I only later focused on the parents' behaviour, see Section 2.7) to observe and describe interactional elements that the parent–child dyads differed in (e.g., engagement and support, instructional styles, approach to completing the game). I followed Saldana's (2009) suggested question, "What strikes you the most?" (p. 18) to observe random video exemplars where the participants played the game "Rush Hour Jr." and to note the behaviours that the participants displayed. During the game, the parents and the children employed various behavioural techniques and tendencies. These interactional elements in which the participants differed constructed parent and child dyad-specific interaction styles and parental styles. I described these interactional elements that the parent–child dyads displayed and differed in, starting to develop the language of description that would serve further granular behaviour analysis. Where I provide the interactional element examples, they serve to illustrate my insights during this phase of analysis and are not exhaustive or descriptive of a full picture of participants' behaviour.

Interactional Elements

Engagement and Support

The parents and the children differed in the level of attempting to encourage each other or to engage with the game or each other.

Struggle and Uncertainty

The parents and the children faced situations where one or both could not move forward in the game. The parents responded to a struggle or uncertainty by taking over the game and interrupting, or by guiding the child towards the next correct move. The children responded to a struggle or uncertainty by attempting to solve the challenge or turning to the parent for approval or guidance. I observed a high variety of participants' behaviours during these moments of struggle and uncertainty.

Instructional Styles

The parents differed in the voice tone and the language which shaped the parents' instructional styles into more direct or guiding.

Asymmetry

The parent and the child occasionally performed distinct roles by focusing on different aspects in the game.

Approach to Completing the Game

All parents and children aimed to complete the game but demonstrated their aims in different ways. The parents and the children allowed for spontaneous moves, focused on teaching and learning, or discussed the game strategy beforehand. The participants also differed in using positive or negative language: creating an enjoyable atmosphere or complaining and criticising the game.

Participants' Orientation to Audience

Participants' orientation to the perceived audience (i.e., the video camera) was considered. Vuchinich et al. (1992) explained that parents and children may amend their behaviours during observation, particularly in a laboratory setting. To minimise such effects, having the researcher absent from the observation room and allowing participants time to adjust to the setting and video equipment should be considered (Bennetts et al., 2017; Vuchinich et al., 1992). Accordingly, to help familiarise participants with the observational setting in the present study, observations were video-recorded, and the experimenter left the room while the parents and the children played a familiar game brought in from home at the beginning of the observation. Furthermore, even if participants showed orientation to the perceived audience, it should decline over the observation period (Gardner, 2000).

Despite these precautions, I searched for the participants' demonstration of awareness of the perceived audience, aware that the effect of the novel setting and situation could not be eliminated entirely. I observed the participants' several subtle glimpses towards the camera although it was rare. The participants' providing an account of their incorrect moves in the game could demonstrate an orientation towards the perceived audience, but I did not observe any clear identifiable behavioural elements that showed this was the case.

Interactional Context

I attributed meaning to the participants' behaviour within the interactional context, not as isolated units, which is in line with the views of Sacks (1992). Furthermore, examining both verbal and non-verbal behaviours in the present study served to sufficiently consider the context and to attribute accurate meaning to behaviours.

2.5 Video Selection and Transcription

After familiarising myself with the data, I proceeded to a more granular data analysis which required selecting and transcribing three 5-minute video fragments where parents demonstrated observable parental style differences. This section explains the process and rationale for the video selection, transcription, and preliminary data analysis.

Video Selection

I selected three videos from the data corpus of 135 possible recordings where parents demonstrated different parental styles (not all 135 videos were looked at during the selection, the three videos were selected based on identifying observable parental style differences). Each video represented a combination of interactional element differences (e.g., engagement and support, instructional styles, approach to completing the game), which formed a parental style unique to the parent–child dyad. One father and two mothers were selected to observe the behaviours of both parental figures. All three children were 5 years old. Two of the children were bilingual.

I selected a 5-minute fragment from each of the three videos, where the interaction appeared the richest—that is, where there was some indication of a struggle, disagreement, or high verbal exchange. Analysing these challenging situations allowed me to observe a high variety of behaviours and to increase the likelihood of constructing a coding scheme that would be accurate and representative of different parents' behaviours. The selected five-minute fragments started after the participants had played "Rush Hour Jr." for at least two minutes, thus allowing for time to their getting used to the game. Furthermore, because task characteristics may influence participants' behaviour frequency, and thus observational data attained from different tasks should not be compared directly (Borduin & Henggeler, 1981; Gardner, 2000), I selected fragments from the same game—"Rush Hour Jr."—throughout this study.

Video Transcription

After selecting the three 5-minute video fragments, I transcribed the parents' and the children's verbal and non-verbal behaviours, noting interruptions of verbal behaviour and behaviours that occurred simultaneously. Transcriptions allowed (a) capturing and analysing behavioural features that may go unnoticed if using video recordings alone, and (b) examining the context in detail for a better understanding of behaviours (Atkinson & Heritage, 1984; Sacks, 1992; Silverman, 2017). Furthermore, transcriptions assisted in the recognition of codable parts within the interactions and further development of the language of description, which formed the basis for the pre-pilot coding scheme. I transcribed the video fragments out-of-software, employing a three-column system to differentiate (a) verbal behaviours, (b) non-verbal behaviours, and (c) preliminary analysis (see Table 2.1). Also, as independent coders were involved in this study in later phases, transcriptions helped to avoid potential coding errors caused by coders' inaccurate hearing and understanding of participants' verbal behaviours.

2.6 Preliminary Data Analysis

Using the transcriptions of the three 5-minute video fragments, I preliminarily analysed both the parents' and the children's verbal and non-verbal behaviours, focusing on what struck me during the interaction (Saldana, 2009). Analysing both participants' behaviour allowed me to further my understanding of the interactional context and to continue developing the language of description for later pre-pilot coding scheme construction (after the preliminary analysis, the focus shifted from both participants' to the parents' behaviour during the pre-pilot segmentation and coding, see Section 2.7). I approached the transcription as a story, noting changes in behavioural topics, how the topics continued, and how many topics occurred, and noted them in the third column of the transcription (see Table 2.1). I referred to the language of description from the previous phase where I familiarised myself with the data and identified several interactional elements (e.g., engaging, instructing, guiding), and noticed new potential descriptions and codable segments. The Leverhulme project Research Associate (RA) and I analysed the transcriptions individually and shared our insights, agreeing on the insights and confirming the direction of analysis. The preliminary descriptions of the parents' behaviour included support, explanation, prompt, hint, instruction, monitoring, confirmation, praise, forbiddance. In the next steps, some of these and new codes formed the pre-pilot coding scheme (see Section 2.7.4).

During the preliminary analysis, I practised describing the participants' behaviour as evident in the data and not through speculations about the participants' intentions (Emerson et al., 1995; Heritage, 1984; see Section 2.3 for an explanation about the participant-focused approach in the present study). Any observation or insights were examined with reference to identifiable behavioural elements in the data (e.g., verbal or non-verbal behaviours that supported the allocation of a code). Some potentially too speculative insights and over-interpretation—which I refrained from in more careful later analysis—remained throughout the preliminary analysis but served as useful examples for questioning the identifiable behavioural elements in the data when describing the behaviour and assigning the code. See Table 2.1 for an example of the transcription and preliminary data analysis.

Table 2.1

Example of Transcription and Preliminary Analysis

Verbal behaviour	Non-verbal behaviour	Preliminary analysis
P: That’s it.	C: Moves the cars.	
	-- P: Slightly stretches hand towards the cars and back.	**Insight 1.** P refrains from interrupting.
	-- C: Moves a car, looks at P, looks back at the game.	**Insight 2.** C moves the car and P doesn’t praise, so C looks at P for approval of C’s move. **Insight 3.** P doesn’t praise because C’s move isn’t correct.
No, you’ve blocked the entrance now, haven’t you?		**Insight 4.** P demonstrates that P knows how to guide C to the solution and that P is aware which steps are wrong or right.
Which one do you think you need to move for the ice cream van to get out?	C: Moves a car.	
< C: This one!		
P: Yup.		**Insight 5.** P approves.
Then which one do you move?		**Insight 6.** P guides.

Note. P = parent, C = child, < = interruption, -- = simultaneous behaviours.

Preliminary Analysis Example

Table 2.1 presents a preliminary data analysis example of the transcribed parents’ and children’s behaviours. The example contains both the insights consistent with the participant-focused approach (i.e., the insights that are based on identifiable behavioural elements) and the over-interpretation of behaviours (i.e., the insights that are based on speculations about the participants’ intentions or cognitions). Both the participant-focused insights and the over-interpretation are explained in this section.

Insights 2 and 3 in Table 2.1 (described in the “Preliminary analysis” column) illustrate the over-interpretation where the reasoning for the parent’s and the child’s behaviour was not evident in the data (i.e., the behavioural elements for the behaviour description could not be identified in the data). Insight 2 suggested that the child's looking at the parent after moving the car was due to the parent's not praising the child for moving the car. Although the child's moving the car was identifiable in the data, the suggestion that the child looked at the parent due to the parent's lack of praising was an assumption that could not be identified in the data. Any speculation about the absence of the parent's behaviour being the reason for the child's looking at the parent would not be grounded in identifiable behavioural elements. The over-interpretation extended to Insight 3, where I assumed that the parent did not praise the child due to the child's incorrect move in the game. Related to Insight 2, where I assumed the child's looking at the parent for approval was due to the absence of the parent's praise, in Insight 3 I further assumed the reason for the absence of the parent's praise. Neither of these insights were grounded in identifiable behavioural elements, and such over-interpretation was carefully avoided during further coding scheme development.

Insights 1, 4, 5, and 6 in Table 2.1 illustrate the preliminary analysis consistent with the participant-focused approach, where the descriptions of behaviour were grounded in identifiable behavioural elements. In Insight 1, the parent's refraining from interrupting the child was evident in the parent's moving the hand forward (anticipated interruption) and backwards (refraining from interruption). In Insight 5, the parent's approving of the child's behaviour was evident in the parent's confirmatory verbal behaviour ("yup") after the child's verbal behaviour ("this one!"). Insight 5 also illustrates the importance of context when analysing the behaviours because the meaning of the parent's behaviour was related to the child's behaviour. In Insight 6, the parent's guiding the child was evident in the parent's question "then which one do you move?" Throughout further coding scheme development, grounding behavioural descriptions in identifiable behavioural elements was carefully attended to.

2.7 Pre-Pilot Segmentation and Coding Development

After the preliminary analysis, the segmentation and coding were developed simultaneously and continuously. This section explains and illustrates with examples the segmentation and the coding development process and presents the pre-pilot coding scheme that was constructed as a result of this phase.

2.7.1 Segmentation and Coding

When developing an inductive coding scheme in this thesis, the segmentation was also developed inductively, and no predetermined segmentation approach was adopted. In such case, segmentation refers to parsing the behaviours into the smallest identifiable codable segments (Kerig et al., 1993; Vuchinich et al., 1992) and should be consistent across observations as it will affect the coding, and thus the results (Margolin et al., 1998). The segmentation rules help to ensure segmentation consistency and replicability by allowing the determination of the start and end of the segment, especially where the number of behaviour occurrences is of interest (Chorney et al., 2015; Yoder & Symons, 2010).

In comparison, coding refers to assigning meaning to the segment, frequently a phrase or a word, that best captures segment characteristics (Saldana, 2009). Coding allows organising data into categories, where all codes in the same category share characteristics that shape the definition of that category (Saldana, 2009; Thomas, 2006; Vuchinich et al., 1992).

Segmentation and coding are interconnected, as Boyatzis (1998) explained: “If sensing a pattern or ‘occurrence’ can be called *seeing*, then the encoding of it can be called *seeing as*” (p. 4). When developing an inductive coding scheme, a researcher identifies parts of the data as codable and assigns a code simultaneously, repeating the process to redefine and reconstruct the segments, codes, and categories until a satisfactory level of analysis granularity and accuracy is reached (Boyatzis, 1998; Creswell & Poth, 2018; Thomas, 2006).

2.7.2 Segmentation and Coding in the Present Study

When familiarising myself with the data and during the preliminary data analysis, I considered both the parent's and the child's behaviour but focused on the parent's behaviour for the segmentation and coding. The child's behaviour provided contextual guidance for coding the parent's behaviour where applicable (i.e., the child's behaviour was not the focus of the code development). I segmented and coded all parents' behaviours in the three transcriptions of 5-minute video fragments to construct a mutually exclusive (i.e., only one code can be assigned to the segment) and exhaustive (i.e., all segments are coded) coding scheme (Ostrov & Hart, 2013). This facilitated the coding decision-making process by not having to identify whether the segment was codable and to consider the unknown number of assignable codes (Chorney et al., 2015).

2.7.3 Pre-Pilot Segmentation Development

The pre-pilot segmentation began by repeatedly examining what differentiated the parents' codable behaviours, and how behavioural topics changed across long behavioural sequences. As a result, I identified granular segments within the sequences (see Tables 2.2 and 2.3 for examples of segments within sequences). Although the sequences were informative to initially familiarise myself with the data, the segments were more descriptive and informative of the parents' behaviour and allowed for the establishment of consistent segmentation and coding granularity and the development of segmentation rules. When verbal and non-verbal behaviours occurred simultaneously, the verbal behaviour was prioritised to form a segment because prioritising the non-verbal behaviour may result in the segments' starting mid-sentence and in confusing and uninformative coding.

2.7.3.1 Pre-Pilot Segmentation Development Examples

Tables 2.2 and 2.3 illustrate the pre-pilot segmentation development process (and presents some of the pre-pilot codes that are further explained in Section 2.7.4.2) where long behavioural sequences were gradually parsed into smaller segments. Increased segment granularity ensured improved segmentation replicability and coding accuracy. Initially, the sequences contained multiple behaviours and meanings, causing difficulty describing what exactly formed the sequences, and such sequencing could not be replicable and consistent throughout the study. Furthermore, the inability to describe the sequences caused further difficulty assigning the codes because the codes should capture segment characteristics (Saldana, 2009). Consequently, a continuous analysis of the initial sequences resulted in the identification of sufficiently granular segments that could be accurately coded and replicated in further segmentation throughout this study.

Example 1 of Pre-Pilot Segmentation Development. In Table 2.2 Sequence 1, the parent demonstrated two verbal behaviours with a non-verbal behaviour in between. In Segment 1, the parent confirmed ("that's it") the child's behaviour (moving the cars) as correct, then, in Segment 2, the parent stretched their hand towards the game and back, and lastly, in Segment 3, the parent commented ("no, you've blocked the entrance now, haven't you?") on the child's further moves (the child moved another car in Segment 2). Initially, these three segments appeared suitable to be merged into one sequence but having taken a closer look, segmenting Sequence 1 was rather intuitive and non-replicable because I struggled to define the reasoning that informed such segmentation. Thus, I further granularly segmented Sequence 1 to achieve sufficient segmentation granularity and replicability. First, I noted that the three behaviours in Sequence 1 could be differentiated as (a) a verbal behaviour, (b) a non-verbal behaviour, and (c) another verbal behaviour. Next, I noticed that in Segment 3, the parent demonstrated two verbal behaviours that could be further parsed into two segments, (a) responding to the child ("yup"), and (b) asking the child a question ("then which one do you move?").

In comparison, Sequence 2 illustrates initial segmentation of sufficient granularity, where the parent demonstrated one verbal behaviour. Having Sequence 2 contain one verbal behaviour (Segment 4) was inconsistent with having Sequences 1 and 3 contain two verbal behaviours each (Segments 1 and 3 and Segments 5 and 6, respectively). Thus, Segments 1, 3, 4, 5, and 6 were consistently parsed to form separate segments that contained one verbal behaviour each. Furthermore, this way, Segments 1 ("that's it") and 5 ("yup"), representing the parent's verbal confirmation of the child's behaviour, were parsed into separate segments by meaning which improved coding accuracy (i.e., the parent's confirmation was not merged with the parent's explanation or other verbal behaviour). Given the inconsistencies of the initial sequences, the segmentation improved segment granularity, replicability, and suitability for coding. A sequence consisting of two or more segments that carry different meanings (e.g., multiple verbal behaviours) would lead to confusing and inaccurate coding.

Table 2.2

Example 1 of Segments Within Sequences

Segment	Verbal behaviour	Non-verbal behaviour	Pre-pilot code
	Sequence 1		
Segment 1	P: That’s it.	C: Moves the cars.	Confirmation, acknowledgement
Segment 2		-- P: Slightly stretches hand towards the cars and back. -- C: Moves a car. C: Looks at P.	Monitoring
Segment 3	P: No, you’ve blocked the entrance now, haven’t you?	C: Looks back at the game.	Explanation, teaching
	Sequence 2		
Segment 4	P: Which one do you think you need to move for the ice cream van to get out? < C: This one!	C: Moves a car.	Assistive clue
	Sequence 3		
Segment 5	P: Yup.		Confirmation, acknowledgement
Segment 6	Then which one do you move?		Indirect instruction, suggestion, prompt

Note. P = parent, C = child, < = interruption, -- = simultaneous behaviours.

Example 2 of Pre-Pilot Segmentation Development. Just like Table 2.2, Table 2.3 illustrates the initial sequences later parsed into segments by identifying changes in the parent’s behaviour. In Table 2.3 Sequence 1, the parent demonstrated two verbal behaviours: (a) a comment about the child's behaviour ("and then you're out"), and (b) an unfinished sentence ("you…"). While the unfinished sentence did not significantly change the meaning of Sequence 1 or cause much coding confusion, any identifiable new verbal behaviour should form a new segment. Thus, Sequence 1 was parsed into two segments for segmentation consistency.

Segments 3 and 5 further illustrate the initial inconsistent sequencing. In Segment 3, the parent's verbal behaviour ("okay, no") formed Sequence 2, but in Segment 5, the parent's linguistically similar verbal behaviour ("no") was merged with other behaviours ("listen, listen" in Segment 4 and "listen, listen, listen" in Segment 6) to form Sequence 3. Furthermore, Segments 3 to 6 followed a pattern where the parent disagreed ("okay, no"), requested attention ("listen, listen"), disagreed again ("no"), and requested attention again ("listen, listen, listen"), which demonstrated a clear differentiation of four verbal behaviours. Thus, Sequences 2 and 3 were parsed into four segments to improve segmentation granularity, consistency, and replicability.

Table 2.3

Example 2 of Segments Within Sequences

Segment	Verbal behaviour	Non-verbal behaviour	Pre-pilot code
	Sequence 1		
Segment 1	-- P: And then you're out. -- C: Yay!	P: Looks at C. C: Throws hands in the air, looking at the game.	Confirmation, acknowledgement
Segment 2	-- P: You... -- C: Now your turn. You're doing super hard.	C: Pushes game towards P.	Other
	Sequence 2		
Segment 3	-- P: Okay, no.	P: Touches the game.	Disagreement, disapproval
	Sequence 3		
Segment 4	P: Listen, listen. -- C: Since you helped me with that one.	P: Chuckles. C: Takes the cars off the board.	Attention request
Segment 5	< P: No,		Disagreement, disapproval
Segment 6	listen, listen, listen.	P: Replaces a car on the table.	Attention request

Note. P = parent, C = child, < = interruption, -- = simultaneous behaviours.

2.7.3.2 Further Segmentation Development

The segments in Tables 2.2 and 2.3 illustrated the pre-pilot segmentation development and were not final. In the next coding scheme development phase (see Chapter 3), the video coding software Transana was employed (see Chapter 3, Section 3.2 for further explanation of Transana), allowing to timestamp and replay the segments, and to notice the subtleties of behaviours that informed further granular analysis. Furthermore, the Leverhulme project RA was involved in the next coding scheme development phase to gain further insights about segmentation replicability and accuracy. Consequently, some segments in the transcriptions presented in this chapter changed due to improved segmentation granularity and replicability.

For example, Segment 3 in Table 2.2 ("no, you've blocked the entrance now, haven't you?") and Segments 5 in Table 2.3 ("no") contained inconsistent parsing of the parent's "no." In Table 2.3 Segment 5, the parent's "no" formed a separate segment, but in Table 2.2 Segment 3, it did not. Similarly, Segment 3 in Table 2.3 ("okay, no") was later parsed into two segments: (a) "okay," and (b) "no." In the next phase, such inconsistencies were attended to. See Chapter 3 for further discussion regarding segmentation development.

2.7.3.3 Segmentation Rules

Because the present study employs microanalytic coding (see Chapter 1, Section 1.4.3), and thus the coding scheme will capture the frequency of behaviours, segmentation rules are required to ensure consistent and replicable parsing of behaviours into codable units, whereas other segmentation methods may not require segmentation rules because, for example, in time-sampling the segments are simply defined by their duration (Yoder & Symons, 2010). Thus, throughout the pre-pilot segmentation development, I examined segment characteristics, start and end points, and continuity, and developed segmentation rules to ensure segmentation consistency and replicability (Yoder & Symons, 2010). These segmentation rules remained unchanged throughout the coding scheme development, although the understanding of the change in the parent's behaviour continued to improve, resulting in the development of the segmentation granularity level appropriate for the present study (one more segmentation rule was added in the next phase, see Chapter 3). Segmentation rules are illustrated by segment examples from the final segmentation phase, except for Rule 3 where the pre-pilot segmentation example is used.

Segmentation Rule 1. A segment starts and ends with a change in the parent's behaviour: verbal, non-verbal behaviour, or both.

The beginning of a new segment can be linguistically-informed (a change in the verbal behaviour, such as the intonation or topic), action-informed (a change in the non-verbal behaviour), or both (a simultaneous change in verbal and non-verbal behaviours). Behaviour changes can be subtle, and observing them cautiously and repeatedly for an indication of a new segment is necessary.

<u>Example 1:</u>

Segment 1: The parent observes the child's playing the game.

Segment 2: The parent smiles.

Segment 3: The parent continues to observe the child's playing the game.

Segment 4: The parent briefly glimpses at the child.

Segment 5: The parent continues to observe the child's playing the game.

Segment 6: The parent moves their head sideways to observe the child's playing the game.

Example 1 illustrates the segmentation of the parent's subtle non-verbal behaviours, where the segments are action-informed (i.e., by changes in the non-verbal behaviour).

<u>Example 2:</u>

Segment 1: "I'll do it, you watch."

Segment 2: "Okay?"

Segment 3: “That goes there” (simultaneously moving a car).

Segment 4: “And that one goes all the way up there” (simultaneously moving a car).

Segment 5: “And that one goes all the way up here” (simultaneously moving a car).

Segment 6: “And now, look.”

Segment 7: The parent moves their hand back to observe the child’s playing the game.

Example 2 illustrates the segmentation of the parent’s uninterrupted speech, followed by the non-verbal behaviour. The changes in the parent’s behaviour in Segments 1 to 6 are linguistically-informed (i.e., by changes in the topic and voice intonation), and Segment 7 is action-informed (i.e., by a change in the non-verbal behaviour).

Segmentation Rule 2. Consecutive segments can be assigned the same code.

The segmentation should be based on changes in the parent’s behaviour, not on the anticipated codes, and thus consecutive segments can be assigned the same code.

Example 1:

Segment 1: The parent observes the child’s playing the game.

Segment 2: The parent glimpses at the child.

Segment 3: The parent continues to observe the child’s playing the game.

Example 1 illustrates the segmentation of the parent’s subtle non-verbal behaviours where the segments were assigned the same code, *monitoring*.

Example 2:

Segment 1: “Would that go back?”

Segment 2: “Would that go back, that one?”

Example 2 illustrates the segmentation of the parent's consecutive verbal behaviours where the segments were assigned the same code, *indirect instruction, suggestion, prompt*.

Segmentation Rule 3. Over-segmenting is more informative than under-segmenting.

Over-segmenting allows for higher precision in analysing the parent's behaviour, whereas under-segmenting may pose a risk of missing information about the parent's behaviour. Behaviours in the under-segmented segments may carry multiple meanings and thus affect coding accuracy. If in doubt, over-segmenting is preferable.

Example 1:

Segment 1: "That's it."

Segment 2: The parent stretches their hand forward and back.

Segment 3: "No."

Segment 4: "You've blocked the entrance now, haven't you?"

During the pre-pilot segmentation, four segments in Example 1 were merged into one sequence which illustrates under-segmenting. The sequence contained three behaviours: (a) a verbal behaviour, (b) a non-verbal behaviour, and (c) another verbal behaviour. Furthermore, Segments 3 and 4 were initially merged into one segment although they contained the parent's negative verbal behaviour ("no") and the explanation about what happened in the game ("you've blocked the entrance now, haven't you?"). Merging the four segments into one sequence may result in confusing and inaccurate coding due to challenges in defining and labelling the segment. Moreover, coding a large sequence may result in prioritising one behaviour over another to assign meaning—that is, a code—and thus losing information about the parent's multiple behaviours. Thus, parsing behaviours into multiple granular segments is preferable for ensuring coding accuracy and granularity.

2.7.4 Pre-Pilot Coding Scheme Development

The pre-pilot segmentation and coding occurred simultaneously, and as granular segments developed, the pre-pilot codes emerged to capture segment characteristics. The pre-pilot coding scheme comprised 20 codes within seven distinct coding categories and contained all elements of informative inductively developed codes: (a) code names, (b) operational definitions, (c) data examples and non-examples, and (d) a category system (Boyatzis, 1998; Chorney et al., 2015; Creswell & Poth, 2018; Thomas, 2006; Yoder & Symons, 2010).

2.7.4.1 Code Elements

Code Names. Code names are developed by a researcher's labelling a behaviour which is always "a judgement call" (Sipe & Ghiso, 2004, p. 482). Labelling decisions open possibilities to explore the data, but also limit the researcher to a particular path of evaluation (Sipe & Ghiso, 2004). Also, different coders may identify different data characteristics and name the behaviours—and thus the codes—differently (Thomas, 2006). Following the participant-focused approach, I coded what the parents were *doing*, and thus ensured that the code names reflected this approach and that I could illustrate the codes with observable data examples.

Operational Definitions. Operational definitions include observable code characteristics that help identify and differentiate the codes (Ribes-Iñesta, 2003; Yoder & Symons, 2010). When developing the codes inductively, a researcher can develop operational definitions by answering the question of "What do I see/hear/observe that tells me I should be providing this label [code] right now?" and by involving other researchers to review the definitions for accuracy (Chorney et al., 2015, p. 158). Accordingly, in this coding scheme development phase, I developed brief pre-pilot code definitions that captured the main segment characteristics (see Table 2.4), which the Leverhulme project RA assisted in reviewing during the next phase (see Chapter 3).

Data Examples and Non-examples. I illustrated the codes with varied data examples, although these examples were never exhaustive (Yoder & Symons, 2010), especially as I analysed more videos in the next phases. Examples were essential to ensure I coded identifiable behavioural elements evident in the data, not my assumptions about the behaviours (Emerson et al., 1995; Heritage, 1984). Because some linguistically similar behaviours were assigned different codes due to the specifics of the behaviour or the context, non-examples were added to explain how such behaviours differed from each other and how to identify their codes accurately (Yoder & Symons, 2010).

Category System. The categories and the codes were developed simultaneously as I repeatedly recoded the transcripts and constructed a category system by identifying shared characteristics that different codes contained and assigning these codes the same category (e.g., *disagreement, disapproval* and *criticism, accusation, complaint* within the *negative* category shared a negative behavioural element; Saldana, 2009). To construct an exhaustive coding scheme (i.e., all behaviours are assigned a code) and to account for behaviours that did not meet the criteria for any code, the code *other* was added (Bakeman & Quera, 2011; Chorney et al. 2015). In total, I developed 20 codes within seven categories. The codes that only occurred a few times were retained as further video analyses would reveal if the amendments were needed.

2.7.4.2 Pre-Pilot Code Development Examples

This section explains the decision-making process when developing the pre-pilot codes and categories. Several pre-pilot codes are presented for illustrative purposes, and the remaining pre-pilot codes, not discussed in this section, were developed following similar patterns, through carefully observing identifiable behavioural elements and considering all behavioural aspects and the interactional context. In case of a linguistic code similarity, the code differentiation is explained and illustrated by data examples and non-examples. Because the coding scheme continuously changed during the present study, the pre-pilot codes presented in this section do not represent the final codes developed in this study. See Table 2.4 for a shortened pre-pilot coding scheme version including several selected code examples and non-examples. See Appendix B for the full pre-pilot coding scheme.

Table 2.4

Shortened Version of the Pre-Pilot Coding Scheme

Category/Code	Pre-pilot code definition	Examples	Non-examples
Positive			
Praise	Short compliments and positive expressions with regards to the child's behaviours.	• "Well done." • "That's good." • "Brilliant."	• "Yeah."
Supportive comment, encouragement	The parent's positive remarks that might encourage a positive attitude towards the process of the game. This does not provide information about the next moves in the game but demonstrates the parent's attempts to create a positive game atmosphere for the child and/or comfort the child.	• "You did the easy one really easily, but with the hard one just needed a little bit of help." • "That's a good one, isn't it?"	None.
Confirmation, acknowledgement	The parent's expressions that do not provide any new information about the game but are used either as the parent's confirmation of the child's behaviours or an acknowledgement that the parent has been observing the child.	• "Yes," "yup," "yeah," "okay." • "No…" (after the child said "no" first). • "You know. Do you?" (After the child said, "I know know know know!")	The parent's behaviour linguistically similar to *confirmation, acknowledgement* (e.g., "yeah") without the child's prior behaviour confirmed or acknowledged.
Positive gesture/expression	The parent's non-verbal positive expressions towards the child. This code should be assigned when the non-verbal behaviour is observed without the accompanying verbal behaviour.	• Smiling. • Laughing. • High five.	None.

Negative			
Disagreement, disapproval	The parent's disagreeing with or disapproving of the child's verbal and/or non-verbal behaviour.	• "That's not that one" (after the child moved a car). • "No" (after the child said "you're doing super hard since you helped me with that one"). • "You can't move it." • "Please, don't look at the answers!" (After the child took the card to look at the answers.)	• "No, you've blocked the entrance now, haven't you?" The parent explained the outcome of the child's behaviour in the game (*explanation, teaching*).
Criticism, accusation, complaint	The parent's criticism, accusations, blaming, and/or complaints about the child or the child's behaviours. Such complains can also be expressed as threats.	• "I told you you should do an easy first." • "That's it, I'm not going to play." • "You always sometimes do this, when you can't win, you think, oh, you know, well, I just do that."	None.
Control			
Direct instruction	The parent's instruction to the child as regards the process and/or the next moves in the game. The parent aims to direct the child's behaviour in a specific way, and this is expressed directly (i.e., in an instructive rather than suggestive way).	• "The white one, go back." • "Okay, just wait for a moment, okay?" • "You set it up." • The parent points at the car on the board for the child to move it.	• "You don't look at the answers, please." Despite the instructive aspect, the parent also expressed disapproval of the child's behaviour (*disagreement, disapproval*).

Decision-making	The parent makes a decision in the game and communicates it to the child. The parent is not suggesting it but making a statement about what is to come.	• "I'll do it, you watch, okay?" • "Let's restart the game." • "Okay, I think I will start the easy ones."	• "Let's reset it and then let's talk it through, and find a solution, alright?" By adding "alright?" the parent asked for the child's contribution rather than stated the decision (*asking for input/assistance*).
Attention request	The parent's verbal and non-verbal behaviours used to attract the child's attention.	• "Right, watch this, okay, watch that." • "Listen, listen." • "Oh, here we go, look."	• "Okay, so just wait for a moment, okay?" Although the parent aimed to attract the child's attention, the parent also instructed the child to wait (i.e., not only to pay attention; *direct instruction*).
Process control	The parent's attempts to contribute to the game by making specific moves without discussing them with the child or by correcting what has been done. Most frequently occurs as a non-verbal behaviour not accompanied by verbal explanations.	• The parent looks at the answers on the other side of the card without consulting the child or sharing the answers with the child. • The parent takes the card pile from the child. • The parent takes the car off the board and puts it to a different place.	None.

Engagement			
Asking for input/ assistance	The parent's asking the child for input or assistance as regards the process of the game. It is task-oriented and serves as the parent's invitation to the child to help the parent. Can be expressed as a question or a statement.	• "Where was it [the car], like this?" • "Which one?" (After the child said to know which car to move next.) • "Should we just do a different one or not?"	• "So how are you thinking about this?" The parent inquired about the child's thinking process towards the game, not for the input or assistance (*parental investigation*).
Parental investigation	The parent's questions about the child's thinking process and approach towards the game. This is an investigative expression and does not have a suggestive component to it. Where expressed as a question about the child's next move, the question is not suggestive of any direction the child should take.	• "So how are you thinking about this?" • "So, what did you learn here?" • "You're setting it up, what are you gonna do?"	• "Which one do you think you need to move for the ice cream van to get out?" The parent provided the child with the hint about the next correct move (*assistive clue*).
Mutuality	Includes situations where both, the parent and the child, are focused on the same item/aspect of the game or on each other.	• The parent and the child were looking at the card simultaneously in silence. • The parent and the child achieved the goal of the game, the parent said "Awesome!" and the child said "Yes!" both looking at each other simultaneously.	• The parent looked at the board while the child was moving the cars on the board. The parent observed the child while the child was engaged in the game (*monitoring*).

Monitoring	The parent's observation of the child and/or the game while the child is engaged in the game.	• The parent glimpsed at the child while the child was talking. • The parent was watching the board while the child moved the cars on the board. • While the child was engaged in the game, the parent stretched the hand towards the game and back without intervening with the game.	None.
Guidance			
Explanation, teaching	The parent's explanation or teaching of the game-related aspects or reinforcing the rules of the game. Contains new information about the process of the game.	• "Then… We need to get that [the car] out the way." • "No, you've blocked the entrance now, haven't you?" • "It's after one road which is here."	• "You can't knock the purple one off" (after the child knocked the purple car off). Although the parent explained what should not be done, the parent disagreed with the child's behaviour and used a harsh voice tone (*disagreement, disapproval*).

Indirect instruction, suggestion, prompt	The parent's attempts to direct the child's behaviour as regards the process and the moves in the game, expressed in a suggestive way. This includes prompts that might not hold a concrete suggestion of the next move but imply that some action should be taken (i.e., a suggestion to proceed with the game).	• "Maybe if you move this across a little bit?" • "Then which one do you move?"	• "Right, let's restart the game, okay." The parent made a decision in the game that included both the parent and the child (*decision-making*).
Assistive clue	The parent's attempts to provide the child with a helpful hint as regards the next move in the game. The child might have to figure out what the hint means as the parent does not provide full information.	• "Is that the right place?" • "Which one do you think you need to move for the ice cream van to get out?" • "No, which one would you move? Which is the only vehicle that can move?"	• "So, what did you learn there?" The parent inquired about the child's thinking process in the game (*parental investigation*).
Statements			
Thinking out loud	The parent's verbal behaviours that are not directed at the child but are only used to vocalise what the parent might be thinking/doing at a given moment.	• "Okay" (no prior child's behaviour to confirm or acknowledge). • "Let me see if I can… Um… Attempt to work this out" (not directed at the child). • "That's super hard, that's hard, okay, right" (not directed at the child). • "That can stay there…" (Not directed at the child.)	• "Okay" (after the child's behaviour). The parent acknowledged the child's behaviour (*confirmation, acknowledgement*).

Apology	The parent's apologising to the child.	• "Sorry."	None.
Other			
Other	Other behaviours that cannot be assigned any of the codes. This could be due to the inaudibility of the segment or where the verbal behaviour is unfinished/interrupted and could not be identified as assignable of any other codes. If a coder can choose a different code, that would be preferred and more informative.	• "For me…" • "Right, so I do…" • "You…"	None.

Praise. *Praise* refers to the parent's brief positive evaluative expression about the child's behaviour. Linguistically, *praise* contains a positive adjective or adverb such as "well done," "that's good," or "brilliant."

Differentiation and Non-Examples. Both *praise* and *confirmation, acknowledgement* occur after the child's behaviour. To differentiate, *praise* positively evaluates and *confirmation, acknowledgement* only confirms or acknowledges the child's behaviour without adding positive evaluation (i.e., a positive adjective or adverb). For example, the parent's "yeah" confirmed the child's behaviour as correct, but did not positively evaluate—that is, did not praise—and thus was coded as *confirmation, acknowledgement.*

Similarly, in some cases, both *praise* and *supportive comment, encouragement* contain a positive adjective or adverb. To differentiate, *praise* refers to and occurs after the child's behaviour whereas *supportive comment, encouragement* refers to any aspects in the game or interaction. For example, the parent's comment "that's a good one, isn't it?" encouraged positive attitude towards the game but did not refer to the child's behaviour, and thus was coded as *supportive comment, encouragement*.

Disagreement, Disapproval. *Disagreement, disapproval* refers to the parent's disagreeing with the child's verbal or non-verbal behaviour, and is expressed briefly (e.g., "no," "you can't move it"). Linguistically, *disagreement, disapproval* contains negative wording such as "no," "can't," or "don't." However, in the pre-pilot phase, negative wording did not always determine this code for the segment and considering the context and all behavioural aspects was crucial (see "Differentiation and non-examples").

Differentiation and Non-Examples. The *disagreement, disapproval* non-example, "no, you've blocked the entrance now, haven't you?" illustrated the importance of considering all behavioural aspects as this behaviour contained a disagreement ("no") and an explanation ("you've blocked the entrance now, haven't you?"). Due to the explanatory part, this segment contained more information than just a disagreement, and thus was coded as *explanation, teaching*. However, this non-example illustrated the pre-pilot segmentation and coding, and in the next phase was parsed into two segments for segmentation and coding consistency and granularity: (a) "no," coded as *disagreement, disapproval*, and (b) "you've blocked the entrance now, haven't you?" coded as *explanation, teaching*.

The two *negative* category codes—*disagreement, disapproval* and *criticism, accusation, complaint*—capture different expressions of the parent's disagreement. To differentiate, through *disagreement, disapproval* the parent disagrees or disapproves of the child's behaviour, and through *criticism, accusation, complaint* the parent elaborates on their disagreement or disapproval by criticising, accusing, or complaining. For example, the parent's "I told you you should do an easy first" expressed their disagreement with the child's behaviour through criticism, and thus was coded as *criticism, accusation, complaint*.

Decision-Making. *Decision-making* refers to the parent's stating their decision that includes both the parent and the child without consulting the child. Linguistically, *decision-making* is expressed in various form, such as "let's," "I will do […], you will do […]," or "I will do […]." For example, although linguistically different, both parent's expressions "I'll do it, you watch, okay?" and "let's restart the game" communicated what both participants should do next. Furthermore, the parent's "okay, I think I will start the easy ones" provided a more ambiguous *decision-making* example because the parent only mentioned themselves, but because the parent referred to choosing the next card, the decision influenced the game for both the parent and the child.

Differentiation and Non-Examples. The *decision-making* non-example "let's reset it and then let's talk it through, and find a solution, alright?" illustrated the importance of considering linguistic detail when assigning a code. Although "let's" indicated that *decision-making* may be considered a suitable code, by adding "alright?" the parent consulted the child about their decision, adding a suggestive aspect to it. Thus, this non-example was coded as *indirect instruction, suggestion, prompt* and illustrated how a careful consideration of subtle verbal behaviours may result in assigning a different code.

However, the *decision-making* example "I'll do it, you watch, okay?" illustrated an inconsistency in the pre-pilot coding scheme. In this example, adding "okay?" was similar to adding "alright?" in "let's reset it and then let's talk it through, and find a solution, alright?" but the former was coded as *decision-making* and the latter as *indirect instruction, suggestion, prompt*. Although adding the question at the end of the verbal behaviour demonstrated the parent's orientation towards the child, the meaning of the verbal behaviour without the added question remained unchanged (i.e., *decision-making*). To capture both behaviours and to improve segmentation and coding granularity and accuracy, in the next phase the segment "let's reset it and then let's talk it through, and find a solution, alright?" was parsed into two segments: (a) "let's reset it and then let's talk it through, and find a solution," and (b) "alright?"

Asking for Input/Assistance. *Asking for input/assistance* refers to the parent's including the child in the decision-making process during the game (i.e., asking for input) or inquiring the child about the next moves when the parent is uncertain (i.e., asking for assistance). The parent's asking for input or assistance were merged into one code because in both, the parent inquired the child about the next moves in the game. For example, when the parent asked, "where was it [the car], like this?" uncertain about the placement of the car and aiming to check the information with the child, or when the parent asked, “should we do a different one or not?” engaging the child in the decision-making about the next moves, the parent invited the child to contribute to the game.

Differentiation and Non-Examples. In both *asking for input/assistance* and *parental investigation*, the parent engages with the child to inquire about the game. To differentiate, *asking for input/assistance* inquires the child about the moves in the game whereas *parental investigation* inquires about the child’s thinking process and approach towards the game. For example, because the *asking for input/assistance* non-example “so, how are you thinking about this?” focused on the child’s thinking process, it was coded as *parental investigation*.

Pre-Pilot Category Development

As I developed the pre-pilot codes, I noticed shared characteristics among the codes and grouped them, forming a category system that comprised seven categories subsuming the 20 codes.

Positive. The *positive* category comprises codes containing positive behavioural aspects. For example, *praise* contains a positive adjective or an adverb about the child’s behaviour, and *positive gesture/expression* contains a positive non-verbal behaviour such as a smile.

Negative. The *negative* category comprises codes containing negative behavioural aspects. For example, *disagreement, disapproval* is expressed using the words “no” or “can’t,” and *criticism, accusation, complaint* contains criticising language.

Control. The *control* category contains the codes where the parent attempts to control the child or the situation. For example, *direct instruction* directs—that is, controls—the child’s behaviour, and *decision-making* states the decision—that is, controls the situation—in the game.

Engagement. The *engagement* category contains the codes where the parent engages with the child about the game. For example, *asking for input/assistance* asks for the child's input about the game, and *parental investigation* inquires about the child's thinking process in the game.

Guidance. The *guidance* category contains the codes where the parent guides the child in the game. For example, *assistive clue* provides the child with a hint about the next correct move, and *indirect instruction, suggestion, prompt* suggests the next move to the child.

Statements. The *statements* category comprises the codes containing the parent's full statements (i.e., verbal behaviours) that do not match any other category. For example, *thinking out loud* includes uninterrupted statements or reflections not directed at the child.

Other. The *other* category was added to construct an exhaustive coding scheme (Chorney et al. 2015) and contains interrupted or unfinished behaviours that could not be assigned a different code.

2.7.4.3 Pre-Pilot Coding Example

This section illustrates with data examples some of the pre-pilot codes and their development (see Table 2.5). Due to changes in segmentation and improved understanding of the data during later coding scheme development phases, some of these segments and codes changed, and thus the examples in Table 2.5 represent the pre-pilot coding, not the final coding developed in this study.

Table 2.5

Example of the Pre-Pilot Segmentation and Coding

Segment	Verbal behaviour	Non-verbal behaviour	Pre-pilot code
Segment 1	P: That's fine, you don't need to worry about that one, you only have to worry about…	C: Moves the cars.	Supportive comment, encouragement
Segment 2	That's it.	C: Moves the cars.	Confirmation, acknowledgement
Segment 3		-- P: Slightly stretches hand towards the cars and back. -- C: Moves a car, looks at P,	Monitoring
Segment 4	No, you've blocked the entrance now, haven't you?	looks back at the game.	Explanation, teaching
Segment 5	Which one do you think you need to move for the ice cream van to get out? < C: This one!	C: Moves a car.	Assistive clue
Segment 6	P: Yup.		Confirmation, acknowledgement
Segment 7	Then which one do you move? C: This one.	C: Moves a car.	Indirect instruction, suggestion, prompt
Segment 8	P: Okay,		Confirmation, acknowledgement

Segment 9	then? -- C: Aaah!	C: Moves a yellow car, knocks over the purple car, moves the yellow car back.	Indirect instruction, suggestion, prompt
Segment 10	-- P: You can't knock the purple one off.		Criticism, accusation, complaint

Note. P = parent, C = child, < = interruption, -- = simultaneous behaviours.

Segment 1. In Segment 1, the parent supported the child by normalising the situation ("that's fine") and encouraging a positive attitude towards the game ("you don't need to worry about that one"). Support and encouragement were observed through wording and positive voice tone, and thus Segment 1 was coded as *supportive comment, encouragement*.

Segment 2. In Segment 2, the parent confirmed ("that's it") the child's behaviour (moving the cars) as correct. Thus, Segment 2 was coded as *confirmation, acknowledgement*.

Segment 3. In Segment 3, the parent demonstrated their observation of the child and the game by non-verbally reacting to what happened in the game but remaining disengaged (stretching the hand towards the cars and back). Thus, Segment 3 was coded as *monitoring*.

Segment 4. In Segment 4, the parent explained the outcome of the child's behaviour in the game ("you've blocked the entrance now"). Thus, Segment 4 was coded as *explanation, teaching*.

Segment 5. In Segment 5, the parent provided the child with a hint about what to consider for the next correct move ("which one do you think you need to move for the ice cream van to get out?"). Through this hint, the child could assess which car to move next, based on the position of the ice cream van. Thus, Segment 5 was coded as *assistive clue*.

Segment 6. In Segment 6, the parent confirmed ("yup") the child's behaviour (moving a car) as correct. Thus, Segment 6 was coded as *confirmation, acknowledgement*.

Segment 7. In Segment 7, the parent prompted the child to make a move ("then which one do you move?") without providing a hint. Thus, Segment 7 was coded as *indirect instruction, suggestion, prompt*.

Segment 8. In Segment 8, the parent acknowledged ("okay") the child's decision ("this one") to move a car. Thus, Segment 8 was coded as *confirmation, acknowledgement*.

Segment 9. In Segment 9, the parent prompted the child to make a move ("then?"). Thus, Segment 9 was coded as *indirect instruction, suggestion, prompt*.

Segment 10. In Segment 10, the parent disapproved of the child's behaviour (knocking the purple car over) and raised their voice ("you can't knock the purple one off"). The verbal behaviour was disapproving and harsh-sounding, and thus Segment 10 was coded as *criticism, accusation, complaint*. However, in the next coding scheme development phase, Segment 10 was recoded as *disagreement, disapproval* due to its similarities to other behaviours for this code (e.g., "you can't move it"), and lack of clear and unambiguous identifiable behavioural elements that would support coding it as *criticism, accusation, complaint*.

2.7.4.4 Coding Rules

Based on the participant-focused approach and the insights gained during coding, I developed the coding rules to improve coding accuracy and reliability. Several more rules were added throughout the next coding scheme development phases (see Appendix E for the final list of the coding rules).

Coding Rule 1. The coding scheme is mutually exclusive and exhaustive.

The coding scheme is mutually exclusive (i.e., only one code can be assigned to the segment) and exhaustive (i.e., every segment must be assigned a code).

Coding Rule 2. Use both the video and the transcription.

A video recording is necessary to observe all aspects of the parent's behaviour because some behaviours are difficult, if not impossible, to convey through transcription alone (e.g., the voice intonation). The transcription ensures that all coders base their coding decisions on the same verbal behaviour and reduces the likelihood of discrepancies.

Coding Rule 3. The verbal behaviour is more informative than the non-verbal behaviour.

All aspects of the parent's behaviour should be considered when coding, but in the same segment, the verbal behaviour is often more informative than the non-verbal behaviour. Thus, the verbal behaviour is prioritised unless the non-verbal behaviour contradicts or amends the code for the segment.

<u>Example 1:</u>

Parent: "I think what we did is clearly make a mistake in our first steps" (simultaneously moving the cars on the board).

Although the non-verbal behaviour indicates *process control*, the verbal behaviour indicates *explanation, teaching* which the segment is coded as.

<u>Example 2:</u>

Parent: "I think then we start the easy ones" (simultaneously taking the cards from the child).

Although the non-verbal behaviour indicates *process control*, the verbal behaviour indicates *decision-making* which the segment is coded as.

Coding Rule 4. Consider all aspects of the parent's behaviour.

A coder should consider all observable aspects of the parent's behaviour such as the verbal and non-verbal behaviours, orientation towards the child, voice intonation, and/or volume.

2.8 Conclusion

This chapter explained and outlined the inductive pre-pilot segmentation and coding development which formed the basis for the specification of a mutually exclusive and exhaustive pre-pilot coding scheme. The pre-pilot coding scheme contained the segmentation and coding rules, categories, codes, code definitions, data examples and non-examples, in line with researchers' recommendations (Boyatzis, 1998; Chorney et al., 2015; Creswell & Poth, 2018; Thomas, 2006; Yoder & Symons, 2010). Furthermore, the scheme contained two to four codes within each category (except the *other* category which contained one code), which, as Yoder and Symons (2010) explained, would allow detecting variable associations more easily and accurately compared to a higher number of codes within a category but a lower occurrence of each code. All but one of the pre-pilot codes contained three or more data examples to illustrate a range of behaviours within the code which was also consistent with Yoder and Symons's recommendation. Because the number of codes within each category and the number of data examples for the codes emerged naturally (i.e., the pre-pilot coding scheme was constructed without the expectation to adhere to these recommendations), its consistency with researchers' recommendations was considered appropriate and of a promising nature.

Chapter 3: Pilot Coding Scheme Development

The pre-pilot coding scheme developed in the previous phase and explained in Chapter 2 needed further developing to improve segmentation and coding consistency, granularity, and reliability. This chapter outlines and explains the pilot coding scheme development phase, describing the Leverhulme project RA's involvement that assisted the segmentation and coding insights.

To develop the pilot coding scheme, the RA and I independently segmented and coded the video fragments, discussed the segmentation and coding disagreements for each video fragment, and I amended the coding scheme accordingly. The segmentation and coding insights and changes included focusing on the segmentation granularity and consistency, ways of segmenting incomplete or uninformative parents' behaviours, considering all behavioural elements, and clarifying the code definitions. The coding scheme amendments resulted in the pilot coding scheme comprising 20 codes within nine distinct categories. Satisfactory IRA between the RA's and my own coding demonstrated the amended coding scheme's suitability for the next coder training phase.

3.1 Introduction

Because I developed the pre-pilot coding scheme for the most part independently, another researcher's involvement was necessary to test and improve the coding scheme's accuracy, replicability, and reliability (Chorney et al., 2015). The segmentation and coding maintain a level of arbitrariness due to people's subjective perception and evaluation of the phenomena despite ensuring defensible and consistent segmentation and coding decisions (Yoder & Symons, 2010), and another researcher may provide insights for improving segmentation and coding replicability. Thus, the RA was involved in this phase and assisted the segmentation and the pilot coding scheme development.

During the present phase, the RA and I independently segmented and coded the video fragments and discussed each segmentation and coding disagreement. Continuous, repeated, and detailed discussions led to a better understanding of the data and the segmentation and coding insights and changes. Such disagreement discussions, code redefinition, and confirmation of every data example for each code were in line with Mile and Huberman's (1994) views of such process being "a good reliability check" (p. 64). Furthermore, through the coding disagreement discussions, coding accuracy could be established (Bakeman & Quera, 2011; Heyman et al., 2014). Consequently, through the segmentation and coding discussions and the IRA assessment, the pilot coding scheme was constructed.

3.2 Video Coding Software Transana

The video coding software Transana Professional 3.32 (consecutively referred to as "Transana"; Woods, 2020) was used in this study starting for this phase. Transana can be used to analyse images, videos, audio files, and text data. In the present study, Transana was used to transcribe, segment, and code video fragments, after employing the out-of-software transcription and segmentation in the previous coding scheme development phase. Compared to the out-of-software transcription and segmentation, Transana allowed for transcribing and segmenting some previously unnoticed verbal and non-verbal behaviours, which resulted in improved segmentation and coding granularity.

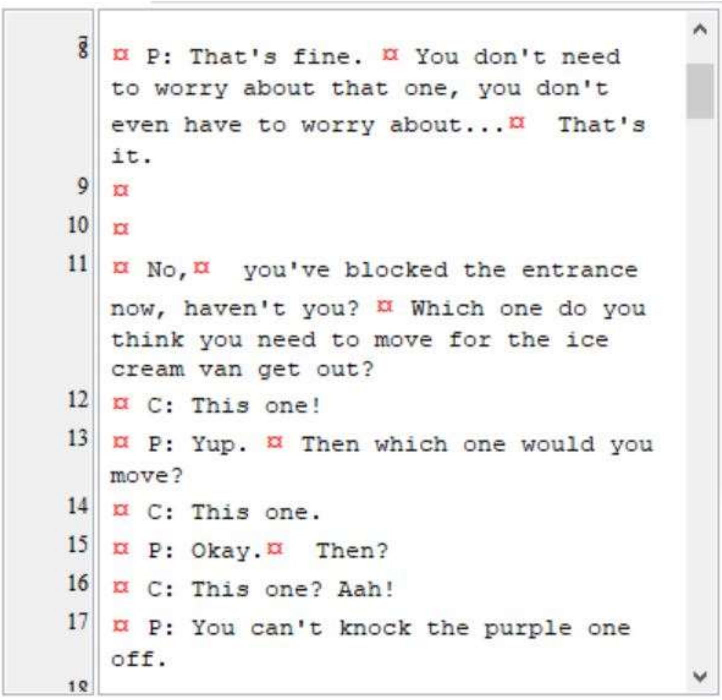
Figure 3.1 shows a screenshot of the video fragment segmentation and coding view in Transana. The sound wave is shown in the top left, and the transcript is shown below the sound wave, in the bottom left. The video is shown in the top right, and a selection of functions such as assigning the codes is available in the bottom right. Figure 3.2 shows a screenshot of a segmented transcript in Transana. The transcription line numbers are shown on the left. The symbols “¤” in the transcription mark the segments that can be played separately or as a segment sequence. For example, where “¤” is placed before the parent’s (P) verbal behaviour, clicking on the verbal behaviour will play that verbal behaviour. Where “¤” is placed in an empty line (e.g., no verbal behaviours in that transcription row) or in a line with no parent’s behaviour but only with the child’s (C) behaviour, clicking on the space after “¤” will play the segment capturing the parent’s non-verbal behaviour. For example, in Figure 3.2, the parent’s non-verbal behaviour is segmented in the transcription lines 9, 10, 12, 14, and 16.

Figure 3.1

A Screenshot of Transana

Figure 3.2

A Screenshot of a Segmented Transcript in Transana



3.3 Pilot Segmentation and Coding Development

Figure 3.3 presents the stages of the pilot coding scheme development. In this phase, the RA and I segmented and coded the same three 5-minute video fragments as in the previous phase. Initially, the RA reviewed the segmentation rules, pre-pilot coding scheme, and Fragment 1 in the form of the out-of-software transcription used in the previous phase, and provided feedback and insights (in this chapter, the three video fragments will be referred to as Fragment 1, 2, and 3 in the order they were used during the segmentation development in this phase). Next, we discussed the RA's insights and questions, and I amended the coding scheme before proceeding to the independent segmentation.

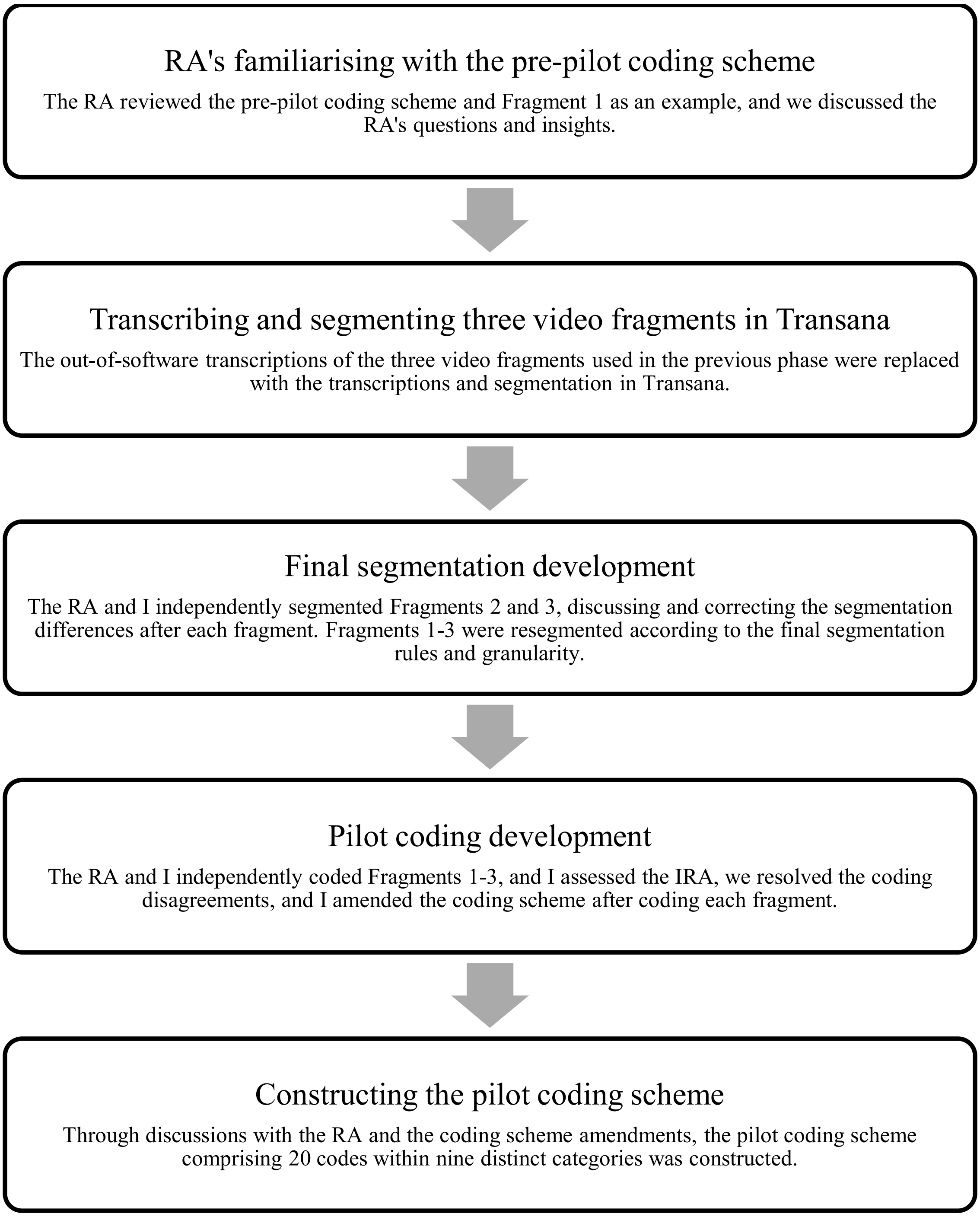
In the next steps, the three video fragments were transcribed and segmented using Transana which assisted in the noticing of subtle verbal and non-verbal behaviours previously unnoticed in the out-of-software transcriptions. The RA and I independently segmented Fragments 2 and 3 and analysed and repeatedly discussed the segmentation disagreements for each video fragment. Consequently, we established consistent and granular segmentation suitable for the present study. Before coding, Fragments 1, 2, and 3 were re-segmented in line with our improved understanding of the segmentation.

Next, the RA and I independently coded the video fragments in the order of Fragment 2, Fragment 1, and Fragment 3, discussing the coding disagreements and amending the coding scheme after coding each fragment. Fragment 2 was coded first because the RA had reviewed Fragment 1 to provide feedback at the beginning of this phase. However, after independently coding Fragment 2 and discussing the coding disagreements, we observed that the video fragment transcription and segmentation had changed after using Transana and establishing the final segmentation. Thus, Fragment 1 was deemed suitable for independent coding. Furthermore, because in the present phase the RA and I focused on re-analysing the segments to achieve consistent, accurate, and reliable segmentation and coding, recoding Fragment 1 assisted in further in-depth understanding of the data and the codes.

The IRA (see Section 3.4) was analysed for each coded video fragment. Through discussing the segmentation and coding disagreements, satisfactory IRA was achieved, and the pilot coding scheme was constructed comprising 20 codes within nine distinct categories (in comparison, the pre-pilot coding scheme comprised 20 codes within seven distinct categories).

Figure 3.3

Stages of the Pilot Coding Scheme Development



3.3.1 Pilot Segmentation Insights and Changes

This section explains the topics discussed when resolving segmentation disagreements between the RA's and my own independent segmentation. After the RA's initial reviewing of the segmentation rules and the pre-pilot coding scheme, the RA and I independently segmented Fragments 2 and 3, discussed segmentation disagreements after segmenting each fragment, and reached agreement on the final segmentation that appeared the most consistent and sufficiently granular. Segmentation disagreement discussions took approximately four hours per video fragment. Employing Transana allowed noticing more subtle, previously unnoticed behaviours (i.e., Transana allowed to replay even the most granular segments individually or within the context), and discussing each segmentation disagreement increased our awareness of the complexity of the parents' behaviours. Both of these factors improved segmentation granularity and consistency. Different data examples illustrate each discussed topic outlining how clarity and topic differentiation was achieved, keeping in mind that the topics may be interconnected and applicable to multiple presented examples. For example, the data example illustrating the segmentation granularity and consistency may also reflect the importance of considering over-segmenting rather than under-segmenting. An exemplar of Fragment 3 is presented and described to illustrate the transcription and segmentation changes from the pre-pilot to pilot coding scheme development phases.

Segmentation Reliability

Several widely used IRA statistics can be applied to assess the degree of coding agreement between two coders (see Section 3.4), but no widely used reliability measure can be applied when analysing the degree of segmentation agreement. However, the likelihood of reliable segmentation (i.e., segmentation consistency and granularity between two coders) increases through following the segmentation rules. The RA and I analysed our segmentation disagreements by adhering to the Segmentation Rule 1, “a segment starts and ends with a change in the parent’s behaviour: verbal, non-verbal behaviour, or both.” We discussed our understanding of the change in the parent’s behaviour as a fundamental segmentation principle (i.e., reliable segments cannot be produced without agreeing on the segment start and end points). Where the RA’s and my own segmentation differed in the number of parsed segments (e.g., the RA parsed the parent’s behaviour into two segments and I parsed the same behaviour into three segments), we clarified the most appropriate way of segmentation. However, because segmentation is unlikely to be identical due to a researcher’s subjectivity (Yoder & Symons, 2010), we considered such occasional differences acceptable if they did not cause coding confusion. Having insufficiently granular segmentation may lead to multiple meanings within the segment and thus confusion when coding. Similarly, having too granular segments may not provide sufficient or accurate information about the segment when coding (e.g., if a verbal behaviour was parsed into multiple segments in the middle of a sentence without a clear identification of the change in behaviour). Thus, when analysing the segmentation disagreements, the RA and I identified the changes in the parent’s behaviour and reached agreement on the segmentation granularity and consistency that allowed meaningful coding of the segments. Consequently, we achieved mutual understanding of the segmentation rules and the segmentation granularity suitable for the present study.

For example, the behaviour “there, yeah, well done” was parsed into one segment or into three: (a) “there,” (b) “yeah,” and (c) “well done.” When discussing this segmentation disagreement, the RA and I asked ourselves, “Does parsing this behaviour into multiple segments provide more information about the parent’s behaviour?” In this example, parsing the behaviour into three segments was informative in that the parent demonstrated three behaviours within the *positive* category (*confirmation, acknowledgement* twice and *praise* once). Thus, we agreed that such informative segmentation granularity should be followed consistently. If "there, yeah, well done" was parsed into one segment, it would be coded as *praise* due to "well done" which added a positive adverb to the segment. However, this would illustrate potential coding confusion (i.e., the segment would contain multiple meanings of the parent's both confirming and praising the child's behaviour) and missing informative data (i.e., the parent's confirming the child's behaviour would not be coded as it would be merged with the parent's praising).

When identifying changes in the parent's behaviour, we also examined whether our identified segment start and end points overlapped in any way. For example, the behaviour "You know. Do you? Which one?" was parsed in two ways: (a) Segment 1 "You know. Do you?" and Segment 2 "Which one?" and (b) Segment 1 "You know" and Segment 2 "Do you? Which one?" That is, the segment start and end points overlapped in that "Do you?" was assigned to either Segment 1 or Segment 2. In some instances, such overlapping may have changed the meaning of both segments and caused coding confusion. However, in the present phase, such occurrences were very rare and did not require much effort to resolve.

Segmentation Granularity and Consistency

The RA and I noticed an occasional lack of consistency and varying granularity in our segmentation. For example, when segmenting Fragment 3, I produced 200 segments and the RA produced 174 segments. We ensured more consistent and sufficiently granular segmentation by reiterating the importance of following the segmentation rules, and by identifying the verbal and non-verbal behaviours that required a closer examination and agreement on how to segment them consistently.

Prioritising Verbal Behaviours. In one of the video fragments, the RA segmented some behaviours based on a change in the non-verbal behaviour when the parent showed simultaneous verbal behaviour, which resulted in the verbal behaviour being interrupted mid-sentence. Because the coding prioritises verbal behaviours (i.e., the coding rule states that "the verbal behaviour is more informative than the non-verbal behaviour" [see Chapter 2, Section 2.7.4.4]), the segmentation should also follow this principle. Because segmentation and coding are interconnected, the verbal behaviour should be prioritised when segmenting to allow for accurate coding of the verbal behaviours. If simultaneous verbal and non-verbal behaviours are segmented based on a change in the non-verbal behaviour, the verbal behaviour—which is more informative than the non-verbal behaviour—may not be accurately coded (e.g., if the verbal behaviour is interrupted mid-sentence). After reiterating this principle, the RA re-segmented the video fragment accordingly and we discussed the remaining segmentation disagreements.

Non-Verbal Behaviours. The non-verbal behaviours were occasionally segmented inconsistently. Frequently, when the parent moved the cars on the board, some segments captured multiple car moves and some captured only one car move. Segmentation consistency was improved by segmenting each of the parent's car moves. For example, the parent's moving three cars on the board was parsed into three segments, and the parent's moving the same car forward and backwards was parsed into two segments. Furthermore, the parent's hovering their hand above the board in between moving the cars was also parsed into a separate segment. For example, a sequence of four segments was observed when the parent (a) moved the green car forward, (b) hovered their hand above the board, (c) moved the yellow car forward, and (d) moved the yellow car backwards. Similar sequences of the parents' non-verbal behaviours occurred frequently and deciding on their segmentation improved segmentation consistency and granularity.

Furthermore, some subtle non-verbal behaviours occasionally remained unsegmented. Where the RA and I easily observed and segmented the parent's moving the cars, subtle non-verbal behaviours required further examination and segmentation agreement. For example, we segmented subtle changes in the parent's non-verbal behaviour when observing the child, where the parent (a) leaned forward, (b) leaned back, and (c) twisted their head to the side. These subtle non-verbal behaviours were parsed into three segments and later coded as three instances of *monitoring*. Furthermore, if the parent disengaged with the game and started observing the child, the parent's (a) disengaging (e.g., moving their hand away from the game) and (b) continuing to observe the child were parsed into two segments. For example, a sequence of four segments was observed when the parent (a) moved their hands away from the game, (b) continued to observe the child, (c) twisted their head to the right while observing the child, and (d) leant forward while observing the child. We also ensured such segmentation consistency and granularity when segmenting other subtle non-verbal behaviours such as slight smiling or nodding.

Verbal Behaviours. In the previous pre-pilot coding scheme development phase (see Chapter 2), the parent's verbal behaviours were segmented based on clear behavioural changes such as a new sentence or a pause. In the present phase, the RA and I observed subtle verbal behaviour changes within the pre-pilot segments. Transana allowed for easy pausing and timestamping (i.e., segmenting) of such subtle behaviours, and for examining them closely which informed the more granular segmentation. For example, in the previous phase, the parent's verbal behaviour "okay, so just wait for a moment, okay?" was parsed into one segment. The parent did not make a clear pause within the sentence, and the out-of-software transcription and segmentation did not allow replaying the segments easily which contributed to overlooking the more subtle segments within the sentence. In contrast, in the present phase, the RA and I employed Transana and observed three segments within the parent's behaviour: (a) "okay," (b) "so just wait for a moment," and (c) "okay?" Previously, "okay, so just wait for a moment, okay?" was coded as *direct instruction* due to the parent's instructing the child to wait. In the present phase, parsing the behaviour into three segments provided further information about the parent's *confirmation, acknowledgement* (the parent's "okay" confirmed the child's behaviour) and *monitoring* (the parent's "okay?" showed the parent's verbal monitoring after addressing the child) in addition to the previously coded *direct instruction* ("so just wait for a moment"). Consequently, following such granular segmentation may increase the likelihood of capturing and coding the parent's subtle informative behaviours.

However, because the parent's behaviour contains multiple elements to consider when segmenting (e.g., voice tone, talking speed, pauses), a linguistically similar behaviour may be segmented differently within a different context. For example, the parent's behaviour "that's hard, okay, right" may appear as three segments when written down: (a) "that's hard," (b) "okay," and (c) "right." However, in the video fragment, the parent expressed these three potential segments quickly, in the same voice tone, and did not pause in between the segments. Therefore, no clear indication of separate segments was observed, and the behaviour was parsed into one segment (i.e., "that's hard, okay, right"). Such segmentation differences further illustrated the complexity of the data in the present study. Throughout this phase, the RA and I continued following such consistent and granular segmentation, defining observable changes in behaviour for meaningful data-based segmentation (i.e., the segmentation decisions were based on identifiable behavioural elements).

Over-Segmenting Rather Than Under-Segmenting

As the RA and I observed the subtle verbal and non-verbal behaviours and reached agreement on their consistent and granular segmentation, we discussed the coding disagreements by adhering to the segmentation rule "over-segmenting is more informative than under-segmenting" (see Chapter 2, Section 2.7.3.3). No segment appeared unnecessary or too granular if a change in the parent's behaviour was identified. Data-based (i.e., the change in behaviour was based on identifiable behavioural elements) granular segmentation produced segments for more informative and accurate coding. For example, three parent's behaviours were observed: (a) "yeah, well done," (b) the parent's briefly observing the child, and (c) "that's fine." The RA and I questioned whether the parent's observing the child in between the verbal behaviours was too brief to segment. However, the segment was long enough to capture and replay independently in Transana. Thus, noticing the parent's observing the child produced the segment later coded as *monitoring* which provided further information about the parent's behaviour.

Segmenting Incomplete or Uninformative Behaviours

During the discussions, the RA and I noticed the segments where the parent's verbal behaviour was interrupted by the child or by the parent's pausing or stopping mid-sentence, and then continued beginning with the same words or what appeared a continuation of the interrupted sentence. For example, the parent said, (a) "you need to move…," paused briefly (i.e., so briefly that the pause could not be segmented), and then continued (b) "…the yellow one up again." Following the coding scheme, the first segment would be uninformative and incomplete, and thus coded as *other.* However, such separation of the first and the second half of the sentence may cause inaccurate coding, whereas merging the two segments would allow observing and coding the full sentence, reducing the frequency of uninformative *other* codes. Although the interrupted behaviour may match the *other* definition, such coding may be inaccurate of the parent's behaviour. Consequently, a new segmentation rule was developed, "the parent's interrupted verbal behaviour and its continuation are merged into one segment" (see Appendix E for the full list of segmentation rules).

Segmentation Rule 4. The parent's interrupted verbal behaviour and its continuation are merged into one segment.

If the parent's verbal behaviour is interrupted by the child or the parent's pausing, and the parent begins the next verbal behaviour in the same words or what appears to be a continuation of the interrupted behaviour, the interrupted part and the continuation are merged into one segment. This applies when no new behaviour occurs between the interrupted part and the continuation.

Example 1:

Parent: "For me… <interruption> For me to move that one, this one is in my way… <interruption> … and this one is in my way."

Example 2:

Parent: "So my objective, so what is my first objective, my first objective is, is… <interruption> … is to clear this space here so that I can move the yellow…"

The rule applied to the parent's verbal behaviours when no new behaviour occurred between the interrupted behaviour and its continuation. Otherwise, all behaviours were parsed into separate segments. For example, if the parent said, "Let's restart… Okay, you've done well, okay. Let's restart… Restart the game," the interrupted behaviour "Let's restart…" was parsed into a separate segment to allow for the segmentation of the new behaviour "okay, you've done well, okay." However, the behaviour "Let's restart… Restart the game" was parsed into one segment because no new behaviour occurred between the interrupted part and the continuation.

Similarly, the RA and I considered merging brief uninformative verbal behaviours with the next verbal behaviour. For example, the parent's behaviour "Okay, so. What did you learn there?" was initially parsed into two segments: (a) "okay, so," and (b) "what did you learn there?" The segment "okay, so" was coded as *other* because it did not match any other code (e.g., the parent did not confirm the child's behaviour). To avoid coding the behaviour as *other*, we considered merging both behaviours into one segment. However, the behaviours "okay, so" and "what did you learn there?" were unrelated unlike the interrupted sentence and its continuation where merging improved coding accuracy, and merging "Okay, so. What did you learn there?" into one segment would not improve the understanding of the meaning of the verbal behaviour but would only decrease the number of *other* codes. Furthermore, the behaviour such as "okay, so" may appear uninformative during the segmentation (i.e., because the segmentation and coding are interconnected, the codes for the segments may be considered during the segmentation), but the context and all behavioural elements would be more closely examined when coding. Thus, for segmentation consistency and granularity and coding accuracy, the behaviour "Okay, so. What did you learn there?" remained parsed into two segments.

Segmentation Process

When segmenting, the RA and I independently noticed that some behaviours—especially subtle non-verbal behaviours—required repeated examination to ensure accurate, consistent, and granular segmentation. Where we observed multiple potential subtle changes in the parent's behaviour, we firstly parsed the behaviours into larger segment sequences, and then examined each sequence for more granular segments. After completing the segmentation for the video fragment, we reviewed the segments from the beginning to the end.

Example of Pre-Pilot to Pilot Segmentation Changes

Table 3.1 illustrates the pre-pilot to pilot transcription and segmentation changes in Fragment 3, presented as an out-of-software transcription for comparison and clarity (although the pilot transcription and segmentation was carried out in Transana). The segmentation changed due to using Transana and discussing the RA's and my segmentation disagreements and insights. The italicised segments (column "segment") and behaviours (columns "verbal behaviour" and "non-verbal behaviour") in Table 3.1 are new to the pilot transcription and segmentation and were not present in the pre-pilot transcription and segmentation. The number of segments has changed from 10 segments during the pre-pilot to 16 segments during the pilot segmentation.

Transana allowed for a more granular segmentation because previously unnoticed verbal and non-verbal behaviours could be considered and segmented. In the pre-pilot segmentation, some of the parent's and the child's behaviours remained unnoticed because segmenting the out-of-software transcription and referring to the video simultaneously was more difficult. For example, the parent's observing the child in Segments 4, 9, 12, and 15 was not transcribed in the pre-pilot phase which led to missing its segmentation and thus losing coding data. Similarly, many of the child's behaviours were not transcribed in the pre-pilot transcription. Given that the child's behaviour may provide contextual guidance for coding the parent's behaviour, omitting the child's behaviours from the transcription may lead to inaccurate coding.

The pilot segmentation in Table 3.1 also improved in granularity due to the more granular segmentation of verbal behaviours which helped to obtain more accurate and detailed data about the parent's behaviour. For example, separating Segment 1 and Segment 2 was informative in that the parent's behaviour provided information about two instances of *supportive comment, encouragement*: (a) "that's fine," and (b) "you don't need to worry about that one, you only have to worry about…" Similarly, separating Segment 6 and Segment 7 was informative in that the parent's behaviour provided information about two different behaviours: (a) *disagreement, disapproval* ("no"), and (b) *explanation, teaching* ("you've blocked the entrance now, haven't you?").

Table 3.1

Example of Pre-Pilot to Pilot Transcription and Segmentation Changes

Segment	Verbal behaviour	Non-verbal behaviour
Segment 1	P: That's fine,	C: Hovers hand above the game.
Segment 2	you don't need to worry about that one, you only have to worry about…	C: Moves the cars.
Segment 3	P: That's it.	C: Moves the cars.
Segment 4		*-- P: Observes C.* *-- C: Hovers hand above the game.*
Segment 5		-- P: Slightly stretches hand towards the cars and back. -- C: Moves a car, looks at P.
Segment 6	P: No,	*C: Continues looking at P.*
Segment 7	you've blocked the entrance now, haven't you?	C: Looks back at the game, *moves the cars.*
Segment 8	P: Which one do you think you need to move for the ice cream van to get out?	*C: Touches the cars.*
Segment 9	< C: This one!	*-- P: Observes C.* -- C: Moves a car.
Segment 10	P: Yup.	*C: Hovers hand above the game.*

Segment 11	P: Then which one do you move?	*C: Hovers the hand above the game.*
Segment 12	C: This one	*-- P: Observes C.* -- C: Moves a car.
Segment 13	P: Okay,	*C: Touches a car.*
Segment 14	then?	*C: Hovers hand above the game.*
Segment 15	*C: This one?*	*-- P: Observes C.* -- C: Moves the yellow car, knocks over the purple car.
Segment 16	-- C: Aaah! -- P: You can't knock the purple one off.	C: Moves the yellow car back.

Note. P = parent, C = child, < = interruption, -- = simultaneous behaviours. Newly transcribed and segmented behaviours italicised.

3.3.2 Pilot Coding Insights and Changes

After segmenting Fragments 2 and 3 and establishing the final segmentation, the RA and I independently coded Fragments 2, 1, and 3 (see Section 3.3 for the explanation of this coding order) and discussed the coding disagreements after coding each video fragment. Coding disagreement discussions took approximately four to five hours per video fragment. I amended the coding scheme after the coding disagreement discussions.

This section explains the topics discussed when resolving the coding disagreements. Different data examples illustrate each discussed topic for clarity and topic differentiation, but the topics may be interconnected and applicable to multiple presented examples. For example, the data example illustrating the importance of considering all behavioural elements may also reflect the importance of the key code characteristics or the participant-focused approach. A Fragment 1 exemplar is presented and described to illustrate the RA's and my own coding agreements and disagreements.

Participant-Focused Approach

The RA and I occasionally noticed potential over-interpretation in our coding where we based our coding decisions on cognitions of behaviour—that is, what the parents may be thinking—and speculations about the meaning of the parent's behaviour rather than on identifiable behavioural elements. We occasionally discussed our coding decisions using language such as "I think the parent intended to…" or "The parent thought…" Such speculations about the parent's intentions or thoughts were not based on identifiable behavioural elements because we could not know what the parent thought or intended (unless the intention was evident in the data, e.g., the parent may have intended to touch the car because we observed the parent's orienting towards the game and reaching towards the car). To ensure that our coding followed the participant-focused approach, the RA and I asked ourselves, "Can I observe and describe the behavioural elements for assigning this code?"

Furthermore, having coded different parents' behaviours, the RA and I noticed a risk of a potential shift in perception about each parent. For example, if the parent appeared more controlling than other parents, we were aware of the potential generalisation of the parent's behaviours that may lead to biased coding where we may code more of that parent's behaviours as controlling. Thus, we ensured that we based our coding on identifiable behavioural elements to mitigate against our subjective perceptions.

Considering All Behavioural Elements and Context

Considering all behavioural elements in the segment such as the voice tone, phrasing of the verbal behaviour, and the parent's orientation towards the child influenced the coding decisions. The RA and I examined such behavioural elements and the context for every coding disagreement to reach data-based agreement (i.e., we clearly described the behavioural elements that prompted our coding decisions). For example, the parent pointed at the cars and simultaneously referred to them, saying "the first bit is to clear this piece here, and then the second piece is here, and then to get the thing there." The RA and I coded this segment as *explanation, teaching* or *indirect instruction, suggestion, prompt.* Having considered the context, the behaviour was part of the segment sequence where the parent explained the child how to play the game: "So, the game is in three parts. Okay? The first bit is to clear this piece here, and then the second piece is here, and then to get the thing there. There are three parts. But you cannot do the second part without doing the third part first." However, considering the example segment ("the first bit is to clear this piece here, and then the second piece is here, and then to get the thing there") without the context, the segment may contain multiple meanings such as the parent's instructing the child indirectly. As we considered the context of the parent's behaviour (i.e., the segment sequence of the parent's explaining the child how to play the game), the voice (i.e., the parent's calm voice tone when explaining the game), and the orientation towards the child (i.e., the parent's orientation to guide the child through the game), we coded the segment as *explanation, teaching.*

When observing different behavioural elements, the RA and I noticed that the parents differed in combinations of these elements when the same codes were assigned to the segments. The same code contained a spectrum of behaviours, with some segments easily being assigned a code, and some requiring a more thorough examination of behavioural elements and a consideration of different codes. For example, two parents' verbal behaviours coded as *disagreement, disapproval* were (a) "that's not that one" expressed in a soft, calm voice, and (b) "you can't move it" expressed in a strict, disagreeing tone.

Given the richness and complexity of the data in the present study, the codes' containing a spectrum of behaviours was inevitable and expected. Because all parent's behaviours were coded (i.e., the coding scheme was exhaustive and a code was assigned to every segment), even the most complex behaviours had to be assigned a suitable code. The parents' behaviours differed in a combination of different behavioural elements as it would in such natural interactions (i.e., the behaviours were unscripted and unique to each parent–child dyad), and each code containing a spectrum of behaviours reflected a realistic observation of behaviours.

Child's Behaviour as Contextual Guidance

Although the present study and the coding scheme focuses on the parent's behaviour (i.e., the child's behaviour is not coded), the RA and I reiterated the importance of considering the child's behaviour as contextual guidance for coding the parent's behaviour. This was part of basing the coding decisions on well-examined identifiable behavioural elements and the context. For example, the parent's behaviour "they're a bit hard, though, aren't they?" may be coded differently depending on the context, and the RA and I coded this behaviour as *confirmation, acknowledgement* and *supportive comment, encouragement. Supportive comment, encouragement* may be assigned if, for example, the parent addressed the child to support the child's struggling with the game. However, in this example, the child said "this is hard," and the parent responded "they're a bit hard, though, aren't they?" That is, the parent repeated and paraphrased—acknowledged—what the child had said. In this example, the child's behaviour provided contextual guidance for more accurate coding of the parent's behaviour.

Considering the Change in Behaviour Within a Segment

To achieve consistent and accurate coding, occasionally a subtle change in behaviour within a segment required further closer examination alongside the examination of all behavioural elements. For example, in two consecutive segments, the parent (a) smiled, and then (b) observed the child while continuing to smile. The change in behaviour for the first segment was the parent's starting to smile, and the segment was coded as *positive gesture/expression*. The change in behaviour for the second segment was the parent's beginning to observe the child, and the segment was coded as *monitoring.* In the second segment, the parent continued smiling as a continuation of the first segment, but the parent's beginning to observe, not the smile from the first segment, was the change in behaviour that prompted the segmentation of the second segment. If the change in behaviour for the second segment was not considered, the parent's simultaneous smiling and observing the child may be confusing to code. Consequently, a new coding rule was added, "consider the change in the parent's behaviour within the segment" (see Appendix E for the full list of coding rules).

Coding Rule 5. Consider the change in the parent's behaviour within the segment.

Segments are based on changes in a parent's behaviour, and these changes should be considered when coding. A segment may include a behaviour that was present in the previous segment but the change in behaviour determining the start of a new segment holds the information for the coding decision.

<u>Example:</u>

Segment 1: The parent laughs.

Segment 2: The parent continues to smile and starts observing the child.

In Segment 1, the change in behaviour is the parent's starting to laugh, coded as *positive expression/gesture*. In Segment 2, although the parent continues to smile, the change in behaviour is the parent's starting to observe the child. Thus, Segment 2 is coded as *monitoring.*

Clarifying and Following Code Definitions

When discussing the coding disagreements, the RA and I identified the key characteristics for each code and I amended the coding scheme, clarifying the code definitions and adding the code differentiation (i.e., the explanation of how the key characteristics differed between the codes), examples, and non-examples. Identifying the key code characteristics assisted the coding disagreement discussions as the RA and I observed and described behavioural elements that matched the characteristics, and reached agreement on the accurate codes.

For example, the parent said “maybe do that one,” referring to the card the child should play next. The RA and I coded this segment as *indirect instruction, suggestion, prompt* or *decision-making.* To assign *decision-making,* the parent’s decision should include both the parent and the child (i.e., the parent’s informing the child about the decision in the game that both the parent and the child will be part of). However, in this example, the parent attempted to direct the child’s behaviour suggestively, indicating a particular card to play next and phrasing the suggestion through “maybe.” Thus, the parent’s behaviour matched the key characteristics of *indirect instruction, suggestion, prompt*.

Because the close examination of the key code characteristics allowed for further insights into the data, the RA and I occasionally concluded that the accurate code for the segment was neither of our initially selected codes. For example, after the child said “can you stop saying ‘yeah’?” the parent responded “I’m agreeing with you” which we coded as *explanation, teaching* or *praise. Praise* contains a positive adjective or adverb about the child’s behaviour, which, in this example, the parent’s comment did not contain, and the comment was not about the child’s behaviour. “I’m agreeing with you” contained an explanation about the parent’s previous behaviour—why the parent was saying "yeah"—but the parent did not explain anything related to the game as per *explanation, teaching* definition. Having examined the segment more closely, the RA and I agreed that the parent responded to the child in a soft voice and a positive manner, maintaining a supportive and positive atmosphere after the child asked the parent to stop saying "yeah." Thus, the segment matched the key characteristics of *supportive comment, encouragement.*

When coding, the RA and I occasionally noticed and discussed the code definition or example discrepancies or ambiguities which later informed the coding scheme amendments. However, having noted such aspects for improvement during coding, we continued following the coding scheme (even the definitions that needed amending) to examine the IRA of the current coding scheme version and our ability to follow the coding scheme. Furthermore, because the coding scheme was amended multiple times, the likelihood of memorising inaccurate (i.e., not up to date) code definitions increased, and we ensured that reference was made to the coding scheme for written, not memorised, code definitions. The importance for the development of a clear manual of codes became paramount as the development proceeded.

Other *Coding Rule*

Although the *other* definition described when to assign this code, the RA and I decided that an explanation of *other* in relation to all other codes may improve coding reliability. Thus, a new coding rule was added, "*other* should only be assigned when no distinct code from the coding scheme is appropriate" (see Appendix E for the full list of coding rules).

Coding Rule 6. *Other* should only be assigned when no distinct code from the coding scheme is appropriate.

If a segment provides enough information to assign a code different than *other,* it is preferred and more informative. *Other* should not be assigned in cases of indecision or consideration of several codes.

Example of Coding Disagreements

Some coding disagreements between the RA's and my own coding have been presented throughout Section 3.3.1 to illustrate the topics discussed when resolving the coding disagreements. Table 3.2 presents an exemplar of Fragment 1 to illustrate the coding agreements and disagreements in a sequence of segments. The IRA was calculated based on similar agreements and disagreements throughout the three video fragments to assess how interchangeable our coding was as the criterion for coding replicability (see Section 3.4.5 for the IRA in the present phase).

Table 3.2 demonstrates that in this exemplar, in case of a disagreement, my codes were accurate most of the time. This was expected because I developed the coding scheme, and thus better than the RA understood how to examine the behaviours and which codes to assign. However, the RA's inaccurate coding provided valuable insights into the code definitions because where I had coded the behaviour accurately, the code definitions were not always clear to a coder who did not participate in the initial coding scheme development (i.e., the RA), and needed amending. Furthermore, sometimes the RA's coding was accurate which prompted further discussions and coding scheme amendments, and improved our understanding of the data. Discussing each coding disagreement also served to establish coding accuracy (see Section 3.4.3 for an explanation of coding accuracy).

Table 3.2

Example of Coding Agreements and Disagreements Between the Thesis Author and the RA

Segment	Verbal behaviour	Non-verbal behaviour	Thesis author	RA
Segment 1	P: Alright,	C: Hovers hands above the game.	Confirmation	Acknowledgement
Segment 2	let me, let me help you. -- Let me- -- C: No.	P: Takes C's hand. C: Pushes P's hand back.	**Direct instruction**	Decision-making
Segment 3	P: I'm not gonna help you, I'm just gonna teach some advice how to do it. I'm not gonna tell you how to do it, just give you some advice.	C: Moves the hand back. -- P: Moves the hand to the game. -- C: Moves the cars.	Decision-making	Decision-making
Segment 4	P: Alright?	-- P: Hovers hand above the game. -- C: Moves the cars.	Monitoring	Monitoring
Segment 5	P: Now, what you've got here (C: Eek) is a situation where you've moved the ice cream van forwards a bit.	-- C: Sits back. -- P: Pointing at the cars.	Explanation, teaching	Explanation, teaching
Segment 6	P: That's good.	P: Glimpses at C.	**Supportive comment, encouragement**	Praise

Segment 7	P: But what you've created is, is created a little bit of a traffic jam that you can't get out of…	-- C: Leans towards the game. -- P: Pointing at the cars.	Explanation, teaching	Explanation, teaching
Segment 8	< C: Why is the ice cream van,	P: Glimpses at C while hovering hand above the game.	**Monitoring**	Process control
Segment 9	why is it just…	P: Glimpses at C while moving the hand back.	Monitoring	Monitoring
Segment 10	P: Okay.	P: Glimpses at C.	Confirmation	Confirmation
Segment 11	P: So, what you need to do is have a think about the whole plan for the whole-whole moves before we start.	P: Looks at C. P: Pointing at the cars. C: Looks towards the door of the room.	**Explanation, teaching**	Decision-making
Segment 12	P: Let's reset it and then let's talk it through… Umm… And find a solution.	P: Moves a car. -- P: Touches the cars. -- C: Touches the cars.	Decision-making	Decision-making
Segment 13	P: Alright?	-- P: Touches the cars. -- C: Touches the cars.	Monitoring	Monitoring

Note. P = parent, C = child, < = interruption, -- = simultaneous behaviours. Where the thesis author and the RA assigned different codes, the accurate codes established during the discussion are noted in boldface.

Segments 1 and 10. Segment 1 illustrates separating *confirmation, acknowledgement* into two codes, *confirmation* and *acknowledgement*, during the present phase, and the RA's and my disagreement when assigning each code. The parent's behaviour "alright" followed the child's verbal behaviour "I'm gonna do it by myself this time," and, after examining all behavioural elements, we concluded that it would be too difficult to decide which code was accurate if *confirmation* and *acknowledgement* remained separate. We could not reach agreement on whether the parent confirmed what the child had decided (i.e., to do it by themselves this time) or only acknowledged the child's talking. Similarly, Segment 10 was coded as *confirmation* but after a closer examination we concluded that the parent did not confirm the child's behaviour but only acknowledged that the child spoke. Through encountering these and similar *confirmation* and *acknowledgement* disagreement examples in Fragment 1, we merged the code into one, *confirmation, acknowledgement* (see Section 3.3.3 for further explanation of *confirmation, acknowledgement* separation and merging).

Segment 2 and 3. In Segment 2, the parent's behaviour "let me, let me help you" was coded as *direct instruction* or *decision-making*. Because the parent instructed the child to allow the parent to help the child, the accurate code was *direct instruction*. In comparison, in *decision-making*, the parent should be making the decision in the game that would include both participants. Segment 3 illustrates accurate *decision-making* coding where the parent stated the decision that included both participants ("I'm not gonna help you, I'm just gonna teach some advice how to do it. I'm not gonna tell you how to do it, just give you some advice")—the parent will be giving advice and the child will be receiving it. (It may be important to note that Segment 3 could have been parsed into two segments because the parent expressed *decision-making* twice [i.e., in two sentences], although such discrepancies were detected very rarely when looking back at the segmented transcripts.)

Segments 5 and 6. In Segment 6, the parent's behaviour "that's good" was coded as *supportive comment, encouragement* or *praise*. Linguistically, both codes could be accurate, but the context provided information when reaching agreement about the accurate code. In Segment 5, the parent explained the child's previous behaviours in the game ("now, what you've got here is a situation where you've moved the ice cream van forwards a bit"), and thus in Segment 6, the parent commented positively ("that's good") on those behaviours. In *praise*, the parent's positive feedback comes shortly after the child's behaviour, but, in Segment 6, the parent provided positive feedback about the child's previous behaviour (i.e., not about what the child just did), and thus Segment 6 was coded as *supportive comment, encouragement*.

Segment 8. Segment 8 coding disagreement illustrates the importance of considering the change in behaviour within the segment. Because the parent hovered their hand above the game, the segment was coded as *process control*. However, the parent's focus was on the child—that is, glimpsing at the child—and because Segment 8 started with the glimpse, it was coded as *monitoring*.

Segment 11. In Segment 11, the parent's behaviour was coded as *explanation, teaching* or *decision-making*. Although the parent told the child what to do ("what you need to do is have a think about the whole plan…"), the parent did not make the decision in the game that would include both participants. Instead, the parent was teaching the child how to approach the game, and thus the accurate code was *explanation, teaching.*

3.3.3 Pre-Pilot to Pilot Code Change Examples

Based on the insights during the coding disagreement discussions, the pilot coding scheme developed through four stages of amendments (i.e., after the RA's initial review and after coding and discussing each of the three video fragments) and comprised 20 codes within nine distinct categories. Two codes—*monitoring* and *process control*—were separated from their pre-pilot categories—*engagement* and *control*, respectively—and formed new *monitoring* and *process control* categories, each containing one code of the same name. *Monitoring* was separated from the *engagement* category because in monitoring the parent disengages with the child and the game, and in other codes within the *engagement* category the parent engages with the child. *Process control* was separated from the *control* category because in *process control* the parent focuses on controlling the game, and in other codes within the *control* category the parent focuses on controlling the child's behaviour (see Section 3.3.3 for further explanation of the *process control* category separation). The pre-pilot code *thinking out loud* was replaced with the pilot code *self-reference* (see Section 3.3.3 for further explanation of this replacement).

During the present phase, the code definitions were amended to clarify the key code characteristics (i.e., new characteristics that assisted code identification were added) and the wording of the definitions (i.e., the definitions were rephrased for clarity). To illustrate the pilot code development process, this section explains how several codes changed from the pre-pilot to the pilot version, including the code definition, code differentiation, examples, and non-examples. Table 3.3 demonstrates the definition changes from the pre-pilot to the pilot codes. See Appendix C for the full pilot coding scheme containing the code definitions, code differentiation, examples, and non-examples.

Confirmation, Acknowledgement

Compared to the pre-pilot definition, the pilot definition of *confirmation, acknowledgement* specified how the parent may express the acknowledgement of having observed the child. For example, the parent may ask to clarify what the child had said, instantly repeat what the child had said, or briefly comment on what the child had done. Examples were added to illustrate the parent's acknowledging the child's behaviour, such as the parent's "huh?" to check what the child had said, and the parent's "oops!" to react to the child's knocking over the car on the board.

The RA and I noted that *confirmation, acknowledgement* contained two parts where (a) *confirmation* referred to the parent's confirming the child's behaviour as correct and (b) *acknowledgement* referred to the parent's acknowledging the child's behaviour without confirming or disagreeing. Thus, these codes were separated to improve the coding scheme's granularity and accuracy. However, after coding two video fragments, coding disagreements emerged where we coded the behaviours as either *confirmation* or *acknowledgement*. For example, after the child set up the game, the parent said "right," which the RA and I coded as *confirmation* or *acknowledgement*. We agreed that the parent acknowledged that the game had been set up and simultaneously potentially confirmed that the child's behaviours had been correct and resulted in setting up the game. This example illustrated that the parent's confirming and acknowledging the child's behaviour were frequently interconnected and the differentiation was challenging. To avoid such confusion and coding disagreements, the two codes were again merged into one, *confirmation, acknowledgement*.

Differentiation and Non-Examples. *Confirmation, acknowledgement* was differentiated from *praise* and *supportive comment, encouragement* as the three codes share positive speech characteristics (hence sharing the *positive* category). *Praise* captures positive feedback about the child's behaviour, whereas *confirmation, acknowledgement* confirms the child's behaviour and/or demonstrates that the parent has been observing the child. *Supportive comment, encouragement* supports or encourages the child, frequently through a more elaborate positive expression than *praise*, and does not always refer to the child's particular behaviour unlike *praise.* For example, the parent's "well done" confirmed the child's behaviour but also provided positive feedback, and thus was coded as *praise.* Similarly, the parent's "it's okay" was linguistically similar to *confirmation, acknowledgement* (e.g., "okay" to acknowledge the child's behaviour) but, within the context, the parent supported and encouraged the child's struggling with the game, and thus it was coded as *supportive comment, encouragement.* Accordingly, these segments were added as *confirmation, acknowledgement* non-examples.

Through the more granular segmentation developed in the present phase, segments such as "okay" or "alright" emerged. Some of these segments were linguistically similar but required a detailed examination when coding. For example, while reaching towards the board, the parent said "okay, so…" and interrupted the child's talking. Linguistically, this example was similar to *confirmation, acknowledgement* but after examining the context and all behavioural elements, the child's behaviour that the parent may have confirmed or acknowledged could not be identified. Because the parent's verbal behaviour was not suggesting any of the codes, it would have been coded as *other.* However, the non-verbal behaviour (reaching towards the board) demonstrated the parent's contributing to the game without consulting the child, and thus the segment was coded as *process control* (see Section 3.3.3 for an explanation of related *process control* changes in the present phase). Accordingly, the segment was added as a *confirmation, acknowledgement* non-example.

Disagreement, Disapproval

Compared to the pre-pilot definition, the pilot definition of *disagreement, disapproval* specified that the parent's behaviours for this code were brief (i.e., not the elaborate comments about the child's behaviour that may more likely be assigned *criticism, accusation, complaint*). Furthermore, the RA and I observed a non-verbal *disagreement, disapproval* example when the parent pushed the child's fingers off the board to stop the child's behaviour. Initially, we discussed a potential lack of evidence for the parent's disagreeing with the child's behaviour in this example and considered that by pushing the child's fingers off, the parent controlled the process of the game. Thus, we initially assigned this example *process control.* However, the parent's pushing the child's fingers off the board contained a negative element as the parent appeared to disagree with the child's behaviour, wanting to stop it. Furthermore, after a closer examination, we established that the parent focused on the child's behaviour (i.e., stopping the child's behaviour) which did not match the *process control* definition where the parent would focus on the game, not the child. As the parent controlled the child's behaviour (i.e., pushed the child's fingers off the board), the *control* category codes were considered. However, in all the *control* category codes the parent aims to direct the child's behaviour in some way (e.g., via instructing the child's next move through *direct instruction*) whereas the parent's pushing the child's fingers off the board only stopped the child's behaviour and did not direct the child's next move. Thus, we concluded that the parent disagreed with the child's behaviour, stopping it non-verbally, similarly to the parent's disagreeing verbally by saying "no" or "you can't do that." Consequently, the parent's non-verbal behaviour was assigned *disagreement, disapproval.*

Before assigning the *disagreement, disapproval* code to similar non-verbal behaviours, the RA and I ensured to identify a negative behavioural element and the parent's focusing on the child's behaviour rather than on proceeding with the game. For example, the parent's grabbing the card from the child in a negative way (e.g., a sudden grabbing and a disapproving facial expression) to stop the child's looking at the card would be coded as *disagreement, disapproval.* In comparison, the parent's grabbing the card from the child in a calm manner and focusing on wanting to look at the card (i.e., focusing on the next move in the game without consulting the child) would be coded as *process control.* These non-verbal *disagreement, disapproval* examples demonstrated that the segments must be closely examined, and the key code characteristics adhered to for accurate and consistent coding.

As the RA and I observed similar parent's non-verbal behaviours, we considered adding a new code to capture the parent's non-verbal intervening with the child's behaviour. However, the new code may be too granular because similar non-verbal behaviours were rarely observed. Having observed the non-verbal *disagreement, disapproval* examples, the RA and I considered that other similar non-verbal behaviours such as the parent's frowning may be assigned *disagreement, disapproval.* However, we did not observe such behaviours in the coded video fragments and thus did not include speculative code examples.

The RA and I discussed whether both parts of *disagreement, disapproval*—(a) disagreement and (b) disapproval—should be included in the code name. We discussed that a disapproval of the child's behaviour may be potentially more elaborate and directed more personally at the child compared to a disagreement. However, we agreed that *disagreement, disapproval* contained the parent's brief disagreement and/or disapproval that were not expressed as a more elaborate criticism towards the child (the code *criticism, accusation, complaint* contained such criticism and similar expressions). Thus, the *disagreement, disapproval* code name remained the same. However, in the pilot scheme testing phase (see Chapter 5), *disagreement, disapproval* was renamed to *disagreement* because the disapproving behaviours appeared more similar to the *criticism, accusation, complaint* code examples. Through disapproval, the parent enforces their opinion about the child's behaviour (i.e., similarly to *criticism, accusation, complaint*), whereas through disagreement the parent only briefly expresses their disagreement with the child's behaviour.

Differentiation and Non-Examples. *Disagreement, disapproval* was differentiated from *direct instruction* because both codes contain an instructive element. For example, the parent said "so just wait for a moment," instructing the child to wait as the parent disagreed with the child's moving the cars. Although the behaviour was prompted by a disagreement, "so just wait for a moment" instructed the child and thus was coded as *direct instruction* and added as a *disagreement, disapproval* non-example. *Disagreement, disapproval* was differentiated from *direct instruction* in that *disagreement, disapproval* expresses the parent's disagreement or disapproval of the child's behaviour, and *direct instruction* directs the child's behaviour even when prompted by the parent's disagreement or disapproval.

Disagreement, disapproval was also differentiated from *criticism, accusation, complaint* as both codes contain a negative element, but *disagreement, disapproval* contains the parent's brief expressions of disagreement or disapproval, and *criticism, accusation, complaint* contains more elaborate explanations related to the parent's disagreement or disapproval. For example, the parent's behaviour "I told you, you should do an easy first" expressed the parent's disagreement with the child's behaviour but also criticised the child's previous behaviour and emphasised that the parent's previous instruction was correct. Thus, the behaviour was coded as *criticism, accusation, complaint* and added as a *disagreement, disapproval* non-example.

Indirect instruction, Suggestion, Prompt

The RA and I discussed whether *indirect instruction, suggestion, prompt* which included the parent's instructing the child (similarly to *direct instruction* but in a suggestive manner) belonged in the *guidance* category or should be moved to the *control* category. We agreed that because through *indirect instruction, suggestion, prompt* the parent expresses an instruction suggestively, the parent guides rather than controls the child. Thus, *indirect instruction, suggestion, prompt* remained in the *guidance* category.

During the discussions, the RA inquired how the indirect instruction and suggestion differed from the prompt in *indirect instruction, suggestion, prompt.* Through the indirect instruction and suggestion, the parent guides the child by specifying the next move, whereas through the prompt the parent guides the child to proceed with the game without specifying the next move. For example, the parent's "maybe if you move this across a little bit?" indirectly guided the child to move the car across (i.e., the parent specified the next move), whereas the parent's "and then?" prompted the child to make any move to proceed with the game (i.e., the parent did not specify the next move). The RA and I agreed that the indirect instruction, suggestion, and prompt fit into one code because in all three the parent guides the child to proceed with the game. More examples were added to illustrate all elements of *indirect instruction, suggestion, prompt.* However, in the pilot coding scheme testing phase, after observing more parents' behaviours, the *indirect instruction, suggestion, prompt* code was separated into two codes, (a) *indirect instruction, suggestion* and (b) *prompt,* to emphasise the parent's specifying the next specific move or not (see Chapter 5, Section 5.4).

Differentiation and Non-Examples. *Indirect instruction, suggestion, prompt* was differentiated from *asking for input/assistance* because upon closer examination some pre-pilot *indirect instruction, suggestion, prompt* examples were identified as the *asking for input/assistance* examples. Through *indirect instruction, suggestion,* prompt the parent attempts to direct the child's behaviour suggestively, whereas through *asking for input/assistance* the parent asks for the child's help in the game. For example, in the previous pre-pilot phase, the parent's "do you want to try a medium one?" and "should we just do a different one?" were assigned *indirect instruction, suggestion, prompt* because the parent asked the child about the next move in the game. A similar *indirect instruction, suggestion, prompt* example was the parent's "maybe if you move this across a little bit?" suggesting the next move via a question. However, "maybe if you move this across a little bit?" was expressed suggestively and guided the child to the next specific move (i.e., moving the car across), whereas "do you want to try a medium one?" or "should we just do a different one?" asked the child about the next decision in the game (i.e., did not attempt to direct the child's behaviour suggestively but asked for the child's input). Such differences were identified by examining the context (i.e., identifying the parent's concern about the next correct move the child could make or the parent's asking for the child's input about proceeding with the game) and all behavioural elements such as the parent's voice tone and orientation towards the child.

Indirect instruction, suggestion, prompt was also differentiated from *direct instruction* as both codes contain the parent's instructing the child, but *indirect instruction, suggestion, prompt* provides information about the next move suggestively, and *direct instruction* provides information about the next move directly. The RA and I encountered previously unidentified *direct instruction* examples that did not contain an instructive verb (the examples containing an instructive verb were "go back," "you set it up," or "hold on"). For example, the parent said "there's your pink one," while placing the pink car in front of the child. The parent instructed the child about the next move (i.e., placing the pink car on the board) but the phrasing differed from the previously encountered *direct instruction* phrasing. Consequently, we considered coding the example as *indirect instruction, suggestion, prompt* but agreed that the parent did not suggest the next move but stated it clearly and provided the child with the car to place on the board. Thus, given the direct and instructive approach, “there’s your pink one” was coded as *direct instruction*.

Indirect instruction, suggestion, prompt was also differentiated from *parental investigation* as both codes contain examples of the parent’s asking the child about the next move in the game, but through *indirect instruction, suggestion, prompt* the parent directs the child’s behaviour and/or prompts the child to make a move, and through *parental investigation* the parent attempts to understand the child’s thinking process and approach to the game. For example, in “then which one would you move?” the parent referred to the next move by prompting the child to make a move (i.e., coded as *indirect instruction, suggestion, prompt*), and in “you’re setting it up, what are you gonna do?” the parent referred to the next move by inquiring about the child’s approach to the next move (i.e., coded as *parental investigation*).

Although *indirect instruction, suggestion, prompt* had been differentiated from *decision-making* in the pre-pilot coding scheme, the RA and I noticed some *indirect instruction, suggestion, prompt* examples that did not match the definition and in the present phase were instead assigned *decision-making* (e.g., “so let’s just have a little think about it,” “let’s start with the basic of the basic first”). These amendments further illustrated the coding scheme improvements prompted by the RA’s involvement in the pilot coding scheme development.

Process Control

In the pre-pilot coding scheme, the *process control* code shared the *control* category with the codes *direct instruction, decision-making,* and *attention request* based on the shared code characteristics of the parent's demonstrating controlling behaviours. However, in the present phase, the RA and I agreed that the parent's controlling behaviours in *process control* were directed at the game and not the child, whereas in all other *control* category codes the parent's controlling behaviours were directed at the child. Consequently, *process control* was separated from the *control* category to form a new *process control* category containing one code of the same name.

Differentiation and Non-Examples. *Process control* was discussed in relation to the *thinking out loud* and *other* codes which captured a combination of similar verbal and non-verbal behaviours. In the pre-pilot coding scheme, *process control* contained only non-verbal behaviours (e.g., the parent's moving the car without consulting the child). In the present phase, the RA and I observed combinations of brief, incomplete or complete, inaudible or audible, and not oriented towards the child verbal behaviours occurring simultaneously with non-verbal behaviours. Such varied behavioural combinations required a close examination and a consideration of the *process control, thinking out loud,* and *other* codes to accurately identify the key code characteristics. Following the coding rule "the verbal behaviour is more informative than the non-verbal behaviour" (see Chapter 2, Section 2.7.4.4), the parent's audible verbal behaviour was examined first, and, in the case of its being uninformative and not oriented towards the child, the non-verbal behaviour was examined next. Consequently, if the non-verbal behaviour matched the *process control* definition, the segment was assigned *process control.* For example, when the parent said "okay, so…" while placing the car on the table, the verbal behaviour was examined first and appeared uninformative (e.g., the parent did not acknowledge the child's behaviour), and the non-verbal behaviour was examined next, matching the *process control* definition (i.e., the parent contributed to the game without consulting the child). Thus, the segment was assigned *process control.* If an inaudible verbal behaviour occurred simultaneously with a non-verbal behaviour, the segment could not be coded accurately due to the inaudibility, and thus was assigned *other.*

Furthermore, in the present phase, *thinking out loud* was replaced with *self-reference* to clarify coding decisions. The pre-pilot *thinking out loud* code contained the parent's vocalising their thinking process (i.e., audible and not directed at the child verbal behaviours) which occurred either with or without a non-verbal behaviour. However, some verbal behaviours coded as *thinking out loud* did not share the same characteristics and caused coding confusion. For example, the parent's "okay…" occurring without a simultaneous non-verbal behaviour was identified as the parent's thinking about the game, and thus was coded as *thinking out loud.* However, compared to other *thinking out loud* examples, where the parent elaborated on their thinking (e.g., "No… I've done that wrong"), brief verbal behaviours such as "okay…" differed in meaning. Thus, *thinking out loud* was replaced with *self-reference* which contained the parent's referring to themselves (e.g., "No… I've done that wrong," "Let me see if I can… Um… Attempt to work this out"). Consequently, the verbal behaviours of the parent's not referring to themselves were assigned either *process control* or *other.* For example, the parent's "okay…" without a simultaneous non-verbal behaviour (previously assigned *thinking out loud*) was uninformative of any code, and thus was assigned *other.* In comparison, the parent's "that can stay there…" while moving the car (previously assigned *thinking out loud*) was examined as containing an audible, uninformative of any code, and not directed at the child verbal behaviour, and a non-verbal behaviour of proceeding with the game without consulting the child, and thus was assigned *process control*.

Moreover, *process control* was differentiated from *monitoring,* and a *process control* non-example was added after observing the parent's similar moving their hand towards the board and back as an example of both codes. In *process control,* the parent moved their hand forward, intending to make a move in the game, and moved their hand back because of an interruption (e.g., the child moved the car before the parent reached it), demonstrating focusing on and engaging with the game. In *monitoring,* the parent moved their hand forward and back without being interrupted by the child, demonstrating the observation of the child or the game.

Table 3.3

Pre-Pilot to Pilot Code Definition Changes

Category/Code	Pre-pilot definition	Pilot definition
Positive		
Praise	Short compliments and positive expressions with regards to the child's behaviours.	Short compliments and positive feedback about the child's verbal and/or non-verbal behaviours. This is expressed shortly after the child's behaviour that is being complimented.
Supportive comment, encouragement	The parent's positive remarks that might encourage a positive attitude towards the process of the game. This does not provide information about the next moves in the game but demonstrates the parent's attempts to create a positive game atmosphere for the child and/or comfort the child.	Includes the parent's attempts to comfort and support the child and/or expressions that might encourage a more enthusiastic, positive, flexible, constructive outlook on the game. This does not provide new information about the next moves in the game.
Confirmation, acknowledgement	The parent's expressions that do not provide any new information about the game but are used either as the parent's confirmation of the child's behaviours or an acknowledgement that the parent has been observing the child.	The parent's brief expressions that do not provide any new information about the game but demonstrate that the parent has been observing the child's verbal and/or non-verbal behaviours or confirm the child's behaviours as correct. Includes the parent's questions to clarify what the child had said, instant repeating of what the child had said, or brief comments about what the child had done.

Positive gesture/ expression	The parent's non-verbal positive expressions towards the child. This code should be assigned when the non-verbal behaviour is observed without the accompanying verbal behaviour.	The parent's non-verbal positive expressions towards the child. Includes positive expressions accompanied by short verbal expressions.
Negative		
Disagreement, disapproval	The parent's disagreeing with or disapproving of the child's verbal and/or non-verbal behaviour.	The parent's brief expressions of disagreement or disapproval of the child's verbal and/or non-verbal behaviour in the game.
Criticism, accusation, complaint	The parent's criticism, accusations, blaming, and/or complaints about the child or the child's behaviours. Such complains can also be expressed as threats.	The parent's criticism, accusations, blaming, and/or complains about the child, the child's behaviours or the situation in the game. Such complains can also be expressed as threats.
Control		
Direct instruction	The parent's instruction to the child as regards the process and/or the next moves in the game. The parent aims to direct the child's behaviour in a specific way, and this is expressed directly (i.e., in an instructive rather than suggestive way).	The parent's direct and concrete instruction to the child about the process and/or the next moves in the game. The parent aims to direct the child's behaviour and expresses it in an instructive rather than suggestive way.
Decision-making	The parent makes a decision in the game and communicates it to the child. The parent is not suggesting it but making a statement about what is to come.	The parent makes a decision in the game that will include both the parent and the child, and communicates this decision to the child. This is not a suggestion but a statement about the next moves and/or approach towards the game to be taken.
Attention request	The parent's verbal and non-verbal behaviours used to attract the child's attention.	The parent's verbal and non-verbal behaviours used to attract the child's attention to the parent's verbal and/or non-verbal behaviour or something the parent is focused on.

Process control	The parent's attempts to contribute to the game by making specific moves without discussing them with the child or by correcting what has been done. Most frequently occurs as a non-verbal behaviour not accompanied by verbal explanations.	*In the pilot coding scheme, the* process control *code formed a separate* process control *category.* The parent's non-verbal attempts to contribute to the game without consulting the child. The non-verbal behaviour can be accompanied by the parent's verbalisations of their non-verbal behaviour or other short verbal expressions.
Engagement		
Asking for input/ assistance	The parent's asking the child for input or assistance as regards the process of the game. It is task-oriented and serves as the parent's invitation to the child to help the parent. Can be expressed as a question or a statement.	The parent's asking the child for help—input or assistance—about the moves or decisions to be made in the game.
Parental investigation	The parent's questions about the child's thinking process and approach towards the game. This is an investigative expression and does not have a suggestive component to it. Where expressed as a question about the child's next move, the question is not suggestive of any direction the child should take.	*Definition remained the same.*
Mutuality	Includes situations where both, the parent and the child, are focused on the same item/aspect of the game or on each other.	Includes the situations where both the parent and the child are explicitly focused on each other and/or the same item/aspect of the game and not engaged in any other activity.

Monitoring	The parent’s observation of the child and/or the game while the child is engaged in the game.	*In the pilot coding scheme, the* monitoring *code formed a separate* monitoring *category.* The parent’s verbal and/or non-verbal monitoring—observation—of the child while the child is engaged in the game. Includes the parent’s verbal monitoring after the parent addressed the child.
Guidance		
Explanation, teaching	The parent’s explanation or teaching of the game-related aspects or reinforcing the rules of the game. Contains new information about the process of the game.	The parent’s demonstration, teaching, and/or explanation of the parent’s or the child’s behaviour in the game, previous or next moves in the game and discoveries in the game or reinforcing the rules of the game.
Indirect instruction, suggestion, prompt	The parent’s attempts to direct the child’s behaviour as regards the process and the moves in the game, expressed in a suggestive way. This includes prompts that might not hold a concrete suggestion of the next move but imply that some action should be taken (i.e., a suggestion to proceed with the game).	The parent’s attempts to direct the child’s behaviour as regards the process and moves in the game, expressed in a suggestive way. Includes prompts that might not provide clear information about the next move but imply that some action should be taken (i.e., a prompt to proceed with the game).
Assistive clue	The parent’s attempts to provide the child with a helpful hint as regards the next move in the game. The child might have to figure out what the hint means as the parent does not provide full information.	The parent’s attempts to provide the child with a helpful hint about the next move in the game. The hint does not provide clear information about the next move, and the child should use the hint to figure out what the next move could be.
Statements		
Thinking out loud	The parent’s verbal behaviours that are not directed at the child but are only used to vocalise what the parent might be thinking/doing at a given moment.	*Code removed (see Section 3.3.3).*

Self-reference	*Not added to the coding scheme yet.*	*Code added to the pilot coding scheme.* The parent's verbalising their thinking process. This is a neutral expression, not directed at the child.
Apology	The parent's apologising to the child.	*Definition remained the same.*
Other		
Other	Other behaviours that cannot be assigned any of the codes. This could be due to the inaudibility of the segment or where the verbal behaviour is unfinished/interrupted and could not be identified as assignable of any other codes. If a coder can choose a different code, that would be preferred and more informative.	The behaviours that cannot be assigned a different code due to the inaudibility, incompleteness or interruption. Includes brief phrases not accompanied by an informative non-verbal behaviour.

3.4 Inter-Rater Agreement and Coding Accuracy

When developing a coding scheme, it is crucial to ensure its replicable application as assessed by inter-rater agreement (IRA), inter-rater reliability (IRR), and coding accuracy (Bakeman & Quera, 2011; Hartmann & Wood, 1990). Coding scheme replicability demonstrates that codes and insights into the data can be replicated by other coders and are not idiosyncratic to one researcher (Margolin et al., 1998). Otherwise, a coding scheme may be interesting and insightful but of little value (Bakeman & Quera, 2011). Thus, in the present study, my inductively developed coding scheme was tested for replicability by involving other coders (i.e., the RA involved in this phase, and independent coders involved in the next phases), assessing inter-rater agreement, and establishing coding accuracy.

3.4.1 Inter-Rater Agreement

The terms *inter-rater agreement (IRA)* and *inter-rater reliability (IRR)* have sometimes been used interchangeably but this has been critiqued and the importance to differentiate these terms has been emphasised (Bajpai et al., 2015; Hartmann & Wood, 1990; Heyman et al. 2014; Tinsley & Weiss, 1975). Inter-rater agreement (IRA) refers to "the extent to which the different judges [coders] tend to make exactly the same judgments about the rated subject [segment]," and inter-rater reliability (IRR) refers to "the degree to which the ratings of different judges [coders] are proportional when expressed as deviations from their means" (Tinsley & Weiss, 1975, p. 359). The differentiation is important because high IRA may not equate to high IRR and vice versa (Johnson & Bolstad, 1972; Tinsley & Weiss, 1975). However, IRA and IRR can only be differentiated when an interval or ordinal coding scheme is used because means and deviations in IRR cannot be calculated for nominal data (Tinsley & Weiss, 1975). Therefore, when using a nominal coding scheme as done in the present study, IRR does not apply and so the term inter-rater agreement (IRA) shall be used (Tinsley & Weiss, 1975).

3.4.2 Cohen's Kappa

One of the most frequently used IRA indices is *Cohen's kappa* (consecutively also referred to as "kappa"; Cohen, 1960), the inter-rater agreement coefficient for nominal coding schemes that accounts for chance agreement. Some authors have discussed its potential limitations such as sensitivity to uneven code distribution, and the resulting high percentage agreement but low kappa (Bakeman & Quera, 2011; Cicchetti & Feinstein, 1990; Feinstein & Cicchetti, 1990). Consequently, authors have attempted to develop better IRA index alternatives (e.g., Krippendorff, 1970, 2004), although no alternative has proven ideal, with each containing potentially problematic paradoxes and assumptions (Zhao et al., 2018; Zhao et al., 2013). Therefore, Zhao et al. (2013) explained that researchers should choose an IRA index depending on the aspects of the coding scheme and the study such as the number of codes and code distribution, and provided guidelines for such choice.

When a coding scheme comprises more than three codes (as in the present study), one of Zhao et al.'s (2013) recommended IRA indices was Cohen's kappa, although a potential issue of unrepresentatively low kappa in the case of uneven code distribution was noted. However, this is more likely to be problematic when following Cohen's kappa score interpretation guidelines that do not account for uneven code distribution or the number of codes employed. For example, Landis and Koch (1977) proposed that kappas of less than 0 demonstrated no agreement, 0–.20 none to slight, .21–.40 fair, .41–.60 moderate, .61–.80 substantial, and .81–1 almost perfect to perfect agreement. However, Landis and Koch also noted that "although these divisions are clearly arbitrary, they do provide useful 'benchmarks'" (p. 165). Similarly, Fleiss et al. (2003)

proposed that kappas of less than .40 demonstrated poor agreement, .40–.75 fair to good, and over .75 excellent agreement, but again did not provide a clear rationale for such kappa score interpretation. Consequently, Bakeman and Quera (2011) critiqued these guidelines for their arbitrariness and provided kappa guidelines that accounted for the number of codes, uneven code distribution, and coding accuracy. According to Bakeman and Quera's calculations, unrepresentatively low kappa scores occurred when the number of codes in a coding scheme was lower than six (i.e., with the number of codes higher than six—as in the present study—unrepresentatively low kappas were not reported). In such cases, following Landis and Koch's or Fleiss et al.'s recommendations may be inaccurate, and low kappas may be prematurely rejected as insufficient. Thus, Bakeman and Quera concluded that "no one value of kappa can be regarded as a threshold of acceptability," and thus, "it is misleading to claim, for example, that kappa values of .80 and above are acceptable whereas values below are not" (p. 83). Combining Zhao et al.'s recommendations of Cohen's kappa's suitability for the present study, and Bakeman and Quera's kappa score guidelines, Cohen's kappa will be employed to assess the IRA in the present study. Furthermore, Bakeman and Quera's guidelines for Cohen's kappa will be followed to avoid arbitrary kappa interpretations.

Table 3.4 presents the guidelines and score interpretation used in the present study. Bakeman and Quera (2011) accounted for levels of code distribution (e.g., moderately variable, highly variable) that may contribute to different kappa scores, but this did not apply in the case of 10 to 20 codes (i.e., kappa scores did not vary based on the code distribution when 10 to 20 codes were employed as in the present study). Table 3.4 also presents kappa score variability in relation to coding accuracy (see Section 3.4.3 for an explanation of coding accuracy) when a coder's coding is compared to the "gold standard" (i.e., the coding predetermined as accurate through discussion with other researchers, e.g., as the RA and I discussed our coding disagreements in the present phase and agreed on accurate codes) or between two coders (i.e., none of the coders' coding can be assumed as accurate). In the present study, the IRA was assessed by following Bakeman and Quera's guidelines and comparing a coder's coding to the "gold standard" or between two coders depending on what was appropriate in each coding scheme development phase.

Table 3.4

Cohen's Kappa Guidelines for the Present Study (Bakeman & Quera, 2011)

Coding Accuracy	Gold Standard	Two Coders
80%	.79	.62
85%	.84	.71
90%	.89	.80
95%	.95	.90

3.4.3 Coding Accuracy

Coding accuracy refers to coders' applying a coding scheme as would be comparable to established criteria of accuracy (Johnson & Bolstad, 1972). In addition to the IRA, coding accuracy is crucial to attend to because coders that show satisfactory IRA may "share similar deviant views of the world" (i.e., coders may agree on the codes, but their coding may not be accurate in relation to code definitions and examples; Bakeman & Quera, 2011, p. 57). Therefore, high IRA does not equate high coding accuracy (Bakeman & Quera, 2011; Harris & Lahey, 1982; Krippendorff, 2004), and Bakeman and Quera even suggested that coding accuracy may be more important than the kappa result.

Bakeman and Quera (2011) provided kappa guidelines that accounted for coding accuracy (see Table 3.4) and were generated through computations that simulated coders' coding decisions assuming coders' equal levels of bias, chance of disagreement, code detection accuracy, and probability of uneven code distribution. Given such conditions, Bakeman and Quera considered 80% coding accuracy as a potential acceptable minimum when interpreting kappa scores as satisfactory. However, given likely differences in human coders and coding schemes, such coding accuracy threshold should not be followed thoughtlessly, and discussing each coding disagreement segment-by-segment is essential (i.e., even when following kappa guidelines, satisfactory kappa scores should not be assumed to equate sufficient coding accuracy; Bakeman & Quera, 2011; Heyman et al., 2014). Because observational data can often be rich and complex, different coders may attend to different elements, and thus training and segment-by-segment discussions and feedback increase coding accuracy (Margolin et al., 1998) and demonstrate trustworthiness of observational research in that coders' errors are corrected, enabling coders to apply the coding scheme as envisioned (i.e., accurately), and providing insights for coding scheme amendments (Bakeman & Quera, 2011). In comparison, unaddressed coding disagreements may lead to decreased coding accuracy (DeMaster et al., 1977), and code misunderstandings and disagreements may remain unnoticed because several clearer codes may increase kappa scores, also potentially contributing to falsely assuming sufficient coding accuracy (Bakeman & Quera, 2011; Heyman et al., 2014).

This was particularly applicable in the present study because the coding scheme was developed through multiple phases of amendments and coders' applying multiple versions of incomplete coding scheme may have potentially increased the possibility of inaccurate coding. Bakeman and Quera's (2011) kappa guidelines did not account for such variation in coding scheme development phases and coders' understanding, and thus segment-by-segment discussions were crucial to ensure sufficient coding accuracy. That is, despite the coding accuracy percentage values estimated in Bakeman and Quera's guidelines, coding accuracy was further ensured and improved through discussions that did not provide numerical estimations but instead relied on mutual agreement and explanations of accurate coding between me and the coders. Coding disagreements were discussed with the RA in the present coding scheme development phase, and with independent coders in the next phases. Discussions provided valuable insights into coders' errors, data, and coding scheme unclarities, and resulted in coding scheme amendments.

3.4.4 Percentage Agreement

In addition to Cohen's kappa, another IRA index that Zhao et al. (2013) recommended in the case of employing more than three codes and an uneven code distribution was *percentage agreement*. Percentage agreement refers to the percentage of segments that coders assigned the same code out of all segments (Kelly, 1977). Although simple to calculate, percentage agreement can overestimate the IRA depending on the frequency and distribution of codes (i.e., if one code occurs many times, percentage agreement may be unrepresentatively high despite the many coding disagreements of the remaining codes; Hartmann, 1977). Moreover, percentage agreement does not account for chance agreement which may also lead to overestimating the IRA (Hallgren, 2012). Due to these limitations, percentage agreement should not be the only reported IRA index. Although an unrepresentatively low kappa should not be observed in the present study due to the high number of codes (Bakeman & Quera, 2011), to ensure this, percentage agreement was employed in combination with Cohen's kappa. Employing these two IRA indices will ensure a more comprehensive reporting of the IRA, should the "high percentage agreement, low kappa" phenomenon occur.

Authors have proposed various thresholds for interpreting percentage agreement. For example, Kelly (1977) considered 90% as a minimum acceptable value, and Jones (1975, as cited in Hartmann & Wood, 1990) considered 70% as an acceptable agreement when using complex coding schemes. Similarly, Heyman et al. (2014) suggested that coders should reach 70-90% agreement with the main researcher during coder training for nominal coding schemes of varying complexity. Thus, in the present study, a percentage agreement of 70% and above will be considered satisfactory, while also considering Cohen's kappa scores.

3.4.5 Inter-Rater Agreement in the Present Phase

In the present phase, the IRA was calculated for the three independently coded video fragments, aiming to achieve satisfactory IRA and to confirm the pilot coding scheme's readiness for the next phase. The IRA was based on coding agreements and disagreements between the RA's and my own coding, some of which were illustrated in Table 3.2 and described in Section 3.3.2. Table 3.5 demonstrates the RA's and my increasing IRA (both the percentage agreement and the kappa scores) after coding each video fragment. The IRA was calculated for each video fragment coded using a different amended coding scheme version, where the amendments were based on the discussion of the previous video fragment coding disagreements. Increasing IRA scores demonstrated improving understanding and clarity of the coding scheme.

Table 3.5 shows that Cohen's kappa scores were in the range of .69-.85, which was satisfactory and demonstrated above minimum acceptable coding accuracy (see Table 3.4 for the kappa score guidelines in the present study; Bakeman & Quera, 2011). Furthermore, the percentage agreement was in the range of 77-89%, also adhering to the 70-90% guidelines (Heyman et al., 2014; Jones, 1975, as cited in Hartmann & Wood, 1990; Kelly, 1977). The "high percentage agreement, low kappa" phenomenon did not occur in the present phase.

During the discussions, some coding disagreements were repeated throughout the video fragment. For example, in one of the video fragments, the RA and I encountered 22 coding disagreements throughout 206 segments, and six out of 22 disagreements (i.e., approx. 27% of the disagreements) were due to the uncertainty in coding the segments as either *process control* or *other.* After clarifying that these segments should be assigned *process control,* all six disagreements were resolved. Because in the present phase we did not encounter any discrepancies or disagreements that could not be clarified through discussion and coding scheme amendments, and because the IRA increased after coding each video fragment, the pilot coding scheme was deemed ready to apply in the next coding scheme development phase.

Table 3.5
Inter-Rater Agreement Results Between Thesis Author's and RA's Coding in Video Fragment Coding Order

	Cohen's kappa	Percentage agreement
Fragment 2	.69	77%
Fragment 1	.74	78%
Fragment 3	.85	89%

Note. The rationale for the coding order of Fragments 2, 1, and 3 is explained in Section 3.3 of this chapter.

3.5 Conclusion

This chapter explained the pilot coding scheme development phase, during which most of the pre-pilot code definitions, code differentiation, examples, and non-examples were questioned, discussed, and amended, resulting in the construction of the pilot coding scheme comprising 20 codes within nine distinct categories. The IRA between the RA's and my own coding improved over coding the three video fragments, demonstrating the pilot coding scheme's readiness for the next phase. Following Chorney et al.'s (2015) recommendation to include another researcher—that is, the RA—in the coding scheme development process served to improve segmentation and coding accuracy and consistency and to gain further insights into the data.

Although the RA and I first segmented and then coded the video fragments, the segmentation and coding were interconnected and changed simultaneously (e.g., an insight into segmentation prompted further insight into coding and vice versa). This chapter explained the pilot coding scheme development in an orderly manner, presenting the segmentation and coding scheme amendments and insights clearly and understandably to the reader. However, just like the pre-pilot coding scheme development phase (see Chapter 2), the present phase required frequent changes in the ways of examining the data, and continuous and repeated re-examination of the segments and the coding scheme. This was consistent with Sipe and Ghiso's (2004) experience of inductive code development which contained the "moments of insight and of confusion, small epiphanies, and times when much had to be reworked," and where the authors observed that "the intricacies and messiness of the process are a bit lost in the retelling, making the problems appear orderly and easily resolved" (p. 478). In the present phase, going back and forth between the video fragments and the segments was frequently confusing and time-consuming, but allowed for an in-depth re-examination of the data and granular insights and amendments of the coding scheme. As Sipe and Ghiso (2004) concluded further, "the purpose of category-building is to allow us to interpret and understand data in fresh ways, and we must constantly work to consider alternative perspectives" (p. 482). Accordingly, in the present phase, I ensured to allow enough time and consideration of new perspectives on the data, which contributed significantly to the construction of the pilot coding scheme.

Chapter 4: Coder Training

As detailed in the previous chapters, the pilot coding scheme was inductively developed through the pre-pilot and pilot coding scheme development phases. To test the pilot coding scheme's suitability for further application, independent coders needed to be involved. This chapter explains the coder training phase, including coder selection and training, coder training development, coders' insights and challenges, and IRA.

In the present phase, three independent coders were selected and trained to use the pilot coding scheme. First, Coder 1 was trained so I could test the coder training and gain insights about the amendments needed. After amending the coder training, Coders 2 and 3 were trained. Coding disagreements were discussed with Coder 1 and Coders 2 and 3 after coding each video fragment. The coders' insights and challenges that were discussed included the importance of video examples, clarifying code definitions and differentiation, change in behaviour within the segment, participant-focused approach, and importance of behavioural context. The IRA during the coder training varied depending on the video fragment and the coder, showing both satisfactory and unsatisfactory scores. However, the coders were deemed sufficiently trained for the next coding scheme testing phase (see Chapter 5) because they demonstrated sufficient understanding of their coding errors during the discussions, and the next coding scheme testing phase was to provide further continuous coding practice.

4.1 Introduction

After developing the pilot coding scheme (see Chapter 3), its replicability needed assessing through testing to determine whether the coding scheme can be applied by multiple coders (Bakeman & Quera, 2011; Hartmann & Wood, 1990), and thus independent coders needed to be involved and trained. At least two independent coders should be employed in the coding scheme testing (Chorney et al., 2015), but given the complexity of the data used in the present study, employing more than two coders ensured that enough coders would be able to complete the testing in case a coder was excluded from the study (e.g., for incomplete work or unsatisfactory IRA; Margolin et al., 1998). Consequently, three independent coders were selected and trained to apply the pilot coding scheme during this phase.

Frequently, observational data from parent–child interactions are complex and may contain multiple meanings and layers, and coders may initially focus on different data elements (Margolin et al., 1998; Vuchinich et al., 1992). During the discussions with the RA in the previous phase, we observed such data complexity and emphasised the importance of mutual understanding of identifiable behavioural elements in order to apply the coding scheme as intended. Coder training teaches coders to reach mutual understanding regarding which behavioural elements to attend to, and what to base their coding decisions on (Margolin et al., 1998), and through training, coders who may perceive the data differently at first should become interchangeable (Heyman et al., 2014).

In the present phase, I trained the coders to follow the participant-focused approach where we searched for identifiable behavioural elements that proved the suitability and accuracy of the assigned code. The coders' insights and challenges were discussed so that a mutual understanding of the data and the coding scheme could be established, and coder interchangeability (i.e., different coders could apply the coding scheme similarly reliably) was further assessed through the IRA. Such thorough coder training, coding disagreement discussions, identifying of behavioural elements of interest, and reporting of IRA are all necessary parts of behavioural observation (Snyder et al., 2006).

4.2 Coder Training

During the present coding scheme development phase, three independent coders were trained to apply the coding scheme before proceeding to the coding scheme testing. This section explains the coder selection and training, and the development of each coder training stage. Because during the coder training the coding scheme was in development, the coder training and the coding scheme development were intertwined, and the coders' insights and coding disagreements discussions were informative of both the coders' understanding of the coding scheme and the coding scheme amendments needed.

4.2.1 Coder Selection

Three independent coders were selected through personal contacts and interviews and the candidates' availability, suitability, and motivation were assessed (Margolin et al., 1998). Coder 1 was known to the thesis author, and Coders 2 and 3 were selected out of four interviewed candidates. Coder 1 and the four interviewees were studying at a master's level in psychology and thus were familiar with the methods used within the discipline. During the interviews, the coders were asked about their previous relevant experience (e.g., observational research, data coding), availability, and motivation to work on the present study. Coders 2 and 3 were selected based on their high motivation and sufficient availability. Coder 1 had previous audio data coding experience, and Coders 2 and 3 did not have previous data coding experience. Coder 1 was a native English speaker and grew up in the UK but was bilingual, Coder 2 was a native English speaker and grew up in the UK, and Coder 3 was not a native English speaker (although spoke English throughout their life and education and was fluent in English) and grew up outside of the UK.

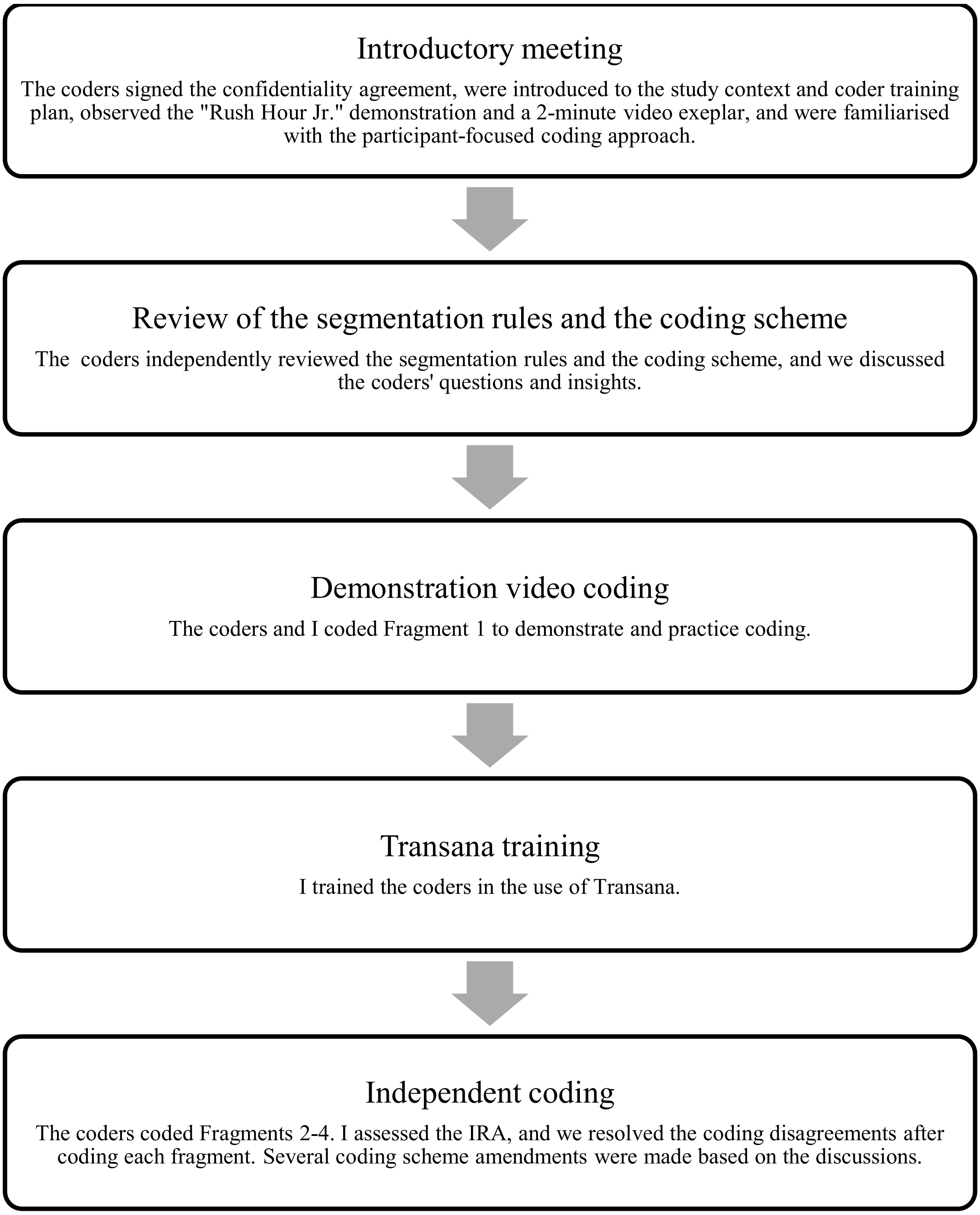
4.2.2 Coder Training Development

Because a universal coder training for all coding schemes does not exist (Margolin et al., 1998), some researchers have recommended what has worked in their coder training practice. Accordingly, in the present study, coder training was developed based on other researchers' recommendations that I considered suitable in providing clear understanding of my coding scheme (e.g., Bakeman & Quera, 2011; Chorney et al., 2015; Heyman et al., 2014; Krippendorff, 2004; Margolin et al., 1998; Seelandt, 2018), insights from the discussions with the RA in the previous phase, and the coders' insights and challenges during their involvement in the present study.

Coder 1 was trained first, aiming to improve the initial coder training through Coder 1's insights and challenges before training Coders 2 and 3. After amending the initial coder training, Coders 2 and 3 were trained. Although the coders were trained separately, all coders underwent the same key training stages. Figure 4.1 presents the stages of coder training.

Figure 4.1

Stages of Coder Training



4.2.2.1 Introductory Meeting

In the introductory meeting, the coders were familiarised with the context of the study and the coder training plan (Heyman et al., 2014; Seelandt, 2018). This section explains each stage included in the introductory meeting.

Confidentiality Agreement. Before the training, each coder signed the confidentiality agreement (see Appendix D).

Introduction to the Study. Coder 1 was trained first to gain insights into the potential coder training amendments needed before training Coders 2 and 3. Thus, Coder 1 was informed about the initial coder training (i.e., the coder training plan before further amendments), and Coders 2 and 3 were informed about the coder training that included the amendments after Coder 1's input. This section presents the introduction to the study the coders received. In italics is the information added after the Coder 1's input. That is, Coder 1 received all the information excluding the information in italics, and Coders 2 and 3 received all the information including the information in italics. However, despite the differences in the information received during the introductory meeting, all coders underwent the same key training stages and received the same information by the end of the training.

Introduction. I am examining parent–child interactions in a play-based instructional context. I am observing and coding parents' behaviour to construct a comprehensive observational coding scheme that would allow capturing the richness and variety of parents' behaviour during interactions. I have taken a "bottom-up" approach where the codes and categories have evolved based on the data and were not predetermined. A thorough observation of parents' behaviour during parent–child interactions allowed for the construction of a pilot coding scheme.

You are an independent coder and will be trained to use the coding scheme. *First, I will provide you with the information that the parent and the child received before the observation so that you are familiar with the context of the interaction. Also, I will show you 2 minutes of a parent–child interaction video to illustrate what the interaction may look like.* Next, you will independently familiarise yourself with the coding scheme, and we will meet to discuss any questions you may have.

Once you are familiar with the coding scheme, we will code one 5-minute video fragment together to illustrate the coding process and to familiarise you with Transana, the video coding software we will use. Next, you will code three 5-minute video fragments independently. The inter-rater agreement for each 5-minute video fragment will be assessed to compare your coding to each other's and to the accurate codes established during the previous coding scheme development phase. After you code each 5-minute video fragment independently, we will meet to discuss the inter-rater agreement results, each coding disagreement, and your questions and insights.

You will be considered trained once satisfactory inter-rater agreement is reached. We will then proceed to the coding scheme testing and will code 15 more video fragments independently. The inter-rater agreement will be analysed for each video fragment. After coding each video fragment, we will meet to discuss the inter-rater agreement results, coding disagreements, and your questions and feedback. We will aim to maintain satisfactory inter-rater agreement throughout the testing as that will be the indicator of a reliable and replicable coding scheme. Throughout the training and the testing, your input will serve to improve the coding scheme until the final coding scheme is constructed.

"Rush Hour Jr." Instructions and Demonstration. Coder 1 suggested providing the coders with the instructions and the demonstration of "Rush Hour Jr." that the parent–child dyads received before the observation. This helped the coders to better understand the game context and the role that participants performed (i.e., the parent was asked to collaborate with the child as would be natural at home; see Chapter 2, Section 2.2 for the "Rush Hour Jr." instructions that participants received). Coder 1 received the demonstration of "Rush Hour Jr." using a physical puzzle, as the parent–child dyads received it, but Coders 2 and 3 received the description of the demonstration remotely due to the COVID-19 pandemic because the in-person demonstration could not be performed.

Video Demonstration. The coders were shown a 2-minute video exemplar to illustrate the parent–child interaction the coding scheme was based on. Furthermore, the video demonstration contributed to the coders' better understanding of written code examples when reviewing the coding scheme independently in the next training stage (see Section 4.2.2.2).

Coding Approach. In the previous phase, the RA and I noticed instances of over-interpretation of some behaviours and emphasised the importance of following the participant-focused approach to identify observable behavioural elements for each code. When training Coder 1, the participant-focused approach was discussed and reiterated several times following Coder 1's over-interpretation of behaviours during the independent coding. Consequently, introducing the participant-focused approach early during the training (i.e., before the coders' independent coding) was deemed potentially preventative of over-interpretation.

4.2.2.2 Independent Reviewing of the Segmentation and Coding Rules, and the Coding Scheme

After the introductory meeting, the coders independently reviewed the segmentation and coding rules, and the coding scheme (Chorney et al., 2015; Margolin et al., 1998). Although the coders were presented with the pre-segmented video fragments (i.e., the coders did not segment the video fragments because the RA and I established sufficient and replicable segmentation in the previous coding scheme development phase; see Chapter 3), reviewing the segmentation rules improved the coders' understanding of how the segments were produced. After the coders reviewed the segmentation and coding rules and the coding scheme, we discussed the coders' questions and insights for a better understanding of what needed further explanation and what needed amending in the coding scheme (Margolin et al., 1998; Seelandt, 2018).

4.2.2.3 Demonstration Video Fragment Coding

After answering the coders' questions about the coding scheme, we together coded Fragment 1 to demonstrate and practice coding. When coding, I asked the coders to verbalise their thinking process when assigning the code to gain insight into the coders' thinking process and to correct the coders' errors (Chorney et al., 2015). The coders referred to the coding scheme and differentiated between the codes, considered code definitions and examples, and verbalised their decision-making process. When needed, I provided hints about the accurate codes (e.g., noted the parent's behaviour that the coders did not consider or emphasised the key code characteristics). Once the accurate code was assigned, I referred to the coding scheme and summarised why the code was accurate, differentiating the code from other codes for coders' better understanding of the coding scheme. When coding the demonstration video, the coders practised applying the participant-focused approach, basing their coding decisions on identifiable behavioural elements and not on speculations about the parent's intentions or the meaning of the parent's behaviour. Furthermore, video examples contributed to a better understanding of written examples in the coding scheme which could not accurately convey all the information about the behavioural elements such as the parent's subtle non-verbal behaviours, voice tone, and contextual nuances (see Section 4.3 for a more detailed explanation of the importance of video examples in the present study).

4.2.2.4 Transana Training

After coding the demonstration video together, I trained the coders in the use of Transana before they coded the video fragments independently in the next training stage.

4.2.2.5 Independent Coding During Training

After the demonstration video coding and Transana training, the coders coded three video fragments (Fragments 2, 3, and 4) independently (i.e., during coding, the coders did not consult with each other or with me which was important for assessing the IRA; Bakeman & Quera, 2011; Chorney et al., 2015; Heyman et al., 2014; Krippendorff, 2004). Fragments 1, 2, and 3 were used to develop the pilot coding scheme (see Chapters 2 and 3), and thus contained examples for every code in the pilot coding scheme (Heyman et al., 2014). However, I anticipated that Fragments 1, 2, and 3 may not illustrate a sufficiently broad spectrum of behaviours that may occur for each code. Thus, a new Fragment 4 was coded by the three coders, the RA and I (i.e., Coder 1 and the RA coded Fragment 4 during Coder 1's training, and Coders 2 and 3 coded Fragment 4 during their training), providing more varied behaviour examples. Furthermore, because the pilot coding scheme was developed based on Fragments 1, 2, and 3, and the examples from these video fragments were used in the coding scheme, coding Fragment

4 provided an opportunity to check the coders' IRA when no segment from Fragment 4 was among the coding scheme examples.

Inter-Rater Agreement. During the coder training, I analysed the IRA for each video fragment to monitor the coders' progress (see Section 4.4 for the IRA during the coder training; Heyman et al., 2014).

Meetings. After coding each video fragment, the IRA results and the coding disagreements were discussed with the coders (Heyman et al., 2014; Seelandt, 2018). Fragments 2 and 3 were considered the "gold standard" because the RA and I reached agreement on accurate codes during the previous coding scheme development phase (see Chapter 3). However, during each coding disagreement discussion, the coders' input on the accurate codes and the potential coding scheme ambiguities or discrepancies was encouraged. Consequently, discussing Fragment 3 with Coder 1 allowed for additional insights and changes of the codes that had been thought to be accurate. Where no code changes were made, the coders' coding errors for Fragments 2 and 3 were explained and questions were answered until the coders understood the rationale behind the accurate codes (Chorney et al., 2015).

During the coder training, Coder 1, the RA, and I coded Fragment 4 for the first time (i.e., the accurate codes had not been established) and established preliminary codes during the coding disagreement discussion. After Coders 2 and 3 coded Fragment 4, one more amendment was made to the codes, resulting in the establishment of the accurate—that is, "gold standard"—codes for Fragment 4. Although the IRA results indicated the coders' increasing coding accuracy and agreement during the training, the discussions were necessary to understand the reasons for each coding disagreement such as inaccuracies in the coding scheme or the coders' poor understanding of the codes, which otherwise would have been lost in the IRA report if other more easily identifiable codes contributed to higher IRA, and false conclusions about sufficient coding accuracy may have been made (Heyman et al., 2014; Margolin et al., 1998; Seelandt, 2018).

Each coding disagreement discussion took approximately two hours, except for Fragment 4 discussion with Coder 1 and the RA. Because Coder 1, the RA, and I coded Fragment 4 for the first time, the coding disagreement discussion took five hours before we reached agreement on the final accurate codes for the novel and complex behaviours and gained insights into the coding scheme amendments needed.

4.2.2.5 Coding Scheme Amendments During Training

Throughout the coder training described in this chapter, the coding scheme was still being developed and thus the coder training contained the coding scheme amendment stage which was excluded from the final coder training (see Appendix E) because future researchers will not be amending the coding scheme further (i.e., they would simply be applying the scheme in their research). During the coder training, the coding scheme was amended based on the coders' insights and challenges which helped to clarify the code definitions, code differentiation, examples, and non-examples. However, only few coding scheme amendments were made during the coder training compared to the many amendments made during the next testing phase (see Chapter 5), when multiple novel and complex data examples were coded and discussed. Thus, the amendments from the pilot to the final coding scheme are illustrated in Chapter 5, Section 5.4.

4.3 Coders' Insights and Challenges During Training

Throughout the training, the coders raised questions about how to understand some code definitions, code differentiation, examples, and non-examples, and how to approach the data.

Furthermore, when discussing the coding disagreements, several topics required continuous and repeated discussion to improve the coders' understanding and coding accuracy. This section explains the main topics discussed during the coder training and illustrates the coders' challenges and their solutions with data examples. The RA and I discussed many of these topics in the previous coding scheme development phase (e.g., clarifying code definitions, considering the context, following the participant-focused approach; see Chapter 3). In such cases, this section further explains the topics within the context of the coder training (i.e., what the coders found challenging, and the examples that illustrated these challenges).

Importance of Video Examples

When independently reviewing the coding scheme for the first time after the introductory meeting, Coder 1 misunderstood some written code examples due to the difficulty of conveying all behavioural elements through text (e.g., voice tone, context, subtle non-verbal behaviours). For example, the parent's verbal behaviour "right, so I do…" was incomplete and uninformative (i.e., coded as *other*) because the parent started the sentence in a neutral voice tone and did not complete it. However, having only seen a written example at this stage of training, Coder 1 misunderstood this verbal behaviour as the parent's agreeing or confirming something (i.e., emphasis on "I do" in the parent's "right, so I do…"), and suggested it should be coded as *confirmation, acknowledgement*. Evidently, this written example could not reflect the full context in which the behaviour occurred and consequently the behaviour was easily misunderstood. As Heyman et al. (2014) explained, "a video example is worth a thousand words" (p. 354), which was particularly relevant in the present study, because the parents' behaviours were often complex and required a close examination of multiple behavioural elements.

Similarly, after independently reviewing the coding scheme, Coders 2 and 3 inquired about the *assistive clue* and *asking for input/assistance* non-example "then which one would you move?" coded as *indirect instruction, suggestion, prompt*. In the written example, the context and the parent's voice tone were unclear, and linguistically, the behaviour may be assigned any of the three codes. Thus, I emphasised the key differences between the three codes, and demonstrated this written example in the video fragment, where all behavioural elements could be observed. In this example, as part of a segment sequence in the video fragment, the parent prompted the child to make a decision about the next move in the game.

Furthermore, some non-verbal behaviours were challenging to describe in writing. For example, the parent's moving the hand towards the game and back in *monitoring* (i.e., the parent moves the hand towards the game and back without intervening) and *process control* (i.e., the parent moves the hand towards the game to intervene but moves it back if the child makes the move the parent wanted to make) were difficult to differentiate through written examples. Thus, video examples were provided to clarify the written examples that the coders inquired about.

To reduce the risk of such misunderstandings, I amended the coding scheme to either replace potentially confusing written examples with similar alternatives (i.e., with the examples that would be assigned the same code and reflect the same key code characteristics but would not be as easily misunderstood) or to describe the context of behaviour in more detail where possible. However, some ambiguities in the written examples may be inevitable; and frequently behavioural elements may be difficult, if not impossible, to convey solely through writing. Thus, if some written examples appear challenging to explain to coders, they should be accompanied by video examples during coder training to ensure coders' accurate understanding. Accordingly, during the training, the coders and I coded Fragment 1 together and the coders coded Fragments

2 and 3 independently which allowed the coders to observe all written examples in the pilot coding scheme as video examples (i.e., because the pilot coding scheme was developed based on Fragments 1, 2, and 3).

Although I replaced complex written examples with equally illustrative alternatives and explained their context for a better understanding of each behaviour, future researchers may still encounter written examples that may appear challenging to explain to some coders (i.e., different coders may find different examples confusing or clear). In such cases, future researchers may benefit from examining the variety of behaviours in their own data and replacing the necessary written examples with their own exemplars so as to illustrate the codes in the present coding scheme.

Code Definitions and Differentiation

Code Definitions and Examples

During the training, the coders inquired about their understanding of the code definitions and examples. For example, Coder 1 questioned whether *supportive comment, encouragement* "does not provide new information about the game" as per its definition. Coder 1 suggested that in the *supportive comment, encouragement* example "I'm sure you can do it," where the context was specified ("[the parent] emphasises that the cars can be set up on the board in any order"), the parent provided information about the game. However, in the coding scheme, "new information about the game" referred to the parent's providing new information about the next correct moves. In comparison, in "I'm sure you can do it," the parent only provided information about the approach to the game and not the next correct moves.

This example also illustrated the difficulty in identifying key code characteristics in a written example. In the video example, the parent said "I'm sure you can do it" as part of the segment sequence where the parent suggested the child puts the ice cream van on the board first, but the child picked up a different car. Next, the parent said “or yeah, yeah, just put in whatever order,” followed by “I’m sure you can do it.” The parent reassured the child that the cars can be set up on the board in any order and supported the child’s choice, creating a positive atmosphere. Thus, this segment was coded as *supportive comment, encouragement.* In the written example, the context was explained (“[the parent] emphasises that the cars can be set up on the board in any order”) to reduce the risk of misunderstanding.

Similarly, Coders 2 and 3 inquired what “contribute to the game” in the *process control* definition referred to (“the parent’s non-verbal attempts to contribute to the game without consulting the child”). The coders inquired whether contributing to the game only included the parent’s moving the cars (i.e., contributing to completing the game) or any other game-related behaviours such as looking at or choosing the cards. I explained that through all game-related behaviours such as choosing the cards, tidying up the cars, or looking for a car on the table—all without consulting the child to adhere to the *process control* definition—the parent was contributing to the existing game situation. The code examples already illustrated such variety of the parent’s behaviours coded as *process control*, but throughout the training, the coders occasionally questioned and confirmed their understanding of the code definitions and examples. I carefully attended to the coders’ questions and challenges and discussed each coding disagreement to ensure the code definitions and examples were correctly understood and all behavioural elements were attended to. Furthermore, because precise and clear code definitions are crucial when training the coders and should be amended based on the challenges encountered (Hops et al., 1995), the coders’ questions provided valuable insights for the coding scheme amendments that contributed to more accurate coding.

Code Differentiation

During the training, Coder 1 noted that the key words in code definitions, such as direct (*direct instruction*), suggest (*indirect instruction, suggestion, prompt*), or attract (*attention request*), helped differentiate between the codes. Furthermore, emphasising the key code characteristics, such as considering whether the parent's behaviour was linked to the child's behaviour (e.g., *confirmation, acknowledgement*) or if the parent clearly and directly expressed the correct move the child should make (*direct instruction*) or if the parent only hinted the correct move (*assistive clue*), also helped differentiate between the codes.

During the training, the coders occasionally inquired about their understanding of some of the code differentiation. For example, the coders explained their understanding of how to differentiate between codes to me (e.g., the differentiation between *praise* and *supportive comment, encouragement*) to confirm if they correctly understood (a) the key code characteristics for each code, and (b) the code differentiation based on the differences in the key code characteristics. Also, the coders occasionally asked to clarify examples that linguistically appeared to match two different code definitions. For example, the coders asked why the parent's "okay?" was assigned *monitoring* and not *asking for input/assistance*. In this example, the parent first said "for me to drive out of here, this one is in my way" (*explanation, teaching*), and then said "okay?" to verbally monitor the child. Thus, the parent did not ask for the child's input or assistance in the game. Although the context for this behaviour was explained in the written example, the coders' questioning it illustrated their motivation to ensure they understood the coding scheme accurately.

Change in Behaviour Within the Segment

During the training, the coders occasionally did not consider the change in behaviour within the segment which led to inaccurate coding (the coding rule "consider the change in the parent's behaviour within the segment"; see Chapter 3, Section 3.3.2). For example, the change in behaviour within one segment was when the parent started touching the cards (*process control*), and the change in behaviour within the second segment was when the parent turned to observe the child (*monitoring*) while continuing to touch the cards. The coders incorrectly coded the second segment as *process control* due to the parent's touching the cards, although the change in behaviour was the parent's turning to observe the child which indicated a new segment and a *monitoring* behaviour.

We discussed the importance of considering the change in behaviour within the segment several times throughout the training. Because I segmented the behaviours (i.e., the coders did not segment the behaviours although they were familiar with the segmentation rules), I easily identified changes in behaviour within complex segments, whereas the coders occasionally needed to examine the segment further or to discuss it with me. However, such coding inaccuracies due to unnoticed changes in behaviour were infrequent and easily clarified during discussions.

Participant-Focused Approach

During the training, the coders occasionally over-interpreted the parent's behaviours, basing their coding decisions on assumed cognitions behind the behaviour—that is, imagining the intention behind the behaviour—and speculations about the meaning of behaviour rather than on identifiable behavioural elements. For example, when the child knocked over the car on the board and the parent said "oop!" while reaching towards the car, one of the coders coded the parent's behaviour as *disagreement, disapproval*. However, in this example, the parent only acknowledged the child's behaviour, and no behavioural elements were observed to identify the parent's disapproval (e.g., the parent did not express "oop!" in a disapproving voice tone). Such coders' errors were discussed, and the participant-focused approach was emphasised through identifying behavioural elements to base the coding decision on and selecting an accurate code.

All coders practised following the participant-focused approach when coding the demonstration video, but during the training, Coder 1 over-interpreted the behaviours more frequently than Coders 2 and 3. This may be related to my early additional explanation of the participant-focused approach and over-interpretation during Coder 2 and 3's training, included in the coder training after observing over-interpretation in Coder 1's coding (see Section 4.2.2.1). Although I reiterated the participant-focused approach to Coder 1 several times after observing coding errors related to over-interpretation, the early additional explanation before Coder 2 and 3's independent coding may have influenced their approach.

Furthermore, Coder 1 was the first independent coder to contribute to the coding scheme development. The potential perceived importance of such input may have contributed to Coder 1's over-interpretation if Coder 1 attempted to identify insights, meanings, and reasoning that I may have missed too strenuously. Attempting to produce such insights was not based on identifiable behavioural elements and was rather speculative. Thus, for the coders to provide valuable input into the coding scheme development, they were first ensured to follow the participant-focused approach.

Context and Child's Behaviour as Contextual Guidance

During the training, the coders occasionally failed to consider the interactional context (e.g., if the parent's behaviour was part of a segment sequence and previous segments provided contextual information for accurate coding) or the child's behaviour as providing contextual guidance for coding the parent's behaviour (see Chapter 3, Section 3.3.2). These topics were discussed multiple times throughout the previous coding scheme development phase and the coder training, and thus two new coding rules were added: "the child's behaviour provides contextual guidance" and "consider the context" (see Appendix E for the full list of coding rules).

When discussing the importance of considering the context, the coders inquired whether the child should be looking at the parent for the parent's non-verbal behaviour to be coded as *positive gesture/expression* (e.g., whether the child should observe the parent's smiling). I explained that because the coding scheme captures the parent's behaviour, we focus on the behaviour that the parent chooses to demonstrate whether the child looked at the parent or not.

Coding Rule 7. The child's behaviour provides contextual guidance.

The segmentation is based on the parent's behaviour and thus the parent's behaviour is coded. However, the child's behaviour may provide contextual guidance for coding the parent's behaviour in some instances.

<u>Example:</u>

Child: Sets up a car correctly.

Parent: "Good."

In the context of the child's behaviour—setting up a car correctly—the parent's behaviour is coded as *praise*.

Coding Rule 8. Consider the context.

To capture behaviours accurately, a segment should be coded within the context of behaviours (both the parent's and the child's), not as an isolated unit.

Differences Among Coders

During the coder training, I observed differences in what the coders found challenging, and the kinds of errors different coders made. For example, Coders 1 and 2 showed better understanding of the coding scheme and needed less explanations to understand the rationale of accurate coding whereas Coder 3 needed more elaborate and frequent explanations. To attend to these differences when training Coders 2 and 3, I discussed Fragment 4 coding disagreements with Coder 2 and Coder 3 separately (i.e., not in a mutual meeting as usual) because Coder 3 demonstrated lower IRA and additional coding errors that Coder 2 did not make. The reason for this was that I did not want to risk confusing Coder 2 who showed sufficient understanding of the coding scheme by discussing Coder 3's additional errors.

To gain insight into Coder 3's errors, I calculated percentage agreement between Coder 2 and 3's and my own coding after removing the segments accurately coded as *monitoring* and *process control*. These codes showed high frequency and were frequently easy to assign accurately which may have unrepresentatively increased percentage agreement. Consequently, percentage agreement for Fragment 4 between Coder 3's and my own coding decreased from 68% to 47% (i.e., by 21%) whereas percentage agreement between Coder 2's and my own coding decreased from 77% to 71% (i.e., by 6%). These results suggested that Coder 3 accurately assigned *monitoring* and *process control* which due to their high frequency unrepresentatively increased percentage agreement between Coder 3's and my own coding, although Coder 3 struggled to accurately assign other codes that often required examining complex verbal behaviours. For example, 21 out of 64 coding disagreements in Fragment 4 were due to Coder 3's incorrectly assigning different codes where *explanation, teaching* was the accurate code. After clarifying the *explanation, teaching* code to Coder 3 during the separate coding disagreement discussion, these disagreements were resolved.

4.4 Inter-Rater Agreement During Coder Training

The IRA was monitored throughout the coder training to examine the coders' progress and coding challenges (Margolin et al., 1998) and to confirm the coders' readiness for the next coding scheme testing phase (see Chapter 5). This section presents and explains the IRA results during the coder training.

Because the coder training consisted of two parts—first training Coder 1 and then training Coders 2 and 3—the IRA was examined for Coder 1 in the first part, and for Coders 2 and 3 in the second part. Cohen's kappa scores were interpreted according to Bakeman and Quera's (2011) guidelines based on whether the codes for the video fragment had been discussed and predetermined as accurate (i.e., the "gold standard" guidelines) or not (i.e., the "two coders" guidelines; see Chapter 3, Section 3.4.2 and Table 3.4 for Cohen's kappa guidelines and the explanation of the guidelines selection in the present study). Using the "gold standard" coding to assess the IRA during the coder training is recommended because it also allows assessing the level of coding accuracy (i.e., coders' performance can be compared to the predetermined accurate coding; Bakeman & Quera, 2011; Chorney et al., 2015; Margolin et al., 1998). Accordingly, the IRA was assessed between Coder 2 and 3's coding (see Table 4.2) to investigate for the "high agreement, low accuracy" phenomenon where coders may agree well with each other but poorly with the "gold standard" coding (Bakeman & Quera, 2011; Harris & Lahey, 1982; Krippendorff, 2004). Furthermore, percentage agreement was assessed, considering

70% a minimum satisfactory level of agreement (Heyman et al. 2014; Jones, 1975, as cited in Hartmann & Wood, 1990; Kelly, 1977).

Table 4.1
Inter-Rater Agreement Between Thesis Author's (TA) Each Coder's Coding During Training in the Video Fragment Coding Order

	TA & Coder 1		TA & Coder 2		TA & Coder 3	
Video fragment	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement
Fragment 2	.70	**77%**	.78	**84%**	.68	**76%**
Fragment 3	**.76**	**80%**	**.80**	**83%**	.70	**74%**
Fragment 4	**.65**	**71%**	.73	**78%**	.61	68%

Note. Scores within percentage agreement guidelines (70-100%), scores within Cohen's kappa "gold standard" (.79-1.00) guidelines for Coder 1, Fragment 2, and Coder 2 and 3, Fragments 2-4, and scores within Cohen's kappa "two raters" (.62-1.00) guidelines for Coder 1, Fragments 2 and 3 are in boldface (Bakeman & Quera, 2011).

4.4.1 Coder 1: Inter-Rater Agreement

Coder 1's IRA was compared to Bakeman and Quera's (2011) Cohen's kappa (Cohen, 1960) "gold standard" guidelines for Fragment 2 (because only one code in Fragment 2 was amended during the coding disagreement discussion with Coder 1 and thus the predetermined Fragment 2 codes remained accurate) and to the "two coders" guidelines for Fragments 3 and 4 (because several codes in Fragment 3 were amended during the coding disagreement discussion and Fragment 4 had not been previously coded, thus accurate codes had not been established). Coder 1's kappa score for Fragment 2 was unsatisfactory (.70, when the minimum recommended kappa score was .79 for 80% coding accuracy; Bakeman & Quera, 2011), but such results were not unexpected because Fragment 2 was the first video fragment Coder 1 coded independently and the pilot coding scheme had not been sufficiently developed yet. Furthermore, Coder 1's kappa scores for Fragments 3 and 4 were satisfactory (.76 and .65, respectively, when the minimum recommended kappa score was .62 for 80% coding accuracy; Bakeman & Quera, 2011), and Coder 1's percentage agreement was satisfactory—that is, above 70%—for all video fragments.

During the coding disagreement discussions, Coder 1 demonstrated good understanding of the rationale behind the accurate codes when Coder 1's coding had been inaccurate. Furthermore, many Fragment 4 disagreements were related to Coder 1's misunderstanding of a particular code which was easily discussed and resolved. For example, 10 out of 57, and 16 out of 57 Fragment 4 disagreements were resolved after discussing and clarifying the *criticism, accusation, complaint* and *process control* definitions and examples, respectively. Thus, having observed Coder 1's satisfactory kappa scores for Fragments 3 and 4, and improving understanding of the coding scheme, Coder 1 was deemed ready to proceed to the next coding scheme testing phase (see Chapter 5).

4.4.2 Coders 2 and 3: Inter-Rater Agreement

Coder 2 and 3's IRA was compared to Bakeman and Quera's (2011) Cohen's kappa "gold standard" guidelines for Fragments 2, 3, and 4 because only one Fragment 4 code was amended during the coding disagreement discussions with Coders 2 and 3, and thus the predetermined codes remained accurate. Coder 2's kappa scores for Fragments 2 and 4 were unsatisfactory (.78 and .73, respectively, when the minimum recommended kappa score was .79 for 80% coding accuracy; Bakeman & Quera, 2011), but satisfactory for Fragment 3 (.80). However, all of Coder 2's kappa scores were close to the minimum recommended score of .79, which showed Coder 2's potential to develop sufficient understanding of the coding scheme. Furthermore, Coder 2's percentage agreement was satisfactory—that is, above 70%—for all video fragments, and during the coding disagreement discussions, Coder 2 showed good understanding of the rationale behind the accurate codes when Coder 2's coding had been inaccurate.

Coder 3's kappa scores for Fragments 2, 3, and 4 were unsatisfactory (.68, .70, and .60, respectively), and percentage agreement for Fragments 2 and 3 was satisfactory (79% and 74%, respectively) but unsatisfactory for Fragment 4 (66%). Furthermore, Fragment 4 coding disagreement discussion showed Coder 3's potentially poorer understanding of the coding scheme compared to Coders 1 and 2, although Coder 3's errors provided insights into the potential coding scheme amendments needed. Thus, despite the unsatisfactory IRA, Coder 3 was included in the next coding scheme testing phase because Coder 3's errors may further provide useful information about ambiguities or discrepancies in the coding scheme.

Table 4.2 presents the IRA assessed between Coder 2 and 3's coding to examine for the "high agreement, low accuracy" phenomenon where coders may agree well with each other but show poorer agreement with the accurate "gold standard" codes and thus poorer coding accuracy (Bakeman & Quera, 2011; Harris & Lahey, 1982; Krippendorff, 2004). This was examined for Coders 2 and 3 only because they coded the video fragments using the same coding scheme version whereas Coder 1 had been trained previously and used a different coding scheme version. Kappa scores in Table 4.2 were assessed according to Bakeman and Quera's (2011) "two coders" kappa guidelines because neither Coder 2's nor Coder 3's coding was considered the "gold standard." For Fragments 2 and 3, the kappa scores (.71 and .69, respectively, when the minimum recommended kappa score was .62 for 80% coding accuracy; Bakeman and Quera, 2011), and percentage agreement (above 70%) were satisfactory. However, the IRA for Fragment 4 was unsatisfactory and lower than the IRA for Fragments 2 and 3 which was consistent with the IRA scores between each coder's and my own coding (except for Coder 1's satisfactory IRA for Fragment 4, see Table 4.1).

Table 4.2

Inter-Rater Agreement Between Coder 2's and Coder 3's Coding During Training in the Video Fragment Coding Order

	Cohen's kappa	Percentage agreement
Fragment 2	.71	79%
Fragment 3	.69	74%
Fragment 4	.59	66%

For all three video fragments, the "high agreement, low accuracy" phenomenon did not occur (i.e., Coders 2 and 3 did not agree with each other better than they did with the "gold standard" coding), and the IRA between Coder 2 and 3's (see Table 4.2) coding followed a similar pattern as the IRA between Coder 3's and my own coding (see Table 4.1). Furthermore, the IRA between Coder 2's and my own coding was higher than the IRA between Coder 3's and my coding, and between Coder 2 and 3's coding (see Table 4.1). That is, Coder 3 demonstrated poorer agreement with both Coder 2's and my own coding. Discussing the coding disagreements and gaining insights into different coders' challenges throughout the training allowed me to notice that Coder 3 showed lower than other coders' IRA scores partially due to poorer understanding of the coding scheme and the data. I noted to continue observing Coder 3's challenges and errors with care in the next coding scheme testing phase (see Chapter 5), should any concerns about Coder 3's suitability for the present study arise.

4.4.3 Coders' Readiness for the Next Phase

Table 4.1 demonstrates that all three coders' IRA increased from Fragment 2 to Fragment 3 but decreased for Fragment 4 which also illustrated the challenges of coding varied and complex data in the present study. Fragment 4 presented novel behaviours that were not part of the pilot coding scheme examples (i.e., the code examples in the pilot coding scheme were taken from Fragments 1, 2, and 3), and required a close examination and my detailed explanations about correctly approaching them. (For example, in Fragment 4, the parent's novel behaviour "alright, come on then" had not been similar to any other prompt examples in the pilot coding scheme and required a detailed discussion before agreeing on coding it as *indirect instruction, suggestion, prompt*.) However, when coding Fragment 4 for the first time (i.e., during Coder 1's training, when the RA, Coder 1, and I coded Fragment 4), kappa between the RA's and my own coding was .76 with percentage agreement of 80%, demonstrating satisfactory IRA. The RA demonstrated higher than other coders' IRA when coding Fragment 4 potentially due to the RA's participating in multiple continuous segmentation and coding disagreement discussions during the previous phase (see Chapter 3). That is, the coders potentially needed further practice in order to reach higher IRA when coding novel and complex segments.

Although not always satisfactory, the IRA provided information about the coders' progress and challenges (e.g., that coding Fragment 4 was the most challenging to all coders; Margolin et al., 1998). Furthermore, the coding disagreement discussions provided further information about each coder's challenges and coding scheme amendments needed, and were crucial for improving coding accuracy (i.e., assessing whether the coders applied the coding scheme as intended, and discussing and correcting instances where they did not; Bakeman & Quera, 2011; Heyman et al., 2014). A recommended practice is to establish satisfactory IRA during coder training before coders code video fragments independently (Chorney et al., 2015; Margolin et al., 1998). However, the next coding scheme testing phase (see Chapter 5) included further coding disagreement discussions which served as the coders' continuous practice and further contributed to the coding scheme development. Thus, during the training, the coders' improved understanding of the coding scheme, data, and coding errors and challenges provided the basis for all coders' proceeding to the next testing phase. Furthermore, the coders' IRA scores during the training were promising considering the complex data used in the present study, the beginning of the coding process, and the coding scheme amendments needed (i.e., during the coder training, the coding scheme was applied in its pilot version).

4.5 Conclusion

This chapter explained the coder training phase during which the coders were selected and trained, coder training was developed, and insights into the coders' challenges when applying the coding scheme were gained. This phase demonstrated that other researchers' recommendations of steps to include in coder training were useful, but also supported Margolin et al.'s (1998) explanation that a universal coder training does not exist because the coder training was amended based on the insights gained throughout the present phase. For example, the coding disagreement discussions provided invaluable information about the coders' misunderstandings and errors which allowed me to focus the training efforts on the topics that the coders expressed as the most unclear. Accordingly, planning a predetermined number of discussions during the coder training may prove unsuitable in case the coders require additional explanations for a better understanding of the coding scheme. Thus, although I have included the final coder training plan in the coding manual (see Appendix E), future researchers could amend it to, for example, include additional steps that may appear useful in making the coding scheme better understood by the coders. Even when training coders to use the same coding scheme, different researchers may rely on different ways to explain the necessary aspects because the data and the coders will inevitably differ in every study. Furthermore, future researchers may benefit from examining the variety of behaviours in their data and providing varied examples of each code during the coder training to account for data differences and to improve coding accuracy.

The coder training described in this chapter took between 23 and 27 hours, depending on the coder (e.g., different coders spent a different amount of time to independently code each video fragment). Such coder training duration was appropriate compared to other researchers' coder training because even the coding schemes containing less codes may take 30-50 hours to train the coders in (Forehand et al., 1979; Jabson et al., 2002). Furthermore, some coding schemes that contain a similar number of codes may vary in the duration of coder training, depending on the complexity of the codes, data, and coders selected. For example, Hummel and Gross (2001) whose coding scheme contained six codes, applicable to both the parent's and the child's behaviour, and Forehand et al. (1979) whose coding scheme similarly contained six codes applicable to the parent's behaviour and three codes applicable to the child's behaviour spent a significantly different amount of time training the coders: six and 50 hours, respectively.

Although coder training may often appear lengthy, establishing satisfactory IRA and accuracy before coders' independent coding (i.e., coding without discussing the coding disagreements after each video fragment) is crucial (Chorney et al., 2015; Margolin et al., 1998). Otherwise, the independent coding following the insufficient coder training may lead to coding inaccuracies and an even lengthier process of attempting to resolve and address such inaccuracies. Accordingly, because the coding scheme manual developed in this thesis (see Appendix E) presents the final coding scheme, future researchers should train their coders to reach satisfactory IRA and accuracy before proceeding to the independent coding. However, although the IRA throughout the coder training explained in this chapter was not always satisfactory, I noted that the coding scheme was still being developed and some ambiguities and errors were expected. Furthermore, the next coding scheme testing phase (see Chapter 5) contained several coding disagreement discussions which further improved the coders' understanding of the coding scheme. Thus, having considered the coders' promising IRA and their improving understanding of the coding scheme and the data during the coder training, incompleteness of the coding scheme, and further coding practice that the next testing phase was to provide, all three coders proceeded to the next coding scheme testing phase.

Chapter 5: Pilot Coding Scheme Testing and Finalising the Coding Scheme

After training the coders (see Chapter 4), the coding scheme needed testing to assess its replicability and to construct the final coding scheme through final amendments. This chapter explains the coding scheme testing phase, including the video fragment selection for testing, coders' insights and challenges, IRA, and pilot to final coding scheme changes.

During the testing, three independent coders trained in the previous phase and I coded 15 randomly selected video fragments and discussed the coding disagreements which allowed amending the coding scheme through insights into the coders' errors and challenges. The topics discussed with the coders included the importance of identifying the key code characteristics, a spectrum of behaviours for each code, and considering the coding categories. Furthermore, guiding questions were developed for each code to emphasise the key code characteristics, and, through multiple coding scheme amendments, the final coding scheme was constructed, comprising 18 codes within eight distinct categories. The IRA was assessed for individual video fragments and for individual categories and codes, showing both satisfactory and unsatisfactory scores. Considering the novelty of the coding scheme, continuous coding scheme development, and coders' improving understanding of the coding scheme and the data, the coding scheme was deemed sufficiently developed to proceed to the next implementation phase.

5.1 Introduction

Coding scheme testing provides information about the coding scheme amendments needed and simultaneously and continuously improves coders' understanding of the coding scheme and the data (Chorney et al., 2015), indicating whether the coding scheme is replicable. That is, in this phase, the coding scheme development and the coders' improving understanding of the coding scheme and the data were intertwined because the coding scheme amendments were made through the insights gained during the coding disagreement discussions, and through the same discussions the coders' understanding continuously improved.

To examine coding scheme replicability and to monitor the coders' progress, the IRA was assessed for each video fragment and for individual categories and codes (Bakeman & Quera, 2015; Margolin et al., 1998). To ensure coding accuracy (i.e., coders' applying the coding scheme as envisioned) and to understand the reasons for coding disagreements, each coding disagreement was discussed (Bakeman & Quera, 2011; Heyman et al., 2014; Johnson & Bolstad, 1972; Margolin et al., 1998). Consequently, through such discussions and coding scheme amendments, the final coding scheme was constructed.

5.2 Pilot Coding Scheme Testing and Further Refinement

This section presents and explains the video fragment selection for testing, topics discussed during the coding disagreement discussions, coding disagreement examples, and pilot to final coding scheme amendments illustrated by data examples. Figure 5.1 presents the stages of the pilot coding scheme testing.

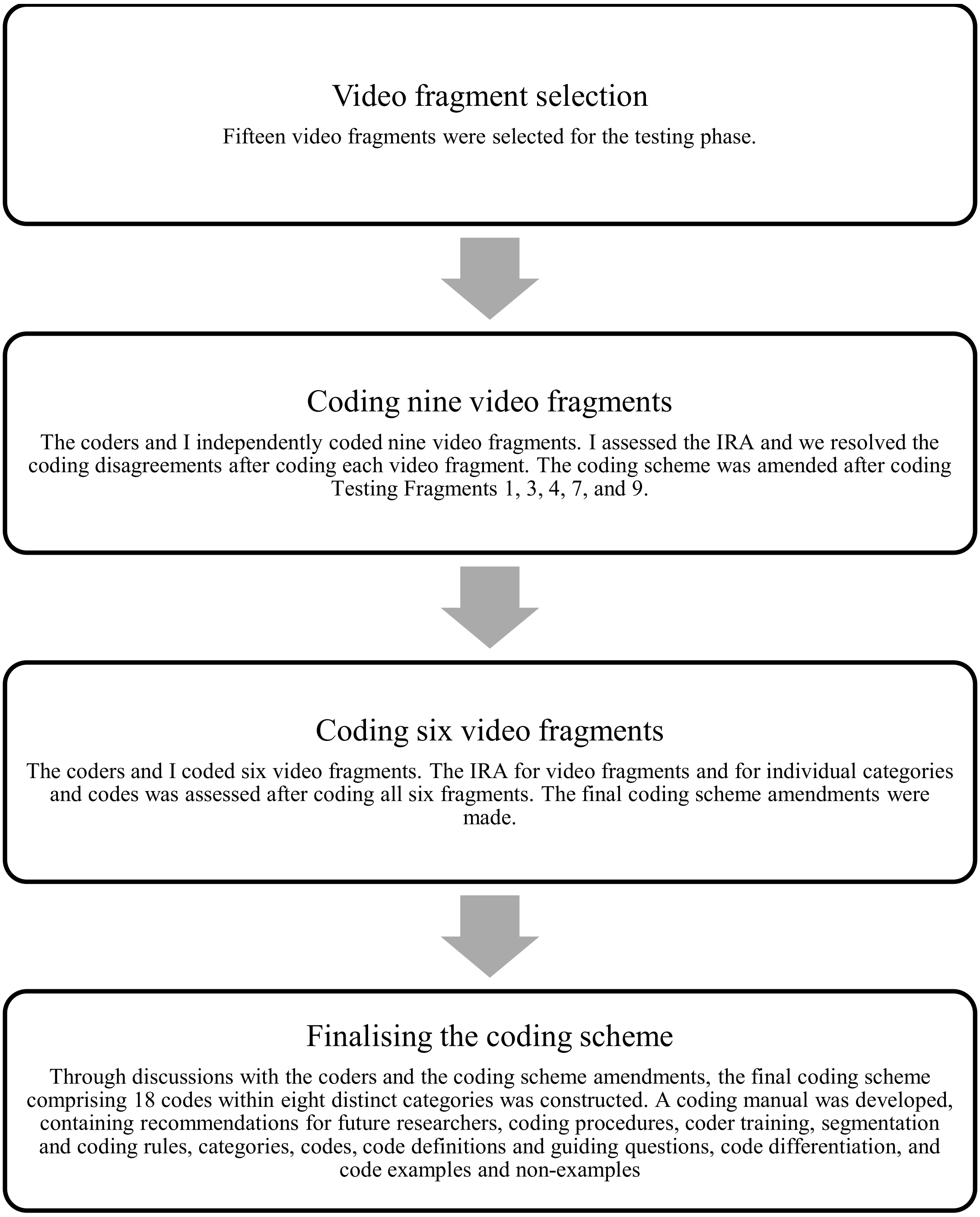
During the testing, Coders 1, 2, and 3 coded 15 new video fragments in two parts: first coding nine and then six video fragments. While coding nine video fragments, the IRA for each video fragment was assessed, coding disagreements were discussed after coding each video fragment, and coding scheme was amended multiple times. Each discussion took approximately two to four hours, depending on the number of coding disagreements and the complexity of the segments. After coding nine video fragments, the coding scheme was deemed sufficiently amended, and the remaining six video fragments were coded to assess the IRA for individual categories and codes.

The IRA for individual categories and codes differed from the IRA for each video fragment. When assessing the IRA for each video fragment, the coders' coding of a video fragment was compared to assess how well they agreed with each other when coding that video fragment. In comparison, the IRA for individual categories and codes was assessed by examining how well the coders' agreed on a particular code throughout the six video fragments. This allowed examining whether any codes may have remained inaccurately applied or unclear to the coders. Otherwise, if only assessing the IRA for individual video fragments, such codes may have gone unnoticed due to the coders' sufficient understanding of other codes that would increase the IRA scores.

Accordingly, coding disagreements for each of the six video fragments were not discussed so that the IRA for individual categories and codes could be assessed based on the coders' and my using the same coding scheme version (i.e., the coding scheme was not amended while coding the six video fragments). After assessing the IRA for individual categories and codes, several data examples from the six video fragments were included in the coding scheme to better illustrate and clarify the codes that showed unsatisfactory IRA. Through multiple amendments during the testing, the final coding scheme was constructed, comprising 18 codes within eight distinct categories.

Figure 5.1

Stages of the Pilot Coding Scheme Testing



5.2.1 Video Fragment Selection

Although a small number of video fragments may be sufficient to test some coding schemes (e.g., two to five video fragments; Chorney et al., 2015), 15 video fragments were coded during the present phase. By coding a larger number of video fragments during the testing, we observed multiple novel and complex behaviours, resolved the coders' challenges through multiple discussions, and I amended the coding scheme to accommodate for a wide variety of behaviours for each code (because the pilot coding scheme had been developed based on three video fragments).

For the testing, 15 out of 135 videos were randomly selected from the first year of parent–child observations (in the Leverhulme project, participants were longitudinally observed for two years). Most of the children observed in the first year were 5 years old, although a few were 6 or 7 years old (e.g., children who turned 6 years old between the time of the invitation to participate and the participation in the study, or siblings of 5-year-olds who participated in the study). Because this thesis is part of the Leverhulme project, the coding scheme developed was later implemented to granularly examine parents' behaviour over time (i.e., when children were aged 5 to 7). Thus, all age groups were included in the testing phase (however, throughout the testing, the coders and I did not encounter any coding challenges that would seem to arise due to the parents' interacting with children of different ages). Out of 135 videos, three videos of 6-year-olds, and three videos of 7-year-olds were available. Thus, all six videos were selected for the testing, and the remaining nine videos of 5-year-olds were selected randomly.

In the videos, participants played "Rush Hour Jr." for 10 minutes (see Chapter 2, Section 2.2 for the explanation of the observation set up and task instructions). I selected a 5-minute fragment from the middle of each 10-minute observation, when participants were already familiar with the game but not yet completing the game or potentially anticipating the end of the 10-minute period (i.e., approximately two to three minutes were excluded from the beginning and the end of the 10-minute observation). The 5-minute fragments began where the first parent's behaviour in the fragment could be coded accurately despite the absence of the preceding behaviours. For example, the beginning of a fragment was not selected mid-conversation or where the coding decision may require considering the context. A suitable beginning to the 5-minute fragment was the parent's monitoring the child or a brief verbal behaviour such as "yes" where the parent's confirming the child's behaviour was observed. All 5-minute video fragments were transcribed and segmented in Transana for independent coding.

5.2.2 Coding Insights and Challenges During Testing

During the testing, the coders and I discussed our coding disagreements after coding each of the nine video fragments, with the discussions focusing on establishing accurate codes for the segments because none of the video fragments had been previously coded. Where our coding differed, the coders and I explained our decision-making process when assigning the codes and reached agreement on accurate codes (Chorney et al., 2014). Discussions provided insights into the coders' thinking about the data and the codes, and the differences in each coder's understanding, therefore allowing me to provide clearer explanations on how to approach the data and the codes (Chorney et al., 2014; Margolin et al., 1998). The main difference between the coding disagreement discussions in the previous coder training phase and this phase was that in the previous phase, I focused on training the coders what the coding scheme entailed and how to apply it and used mostly familiar and previously thoroughly examined video fragments, whereas in this phase, we coded new video fragments and I focused on improving the coding scheme through discussing novel, unclear, and complex data examples and amending the scheme based on our insights.

Frequently, coding disagreements were related to ambiguous code definitions or code differentiation, encountering novel and complex behaviours, and coders' needing further explanations on how to approach certain segments. However, occasionally, the coders' coding during the testing was accurate and my coding was inaccurate, providing additional insights into the coding scheme and the data. The coding scheme was amended based on our discussions to improve the code definitions and code differentiation, and to include more varied examples (Chorney et al., 2015). Furthermore, to improve the coding scheme's clarity, a flowchart was developed and tested but did not prove useful. Instead, guiding questions were added for each code, facilitating the identification of key code characteristics.

All topics discussed during the previous coder training phase (see Chapter 4) also arose during the testing because coding novel and complex behaviours presented the coders with similar points of confusion which were continuously resolved through discussions. Through practice, the coders improved their understanding of these topics and the number of repeated errors decreased, and the coding scheme was amended further to accommodate such complex data examples (this also illustrates that the coding scheme development during the testing was intertwined with the coders' improving understanding of the coding scheme and the data). Furthermore, during the testing, several new topics were discussed due to encountering novel and complex behaviours. This section explains the new topics the coders and I discussed during the testing. Where the topics are similar or the same as the ones discussed during the previous coder training phase, they are explained in relation to coding novel and complex video fragments during the testing.

Identifying Key Code Characteristics and Behavioural Elements

Flowchart. During the testing, the coders and I repeatedly and continuously discussed the code definitions and code differentiation, with my emphasising the importance of identifying the key code characteristics and observable behavioural elements when assigning a code. For example, we established whether the parent directed the child's behaviour (one of the key characteristics for *direct instruction*) by identifying whether we could name what the parent wanted the child to do (the behavioural element).

Throughout the testing, I amended the coding scheme multiple times but similar coders' errors frequently reoccurred due to difficulties in considering all key code characteristics when encountering novel and complex behaviours. For example, when coding Testing Fragment 3 (in this chapter, I refer to the video fragments coded during the testing as Testing Fragments 1-15, in their coding order), I anticipated that some novel behaviours may challenge the coders, and, accordingly, the IRA for Testing Fragment 3 was lower than for Testing Fragments 1 and 2 (see Section 5.3 for the IRA during the testing). Throughout the testing, when a novel and complex behaviour occurred, my coding was most frequently accurate compared to the coders' because of my comprehensive understanding of the coding scheme gained throughout the lengthy coding scheme development process. However, the coders were occasionally unable to identify whether the novel behaviour matched the code definition if a similar behaviour had not been observed previously. For example, in Testing Fragment 3, the parent referred to the ice cream cones displayed on the game cards, "that one looks nice" and "nice ice creams, aren't they?" Not having previously observed similar behaviours, two out of three coders coded these behaviours as *other*, confused and uncertain about the suitability of different codes. However, during the discussion, we reached agreement that these parent's behaviours were positive and playful, and thus should be assigned *supportive comment, encouragement* (i.e., we identified the key code characteristics and behavioural elements for this code). Accordingly, I emphasised and explained the importance of being accurate and specific yet flexible when identifying key code characteristics and behavioural elements in such novel behaviours.

To assist the coders in identifying the key code characteristics and behavioural elements, I created a flowchart which can be useful to guide coders through coding decisions when employing complex coding schemes (see Figure 5.2; Yoder & Symons, 2010). In the flowchart, the coders first selected the kind of behaviour the parent demonstrated (e.g., positive, directing, engaging) that corresponded to the coding scheme categories (e.g., *positive, control, engagement*). Then, the coders answered questions about the segments as “yes” or “no” which guided the coders to the accurate code.

We tested the flowchart’s usefulness by using it to recode Testing Fragment 3. As Table 5.1 demonstrates, after recoding, the IRA between each coder’s and my own coding slightly increased. Furthermore, Table 5.2 demonstrates that the IRA for each coder pair for Coders 1, 2, and 3 varied, slightly increasing or decreasing after using the flowchart. Although the flowchart occasionally helped to assign the accurate code where an inaccurate code had been assigned previously, such instances were rare. The coders reported that although the flowchart helped to confirm coding decisions for the segments that were not too challenging to code, the coders mostly referred to the flowchart when faced with a challenging segment (i.e., when the segment did not appear challenging, the coders used the coding scheme only).

Furthermore, we discussed that examining novel and complex segments required considering multiple behavioural elements and the context simultaneously, whereas the flowchart guided the decision-making process by providing questions in a sequence (i.e., one question at a time) and did not reflect the complexity of the examination required. Thus, we agreed that the flowchart would not help mitigate against coding disagreements when coding novel and complex parents' behaviours, and that such disagreements needed resolving through discussion, while examining multiple complex behavioural elements simultaneously. Consequently, the flowchart was not used in this study further.

Table 5.1

Inter-Rater Agreement Between Thesis Author (TA) and Each Coder Before and After Applying the Flowchart to Testing Fragment 3

	TA & Coder 1		TA & Coder 2		TA & Coder 3	
	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement
Before the flowchart	**.67**	**75%**	**.66**	**75%**	.60	**70%**
After the flowchart	**.73**	**79%**	**.68**	**76%**	**.64**	**73%**

Note. Scores within Cohen's kappa "two raters" (.62-1.00; Bakeman & Quera, 2011) and percentage agreement (70-100%) guidelines are in boldface.

Table 5.2

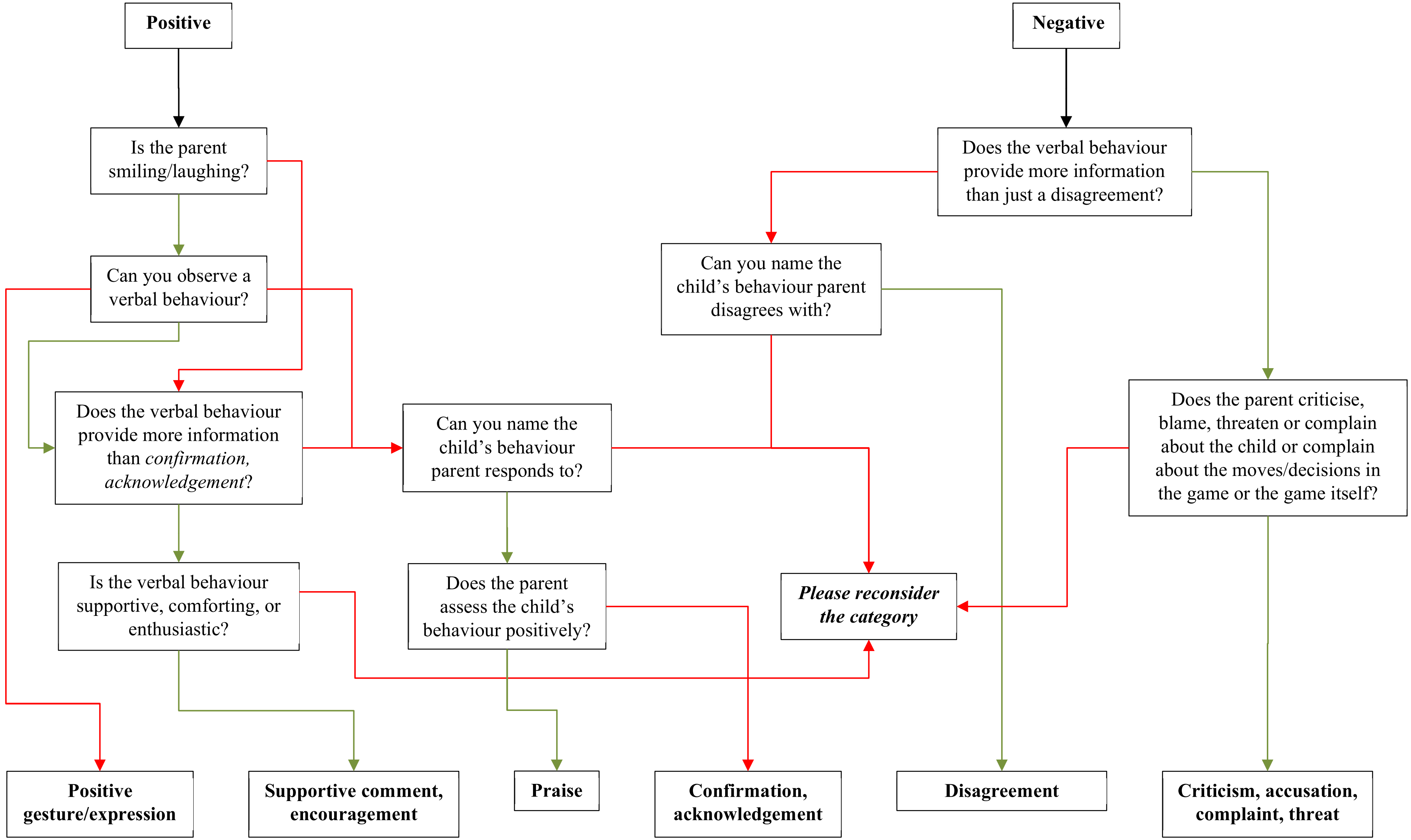
Inter-Rater Agreement Between Coders Before and After Applying the Flowchart to Testing Fragment 3

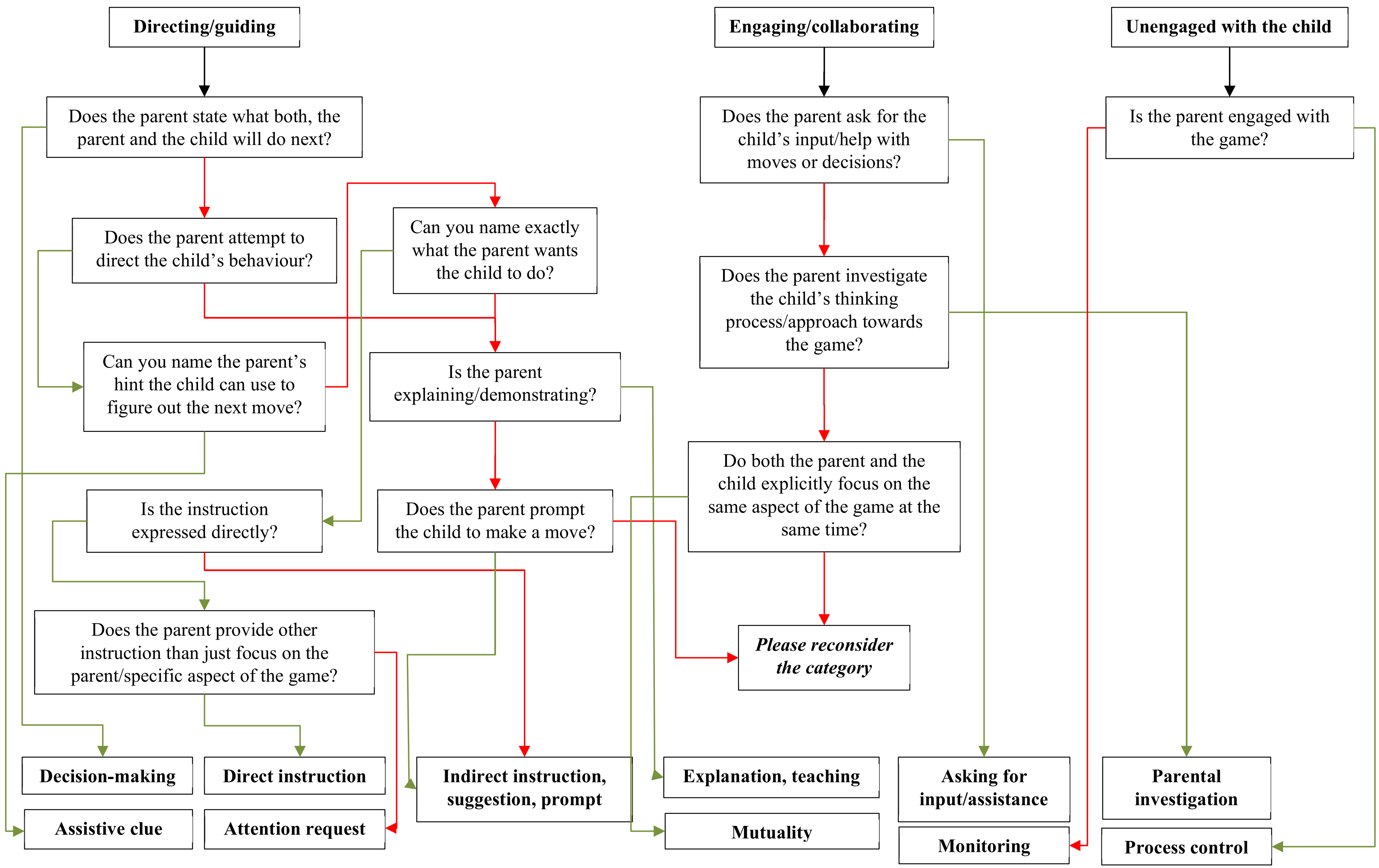
	Coders 1 & 2		Coders 1 & 3		Coders 2 & 3	
	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement
Before the flowchart	**.63**	**72%**	.58	69%	**.71**	**79%**
After the flowchart	.60	**70%**	**.63**	**72%**	.65	**75%**

Note. Scores within Cohen's kappa "two raters" (.62-1.00; Bakeman & Quera, 2011) and percentage agreement (70-100%) guidelines are in boldface.

Figure 5.2

Flowchart (Green Arrow = Yes; Red Arrow = No)





Directing/guiding
Engaging/collaborating
Unengaged with the child
Does the parent state what both, the parent and the child will do next?
Does the parent ask for the child's input/help with moves or decisions?
Is the parent engaged with the game?
Does the parent attempt to direct the child's behaviour?
Can you name exactly what the parent wants the child to do?
Does the parent investigate the child's thinking process/approach towards the game?
Can you name the parent's hint the child can use to figure out the next move?
Is the parent explaining/demonstrating?
Do both the parent and the child explicitly focus on the same aspect of the game at the same time?
Is the instruction expressed directly?
Does the parent prompt the child to make a move?
Please reconsider the category
Does the parent provide other instruction than just focus on the parent/specific aspect of the game?
Decision-making
Direct instruction
Indirect instruction, suggestion, prompt
Explanation, teaching
Asking for input/assistance
Parental investigation
Assistive clue
Attention request
Mutuality
Monitoring
Process control

Guiding Questions. Although the flowchart did not reflect the complex examination of multiple behavioural elements when assigning a code and thus was not used in this study further, the questions in the flowchart provided information about the key code characteristics which we consistently referred to during the discussions. Thus, instead of the flowchart, I specified the key code characteristics by adding guiding questions to each code (see Table 5.9 for the final code definitions and guiding questions). To assign a code accurately, the coders needed to answer "yes" to multiple or some guiding questions. Accordingly, a new coding rule was added, "confirm coding decisions through guiding questions."

Coding Rule 9. Confirm coding decisions through guiding questions.

Guiding questions reflect the key code characteristics and should be answered "yes" to assign the code to the segment. If "or" is noted between the questions, at least one question should be answered "yes," and if "or" is not noted, all questions should be answered "yes."

An example of using guiding questions was Schaefer and Bayley's (1963) study that investigated parent–child interactions where each coding category was defined by several questions. For example, the category *ignoring* was defined by questions such as "does the mother seem to know very little about the child?" and "does she tend to overlook the needs of the child?" Each question was answered by providing a rating on a 7-point scale, and then the general score for the category was calculated. Although Schaefer and Bayley applied guiding questions to a global rating scale (i.e., not a microanalytic coding scheme as in the present study), their study illustrated the importance of identifying key characteristics for each code.

After adhering to the guiding questions when coding Testing Fragment 4, the coders reported that the guiding questions were useful when assigning the accurate code. First, the placement of the guiding questions in the coding scheme—that is, next to the code definitions—

was quicker to refer to compared to the flowchart (i.e., the flowchart was separate from the code definitions). Furthermore, as the code definitions provided full information about the behaviours that the codes captured, the guiding questions emphasised each key code characteristic through paraphrasing the definition into multiple questions, facilitating the understanding of each code. For example, the *praise* definition "short compliments or feedback containing a positive adjective or adverb about the child's verbal and/or non-verbal behaviours, expressed shortly after the child's behaviour" was paraphrased into two questions to emphasise the key code characteristics: (a) "can you name the child's behaviour that the parent responds to?" and (b) "does the parent positively evaluate the child's behaviour?"

Moreover, the guiding questions were easy to refer to when discussing coding disagreements. Before developing the guiding questions, the coders occasionally overlooked some of the key code characteristics due to the code definitions' containing a lot of information, and I repeatedly identified the key characteristics based on the code definitions during the discussions. After developing the guiding questions, instead of my repeatedly identifying the key code characteristics to the coders, we easily referred to the guiding questions.

For example, the parent's verbal behaviours "what can you do with this car?" and "what can we do with this one?" were inaccurately coded as *assistive clue*. Referring to the *assistive clue* guiding question, "can you name the parent's hint that can be used to figure out the next correct move?" we clarified that no hint about the next correct move could be identified in these segments. Instead, the guiding questions for *prompt* "does the parent prompt the child to proceed with the game?" and "does the parent not provide a clear instruction or hint about the next correct move?" could be answered "yes." Similarly, the parent's verbal behaviour "what could you do now?" was inaccurately coded as *parental investigation*. Referring to the *parental* *investigation* guiding question, "does the parent ask about the child's thinking process or approach towards the game?" we clarified that the parent did not inquire about the child's thinking process or approach towards the game. Instead, again, the guiding questions for *prompt* could be answered "yes." Throughout the testing, the guiding questions were deemed useful and thus remained part of the final coding scheme.

Considering Coding Categories

During the coding disagreement discussions, I occasionally reiterated the importance of considering the coding categories (e.g., if deciding between two codes in the *guidance* and *control* categories, asking "does the parent appear to guide or to control the child?"). However, the coders frequently referred to the codes without considering the categories which occasionally contributed to inaccurate coding. For example, the parent said, "you don't look at the solution!" while suddenly taking the card from the child's hand. Although the parent instructed the child to not look at the solutions on the card (i.e., potential *direct instruction* code and thus *control* category), the negative element of this behaviour was clearly expressed (i.e., the parent's raised voice tone, sudden taking the card from the child, and disapproving of the child's looking at the solution on the card). Consequently, the *negative* category was considered which helped identify the accurate code, *disagreement, disapproval* (i.e., the parent disagreed with the child's looking at the solution on the card).

Using the flowchart when recoding Testing Fragment 3 prompted the coders to consider the coding categories (e.g., *positive*, *guidance*, *control*) but after excluding the flowchart from further use in this study, the coders were not reminded of considering the categories anymore. Therefore, the coding rule was added, "consider the coding categories." Consequently, during the testing, the coders considered the coding categories more frequently which assisted in assigning accurate codes.

Coding Rule 10. Consider the coding categories.

Referring to the coding categories can help to differentiate between the codes and to improve coding accuracy. For example, if deciding between *direct instruction* and *indirect instruction, suggestion*, assess whether the segment better matches the *guidance* or *control* category.

Considering the Context

The importance of considering the context of the parent's behaviour was discussed with the RA during the pilot coding scheme development phase (see Chapter 3, Section 3.3.2) and with the coders during the coder training (see Chapter 4, Section 4.3). When testing the pilot coding scheme, the context was discussed multiple times to resolve coding disagreements. When the coders insufficiently considered the context, I repeatedly demonstrated the difference in examining the parent's behaviour when looking at a segment as an isolated unit or within the context. That is, in Transana, I played the segment on its own (i.e., as an isolated unit) and as part of a segment sequence that included the preceding segments (i.e., within the context). In such coders' errors I observed what Chorney et al. (2015) described as "missing the forest for the trees," when granular coding may occasionally result in an isolated and simplified view of behaviours (p. 157). Thus, for each segment, a thorough consideration of all behavioural elements and the context was crucial. Accordingly, throughout the discussions, the coders' consideration of context continuously improved, contributing to improved coding accuracy.

A Spectrum of Behaviours for the Code

During the previous pilot coding scheme development phase, the RA and I observed a spectrum of behaviours for each code (see Chapter 3, Section 4.3). Because the coding scheme is exhaustive, a code is assigned to every segment, resulting in a variety of segments assigned the same code. During the testing, the coders and I observed more varied and complex segments, some of which were more challenging to reach agreement on due to the richness and complexity of multiple behavioural elements because they were different from or did not appear in previously coded video fragments. As Silverman (2017) explained, such varied and challenging segments required a careful analysis formulating a clear rationale for coding strategies. Thus, such challenging segments were discussed in detail to examine all identifiable behavioural elements and to reach agreement on the most suitable codes. Although some segments required a lengthy discussion, all segments contained identifiable behavioural elements that allowed to assign a code from the pilot coding scheme (i.e., no new codes needed including in the coding scheme to accommodate the challenging segments).

For example, the parent's "that was tricky!" after completing the game was coded as *supportive comment, encouragement* or *criticism, accusation, complaint*. Because the parent's voice tone was not harsh or negative, some coders thought this example could not be assigned a code from the *negative* category (i.e., *criticism, accusation, complaint*). However, during the discussions, we reached agreement that the parent may express *criticism, accusation, complaint* in various ways, including using a calm or harsh voice tone. Furthermore, in this example, we could not identify behavioural elements for considering the parent's behaviour supportive or encouraging. Although the parent's mentioning that the game was tricky may support the child in communicating that the child was not alone in this tricky situation, such interpretation may be speculative. Instead, as an identifiable behavioural element, we noted the parent's complaining about the situation (i.e., that the game was tricky to complete). Thus, this example was coded as *criticism, accusation, complaint* and illustrated a behaviour among a spectrum of other behaviours for this code where the key code characteristics may be expressed differently (e.g., the parent's voice tone may be calm or harsh). Such varied coding disagreements also provided insights for the coding scheme amendments (see Section 5.2.3 for an illustration of more novel and complex coding disagreement examples during the testing).

Change in Behaviour Within a Segment

Considering the change in behaviour within a segment was discussed during the previous phases (see Chapter 3, Section 3.3.2, and Chapter 4, Section 4.3). During the testing, we further discussed attending to the change in behaviour within the segment when coding to improve coding accuracy. During the discussions, I noted the importance of accurate segmentation where the segment must start at the exact point of the change in behaviour. If a new segment includes even a brief moment of the previous behaviour, it may confuse coders regarding where the segment started, and which behavioural elements should be examined. Because I segmented the behaviours, changes in behaviour were clear to me, but the coders coded pre-segmented video fragments and thus any segmentation ambiguities were confusing. Although rarely, several coding disagreements occurred because a segment included a moment of behaviour from the previous segment. After observing and clarifying such ambiguities (i.e., re-segmenting such confusing segments when needed), I further carefully segmented the video fragments to avoid such coding confusion.

Furthermore, the segmentation of subtle non-verbal behaviours was discussed during the testing. Occasionally, when the parent demonstrated a subtle non-verbal behaviour (e.g., a slight nod or a smile), the coders questioned whether the behaviour was present and whether I intended to segment it. Similarly, the coders occasionally missed subtle non-verbal behaviours that I intended to segment, only noticing them during the coding disagreement discussions. For example, the coders missed a slight nod and instead coded the segment as *monitoring*. In the present study, non-verbal behaviours were not transcribed in Transana (i.e., a smile or a nod was segmented but was not described as “a smile” or “a nod” in the transcription), but after noticing the coders’ uncertainty, non-verbal behaviours such as laughing, smiling, or nodding were transcribed in Testing Fragments 13, 14, and 15. The coders reported that such transcriptions were easier to code. Thus, future researchers should consider transcribing subtle non-verbal behaviours to improve coding accuracy.

***Coding* Other**

When discussing coding disagreements, I observed that the coders occasionally avoided assigning *other* because it appeared to be uninformative (i.e., the coders were cautious not to code an informative behaviour as *other*). Because we observed many novel and complex segments which required a close examination to assign a suitable code, the coders occasionally perceived the segments that appeared to not fit any code description as needing a closer examination. Although that was frequently correct, some segments were challenging to assign an accurate code because no code was suitable except *other*. *Other* is informative in reflecting the parent’s observed behaviour when the behaviour does not contain suitable information to assign any code.

For example, the parent said “yup, that looks right” (after the game was set up correctly, and thus coded as *confirmation, acknowledgement*) and then said “okay.” The coders coded “okay” as *supportive comment, encouragement*, or *confirmation, acknowledgement*, or *indirect* *instruction, suggestion, prompt*. I coded this segment as *other*, and we discussed identifiable behavioural elements to confirm each of the codes. For *supportive comment, encouragement*, we could not identify the parent's playful, encouraging, or supportive behaviour. For *confirmation, acknowledgement*, although the previous behaviour "yup, that looks right" confirmed and acknowledged the child's behaviour, we agreed that the parent's "okay" did not confirm or acknowledge the child's behaviour or the situation that the child was involved in. Instead, the parent's "okay" was a new behaviour after the confirmation of setting up the game. For *indirect instruction, suggestion, prompt*, we could not identify the parent's prompting the child to proceed with the game. Therefore, we further considered different codes in the coding scheme and reached agreement that because the segment did not match the key characteristics for any code, the accurate code to assign was *other*.

In contrast, the coders also occasionally assigned *other* to complex and challenging segments that needed a closer examination. In such instances, when the coders had not previously observed similar segments, novel segments appeared unrepresentative of any codes. However, as we observed more novel and complex segments during the testing, the number of code examples for each code increased, representing a spectrum of behaviours for each code. The coders practised coding and examining novel and complex behaviours, improving their ability to identify accurate codes rather than *other* where applicable. Furthermore, occasionally, where I assigned *other*, the coders accurately identified a different code (see Section 5.2.3 and Table 5.3 for such examples). Such varied examples of accurately and inaccurately assigning *other* further illustrated the importance of detailed examination of multiple behavioural elements and the value of coding disagreement discussions when determining the accurate codes, and were added to the final coding scheme for a clearer understanding of the codes.

Resolving Coding Disagreements

Because during the testing none of the IRAs of the video fragments were compared to the "gold standard" guidelines (i.e., no accurate codes had been established before coding), during the discussions we reached agreement on the accurate codes where the coders and I disagreed (i.e., a coder's, mine, or a different code). My coding was accurate most frequently, and in such cases, I explained to the coders how to approach the data and the coding scheme. Accordingly, I gained insights into the coding scheme amendments needed where the coders' errors were influenced by the ambiguities in the coding scheme.

However, occasionally, a different code than either of us initially assigned turned out to be accurate. Such challenging segments were thoroughly analysed by identifying observable behavioural elements for each code, and were frequently added to the coding scheme as examples, to illustrate a variety of behaviours that can represent a code. For example, as the child was setting up the cars on the board, the parent said "then that's the yellow one there" while pointing at the board where the yellow car should be placed. The coders and I assigned different codes to this segment, *assistive clue*, *direct instruction*, and *explanation, teaching*. This example contained behavioural elements that appeared to fit multiple code definitions and thus was closely examined through discussion. For *assistive clue*, we could not name the hint that the parent provided to the child (i.e., we could not answer the *assistive clue* guiding question, "can you name the parent's hint that can be used to figure out the next correct move?") because the parent directly named the next correct move without hinting it (i.e., to place the yellow car where the parent pointed on the board). For *direct instruction*, we could name exactly what the parent wanted the child to do (i.e., we could answer the *direct instruction* guiding question, "can you name exactly what the parent wants the child to do?"), but the parent's behaviour was not expressed in a direct way (i.e., we could not answer the *direct instruction* guiding question, "is the instruction expressed in a direct way?") because the parent's voice tone was suggestive rather than direct. For *explanation, teaching*, we could not identify the element of teaching "how" or "why" something is done or answer any other guiding questions. Thus, having considered our coding decisions, we reached agreement that neither of our codes was accurate for this segment. Consequently, after identifying the parent's suggestive voice tone, we considered *indirect instruction, suggestion, prompt*, and, after considering the coding categories, we reached agreement that the parent's behaviour appeared guiding (i.e., *indirect instruction, suggestion, prompt*) rather than controlling (i.e., *direct instruction*). Thus, we coded the segment as *indirect instruction, suggestion, prompt*. See Section 5.2.3 for more examples of resolving the coding disagreements.

5.2.3 Examples of Coding Disagreements During Testing

Some data examples have been presented throughout this chapter to illustrate coding disagreements for the topics that the coders and I discussed. Most frequently, when discussing coding disagreements, my coding was accurate. Table 5.3 presents a segment sequence to illustrate several coding disagreements where my coding was inaccurate and one of the coders' coding or a different code (i.e., a code that neither of us assigned) was accurate. The segments where there were no disagreements (i.e., Segments 1, 2, and 5) provide the context for explaining the segments with coding disagreements (i.e., Segments 3, 4, 6, and 7). Furthermore, Table 5.3 illustrates the novel and complex segments we observed, examined, and discussed. Where the coders were correct, they demonstrated a better insight and examination of the novel segments than I did, and demonstrated their effort and improving ability to identify the accurate codes for complex segments. This was an indication that the coding scheme could be interchangeably and accurately applied by multiple coders (i.e., the coding scheme was not idiosyncratic to my understanding).

Table 5.3

Example of Coding Agreements and Disagreements Between Thesis Author and Each Coder During Testing

	Verbal behaviour	Non-verbal behaviour	Thesis author	Coder 1	Coder 2	Coder 3
Segment 1	P: Come on then.	P: Moves hand away from the game.	**Prompt**	**Prompt**	**Prompt**	**Prompt**
Segment 2	C: Easy peasy.	-- C: Leans towards the game. -- P: Glimpses at C.	**Monitoring**	**Monitoring**	**Monitoring**	**Monitoring**
Segment 3	P: I'll count how long it takes you to do it.	C: Moves a car forward and back on the board.	Other	**Supportive comment, encouragement**	Confirmation, acknowledgement	**Supportive comment, encouragement**
Segment 4	P: One, two, three, four, five…	-- P: Glimpses at C. -- C: Touches a car on the board.	Other	**Supportive comment, encouragement**	**Supportive comment, encouragement**	**Supportive comment, encouragement**
Segment 5	< C: Oi, don't count, it annoys me.	-- C: Laughs. -- P: Laughs. C: Moves two cars on the board.	**Positive gesture/ expression**	**Positive gesture/ expression**	**Positive gesture/ expression**	**Positive gesture/ expression**
Segment 6	P: Easy, is it? Easy, is it?	-- P: Glimpses at C. -- C: Touches the cars.	Criticism, accusation, complaint, threat	Confirmation, acknowledgement	Confirmation, acknowledgement	**Supportive comment, encouragement**

Segment 7	-- C: Yeah, it's easy! -- P: Is it, really easy?	Criticism, accusation, complaint, threat	Confirmation, acknowledgement	Confirmation, acknowledgement	Confirmation, acknowledgement

Note. P = parent, C = child, < = interruption, -- = simultaneous behaviours.
The accurate codes are in boldface. The accurate code for Segment 7 is *supportive comment, encouragement.*

Segments 3 and 4

In Segment 3 in Table 5.3, the parent's behaviour "I'll count how long it takes you to do it" was coded as *other*, or *supportive comment, encouragement*, or *confirmation, acknowledgement*. Because this segment was different from previously observed, assigning an accurate code was challenging. I concluded that no code could be accurately assigned to Segment 3 and thus assigned *other* (also concluding the same for Segment 4), but Coder 2 suggested that in Segment 3 the parent responded to the child's "easy peasy" (Segment 2), and thus Segment 3 should be coded as *confirmation, acknowledgement*. However, after a closer examination, we agreed that the parent's behaviour contained more information than other segments usually assigned *confirmation, acknowledgement*. Coders 1 and 3 suggested that the parent responded to the child's "easy peasy" by referring to counting how long the child would take to complete the game and thus creating a positive and playful game atmosphere. Accordingly, the parent continued the playful behaviour to Segment 4 by starting to count how long the child would take to complete the game. Furthermore, in Segments 3 and 4, the parent's voice tone was calm and positive, contributing to the identifiable behavioural elements of playfulness and positivity. As the child said "oi, don't count, it annoys me" in Segment 5, the child and the parent simultaneously laughed which further suggested the playfulness and positivity of the interaction and the parent's behaviours. Thus, having examined the behavioural elements and the context, we coded Segments 3 and 4 as *supportive comment, encouragement*.

Segments 6 and 7

In Segment 6 in Table 5.3, the parent's behaviour "Easy, is it? Easy, is it?" was coded as *confirmation, acknowledgement*, or *supportive comment, encouragement* or *criticism, accusation, complaint, threat*. Because the child had moved the cars on the board unsuccessfully

(Segment 5), I concluded that in Segment 6 the parent criticised the child's statement that the game was easy (Segment 2), and thus coded Segment 6 as *criticism, accusation, complaint, threat* (the same reasoning for Segment 7). In comparison, Coders 1 and 2 suggested that in Segment 6 the parent acknowledged the child's struggling to proceed with the game, and thus Segment 6 should be coded as *confirmation, acknowledgement*. However, similarly to Segment 3, we reached agreement that Segment 6 contained more information than other segments usually assigned *confirmation, acknowledgement*. Accordingly, Coder 3 suggested and we agreed that in Segment 6 the parent continued to express the playfulness and positivity initiated in Segments 3 and 4. The parent continued the playful behaviour to Segment 7, exchanging playful comments about the situation with the child. Furthermore, the parent's voice tone was positive which further suggested the playfulness and positivity of the parent's behaviour. Thus, having examined the behavioural elements and the context, we coded Segments 6 and 7 as *supportive comment, encouragement*.

5.3 Inter-Rater Agreement During Testing

This section discusses the IRA results during the testing phase. The IRA for each video fragment (i.e., assessing how well coders agreed on the codes they assigned within a particular video fragment) was assessed (a) for nine video fragments, after coding each fragment, and (b) for six video fragments, after coding all six fragments. When coding nine video fragments, the coding scheme was continuously amended based on the IRA and the coding disagreement discussions. After sufficiently amending the coding scheme, six video fragments were coded using the same amended coding scheme version (i.e., the coding scheme was not amended further while coding the six video fragments) to assess the IRA for individual categories and codes (i.e., how well coders agreed on a particular code throughout the six video fragments), and to investigate the coders' ability to apply the coding scheme without regular discussions after coding each video fragment.

5.3.1 Inter-Rater Agreement for Each Video Fragment: Testing Fragments 1-9

When coding nine video fragments, coding disagreements were discussed after coding each fragment, and the coding scheme was amended several times. Thus, we used different coding scheme versions to code different video fragments. The IRA was assessed to examine the coders' progress (i.e., the level of agreement and the coding improvements throughout the testing; Bakeman & Quera, 2015; Margolin et al., 1998) and the coding scheme's completeness (i.e., in case of low IRA, the coding scheme may benefit from further amendments).

Tables 5.4 and 5.5 present the IRA between each coder's coding and my own coding, and between the coders' coding for nine video fragments. The IRA results were examined according to Bakeman and Quera's (2011) Cohen's kappa guidelines for comparing two coders' coding (see Chapter 3, Table 3.4 for the kappa guidelines) because the accurate codes for these video fragments had not been previously established (i.e., had the accurate codes been established, the "gold standard" guidelines would have been followed). After coding each of the nine video fragments, we discussed the coding disagreements and established the accurate codes. Table 5.6 presents the IRA for each coder's and my own coding assessed in relation to the accurate coding established during the discussions. These results allow examining our coding accuracy—that is, how accurately we coded the segments initially compared to the mutually agreed accurate coding. Because these accurate codes had been established, the IRA results in Table 5.6 were examined according to Bakeman and Quera's "gold standard" kappa guidelines.

Table 5.4
Inter-Rater Agreement Between Thesis Author (TA) and Each Coder for Testing Fragments 1-9

	TA & Coder 1		TA & Coder 2		TA & Coder 3	
Video fragment	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement
Fragment 1	**.84**	**88**	**.86**	**90**	**.73**	**80**
Fragment 2	**.82**	**86**	**.83**	**87**	**.80**	**86**
Fragment 3	**.67**	**75**	**.66**	**75**	.60	**70**
Fragment 4	**.66**	**71**	**.66**	**71**	.50	57
Fragment 5	**.82**	**85**	**.83**	**86**	**.74**	**78**
Fragment 6	**.77**	**81**	**.81**	**85**	**.68**	**75**
Fragment 7	**.76**	**80**	**.74**	**78**	**.63**	69
Fragment 8	**.77**	**82**	**.86**	**89**	**.77**	**82**
Fragment 9	**.69**	**75**	**.71**	**78**	.61	68

Note. Scores within Cohen's kappa "two raters" (.62-1.00; Bakeman & Quera, 2011) and percentage agreement (70-100%) guidelines are in boldface.

Table 5.5
Inter-Rater Agreement Between Coders for Testing Fragments 1-9

	Coder 1 & 2		Coder 2 & 3		Coder 1 & 3	
Video fragment	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement
Fragment 1	**.76**	**83**	**.66**	**76**	**.74**	**81**
Fragment 2	**.78**	**84**	**.78**	**84**	**.77**	**83**
Fragment 3	**.63**	**72**	**.71**	**79**	.58	67
Fragment 4	**.65**	**71**	.57	65	.53	61
Fragment 5	**.77**	**81**	**.83**	**83**	**.70**	**75**
Fragment 6	**.74**	**79**	**.66**	**73**	**.65**	**72**
Fragment 7	**.76**	**80**	**.66**	**72**	**.63**	69
Fragment 8	**.76**	**81**	**.77**	**82**	**.76**	**81**
Fragment 9	**.73**	**79**	.58	65	**.66**	72

Note. Scores within Cohen's kappa "two raters" (.62-1.00; Bakeman & Quera, 2011) and percentage agreement (70-100%) guidelines are in boldface.

Table 5.6

Inter-Rater Agreement Between Each Coder's and Thesis Author's Coding in Relation to Accurate Coding for Testing Fragments 1-9

	Thesis Author		Coder 1		Coder 2		Coder 3	
Video fragment	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement
Fragment 1	**.94**	**96**	**.86**	**90**	**.80**	**86**	.75	**82**
Fragment 2	**1.00**	**100**	**.82**	**86**	**.83**	**87**	**.80**	**86**
Fragment 3	**.93**	**95**	.69	**76**	.64	**73**	.59	**70**
Fragment 4	**.95**	**96**	.68	**71**	.66	**71**	.50	57
Fragment 5	**.89**	**91**	**.82**	**85**	**.86**	**88**	**.79**	**83**
Fragment 6	**.97**	**97**	.78	**82**	**.83**	**86**	.69	**76**
Fragment 7	**.92**	**94**	**.79**	**82**	.78	**82**	.64	**70**
Fragment 8	**.96**	**97**	.77	**82**	**.87**	**90**	.77	**82**
Fragment 9	**.90**	**93**	.76	**81**	**.80**	**84**	.66	**73**

Note. Scores within Cohen's kappa "gold standard" (.79-1.00; Bakeman & Quera, 2011) and percentage agreement (70-100%) guidelines are in boldface.

The IRA between my own coding and Coders 1 and 2's coding (see Table 5.4), and between Coder 1's and Coder 2's coding (see Table 5.5) was satisfactory for all nine video fragments (i.e., kappa above the recommended minimum of .62; Bakeman & Quera, 2011). In comparison, the IRA between my own coding and Coder 3's coding (see Table 5.4), and between Coders 1 and 2's and Coder 3's coding (see Table 5.5) was unsatisfactory for Testing Fragments 3, 4, and 9 which contained many novel and complex segments, as observed based on the coding disagreement discussions. Thus, Coder 3's coding was potentially less accurate than other coders' and my own coding. This was further supported by the IRA results between the accurate coding and each coder's and my coding (see Table 5.6), where Coder 3 showed unsatisfactory IRA scores for 7 out of 9 video fragments, and the two fragments with satisfactory IRA scores were close to the recommended minimum (.80 and .79 where the recommended minimum was .79; Bakeman & Quera, 2011). Although the IRA between the accurate coding and Coders 1 and 2's coding was also unsatisfactory for some video fragments, Coder 3's IRA was the lowest out of all coders. For example, for Testing Fragment 4, the IRA between the accurate coding and Coder 1, 2, and 3's coding was .68, .66, and .50, respectively. Thus, Coder 3's IRA indicated the poorest coding accuracy out of all coders which was further confirmed during the coding disagreement discussions, when I observed Coder 3's repeated coding errors that had been resolved and not repeated by Coders 1 and 2.

These insights suggested Coder 3's poor understanding of the coding scheme (and the understanding could not be sufficiently improved through repeated discussions) and not the lack of potential in the coding scheme's replicable application. In comparison, Coders 1 and 2 demonstrated higher IRA than Coder 3 and a better understanding of the coding scheme which demonstrated the potential in the coding scheme's replicable application. Thus, after coding nine video fragments, Coder 3 was excluded from further coding (see Section 5.3.2.1 for further information about Coder 3's exclusion).

Table 5.6 demonstrates that when compared to the accurate coding established during the discussions, my coding was always more accurate than Coders 1, 2, and 3's which was expected because I developed the coding scheme and had practiced coding the longest. However, I only coded Testing Fragment 2 to 100% accuracy, and some of my coding was inaccurate for other video fragments. My occasionally inaccurate coding illustrated the complexity of the data where even having developed the coding scheme myself, I made several errors depending on the novelty and complexity of a segment. During the discussions, we questioned each other's coding decisions and through resolving coding disagreements I observed potential inaccuracies, discrepancies, or unclarities in the coding scheme, and in my own coding, which allowed me to improve the coding scheme. Such cases, when the coders' coding was accurate, also demonstrated the coders' invaluable input to our understanding of the data and the coding scheme development.

The IRA between the accurate coding and Coders 1 and 2's coding for some video fragments was below the recommended Cohen's kappa minimum (see Table 5.6), but the IRA between Coders 1 and 2' coding and my own coding was satisfactory for all video fragments (see Table 5.4). Because of high IRA between my coding and the accurate coding for all video fragments, satisfactory IRA between the coders' coding and my own coding showed the coders' ability to apply the coding scheme in agreement with my coding, as my coding was highly accurate. Furthermore, as Crittenden and Hill (1971) explained, low IRA may be related to the challenging task of examining complex segments through the coders' judgement. Accordingly, where the coders' IRA was lower for some video fragments, those fragments contained more novel and complex—and therefore frequently more challenging to code accurately—behaviours (e.g., Testing Fragments 3 and 4, as demonstrated by the IRA and observed during the coding disagreement discussions). However, the coders' continuous improving understanding of the data and the coding scheme, and the IRA scores indicated the coders' readiness to proceed to coding the next six video fragments (Bakeman & Quera, 2011; Heyman et al., 2014), and the coding scheme's sufficient amendments so that the coding scheme could be applied independently (i.e., without regular discussions and coding scheme amendments).

5.3.2 Inter-Rater Agreement for Each Video Fragment and Individual Categories and Codes: Testing Fragments 10-15

After the coding scheme was deemed sufficiently developed and the coding disagreements were discussed in detail to form a solid basis for the coders' understanding of the data and the coding scheme, we independently coded six video fragments. We applied the coding scheme version developed throughout coding the nine video fragments and did not discuss the coding disagreements or further amend the coding scheme throughout coding the six video fragments. Applying the same coding scheme version allowed to assess the IRA for individual categories and codes (i.e., how well the coders agreed on assigning each code) and to examine whether the coding scheme needed further amendments. Several final coding scheme amendments were made based on the insights after coding the six video fragments (e.g., more code examples were added to the codes with unsatisfactory IRA), resulting in the construction of the final coding scheme.

5.3.2.1 Coder 3's Exclusion

During the coder training, I observed potential issues with Coder 3's coding accuracy (see Chapter 4, Section 4.4.2) and carried out a separate coding disagreement discussion after observing more errors in Coder 3's coding than in other coders' coding. Similarly, throughout the testing, the IRA scores between Coder 3's coding and my own or other coders' coding (see Tables 5.4 and 5.5) or the accurate coding (see Table 5.6) showed Coder 3's potentially poorer understanding of the coding scheme and the data. This was frequently confirmed during the coding disagreement discussions, when I occasionally discussed some of Coder 3's coding disagreements separately because other coders did not continuously make the errors that needed repeated resolving with Coder 3. Having employed three coders during the testing allowed me to observe that Coder 3's poorer IRA and more frequent repeated coding errors may not be due to the ambiguities in the coding scheme because other coders more frequently demonstrated satisfactory IRA and improving coding scheme understanding during the discussions. Thus, Coder 3's coding errors were deemed to not be reflective of the quality of the coding scheme (i.e., that the coding scheme may need further amendments) or my explanations. Instead, Coder 3 appeared to differ from other coders in the ability to understand the data and apply the coding scheme.

Although I ensured to repeatedly support Coder 3's progress and learning by discussing every coding disagreement and organising separate meetings to discuss the aspects of coding that Coder 3 struggled with, such as attending to the context or identifying behavioural elements for the key code characteristics, as Chorney et al. (2015) explained, "despite good training and multiple attempts at feedback, some individuals have great difficulty becoming reliable coders" which "becomes clear relatively early in training" (p. 161). I may assume this was the case for Coder 3's performance in the present study, as I started noticing Coder 3's coding errors and difficulties during the previous coder training phase. Thus, after coding nine video fragments, Coder 3 was excluded from coding the next six video fragments to prevent inaccurate IRA results that may not reflect the quality of the coding scheme. As I anticipated before the coder training, having employed more than two coders ensured that enough coders could complete the testing phase in case one coder needed excluding from the study due to factors such as unsatisfactory IRA (Margolin et al., 1998).

When discussing the exclusion, Coder 3 reflected on noticing their potentially different understanding of the interactional context and parents' behaviour (e.g., phrasing of verbal behaviours), and attributed such differences to their different cultural background. This may contribute to coders' coding differences (Margolin et al., 1998), but I could not draw definite conclusions about such reasons for Coder 3's poorer coding performance during the present study. Thus, I based my decision to exclude Coder 3 from the study on the IRA scores and the insights about repeated coding errors gained during the discussions. However, even though Coder 3 was excluded from part of the study, their participation had provided valuable insights into the data and the coding scheme amendments as Coder 3 participated in multiple coding disagreement discussions.

Although I only excluded Coder 3 from the study during this phase, I had noticed Coder 3's potential coding difficulties during the previous coder training phase. However, all three coders proceeded to this phase even when unsatisfactory IRA was at times observed because the coding scheme had not yet been sufficiently developed which contributed to unsatisfactory IRA (i.e., the coding scheme ambiguities contributed to the coders' inaccurate coding). Accordingly, I was unsure whether Coder 3's repeated errors may be due to the further needed coding scheme amendments or Coder 3's poorer understanding of the coding scheme and the data. However, because future researchers will be applying the final coding scheme, they should train coders to satisfactory IRA and, should any doubt with coders' suitability arise, researchers should be able to notice them during coder training and to amend training accordingly (e.g., add more discussions as needed) or to decide to exclude the coder from the study. Accordingly, future researchers may benefit from employing more than two coders in case one of the coders proves unsuitable.

5.3.2.2 Inter-Rater Agreement for Individual Categories and Codes

Table 5.7 shows that the IRA for each coder pair was satisfactory for all six video fragments, demonstrating the coders' ability to apply the coding scheme reliably and independently. Further, Cohen's kappa for individual categories and codes was assessed (see Table 5.8; see Kvålseth, 1989, for the formulas used in the present study) to examine how well the coders and I agreed on assigning each category and code throughout the six video fragments. Because no guidelines have been established for interpreting kappa scores for individual categories and codes, I examined various guidelines for interpreting kappa scores for individual video fragments. Consequently, I considered kappa scores above .70 satisfactory (Bakeman & Quera, 2011; Fleiss et al., 2003; Landis & Koch, 1977). However, when encountering unsatisfactory kappa scores for individual categories and codes, I also considered the code frequency and the complexity of each code based on the insights gained during the coding disagreement discussions throughout the present study. Thus, consistent with the approach to the IRA interpretation for individual video fragments, kappas for individual categories and codes were considered alongside the insights into the data and the coding scheme.

Table 5.7

Inter-Rater Agreement Between Thesis Author (TA) and Coders for Testing Fragments 10-15

	TA & Coder 1		TA & Coder 2		Coder 1 & 2	
Video fragment	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement
Fragment 10	**.75**	**80**	**.78**	**82**	**.77**	**82**
Fragment 11	**.78**	**83**	**.77**	**82**	**.76**	**81**
Fragment 12	**.71**	**77**	**.76**	**82**	**.68**	**75**
Fragment 13	**.75**	**80**	**.79**	**83**	**.77**	**82**
Fragment 14	**.70**	**75**	**.80**	**83**	**.71**	**76**
Fragment 15	**.82**	**88**	**.81**	**88**	**.83**	**89**

Note. Scores within Cohen's kappa "two raters" (.62-1.00; Bakeman & Quera, 2011) and percentage agreement (70-100%) guidelines are in boldface.

Table 5.8

Inter-Rater Agreement for Individual Categories and Codes Between Thesis Author (TA) and Each Coder for Testing Fragments 10-15

	Cohen's kappa			Code frequency (% of segments)		
Category/Code	TA & Coder 1	TA & Coder 2	Coder 1 & Coder 2	TA	Coder 1	Coder 2
Positive	**.82**	**.86**	**.82**	298 (23.0)	289 (22.3)	290 (22.4)
Praise	**.85**	**.87**	**.81**	24 (1.9)	18 (1.4)	24 (1.9)
Confirmation, acknowledgement	**.78**	**.83**	**.77**	178 (13.7)	185 (14.3)	192 (14.8)
Positive gesture/expression	**.75**	**.87**	**.77**	29 (2.2)	42 (3.2)	28 (2.2)
Supportive comment, encouragement	.60	**.70**	.63	67 (5.2)	44 (.3.4)	46 (3.5)
Negative	**.72**	**.70**	.69	30 (2.3)	28 (2.2)	24 (1.9)
Disagreement	**.75**	**.70**	**.78**	19 (1.5)	13 (1.0)	15 (1.2)
Criticism, accusation, complaint, threat	.53	**.70**	.58	11 (.8)	15 (1.2)	9 (.7)
Control	**.74**	**.80**	**.79**	57 (4.4)	71 (5.5)	62 (4.8)
Attention request	**.83**	**.92**	**.77**	6 (.5)	6 (.5)	7 (.5)
Decision-making	**.72**	**.70**	**.82**	10 (.8)	12 (.9)	10 (.8)
Direct instruction	**.71**	**.78**	**.77**	41 (3.2)	53 (4.1)	45 (3.5)
Engagement	**.70**	**.87**	**.73**	43 (3.3)	56 (4.3)	44 (3.4)
Asking for input/assistance	.61	**.78**	**.70**	30 (2.3)	51 (3.9)	39 (3.0)
Parental investigation	.44	.55	**.80**	13 (1)	5 (.4)	5 (.4)
Guidance	.67	**.76**	**.70**	151 (11.6)	128 (9.9)	151 (11.6)
Assistive clue	.37	.55	.25	9 (.7)	7 (.5)	9 (.7)
Explanation, teaching, demonstration	.65	.68	**.70**	94 (7.2)	96 (7.4)	111 (8.6)

Indirect instruction, suggestion	.68	.51	.64	19 (1.5)	13 (1.0)	12 (.9)
Prompt	.38	.66	.31	29 (2.2)	12 (.9)	19 (1.5)
Monitoring	**.89**	**.90**	**.87**	492 (37.9)	489 (37.7)	531 (40.9)
Monitoring	**.89**	**.90**	**.87**	492 (37.9)	489 (37.7)	531 (40.9)
Process control	**.83**	**.79**	**.81**	186 (14.3)	177 (13.6)	167 (12.9)
Process control	**.83**	**.79**	**.81**	186 (14.3)	177 (13.6)	167 (12.9)
Other	.42	.34	.21	40 (3.1)	59 (4.5)	28 (2.2)
Other	.42	.34	.21	40 (3.1)	59 (4.5)	28 (2.2)

Note. Scores within Cohen's kappa guidelines (.70-1.00) are in boldface.

As shown in Table 5.8, unsatisfactory kappa scores for one or more coder pairs were observed for nine codes. For five out of nine codes, kappa scores between Coder 1's and my own coding, and between Coder 1's and Coder 2's coding were lower than kappa scores between Coder 2's and my own coding, which potentially showed Coder 1's different understanding of the data and the coding scheme compared to Coder 2's and my own understanding. Thus, considering the complexity and variety of behaviours and the subtle differentiation of codes, the coding disagreement discussions may improve Coder 1's coding accuracy and mutual understanding of behavioural elements to focus on (Margolin et al., 1998; Vuchinich et al., 1992), should Coder 1 continue to produce coding data. (However, Coder 1 did not participate in this study beyond this phase, and thus additional discussions were not carried out.)

Out of the nine codes that showed unsatisfactory kappa scores (see Table 5.8), *other* was not expected to show satisfactory kappa scores. Coders may assign *other* to various segments that appeared uninformative of a different code. As observed during the coding disagreement discussions, a coder may assign *other* to novel and complex segments that may be challenging or confusing when examining key code characteristics. Thus, in addition to the segments accurately assigned *other*, different complex and challenging segments that should be assigned different codes may also be inaccurately assigned *other*. Consequently, *other* may contain a variety of accurately and inaccurately coded segments and thus result in low kappa scores.

Table 5.8 shows that Coder 1 assigned *other* more frequently (59 times) compared to Coder 2 or myself (28 and 40 times, respectively). This may reflect Coder 1's poorer identifying of key code characteristics whereas Coder 2 and I were able to assign a suitable code to more segments. However, such *other* frequency differences may be best clarified through discussion. Furthermore, neither of us assigned *other* to more than 5% of the segments which Chorney et al.

(2015) suggested as one of the indications for successful coding scheme testing because we successfully applied the coding scheme to most segments.

Low code frequency may have contributed to unsatisfactory kappa scores for some codes (e.g., *parental investigation*, *assistive clue*). Different coders may code several complex segments differently which may contribute to unrepresentatively low kappa scores although it may remain unclear whether those segments represented typical and easier to identify behaviours for the code. In such cases, coding disagreement discussions may be considered, and more video fragments may be coded to clarify the reasons for unsatisfactory kappa scores. For example, coding more video fragments may provide varied and less complex segments which may increase kappa scores (in cases where the initial few segments were particularly complex and unrepresentative of a wide spectrum of behaviours for the code). However, coding more segments may also reveal differences and inaccuracies in the coders' understanding of the data and the codes (in cases where kappa scores remain unsatisfactory after coding more varied segments). Thus, to prevent further inaccurate coding, coders may discuss the coding disagreements once unsatisfactory kappa scores are observed (i.e., before coding more video fragments).

The eight codes (excluding *other*) that showed unsatisfactory kappa scores after coding six video fragments (see Table 5.8) were also discussed multiple times during the previous coding scheme development phases, and thus were known to require a detailed examination of behaviours and to be occasionally challenging due to the variety and complexity of segments. For example, assigning *assistive clue* required identifying whether the parent provided a hint about the next correct move where the hint may be expressed differently and subtly in different segments (e.g., phrased differently). Because parents demonstrated a spectrum of behaviours that may be assigned the same code, such different segments were occasionally challenging to examine and code accurately. Thus, to reach satisfactory agreement and ensure accurate coding, coding disagreement discussions may again be recommended to continuously include in the coding process.

Having observed unsatisfactory kappa scores for some codes, the final coding scheme amendments were made to further improve the code definitions of these codes and to include more data examples from the six video fragments (because the coding disagreements for the six video fragments were not discussed to establish accurate codes, I examined and selected the data examples that I ensured matched the key code characteristics). Because kappa scores were satisfactory or almost satisfactory for most of the codes between either Coder 1's and my own coding or Coder 2's and my own coding, indicating the coders' appropriate coding accuracy for this phase of the coding scheme development, further coding disagreement discussions were not carried out. After the final coding scheme amendments, all codes were deemed sufficiently developed and replicable considering the novelty of the coding scheme. The coding scheme was deemed ready to independently apply in the next coding scheme implementation phase (see Chapter 6).

5.4 Pilot to Final Code Development Examples

Throughout the coder training and the testing, the final coding scheme was developed through several stages of amendments (although most amendments were made during the testing phase), comprising 18 codes within eight distinct categories. The amendments were based on the IRA, coders' challenges, and insights gained during the coding disagreement discussions. A variety of novel and complex data examples were added, and the code definitions and code differentiation were clarified after observing the errors that the coders made (Hops et al., 1995).

Accurate and precise code definitions were particularly crucial for improving the coders' coding accuracy (Hops et al., 1995).

This section explains the pilot to final code development of four codes that have not yet been explained in Chapters 2 and 3. Consequently, at least one stage of development for each code in the final coding scheme is explained throughout this thesis. Furthermore, *assistive clue* and *prompt* explained in this section showed unsatisfactory IRA during the testing, and explaining how these codes were developed will help clarify the coders' challenges and how they were resolved through the coding scheme amendments. Table 5.9 presents the pilot and final code definitions for comparison. See Appendix E for the full final coding scheme.

In the final coding scheme, *prompt* was separated from *indirect instruction, suggestion, prompt* and formed a separate code because of the differences in the parent's behaviour these codes captured. Through *indirect instruction, suggestion*, the parent communicated the next move the parent would like the child to do, and through *prompt*, the parent prompted the child to proceed with the game (i.e., to make any move). The pilot codes *apology* and *self-reference* were removed from the final coding scheme, consequently removing the *statements* category. Throughout the coding scheme development, *apology* occurred too few times, and *self-reference* became redundant after clarifying other code definitions that could accommodate the segments that *self-reference* had previously accommodated. Furthermore, *mutuality* was removed from the final coding scheme because coding the parent's and the child's mutual attention on each other or something in the game was not descriptive of the parent's behaviour. Where the child showed a behaviour similar to the parent's behaviour (e.g., the parent and the child looked at each other simultaneously), the parent's behaviour could not be described as *mutuality* due to the child's coincidental similar behaviour. For example, the parent's looking at the child when the child simultaneously looks at the parent would be coded as *monitoring* which is descriptive of the parent's behaviour. Furthermore, the code summary table that included the category and code names in the pilot coding scheme (see Appendix C) was expanded to include the code definitions and the guiding questions for easier referring to each code (see Appendix E).

Direct Instruction

Direct instruction was frequently discussed, particularly when differentiating from other codes (e.g., from *assistive clue* or *indirect instruction, suggestion*) or coding non-verbal behaviours as *direct instruction*. Two guiding questions were added to specify the key *direct instruction* characteristics: (a) "can you name exactly what the parent wants the child to do?" and (b) "is the instruction expressed in a direct way?" Moreover, after observing novel and complex segments during the testing, more varied data examples were added to illustrate the spectrum of behaviours coded as *direct instruction*. For example, *direct instruction* frequently contained a verb (e.g., "move the purple one") but we observed the parent's occasionally expressing *direct instruction* without a verb (e.g., "ice cream van out" or "then…" while pointing at the car to move), and such examples were added to the coding scheme.

Furthermore, we observed non-verbal *direct instruction* examples that needed a detailed examination to code accurately. For example, in a segment sequence where the parent was directly instructing the child, the parent pointed at the car for the child to move next. We considered coding this non-verbal behaviour as *attention request* in that the parent attracted the child's attention to the car. However, we reached agreement that through *attention request*, the parent aims to attract the child's attention to what the parent is doing or is focused on, whereas through *direct instruction*, the parent aims to direct the child's behaviour. In this example, within the context, although the parent aimed to attract the child's attention to the car, the parent also wanted to direct the child to move the car. Thus, the behaviour adhered to the *direct instruction* guiding questions because we could name what the parent wanted the child to do (i.e., to move the car the parent pointed at), and the parent expressed this instruction directly (i.e., pointed at the exact car to move). Consequently, compared to the pilot definition, the final definition of *direct instruction* specified that both verbal and non-verbal behaviours may be coded as *direct instruction*, and code examples were added accordingly.

We were occasionally uncertain which behaviours to code as *direct instruction* or *indirect instruction, suggestion*. In the pilot coding scheme, *indirect instruction, suggestion* contained the parent's verbal behaviours expressed suggestively through adding the words such as "maybe" (e.g., "maybe move the fire engine up"), but during the testing, we observed similar behaviours phrased using the words such as "maybe," but expressed in a strict voice tone. Thus, we discussed whether such behaviours should be assigned *indirect instruction, suggestion* due to the suggestive phrasing (i.e., "maybe") or *direct instruction* due to the strict voice tone, which potentially added a direct and instructive aspect. At first, we agreed to code such behaviours based on the examination of each individual example. However, after coding several similar behaviours, reaching agreement on whether the voice tone was sufficiently strict to code the suggestively phrased verbal behaviour as *direct instruction* was challenging and confusing. Thus, the behaviours that included suggestive phrasing were coded as *indirect instruction, suggestion* and were excluded from the *direct instruction* examples.

Explanation, Teaching, Demonstration

Explanation, teaching, demonstration was frequently discussed because of many coding disagreements when coding novel and complex behaviours, where segments should have been assigned *explanation, teaching, demonstration*, but the coders inaccurately assigned different codes. For example, in one of the testing video fragments, 21 out of 59, 28 out of 88, and 20 out of 58 different coders' coding errors were due to inaccurate understanding of *explanation, teaching, demonstration*. Thus, the *explanation, teaching, demonstration* definition and examples were amended and clarified. Furthermore, based on different novel examples and the coders' challenges, five *explanation, teaching, demonstration* guiding questions were added: (a) "does the parent teach/explain how or why something is done?" or (b) "does the parent demonstrate how something is done?" or (c) "does the parent correct the child to teach the right move?" or (d) "does the parent teach/explain what something is?" or (e) "does the parent answer the child's question to explain or teach something?" The guiding questions illustrated a wide spectrum of behaviours the code may capture because at least one and not all questions needed answering "yes" (i.e., as per coding rule [see Chapter 5, Section 5.2.2], the questions were separated by "or," indicating that at least one question needed answering "yes" to assign the code). Such variety of behaviours that may be assigned *explanation, teaching, demonstration* potentially contributed to the coders' challenges, but adding the guiding questions further improved the coders' understanding of the key code characteristics and consequently contributed to improved coding accuracy.

Furthermore, during the testing, we observed the parent's non-verbal behaviour when after explaining which car should be moved, the parent then moved the same car. In the pilot coding scheme, such non-verbal behaviour was coded as *process control* because the parent proceeded with the game independently. However, during the discussions, we reached agreement that the parent's moving the car after explaining which car will be moved was the parent's demonstrating how to proceed with the game. Through the segment sequence of both the verbal explanation and the non-verbal demonstration of the move, the parent guided the child, explaining and demonstrating the correct moves. Accordingly, the pilot code name *explanation, teaching* was amended to include *demonstration* in the final coding scheme, and the non-verbal demonstration examples were added.

The parent's non-verbal demonstration of the move after requesting the child's attention (e.g., "look") was also coded as *explanation, teaching, demonstration* because the parent first engaged with the child and then guided the child through the game by non-verbally demonstrating the correct moves. However, after referring to the car and moving the car (i.e., both behaviours coded as *explanation, teaching, demonstration*), the parent's continuing to move other cars independently was coded as *process control* because the parent proceeded with the game independently. Similarly, after referring to one car through *explanation, teaching, demonstration*, the parent's then moving a different car was coded as *process control* because the parent did not demonstrate the move they referred to but instead proceeded with the game independently. Accordingly, the *explanation, teaching, demonstration* non-examples were added to differentiate between these non-verbal behaviours depending on the context.

Furthermore, in one of the testing video fragments, we observed the parent's answering the child's questions which we had not encountered previously. For example, when the child asked, "what's a solution?" the parent responded, "solution is the answer." We reached agreement that because the parent explained/taught something to the child (i.e., what the solution meant), such behaviours should be coded as *explanation, teaching, demonstration*. Accordingly, the code definition was amended to include the parent's answering the child's questions and varied code examples were added to illustrate the spectrum of behaviours coded as *explanation, teaching, demonstration*.

Assistive Clue

Assistive clue was frequently discussed to identify the presence or absence of a hint about the next correct move that the parent communicated to the child. Such identification required a detailed examination of all behavioural elements and the context to avoid confusing *assistive clue* with other codes such as *indirect instruction, suggestion* or *prompt*. For example, the parent's "now, could we move that yellow one?" could be coded as *assistive clue* or *indirect instruction, suggestion*, depending on the context. If the parent suggested moving the yellow car next, it would be coded as *indirect instruction, suggestion*. However, in this example, the child moved different cars on the board before the parent's hinting to the child about assessing whether the yellow car can move as a result of the child's previous moves. Thus, having observed the child's behaviour, we reached agreement that the parent hinted the next correct move, and this segment was coded as *assistive clue*. Based on discussing similar examples and observing the coders' struggling to identify a hint, a guiding question was added to *assistive clue*, "can you name the parent's hint that can be used to figure out the next correct move?"

Although examining behavioural elements and the context through video examples was important for accurate assignment of all codes, *assistive clue* required a particularly detailed and subtle examination, and thus written examples may not convey the entirety of all behavioural elements observable in the video (see Chapter 4, Section 4.3 for an explanation of the importance of video examples). Thus, during the discussions, a repeated and detailed video observation served to reach agreement on the accurate codes for *assistive clue*. Furthermore, after *prompt* was separated from *indirect instruction, suggestion*, *assistive clue* was also differentiated from each of the separated codes. Accordingly, separate non-examples were added to illustrate the differentiation between *assistive clue* and both *indirect instruction, suggestion* and *prompt*.

Prompt

During the testing, we observed challenging segments that we initially coded inaccurately, but after identifying the prompt in the parent's behaviour through discussion, we coded as *indirect instruction, suggestion, prompt*. Because many parents' behaviours were assigned *indirect instruction, suggestion, prompt* after identifying indirect instruction or suggestion, we occasionally forgot that prompt was part of the same code. Furthermore, *indirect instruction, suggestion* and *prompt* contained different key code characteristics to identify when assigning the code. Through *indirect instruction, suggestion*, the parent aimed to suggestively direct the child to make a specific move in the game, and through *prompt* the parent did not provide information about a specific move but only prompted the child to proceed with the game (i.e., to make any move). For example, by saying "and then?" the parent did not name a specific move for the child to make but only prompted the child to proceed with the game. Consequently, *indirect instruction* and *prompt* were separated, and separate guiding questions were added to *prompt*: (a) "does the parent prompt the child to proceed with the game?" and (b) "does the parent not provide a clear instruction or hint about the next correct move?"

After the separation, *prompt* was differentiated from *indirect instruction, suggestion* where behaviours appeared linguistically similar. Furthermore, *prompt* was differentiated from *assistive clue* in that *prompt* did not provide a hint about the next correct move whereas *assistive clue* did. However, despite the differentiation, *prompt* and *assistive clue* remained occasionally mixed up which contributed to unsatisfactory *prompt* and *assistive clue* IRA for some coder pairs when coding six video fragments during the testing (see Table 5.8), with *prompt* showing the lowest IRA out of all the codes (except *other*). Thus, identifying *prompt* may remain challenging, and further coding disagreement discussions may be recommended to establish mutual understanding of the data and the code, and to improve coding accuracy.

Table 5.9

Pilot to Final Code Definitions Changes and Final Guiding Questions

Category/Code	Pilot Definition	Final Definition and Guiding Questions
Positive		
Praise	Short compliments and positive feedback about the child's verbal and/or non-verbal behaviours. This is expressed shortly after the child's behaviour that is being complimented.	Short compliments or feedback containing a positive adjective or adverb about the child's verbal and/or non-verbal behaviours, expressed shortly after the child's behaviour. Guiding questions: 1. Can you name the child's behaviour that the parent responds to? 2. Does the parent positively evaluate the child's behaviour?
Supportive comment, encouragement	Includes the parent's attempts to comfort and support the child and/or expressions that might encourage a more enthusiastic, positive, flexible, constructive outlook on the game. This does not provide new information about the next moves in the game.	The parent's attempts to comfort and/or support the child. Expressions that may encourage a more enthusiastic, positive, flexible, constructive outlook on the game. Verbal behaviours that may not directly support or encourage the child but are enthusiastic and playful in their content and expression. Guiding questions: 1. Is the expression supportive, comforting, or encouraging to the child? **or** 2. Is the expression positive, enthusiastic, or playful in itself?

Confirmation, acknowledgement	The parent's brief expressions that do not provide any new information about the game but demonstrate that the parent has been observing the child's verbal and/or non-verbal behaviours or confirm the child's behaviours as correct. Includes the parent's questions to clarify what the child had said, instant repeating of what the child had said, or brief comments about what the child had done.	The parent's brief expressions confirming the child's behaviour as correct and/or demonstrating the parent's observation of the child. The acknowledgement includes the parent's questions to clarify what the child has said, repeating what the child has said, or brief comments about what the child has done. These expressions do not provide new information about the game. Guiding question: 1. Can you name the behaviour/situation the parent reacts to?
Positive gesture/ expression	The parent's non-verbal positive expressions towards the child. Includes positive expressions accompanied by short verbal expressions.	The parent's non-verbal positive expressions that might be accompanied by brief verbal expressions. Guiding question: 1. Does the parent's positive gesture/expression start in this segment?
Negative		
Disagreement, disapproval	The parent's brief expressions of disagreement or disapproval of the child's verbal and/or non-verbal behaviour in the game.	*Code name changed to* disagreement *because* criticism, accusation, complaint, threat *contained the parent's expression of disapproval.* The parent's brief expressions of disagreement of the child's verbal and/or non-verbal behaviour. It does not provide new information about the game. Guiding question: 1. Can you name the child's behaviour that the

		parent disagrees with?
Criticism, accusation, complaint	The parent's criticism, accusations, blaming, and/or complains about the child, the child's behaviours or the situation in the game. Such complains can also be expressed as threats.	*Code name changed to* criticism, accusation, complaint, threat. The parent's criticism, accusations, blaming, or threats to the child. Complaints about the child, the child's or the parent's own behaviour, or the situation in the game. Includes expressions negative in the content but not in the voice tone. Guiding questions: 1. Does the parent's behaviour provide more information than just a disagreement? 2. Does the parent criticise, accuse, blame, threaten or complain?
Control		
Direct instruction	The parent's direct and concrete instruction to the child about the process and/or the next moves in the game. The parent aims to direct the child's behaviour and expresses it in an instructive rather than suggestive way.	The parent's verbal and non-verbal attempts to direct the child's behaviour, expressed in a direct and instructive way. Guiding questions: 1. Can you name exactly what the parent wants the child to do? 2. Is the instruction expressed in a direct way?
Decision-making	The parent makes a decision in the game that will include both the parent and the child, and communicates this decision to the child. This is not a suggestion but a statement about the next moves and/or approach towards the game to be taken.	The parent communicates a decision to the child, implying what both the parent and the child will do next. This is not a suggestion but a statement about the next moves and/or approach towards the game.

		Guiding questions: 1. Can you name the parent's decision about the next moves in the game? 2. Does the decision include both the parent and the child?
Attention request	The parent's verbal and non-verbal behaviours used to attract the child's attention to the parent's verbal and/or non-verbal behaviour or something the parent is focused on.	The parent's verbal and non-verbal behaviours used to attract the child's attention to the parent or something the parent is focused on. Guiding questions: 1. Does the parent aim to attract the child's attention? 2. Does the parent aim only to attract the child's attention and not to direct the child's behaviour?
Engagement		
Asking for input/ assistance	The parent's asking the child for help—input or assistance—about the moves or decisions to be made in the game.	The parent asks for the child's assistance or input about the decisions and moves in the game. Asking for input, the parent is interested in the child's opinion about the next move. Asking for the child's assistance, the parent is unsure about the next move and asks for help. Guiding questions: 1. Does the parent ask for the child's input about the next decision? **<u>or</u>** 2. Is the parent unsure about the next move in the game and asks the child to help?

Parental investigation	The parent's questions about the child's thinking process and approach towards the game. This is an investigative expression and does not have a suggestive component to it. Where expressed as a question about the child's next move, the question is not suggestive of any direction the child should take.	The parent's attempts to understand the child's thinking process, views, readiness, or approach towards the game. This is an investigative expression about the child and not the game. Guiding question: 1. Does the parent ask about the child's thinking process or approach towards the game?
Mutuality	Includes the situations where both the parent and the child are explicitly focused on each other and/or the same item/aspect of the game and not engaged in any other activity.	*Code removed (see Section 5.4).*
Guidance		
Explanation, teaching	The parent's demonstration, teaching, and/or explanation of the parent's or the child's behaviour in the game, previous or next moves in the game and discoveries in the game or reinforcing the rules of the game.	*Code name changed to* explanation, teaching, demonstration *(see Section 5.4).* The parent's demonstration, teaching, and/or explanation of the parent's or the child's behaviour in the game, previous or next moves and discoveries in the game, or reinforcing the rules of the game. Teaching, explaining, or demonstrating how or why something is done. Answering the child's question to explain or to teach something. Guiding questions: 1. Does the parent teach/explain how or why something is done? **<u>or</u>** 2. Does the parent demonstrate how something

		is done? **<u>or</u>** 3. Does the parent correct the child to teach the right move? **<u>or</u>** 4. Does the parent teach/explain what something is? **<u>or</u>** 5. Does the parent answer the child's question to explain or teach something?
Indirect instruction, suggestion, prompt	The parent's attempts to direct the child's behaviour as regards the process and moves in the game, expressed in a suggestive way. Includes prompts that might not provide clear information about the next move but imply that some action should be taken (i.e., a prompt to proceed with the game).	Indirect instruction, suggestion *separated from* indirect instruction, suggestion, prompt *to form a separate code (see Section 5.4).* The parent's attempts to direct the child's behaviour, expressed in a suggestive, guiding way. The suggestive component is often expressed as "maybe," "what about," "can/could" or similar. Guiding questions: 1. Can you name exactly what the parent wants the child to do? 2. Is the instruction expressed in a suggestive, guiding way?
Prompt	*Not separated from* indirect instruction, suggestion, prompt *to form a separate code yet.*	Prompt *separated from* indirect instruction, suggestion, prompt *to form a separate code (see Section 5.4).*

		The parent's attempts to prompt the child to proceed with the game without providing clear information about the next correct move. Guiding questions: 1. Does the parent prompt the child to proceed with the game? 2. Does the parent not provide a clear instruction or hint about the next correct move?
Assistive clue	The parent's attempts to provide the child with a helpful hint about the next move in the game. The hint does not provide clear information about the next move, and the child should use the hint to figure out what the next move could be.	The parent's attempts to provide a helpful hint about the next correct move. The child can use the hint to figure out the next move. Guiding question: 1. Can you name the parent's hint that can be used to figure out the next correct move?
Statements		
Self-reference	The parent's verbalising their thinking process. This is a neutral expression, not directed at the child.	*Code removed (see Section 5.4).*
Apology	The parent's apologising to the child.	*Code removed (see Section 5.4).*
Monitoring		
Monitoring	The parent's verbal and/or non-verbal monitoring—observation—of the child while the child is engaged in the game. Includes the parent's verbal monitoring after the parent addressed the child.	The parent's verbal and/or non-verbal monitoring—that is, observation—of the child or the game. The parent's verbal monitoring after addressing the child. The parent may be engaged with the game but focus on observing the child. Guiding questions: 1. Is the parent disengaged with the child and

		the game? 2. Is the parent observing the child or the game?
Process control		
Process control	The parent's non-verbal attempts to contribute to the game without consulting the child. The non-verbal behaviour can be accompanied by the parent's verbalisations of their non-verbal behaviour or other short verbal expressions.	The parent's non-verbal attempts/intention to contribute to the game without consulting the child. A brief audible and complete but uninformative verbal behaviour may accompany the non-verbal behaviour. Guiding questions: 1. Is the parent disengaged with the child? 2. Is the parent engaged with the game?
Other		
Other	The behaviours that cannot be assigned a different code due to the inaudibility, incompleteness or interruption. Includes brief phrases not accompanied by an informative non-verbal behaviour.	Inaudible, incomplete, or interrupted behaviours. Behaviours that do not match any different code description.

5.4 Conclusion

During the pilot coding scheme testing explained in this chapter, the coders and I coded 15 new video fragments and discussed the coding disagreements, gaining insights into the data, the coding scheme, and the coders' challenges. I continuously amended the coding scheme and improved the coders' understanding of each code and the parent's behaviours through discussion. This was consistent with Cone's (1977) suggestion that coding disagreements call for amending code definitions and/or retraining coders, and that such interventions may be situation-specific.

The IRA for 15 video fragments was mostly satisfactory, demonstrating the coding scheme's replicability. Although the IRA for individual categories and codes varied, unsatisfactory IRA also provided an opportunity to clarify the coders' understanding of the coding scheme and the data through discussion, given the novelty, complexity, and variety of behaviours observed. As the IRA provided guidance about the coders' progress and agreement on code assignment, the coding disagreement discussions provided further valuable information about the types of errors the coders made, discrepancies and ambiguities in the coding scheme and amendments needed, novelty and complexity of parents' behaviours, and effort required to thoroughly examine the segments and to achieve sufficient coding accuracy. Thus, as unsatisfactory IRA may be encountered by future researchers, discussing coding disagreements should be included in the coding process.

Consequently, the final coding scheme was constructed, comprising 18 codes within eight distinct categories, and unique in its inductive nature and capturing parents' behaviours only, while considering multiple behavioural elements and the interactional context. Furthermore, the coding manual was developed (see Appendix E), containing the coder training plan, coding procedures, recommendations for improving coding accuracy (e.g., discussing coding disagreements throughout the coding process), segmentation rules, coding rules, and final coding scheme including categories and codes, code definitions and guiding questions, code differentiation, and code examples and non-examples (Bakeman & Quera, 2011; Chorney et al., 2015; Heyman et al., 2014; Yoder & Symons, 2010).

Because of multiple satisfactory IRA results throughout the testing, detailed and continuous coding scheme amendments, and the coders' consequent improved understanding of the coding scheme and the data, the final coding scheme was deemed appropriately developed to be applied independently in the next implementation phase (see Chapter 6).

Chapter 6: Implementation of the Final Coding Scheme

After testing the pilot coding scheme and constructing the final coding scheme through multiple coding disagreement discussions and coding scheme amendments (see Chapter 5), the final coding scheme needed implementing to ensure its reliable independent applicability. This chapter explains the implementation of the final coding scheme, including the RA's training in segmentation and coding, the RA's and Coder 2's independent coding and the IRA monitoring, and observer drift assessment.

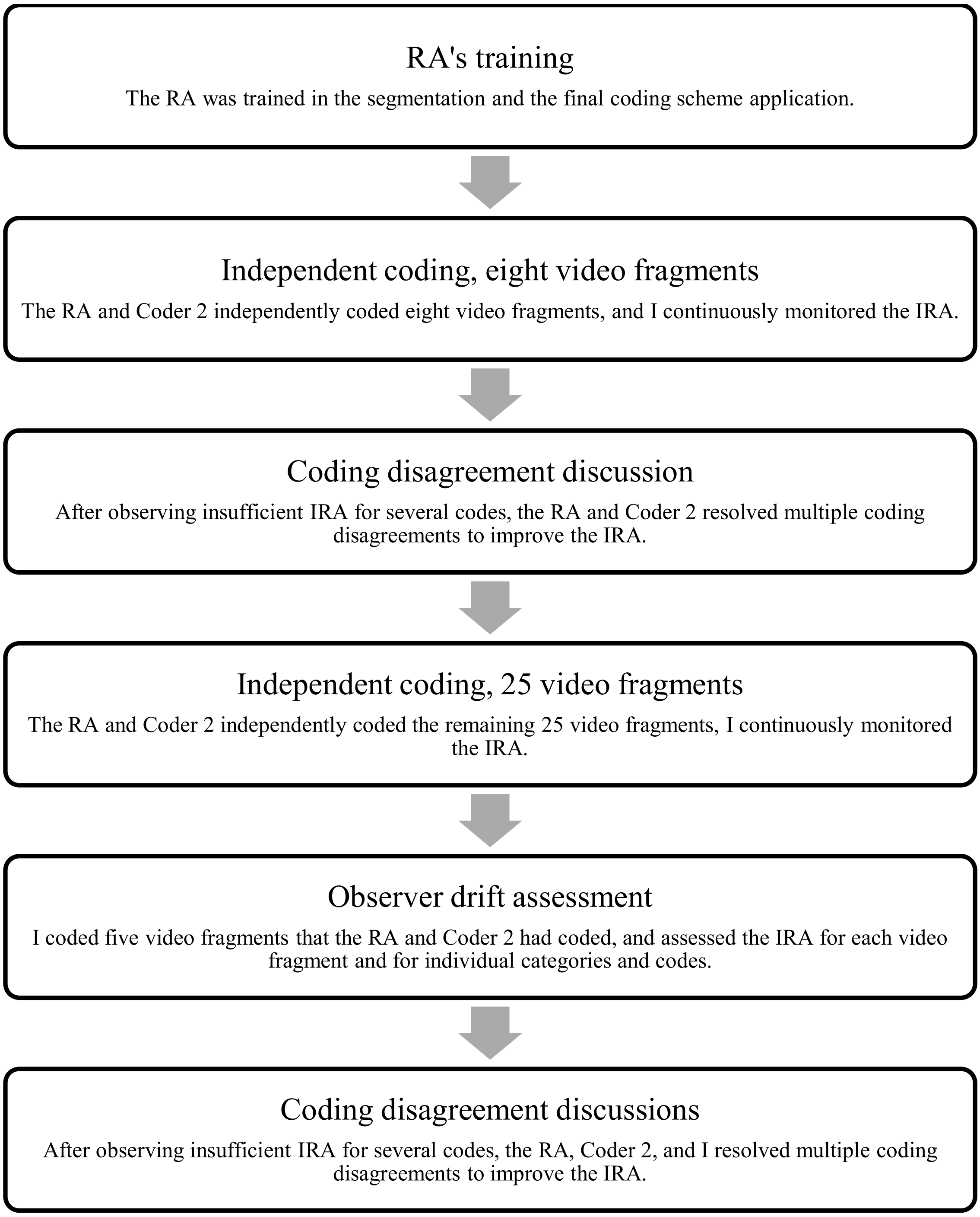
During the implementation, the RA and Coder 2 coded 33 randomly selected video fragments and discussed coding disagreements after observing unsatisfactory IRA for several codes at the beginning of the implementation phase. Consequently, the IRA for individual video fragments and for individual categories and codes improved, demonstrating the RA's and Coder 2's agreement on the coding scheme application. Next, I coded five video fragments to assess the IRA and the RA's and Coder 2's observer drift and consensual observer drift, and we discussed coding disagreements for the codes that showed unsatisfactory IRA. Having observed the coders' ability to apply the coding scheme independently and to resolve coding disagreements, the final coding scheme developed throughout this thesis was deemed successfully implemented, complete, and suitable for application by future researchers.

6.1 Introduction

After testing the pilot coding scheme as replicable to apply by multiple coders, the final coding scheme shall be implemented independently (i.e., I was not involved in the independent coding, I only assessed observer drift after the independent coding). However, the IRA should be continuously monitored throughout the independent coding to detect observer drift early in case coders, although trained sufficiently, start applying the coding scheme not as intended (Kobak et al., 2007; Margolin et al., 1998). Furthermore, even when coders show satisfactory IRA, consensual observer drift needs assessing to ensure coders had not mutually drifted from the intended coding scheme application, showing high IRA but low coding accuracy (Bakeman & Quera, 2011; Harris & Lahey, 1982; Johnson & Bolstad, 1972; Kazdin, 1977; Krippendorff, 2004). Thus, during this phase, the IRA was monitored continuously, observer drift and consensual observer drift was assessed, and coding disagreements were discussed as needed. Figure 6.1 presents the stages of the implementation of the final coding scheme.

Figure 6.1

Stages of the Implementation of the Final Coding Scheme



6.2 RA's Training

After the coding scheme testing, the final coding scheme was implemented independently by the RA and Coder 2. The RA was involved in this phase because the coding data produced during the implementation (if implementation proved successful) was to be used in the next steps of the Leverhulme project data analysis, and the RA was responsible for further coding within the project (i.e., for coding beyond the scope of this thesis). Because the IRA needed assessing during the implementation phase, Coder 2 was employed because of showing satisfactory IRA and good understanding of the coding scheme during the previous testing phase.

Coder 2 had practised coding throughout the coder training and the testing phases, and thus could successfully apply the final coding scheme. Where the final coding scheme amendments had been made after coding the six video fragments (see Chapter 5, Section 5.3.2), Coder 2 reviewed them to note the newly added data examples before the implementation phase. In comparison, the RA had been involved in the pilot coding scheme development (see Chapter 3) but did not participate in the present study further, and thus needed training in the use of the final coding scheme. Furthermore, the RA needed retraining in segmentation of video fragments (although the RA had taken part in the final segmentation development explained in Chapter 3, several months passed since), which also helped to test whether future researchers could be trained in segmentation and apply it independently. This section explains the RA's training in segmentation and final coding scheme application.

6.2.1 Segmentation Training

During the segmentation training, the RA reviewed the segmentation rules and two pre-segmented video fragments that had been used in the previous testing phase. After the review, the RA segmented four video fragments independently that had also been used in the previous testing phase because they had been segmented and discussed in detail, thus providing accurate segmentation for training (i.e., any segmentation discrepancies were likely to be noticed during the previous testing phase). After segmenting each fragment, I reviewed the RA's segmentation and provided corrections and explanations of the RA's errors. The main aspects that needed reiterating during the RA's segmentation training were segmentation granularity and consistency, segmenting verbal behaviours that occur simultaneously with non-verbal behaviours, and accurately time-stamping segment start points in Transana.

As an example of segmentation granularity, the parent's (a) moving the hand away from the board, and (b) continuing to monitor the child were parsed into two segments. Similarly, the parent's moving the cars several times was parsed into several segments. Furthermore, the RA occasionally segmented behaviours based on changes in a non-verbal behaviour while a verbal behaviour occurred simultaneously which resulted in the verbal behaviour being segmented mid-sentence. I reiterated the coding rule "the verbal behaviour is more informative than the non-verbal behaviour" (see Chapter 2, Section 2.7.4.4) and that, accordingly, segmenting verbal behaviours mid-sentence may lead to confusion when coding. Also, the RA occasionally time-stamped segment start points inaccurately in Transana, including a moment of the previous segment which may also lead to confusion when coding. Thus, I reiterated the importance of accurate segment start and end points. Throughout reviewing my corrections and receiving feedback, the RA's segmentation consistently improved, and I was confident that the RA was ready to segment video fragments independently.

Interestingly, when correcting the RA's segmentation, I also observed several cases where the RA segmented behaviours that I had not segmented myself but after reviewing agreed that it would be accurate to segment them. Although this was rare, it supported Yoder &

Symons's (2010) explanation that segmentation always maintains a level of subjectivity and is unlikely to be identical. Where these additional segments were observed, our segmentation was combined for further coding training.

6.2.2 Coding Training

After the segmentation training, I trained the RA in the use of the final coding scheme. The RA coded five video fragments independently: The same four video fragments used during the segmentation training and one new video fragment. Because the coding scheme was continuously amended during the previous testing phase and thus the coders and I used different coding scheme versions when coding these fragments, I also recoded the five fragments independently to assess the IRA between the RA's and my own coding when using the final coding scheme version. After coding each video fragment, we discussed coding disagreements to improve the RA's coding accuracy and understanding of the final coding scheme. The topics discussed were the ones already explained throughout this thesis, such as the importance of examining behavioural elements and key code characteristics, and attending to the context and the child's behaviour as contextual guidance.

Accordingly, Cohen's kappa scores were assessed according to Bakeman and Quera's (2011) "two raters'" kappa guidelines. Table 6.1 shows satisfactory IRA between the RA's and my own coding, with kappa scores above the recommended minimum of .62 (Bakeman & Quera, 2011) and percentage agreement of 70% or above which demonstrated the RA's readiness to proceed to the coding scheme implementation phase. At this point, the IRA for individual categories and codes was not assessed because the RA's understanding of the codes was continuously changing throughout the coding disagreement discussions, and thus the IRA would not accurately reflect the RA's application of each code. Instead, the IRA for individual categories and codes was assessed after the RA's training—that is, during the RA's and Coder 2's independent coding—when coding disagreements were not discussed after coding each video fragment.

Table 6.1

Inter-Rater Agreement Between RA and Thesis Author During RA's Coding Training

Video fragment	Cohen's kappa	Percentage agreement
Fragment 1	**.86**	**89**
Fragment 2	**.65**	**70**
Fragment 3	**.71**	**76**
Fragment 4	**.71**	**77**
Fragment 5	**.75**	**80**

Note. Scores within Cohen's kappa "two raters" (.62-1.00; Bakeman & Quera, 2011) and percentage agreement (70-100%) guidelines are in boldface.

6.3 Independent Coding

Once the RA was trained, the RA and Coder 2 independently coded 33 randomly selected video fragments as a suitable 10% of the available sample for assessing the IRA during the implementation of the coding scheme (Chorney et al., 2015). The fragments were selected from both the first and the second year of parent–child observations, and the same parent–child dyads were not selected across both years to assess the IRA when coding behaviours of a variety of different parents. Throughout the RA's and Coder 2's coding, I continuously monitored the IRA so that both coders remained unaffected by the IRA results (e.g., if the RA monitored the IRA and observed unsatisfactory scores, the RA's coding may change by attempting to code more accurately).

Table 6.2 shows that the IRA between the RA's and Coder 2's coding was satisfactory for all video fragments, with kappas above the recommended minimum of .62 (Bakeman & Quera's, 2011) and percentage agreement above 70%. However, after examining the IRA for individual categories and codes after the RA and Coder 2 coded Fragments 1-8, the IRA was unsatisfactory for some codes (i.e., below .70; see Table 6.3). Because some codes in Fragments 1-8 were assigned less frequently (e.g., *criticism, accusation, complaint, threat* or *parental investigation*), that may have contributed to their lower IRA if the few observed segments were particularly complex and challenging to code. However, the RA's and Coder 2's different understanding of some codes may also have contributed to unsatisfactory IRA. Thus, to ensure accurate and mutual understanding of the codes, the RA and Coder 2 discussed their coding disagreements for the codes that showed unsatisfactory IRA. Although Hops et al. (1995) recommended such discussions for the codes that showed the IRA below .60, most disagreements were discussed for the codes below .70, to ensure the coders' improving understanding of the coding scheme and the data during further coding. Yet again, the topics discussed were the ones already explained throughout this thesis.

Table 6.3 shows that the IRA after the discussion increased, reaching a satisfactory level for each code. Likely, because the code frequency before and after the discussion differed for each code (e.g., before and after the discussion, the RA coded eight and 59 segments as *disagreement*, respectively), lower code frequency before the discussion may have negatively influenced the IRA if several segments were challenging or coded inaccurately. However, should future researchers observer unsatisfactory IRA early in the coding process, it is preventative to detect and resolve potential issues early because they may cause further coding inaccuracies if left unresolved.

Table 6.2

Inter-Rater Agreement Between the RA and Coder 2 During Implementation

Video fragment	Cohen's kappa	Percentage agreement
Fragment 1	**.74**	**79**
Fragment 2	**.78**	**83**
Fragment 3	**.73**	**76**
Fragment 4	**.79**	**83**
Fragment 5	**.79**	**85**
Fragment 6	**.74**	**79**
Fragment 7	**.81**	**87**
Fragment 8	**.77**	**80**
Fragment 9	**.88**	**91**
Fragment 10	**.87**	**90**
Fragment 11	**.79**	**82**
Fragment 12	**.84**	**86**
Fragment 13	**.78**	**84**
Fragment 14	**.87**	**91**
Fragment 15	**.93**	**95**
Fragment 16	**.88**	**90**
Fragment 17	**.82**	**85**
Fragment 18	**.76**	**84**
Fragment 19	**.88**	**90**
Fragment 20	**.87**	**89**
Fragment 21	**.88**	**90**
Fragment 22	**.88**	**90**
Fragment 23	**.85**	**87**
Fragment 24	**.84**	**88**
Fragment 25	**.83**	**87**
Fragment 26	**.79**	**85**
Fragment 27	**.86**	**89**

Fragment 28	**.89**	**91**
Fragment 29	**.89**	**91**
Fragment 30	**.85**	**88**
Fragment 31	**.89**	**91**
Fragment 32	**.90**	**92**
Fragment 33	**.87**	**90**

Note. Scores within Cohen's kappa "two raters" (.62-1.00; Bakeman & Quera, 2011) and percentage agreement (70-100%) guidelines are in boldface.

Table 6.3

Inter-Rater Agreement for Individual Categories and Codes Before and After RA's and Coder 2's Discussion, and Overall During Implementation

	Cohen's kappa			Code frequency (% of segments)					
				Before discussion		After discussion		Overall	
Category/Code	Before discussion	After discussion	Overall	RA	Coder 2	RA	Coder 2	RA	Coder 2
Positive	**.88**	**.91**	**.91**	258 (24.1)	288 (26.9)	1004 (22.0)	1015 (22.3)	1262 (22.4)	1303 (23.1)
Praise	**.95**	**.93**	**.93**	29 (2.7)	30 (2.8)	93 (2.0)	94 (2.1)	122 (2.2)	124 (2.2)
Confirmation, acknowledgement	**.84**	**.89**	**.88**	161 (15.0)	191 (17.8)	616 (13.5)	644 (14.1)	777 (13.8)	835 (14.8)
Positive gesture/ expression	**.96**	**.95**	**.95**	34 (3.2)	35 (3.3)	177 (3.9)	169 (3.7)	211 (3.7)	204 (3.6)
Supportive comment, encouragement	.62	**.74**	**.71**	34 (3.2)	32 (3.0)	118 (2.6)	108 (2.4)	152 (2.7)	140 (2.5)
Negative	.60	**.83**	**.81**	14 (1.3)	6 (.6)	113 (2.5)	106 (2.3)	127 (2.3)	112 (2.0)
Disagreement	.61	**.84**	**.82**	8 (.7)	5 (.5)	59 (1.3)	67 (1.5)	67 (1.2)	72 (1.3)
Criticism, accusation, complaint, threat	.28	**.77**	**.74**	6 (.6)	1 (.1)	54 (1.2)	39 (.9)	60 (1.1)	40 (.7)
Control	**.71**	**.80**	**.78**	63 (5.9)	55 (5.1)	183 (4.0)	188 (4.1)	246 (4.4)	243 (4.3)
Attention request	**.94**	**.70**	**.78**	9 (.8)	8 (.7)	14 (.3)	20 (.4)	23 (.4)	28 (.5)
Decision-making	.66	**.84**	**.79**	17 (1.6)	13 (1.2)	44 (1.0)	39 (.9)	61 (1.1)	52 (.9)

Direct instruction	.66	**.77**	**.75**	37 (3.5)	34 (3.2)	125 (2.7)	129 (2.8)	162 (2.9)	163 (2.9)
Engagement	**.76**	**.84**	**.83**	48 (4.5)	43 (4.0)	190 (4.2)	166 (3.6)	238 (4.2)	209 (3.7)
Asking for input/assistance	**.72**	**.77**	**.76**	39 (3.6)	32 (3.0)	132 (2.9)	119 (2.6)	171 (3.0)	151 (2.7)
Parental investigation	.60	**.78**	**.75**	9 (.8)	11 (1.0)	58 (1.3)	47 (1.0)	67 (1.2)	58 (1.0)
Guidance	**.76**	**.86**	**.84**	137 (12.8)	152 (14.2)	716 (15.7)	766 (16.8)	853 (15.2)	918 (16.3)
Assistive clue	.66	**.71**	**.69**	24 (2.2)	27 (2.5)	66 (1.4)	58 (1.3)	90 (1.6)	85 (1.5)
Explanation, teaching, demonstration	.68	**.82**	**.81**	61 (5.7)	70 (6.5)	444 (9.7)	485 (10.6)	505 (9.0)	555 (9.9)
Indirect instruction, suggestion	.55	**.73**	**.70**	16 (1.5)	27 (2.5)	90 (2.0)	83 (1.8)	106 (1.9)	110 (2.0)
Prompt	.61	**.76**	**.73**	36 (3.4)	28 (2.6)	116 (2.5)	140 (3.1)	152 (2.7)	168 (3.0)
Monitoring	**.84**	**.92**	**.91**	385 (35.9)	392 (36.6)	1680 (36.9)	1702 (37.3)	2065 (36.7)	2094 (37.2)
Monitoring	**.84**	**.92**	**.92**	385 (35.9)	392 (36.6)	1680 (36.9)	1702 (37.3)	2065 (36.7)	2094 (37.2)
Process control	**.71**	**.84**	**.81**	139 (13.0)	120 (11.2)	546 (12.0)	522 (11.5)	685 (12.2)	642 (11.4)
Process control	**.71**	**.84**	**.81**	139 (13.0)	120 (11.2)	546 (12.0)	522 (11.5)	685 (12.2)	642 (11.4)
Other	.54	.66	.64	28 (2.6)	16 (1.5)	126 (2.8)	93 (2.0)	154 (2.7)	109 (1.9)
Other	.54	.66	.64	28 (2.6)	16 (1.5)	126 (2.8)	93 (2.0)	154 (2.7)	109 (1.9)

Note. The IRA before the discussion includes Fragments 1-8, after the discussion includes Fragments 9-33, and overall includes Fragments 1-33. Scores within Cohen's kappa (.70-1.00) guidelines are in boldface.

6.4 Observer Drift

Observer drift refers to “the tendency of observers to change the manner in which they apply the definitions of behaviour over time,” which results in the coding scheme’s being applied not as intended (Kazdin, 1977, p. 143). Observer drift can be related to a change in coders’ being monitored, with the IRA decreasing when coders know they are not monitored anymore (Taplin & Reid, 1973). Specifically, Taplin and Reid observed a significant decrease in the IRA once coder training was complete and coders started implementing the coding scheme independently. Thus, the IRA for unmonitored observations should not be assumed and should be continuously checked throughout the study (Taplin & Reid, 1973), which provides an opportunity to detect potential issues early and to carry out coding disagreement discussions that would improve coding accuracy (DeMaster et al., 1977; Margolin et al., 1998).

Accordingly, I continuously monitored the IRA after the RA and Coder 2 coded each video fragment. Although the IRA was satisfactory for all video fragments and for individual categories and codes (see Tables 6.2 and 6.3), consensual observer drift (Johnson & Bolstad, 1972) also needed assessing. That is, coders may show satisfactory IRA but deviate from the coding scheme’s intended application, and thus high IRA may not equate high coding accuracy (Bakeman & Quera, 2011; Harris & Lahey, 1982; Johnson & Bolstad, 1972; Krippendorff, 2004). To differentiate, observer drift refers to a change in a coder’s application of the coding scheme (in such case, two coders may show poor IRA if one coder’s coding has drifted from the intended coding scheme’s application), and consensual observer drift refers to a change in multiple coders’ application of the coding scheme (in such case, coders may show satisfactory IRA but poor coding accuracy).

To assess consensual observer drift, the RA's and Coder 2's coding needed comparing to my own coding because I had developed the coding scheme and showed the highest coding accuracy during the previous coding scheme development phase (see Chapter 5, Table 5.6). Thus, I coded 15% of video fragments—that is, five fragments—that the RA and Coder 2 had coded, and assessed the IRA for each video fragment (see Table 6.4) and for individual categories and codes (Table 6.5). The IRA for each video fragment was satisfactory but the IRA for some individual categories and codes was unsatisfactory for several codes, suggesting a slight consensual observer drift and that satisfactory IRA between RA's and Coder 2's coding may not have indicated sufficient coding accuracy (e.g., the IRA for *decision-making* and *direct instruction* was satisfactory between the RA's and Coder 2's coding, but unsatisfactory between both the RA's or Coder 2's and my own coding). In such cases, coders could be retrained and problematic codes could be discussed (Hops et al., 1995; Kazdin, 1977; Ostrov & Hard, 2013), although such interventions should only reiterate the aspects noted in the coding manual and should not include any new coding rules after coder training had been completed, so as to not influence coding data in the middle of the implementation coding process (Chorney et al., 2015).

Accordingly, we discussed multiple complex coding disagreements for the codes that showed unsatisfactory IRA, reaching agreement on the accurate codes. Because in the case of a disagreement my coding was accurate most of the time, explaining the coding rationale to the RA and Coder 2 improved their coding accuracy and mitigated against observer drift in future coding. The topics discussed were yet again the ones explained in this thesis, such as examining all behavioural elements and key code characteristics, and attending to the context. The disagreements arose mostly when novel and complex behaviours were observed due to coding previously uncoded video fragments.

Some of the codes that had been challenging and discussed frequently in the previous testing phase remained slightly challenging (i.e., *supportive comment, encouragement* and *criticism, accusation, complaint, threat*) but the IRA for some other codes improved during this phase (e.g., *assistive clue*, *prompt*) without further amending the coding scheme, which demonstrated that the coding scheme can be applied with increasing replicability and accuracy. However, future researchers should attend to these potentially challenging codes and ensure coders' sufficient understanding through discussion.

Table 6.4

Inter-Rater Agreement Between Thesis Author (TA), RA, and Coder 2 to Assess Observer Drift

	TA & RA		TA & Coder 2		RA & Coder 2	
Video fragment	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement	Cohen's kappa	Percentage agreement
Fragment 6	**.71**	**77**	**.79**	**83**	**.74**	**79**
Fragment 12	**.78**	**81**	**.81**	**84**	**.84**	**86**
Fragment 18	**.71**	**80**	**.88**	**92**	**.76**	**84**
Fragment 24	**.76**	**82**	**.80**	**85**	**.84**	**88**
Fragment 30	**.83**	**87**	**.81**	**85**	**.85**	**88**

Note. Scores within Cohen's kappa "two raters" (.62-1.00; Bakeman & Quera, 2011) and percentage agreement (70-100%) guidelines are in boldface

Table 6.5

Inter-Rater Agreement for Individual Categories and Codes Between Thesis Author (TA), RA, and Coder 2 to Assess Observer Drift

	Cohen's kappa			Code frequency (% of segments)		
Category/Code	TA & RA	TA & Coder 2	RA & Coder 2	TA	RA	Coder 2
Positive	**.84**	**.87**	**.90**	178 (21.2)	171 (20.4)	177 (21.1)
Praise	**.75**	**.86**	**.80**	10 (1.2)	14 (1.7)	11 (1.3)
Confirmation, acknowledgement	**.77**	**.80**	**.85**	110 (13.1)	107 (12.8)	119 (14.2)
Positive gesture/expression	**.87**	**.90**	**.92**	29 (3.5)	28 (3.3)	24 (2.9)
Supportive comment, encouragement	.66	.60	**.70**	29 (3.5)	22 (2.6)	23 (2.7)
Negative	**.78**	**.81**	**.71**	16 (1.9)	17 (2.0)	11 (1.3)
Disagreement	**.84**	**.89**	**.82**	10 (1.2)	9 (1.1)	8 (1.0)
Criticism, accusation, complaint, threat	**.71**	.67	.54	6 (0.7)	8 (1.0)	3 (0.4)
Control	.51	.61	**.77**	29 (3.5)	35 (4.2)	29 (3.5)
Attention request	**1.00**	.67	.67	1 (0.1)	1 (0.1)	2 (0.2)
Decision-making	.50	.53	**.73**	6 (0.7)	10 (1.2)	9 (1.1)
Direct instruction	.51	.59	**.71**	22 (2.6)	24 (2.9)	18 (2.1)
Engagement	**.79**	**.78**	**.76**	27 (3.2)	31 (3.7)	24 (2.9)
Asking for input/assistance	**.76**	**.72**	.69	19 (2.3)	23 (2.7)	17 (2.0)
Parental investigation	**.75**	**.80**	**.93**	8 (1.0)	8 (1.0)	7 (0.8)
Guidance	**.75**	**.82**	**.82**	118 (14.1)	116 (13.8)	130 (15.5)
Assistive clue	.69	**.82**	**.75**	36 (4.3)	24 (2.9)	29 (3.5)

Explanation, teaching, demonstration	.63	**.78**	**.75**	59 (7.0)	48 (5.7)	62 (7.4)
Indirect instruction, suggestion	.63	**.76**	.66	8 (1.0)	14 (1.7)	13 (1.5)
Prompt	.57	.68	**.74**	15 (1.8)	30 (3.6)	26 (3.1)
Monitoring	**.90**	**.94**	**.89**	314 (37.4)	320 (38.1)	327 (39.0)
Monitoring	**.90**	**.94**	**.89**	314	320	327
Process control	**.81**	**.89**	**.81**	126 (15.0)	127 (15.1)	121 (14.4)
Process control	**.81**	**.89**	**.81**	126	127	121
Other	.44	.45	.61	31 (3.7)	22 (2.6)	20 (2.4)
Other	.44	.45	.61	31	22	20

Note. The IRA was assessed based on the coding data from Fragments 6, 12, 18, 24, and 30 that were coded by the TA to assess the observer drift. Scores within Cohen's kappa (.70-1.00) guidelines are in boldface

6.5 Conclusion

This chapter explained the implementation of the final coding scheme, during which I trained the RA in segmentation and coding, the RA and Coder 2 independently coded 33 video fragments, and I assessed the RA's and Coder 2's IRA and observer drift. Varied IRA results demonstrated that coding disagreement discussions may be an inseparable part of observational coding when using the coding scheme developed in this thesis because a spectrum of novel behaviours are likely to occur in every video fragment, requiring coders to clarify their understanding of such segments. However, given that some coding schemes may require constant resolving of all disagreements to produce reliable and accurate coding data (Chorney et al., 2015), my coding scheme only required discussing several codes to improve the coders' understanding and coding accuracy. Furthermore, Margolin et al. (1998) explained that because independent coding of multiple data fragments may become "tedious and emotionally draining," regular discussions may help maintain coders' motivation (p. 206). This, in turn, may help coders maintain a sufficient level of effort and coding accuracy.

During the implementation, I also detected a slight consensual observer drift (Johnson & Bolstad, 1972), indicating that the coders occasionally applied some codes not as intended. Again, this was resolved through coding disagreement discussions and reiterating the aspects that were important to consider when assigning the codes, such as examining identifiable behavioural elements and key code characteristics. Detecting consensual observer drift allowed us to resolve the issues before further coding (the RA and Coder 2 continued the independent coding to produce data for the Leverhulme project where they coded separate video fragments) and to provide a recommendation to future researchers who would benefit from assessing observer drift early and continuously. Furthermore, future researchers should attend to the codes that remain challenging throughout the coding and continuously monitor the IRA, incorporating regular coding disagreement discussions to mitigate against observer drift and inaccurate coding. This should be attended to throughout the whole of the independent coding, when initially, as demonstrated in this chapter, coders code the same video fragments independently to assess the IRA, and afterwards (i.e., after establishing that coders' agreement and coding accuracy are satisfactory to proceed) code different video fragments separately with an occasional checking of the IRA and observer drift. For the latter, the main researcher and coders would code separate video fragments but would occasionally code the same fragments to assess the IRA and observer drift (such further coding was carried out in the Leverhulme project but was not part of this thesis).

In summary, successful resolving of coding disagreements (i.e., no unresolved or misunderstood segments remained) supported the final coding scheme's reliable applicability by multiple coders. Thus, the final coding scheme was deemed successfully implemented to independently code new video fragments within the Leverhulme project and also to be applied by future researchers.

Chapter 7: General Discussion

Chapter 1 explained that coding schemes' generalisation across different observational contexts requires a careful consideration, and that perfectionism research lacks inclusion of observational methods and a coding scheme that would capture parents' perfectionism-related behaviours does not yet exist. This resulted in the need to develop a coding scheme to use within the Leverhulme project. However, the unsuccessful attempt to develop a deductive coding scheme that focused on perfectionism-related parents' behaviours (Majewska, 2017) led to the need to develop an inductive coding scheme. The chapters in this thesis explained each phase of the inductive coding scheme development, illustrating each phase with examples and providing detailed explanations of the challenges encountered, their resolution, and considerations for proceeding to further phases. This chapter summarises and discusses the results and insights gained throughout the present study, presents the study's limitations and future directions, and discusses theoretical and practical implications.

7.1 Summary of the Thesis and Its Results

This thesis aimed to develop an inductive coding scheme that would granularly capture parents' behaviour during play-based instructional parent–child interactions. The coding scheme was developed over five phases: pre-pilot coding scheme development, pilot coding scheme development, coder training, pilot coding scheme testing and finalising the coding scheme, and implementation of the final coding scheme.

Chapter 2 explained the pre-pilot coding scheme development, where I began the inductive analysis by familiarising myself with the data and preliminarily analysing parents' and children's behaviour before moving to more granular pre-pilot segmentation and coding. This allowed establishing the basis for following the participant-focused approach, avoiding over-interpretation, and focusing on identifiable behavioural elements within the data, and led to the development of the pre-pilot coding scheme (see Appendix B).

Chapter 3 explained the pilot coding scheme development during which I collaborated with the RA to gain further insights into the segmentation and coding, and the coding scheme amendments needed. Through multiple detailed discussions of segmentation and coding disagreements between the RA and I, the pilot coding scheme was constructed (see Appendix C).

Chapter 4 explained the coder training because independent coders needed involving in further pilot coding scheme testing explained in Chapter 5. Accordingly, I developed a coder training plan to be used by future researchers (see Appendix E), and trained coders to sufficient understanding of the pilot coding scheme considering its novelty and incompleteness. The training included assessing the IRA and carrying out multiple coding disagreement discussions which allowed for gaining insights into the coders' challenges and subsequently amending the coder training plan and the coding scheme.

Chapter 5 explained the pilot coding scheme testing through mine and independent coders' coding, assessing the IRA, discussing coding disagreements, and amending the coding scheme to construct the final coding scheme that comprised 18 codes within eight distinct categories. Moreover, the coding scheme development phases explained in Chapters 2-5 led to the development of a coding manual (see Appendix E) that includes the segmentation and coding rules, final coding scheme including categories and codes, code definitions and guiding questions, code differentiation, code examples and non-examples, coder training plan, and recommendations for future researchers (Bakeman & Quera, 2011; Chorney et al., 2015; Heyman et al., 2014; Yoder & Symons, 2010).

Finally, Chapter 6 explained the implementation of the final coding scheme where I successfully re-trained the RA in segmentation and coding, and the RA and Coder 2 independently coded video fragments whilst I monitored the IRA and observer drift. This phase supported the successful application of the coding scheme in that the IRA was satisfactory for video fragments and most codes, or, where the IRA was unsatisfactory or observed drift was detected, coding disagreements were effectively resolved, improving coders' coding accuracy and thus allowing them to apply the coding scheme as intended. Thus, considering the novelty of the coding scheme, such replicable coding scheme's application demonstrated that inductively developed codes did not reflect my own "idiosyncratic view" of the data (Heyman et al., 2014, p. 354), and could be reliably applied by other researchers.

7.2 The Coding Scheme's Characteristics in Relation to Other Coding Schemes

This section discusses the coding scheme and its characteristics in relation to several extant coding schemes. Furthermore, the coding scheme's granularity is discussed, concluding that the scheme adheres to researchers' recommendations for maintaining balance between too broad and too granular codes.

7.2.1 The Coding Scheme in Relation to the Previous Coding Scheme Development Attempt Within the Leverhulme Project

As explained in Chapter 1, my coding scheme was developed after Majewska's (2017) previous unsuccessful attempt to develop a deductive perfectionism theory-informed coding scheme. Perhaps unsurprisingly, having developed my scheme, I noticed only minor similarities to Majewska's scheme (see Appendix A for an outline of Majewska's coding scheme). For example, Majewska's scheme contained a code *intrusive overcontrol/parental negative control* which may sound as resembling the *control* category in my coding scheme. However, Majewska's definition of this code was limited to the parent's intrusive behaviour that interrupted the child's behaviour in the game. In comparison, the *control* category in my coding scheme contains various codes that capture the parent's controlling, rather than only intruding, the child's behaviour (e.g., *direct instruction*), and thus is more granular and descriptive of parents' behaviour.

With regards to other differences, Majewska's (2017) code *parental expectations* contained parents' behaviour such as "look, let's put it so it's up that way, like that" which in my coding scheme would be coded as *decision-making* (because the parent makes a decision that includes both the parent and the child). Similar behaviours in my coding scheme were ensured accurate assignment of *decision-making* through multiple discussions with the RA and coders and through continuous data analysis, and thus this example may not be accurate to assign *parental expectations*. Similar behaviours in Majewska's scheme may have been assigned inaccurate codes or remain uncoded because perfectionism-related codes were developed deductively, and different potentially more accurate codes did not exist. This case further illustrates how developing an inductive coding scheme improved the accuracy and granularity of coding parents' behaviour.

In addition to more informative and granular capturing of parents' behaviour, my coding scheme also considered the interactional context. In comparison, Majewska's (2017) coding scheme coded parents' behaviours as isolated units—that is, did not consider the context of behaviours—which may have contributed to coders' unsatisfactory agreement due to their potential different interpretations of behaviours. Indeed, this issue was also encountered in the present study and explained in Chapter 5, where I noticed that some coders' coding inaccuracies were related to their insufficiently considering the interactional context. This illustrated the influence that the lack of consideration for context may have on the coding accuracy and IRA, and supported successful development of my coding scheme in that such issues were noticed and attended to. Moreover, although only parents' behaviour was coded in my coding scheme, considering the interactional context allowed for the consideration of the child's behaviour which was important because an interaction is always bi-directional (Lollis & Kuczynski, 1997), and thus it may be inaccurate to consider one participant's behaviour outside of context.

7.2.2 The Coding Scheme's Similarities to Extant Coding Schemes

In relation to coding scheme similarities, I noticed that some codes in my coding scheme capture similar behaviours to the ones captured in other extant coding schemes. For example, behaviours that are coded as *indirect instruction, suggestion* in my coding scheme, are also captured in other coding schemes by codes such as *implicit directive: suggestion, hint of new direction* (Woodruff-Borden, 2001) or *indirect command* (Eyberg et al., 2009). However, such similarities in the type of behaviour that the coding schemes capture are expected because parents are likely to show some similar behaviours during parent–child interactions (e.g., in this case, suggestive and instructive behaviours) even when different tasks are used in different studies.

Furthermore, although my coding scheme was developed inductively, some code names share similarities with code names in other coding schemes. For example, *indirect instruction, suggestion* in my coding scheme may appear similar to *implicit directive: suggestion, hint of new direction* (Woodruff-Borden, 2001) and *indirect command* (Eyberg et al., 2009). Similarly, *decision-making* in my coding scheme may appear similar to *choice-making: planning or taking over* in Woodruff-Borden's (2001) coding scheme. I may suggest that such similarities could reflect what Sipe and Ghiso (2014) explained as inevitable subjectivity in developing inductive codes because of a researcher's prior knowledge and prejudices. That is, because I reviewed extant coding schemes before developing my coding scheme (as illustrated in Chapter 1), it is possible that having observed how other researchers had named their codes may have influenced the labelling of some codes in my coding scheme. However, during the pre-pilot coding scheme development (i.e., during the initial grouping of behaviours, see Chapter 2), I focused on simultaneously developing sufficient segmentation and grouping behaviours by similarities in characteristics, and only later considered code names that reflected what the groups of similar behaviours contained. Thus, despite the occasional code name similarities, the codes in my coding scheme capture behaviours that I grouped into codes inductively.

7.2.3 The Coding Scheme's Differences from Extant Coding Schemes

Interestingly, despite some code name similarities, different behaviours may be assigned to these codes in my coding scheme and other coding schemes. For example, in my coding scheme, the behaviours that include "let's" (e.g., "let's restart the game" or "let's start with the basic of the basic first") are frequently identified as the parent's deciding about the next moves in the game for both the parent and the child, and are coded as *decision-making*. In comparison, in other coding schemes, similar behaviours that include "let's" are coded as *suggestion* (Hummel & Gross, 2001), *indirect command* (Eyberg et al., 2009), or *implicit directive: suggestion, hint of new direction* (Woodruff-Borden, 2001). This demonstrates that such behaviours are frequently seen as the parent's suggesting something to the child rather than the parent's making a decision. Furthermore, in Woodruff-Borden's coding scheme, the equivalent of my *decision-making* code is named *choice-making: planning or taking over*, and does not include examples containing "let's." However, through multiple coding disagreement discussions carried out throughout this study, the coders and I agreed that the behaviours we observed that contained "let's" should be assigned *decision-making*, and not *indirect instruction, suggestion* due to the characteristics of each code specified in the code definitions. That is, *indirect instruction, suggestion* contains the parent's behaviour that suggestively directs the child towards the next move, whereas *decision-making* contains the parent's behaviour stating the decision without providing an instruction suggestively. In comparison, in Woodruff-Borden's coding scheme, *implicit directive: suggestion, hint of new direction* definition includes not only a suggestive instruction (as in my *indirect instruction, suggestion*), but also "a new direction to the task that the speaker wants the other to accept" (p. 4), which, in my coding scheme, is a characteristic included in the *decision-making* definition. Thus, because characteristics of each code in both my and Woodruff-Borden's coding schemes are clearly defined to allow for accurate and consistent assignment of the codes, all of these codes may be considered accurate within the context of the coding scheme (Snyder et al., 2006).

Of course, if, when applying my coding scheme, future researchers observe and discuss linguistically similar behaviours that contain "let's" but may be assigned a different code than *decision-making*, the codes should be assigned according to what appears accurate rather than thoughtlessly following linguistically similar examples in the coding scheme. As observed throughout the present study, different parents show a variety of different behaviours, and thus a thorough examination of each behaviour and its context is crucial. Adding varied examples to the coding scheme would improve the scheme's accuracy over time, similarly to some other coding schemes' application and testing in multiple studies that resulted in several updated coding scheme editions (e.g., Eyberg et al., 2009; Jabson et al., 2002). Such updating of Eyberg et al.'s and Jabson et al.'s schemes allowed for further assessment of psychometric properties such as the IRA (e.g., Cañas et al., 2021; Cotter, 2016; Schuhmann et al., 1998), and established the schemes' suitability for application in different observational contexts (e.g., Bagner et al., 2004; Dishion et al., 2014; Gross et al., 2008; McIntosh et al., 2000) which led to the coding schemes' being employed more widely.

As another illustration of coding scheme differences, in Kerig's (1989, as cited in Kerig et al., 1993) coding scheme the parent's behaviour "what a nice game" is coded as *express pleasure*, but in my coding scheme such behaviour would likely (depending on the context) be assigned *supportive comment, encouragement*. Interestingly, such code differences also indicate differences in how parents' behaviour is approached in these coding schemes. That is, where *express pleasure* reflects the parent's own behaviour unrelated to the child, *supportive comment, encouragement* reflects the parent's behaviour in relation to the child. This demonstrates that although the coding scheme developed in this thesis focused on parents' behaviour only (i.e., the child's behaviour was not coded), parents' behaviour was described in relation to their communication with the child. Other codes in my coding scheme also reflect this, such as *praise* (i.e., praising the child), *indirect instruction* (i.e., instructing the child), or *assistive clue* (i.e., providing a hint to the child). Thus, as anticipated in Chapter 1, coding only parents' behaviour in this thesis did not undermine the interactional nuances that occur between the parent and the child such as bi-directionality and each participant's influence on another participant's behaviour (in this case, the child's influence on the parent's behaviour; Lollis & Kuczynski, 1997). Moreover, as Sipe and Ghiso (2004) explained, "all coding is a judgment call, and as such opens up possibilities, but always obscures other potential alternatives" (p. 482). Consequently, neither mine nor Kerig's code naming may be assumed inaccurate if, again, the codes can be accurately and reliably applied (Snyder et al., 2006) because both codes capture different elements and angles of parents' behaviour.

However, it may worth noting that differences in what a code entails may be useful to consider when discussing results and drawing conclusions in studies that analyse observational data. This may allow for a more accurate interpretation of results and explanations of differences in correlations between a particular behaviour or a construct and other constructs. For example, this would attend to instances such as reported by Siew et al. (2020) where variability in behaviours observed when assessing father–infant relationship quality contributed to differences in correlations between father–infant relationship quality and other constructs such as infant outcomes.

7.2.4 The Coding Scheme's Granularity

Furthermore, my coding scheme shows greater yet appropriate coding granularity compared to some other coding schemes. For example, in Hummel and Gross's (2001) coding scheme, a code *question* captures when "parent (child) asks the child (parent) about a single part of the task (e.g., where does this piece go?)" (p. 24). In comparison, my coding scheme captures questions depending on their various meanings through examining identifiable behavioural elements and the context. For example, in my coding scheme, the *question* example "where does this piece go?" that Hummel and Gross presented could be coded as *asking for input/assistance* if the parent was unsure about the next move in the game and asked for the child's assistance, or as *prompt* if the parent was prompting the child to make any move in the game in relation to a particular piece. Such coding captures parents' behaviour more granularly and thus can provide a more accurate summary of different parents' behavioural patterns. That is, coding similar behaviours as *question* would only reveal how many questions the parent asked the child, but coding them more granularly would reveal the meanings behind the questions and how the parent behaved with the child. Even when analysing this example in relation to coding categories in my coding scheme, *asking for input/assistance* and *prompt* belong to different categories—that is, *engagement* and *guidance*, respectively—which already reveals different information about the parent's behaviour. Thus, this comparison to another coding scheme supports the sufficiency and success of coding granularity development in this thesis.

Moreover, regarding the coding scheme's granularity, too broad codes may contribute to coders' less specific judgement and less guidance on what each code contains (Margolin et al., 1998) whereas too granular codes may contribute to unsatisfactory IRA because even slight behavioural differences may determine the assignment of a different code which even well-trained coders may not be able to identify accurately (Heyman et al., 2014). However, more granular codes (i.e., when granularity is sufficient and does not undermine the accuracy of code identification) are more informative of the data than less granular codes and provide more varied data analysis options (Margolin et al., 1998). This is because more granular codes can be grouped into categories, but too broad categories would require starting coding from the beginning, should the need for more granular codes arise (Margolin et al., 1998).

Because I developed the coding scheme inductively, I did not follow any guidelines for a recommended number of codes and instead focused on exploring what the data contained. Establishing satisfactory IRA for most codes or, where the IRA was unsatisfactory, being able to resolve coding disagreements through discussion indicated that the number of codes in my coding scheme—that is, 18 codes—was not too large to be applied reliably by multiple coders (Heyman et al., 2014). Also, my coding scheme contains eight distinct categories which allows grouping the more granular codes as needed. Moreover, the coding scheme contains two to four codes within each category (except the *monitoring*, *process control*, and *other* categories which all contained one code of the same name), in line with Yoder and Symons's (2010) recommendation of this being an optimum number of codes for detecting variable associations more easily. This further supports the code granularity in my coding scheme as appropriate and sufficient, and also suggests that, although granular, my codes do not capture "tedious and not very fruitful detail" of the data (Bakeman & Gottman, 1997, p. 16).

Furthermore, although I added and removed several codes from the coding scheme throughout the study, most novel and complex behaviours could be assigned existing codes and did not require adding new codes to the scheme. That is, existing codes could accommodate a wide spectrum of behaviours and the key code characteristics for each behaviour could be successfully identified. This further suggested that I maintained a balance between developing granular codes and being able to assign them accurately.

7.3 Considerations About the Coding Scheme's Development Within This Study

This section discusses insights gained throughout the present study in relation to practices carried out in different coding scheme development phases and other researchers' recommendations and insights.

7.3.1 Inductive Coding Scheme Development and Reporting of Challenges

In Chapter 2, I anticipated that developing the coding scheme inductively would be a cyclical and iterative process, requiring a repeated and thorough data analysis (Creswell & Poth, 2018; Liu, 2016; Percy et al., 2015; Saldana, 2009; Thomas, 2006). This proved accurate throughout all coding scheme development phases, as I continuously amended the coding scheme, and the coders and I repeatedly discussed the coding disagreements. The necessity for such a cyclical process arose from observing novel and complex behaviours, and the final coding scheme could not have been developed without such going back and forth. This process was also in line with Bakeman and Gottman's (1997) explanation of the coding scheme's development being "an arduous task" that often requires lengthy discussions and multiple coding scheme amendments (p. 36).

Repeated and cyclical data analysis, as the basis for an inductive approach, allowed for an examination of the data without preconceptions or hypotheses and for an exploratory view at what codes and patterns of behaviours may emerge from the data (Liu, 2016; Thomas, 2006; Vuchinich et al., 1992). Indeed, I captured the behavioural patterns that parents demonstrated during a problem-solving task (e.g., parents' controlling or guiding behaviours), and the coding scheme could capture all parental behaviours without the need to continuously develop new codes when coding new video fragments. Such successful coding scheme development also supported Boyatzis' (1998) notion that an inductive coding scheme is less likely to miss what the data contains because its development is based on the specific data to be coded. As described in Chapter 1, unsuccessful capturing of what the data contained may have occurred during the previous unsuccessful attempt to develop a deductive coding scheme within the Leverhulme project (Majewska, 2017). Accordingly, further deductive attempts may have resulted in guessing and imposing what the data may contain. In comparison, the inductive coding scheme development in this thesis proved successful in capturing all parents' behaviours within the data to sufficient granularity and thus also attending to their richness and complexity potentially more accurately and informatively than a deductive approach may have done (Vuchinich et al., 1992).

However, it is worth noting that, having employed an inductive coding scheme development approach, I also noticed that inductive process throughout this study contained deductive elements. For example, after I inductively developed the codes, checking whether they could be applied to other video fragments was a deductive process. That is, the coders and I read through a code definition and checked whether a behaviour could be accurately assigned the code (i.e., a pre-existing description of behaviour assigned to a behaviour which would be in line with a deductive approach). This was in line with Erickson's (1986, as cited in Sipe & Ghiso, 2004) notion that "induction and deduction are in constant dialogue." Indeed, although I initially developed the codes inductively (i.e., without preconceptions and based on three initial video fragments), the coding scheme development process had to include deductive elements to ensure that such inductively developed codes could be reliably applied by the coders and future researchers.

Moreover, the coding scheme development included an interpretative process that required analysing varied and unstructured parents' behaviour inductively and developing appropriate segmentation and coding, while also ensuring that such interpretations adhere to the participant-focused approach so that the codes could be accurately assigned by other coders (Kuczynski & Dali, 2003). Krippendorff (2004) described such challenges as a "common dilemma of having to choose between interesting but nonreproducible interpretations … and oversimplified or superficial but reliable … analyses generated through the use of computers or carefully instructed human coders" (p. 213). Coding disagreement discussions frequently reflected the challenge of juggling these elements when the coders and I observed different interesting and novel behaviours but needed to maintain the participant-focused approach and to not over-interpret the behaviours for their accurate and replicable coding. I maintained a balance between a “nonreproducible” and an “oversimplified” view of the data by achieving satisfactory IRA yet noticing and discussing complex coding disagreements and following the participant-focused approach.

Also, while maintaining such balance, I appreciated that, as Sipe and Ghiso (2004) explained, challenges of inductive research should be attended to and reported when writing about the research process, and may enrich our understanding of results. For example, other researchers’ explaining that some challenges are not unusual (e.g., being cautious about any “high agreement, low accuracy” phenomenon, monitoring coders for observer drift, or continuous and lengthy coding disagreement discussions’ being an imperative part of the coding scheme development; e.g., Bakeman & Gottman, 1997; Harris & Lahey, 1982; Taplin & Reid, 1973) allowed me to look at the data analysis more creatively and to appreciate that the process and the insights were the result of this thesis together with the reporting of satisfactory IRA and the successful development of the coding manual.

However, apart from such main challenges, few researchers have reported their reflections and challenges in more detail (e.g., the detail of considerations for code refinement). For example, some challenges have been detailed when developing inductive categories in ethnographic research (Sipe & Ghiso, 2004), deductive coding scheme in social psychology (Hackathron & Hodges, 2021), or deductive coding scheme that examines classroom dialogue (Hennessy et al., 2016), but published research of parent–child interaction often lacks detailed reporting of challenges encountered when developing an inductive coding scheme. This may be because of the limits of the word count in published research or because most coding schemes that examine parent–child interactions are developed deductively and may not present considerable challenges. However, for example, Matias (2006) in her PhD thesis developed an attachment-theory informed deductive coding scheme for coding behaviours during parent–child interactions, where the existence of challenges in code refinement was mentioned and implied, and the thesis provided space (i.e., the word count) for a more in-depth reporting of such challenges. Nevertheless, Matias only reported that code definitions were discussed with supervisors and subsequently amended weekly for several months, but the details of the challenges and what prompted the amendments were not provided. This illustrates a lack of reporting of challenges related to code development, and thus my reporting of a variety of challenges and considerations throughout this thesis adds to the knowledge of inductive coding scheme development when examining parent–child interactions.

Future researchers should also consider reporting their challenges when developing a coding scheme, and even when applying my coding scheme. This is because different coders may encounter various challenges in different studies, especially if my coding scheme is applied in different observational contexts. Such reporting may further add to the knowledge of what observational coding entails and assist future resolving of disagreements and improve coder training through further insights and topics for discussion.

Also, when reporting the challenges throughout this thesis, I attended to Sipe and Ghiso's (2004) noted "ways to hide ourselves in our writing" when describing the inductive development of codes such as "categories emerged from the data" or "transcripts were coded and analysed," when, in fact, it is us with our subjective biases that develop these codes and categories (p. 474). Accordingly, I intentionally presented the process of the coding scheme development in a way that would indicate mine, the RA's, and the coders' active participation and decision-making. For example, I noted that coders and I coded the video fragments (i.e., not that "the video fragments were coded"), and that we discussed and resolved coding disagreements (i.e., not that "the disagreements were discussed and resolved").

7.3.2 Coding Parents' Behaviour Only

My coding scheme captures parents' behaviour only, although the child's behaviour is considered as contextual guidance for coding the parent's behaviour. In comparison, when coding both participants' behaviour, some extant coding schemes contain different codes for the parent's and the child's behaviour or the same codes for both participants' behaviour. For example, in the DPICS (see Chapter 1 for an overview; Eyberg et al., 2009), the codes for the parent's behaviour include *labelled praise*, but the codes for the child's behaviour do not include this code. This reflects the differences in roles that the parent and the child may take up—that is, the parent likely praises the child during the task but not vice versa. However, some codes in the DPICS are shared, such as *negative touch* which can be demonstrated by both the parent and the child. In comparison, in the RPC (see Chapter 1 for an overview; Jabson et al., 2004), both the parent's and the child's behaviour is coded by the same codes such as *positive verbal* or *negative physical contact* because such codes are not specific to each participant's behaviour (e.g., *positive verbal* is not specified as *labelled praise*, which would reflect a behaviour that may only be specific to the parent). Such differences also illustrate the variety of approaches to coding granularity and behaviour analysis that may be employed depending on different study elements when developing a coding scheme.

If my coding scheme coded the child's behaviour, both participants' behaviour would need analysing inductively, and the coding scheme would comprise different codes than it currently does. Moreover, the segmentation may need developing differently when considering both the parent's and the child's behaviour for coding (i.e., the child's behaviour would not only serve as contextual guidance but would be analysed and coded granularly as well as the parent's behaviour). Other researchers have coded both participants' behaviour after segmenting them using time-sampling (e.g., Eyberg et al., 2009) or parsing behaviours into the smallest identifiable units (e.g., Kerig, 1989, as cited in Kerig et al., 1993). The latter was employed in the present study and may be used if segmenting both participants' behaviour, although the nature of the task may influence such segmentation. For example, in Kerig et al.'s (1993) study, parent–child dyads were collaborating on building a world in a sand tray by using play figurines, and such a task may have contained participants' more orderly conversation and allowed for parsing each participant's behaviour into segments. However, during "Rush Hour Jr.," participants focused on solving the task and were frequently making moves and talking simultaneously. Thus, segmenting behaviours during a problem-solving task may require additional considerations. For example, segmenting both participants' behaviours for later coding may be done separately, where the parent's behaviour would be segmented and coded, and the child's behaviour would be separately segmented and coded (i.e., the same video fragment would be segmented twice for each participant's behaviour). Such segmentation may be illustrated as, for example, the parent's talking forming one segment, and the child's simultaneously moving different cars forming multiple separate segments.

However, such considerations may only be speculative and an inductive analysis and exploratory view at the data may reveal different segmentation options. This would also be in line with the notion that inductive analysis should be carried out without preconceptions or hypotheses (i.e., without preconceptions about how the segmentation may be approached; Liu, 2016; Thomas, 2006; Vuchinich et al., 1992). Thus, should future researchers decide to develop an inductive coding scheme that would capture both the parent's and the child's behaviours, an inductive analysis may be carried out that may provide further and different insights into the inductive coding scheme development and participants' behaviours, and would lead to a construction of a significantly different coding scheme.

Furthermore, by coding the child's behaviour, I may have gained more information about both participants' behaviour during a problem-solving task (e.g., how the child behaves in relation to the parent) and insights into the challenges when developing an inductive coding scheme that captures both participants' behaviour. However, because the Leverhulme project aimed to focus on parents' behaviour only, the inductive analysis of the child's behaviour was not carried out. Also, such focusing on parents' behaviour allowed for the time and effort to be concentrated on conducting a detailed exploration of parents' behaviour that may not have been possible to the same extent when focusing on both participants' behaviour.

7.3.3 Coding Perfectionism-Related Behaviours

The coding scheme developed in this thesis did not aim to capture perfectionism-related parents' behaviours but instead captured all parental behaviours during play-based instructional parent–child interactions. This allowed for capturing a more comprehensive picture of parents' behaviour, and thus for a more detailed and varied analysis of behaviours and their correlations with the data from other measures in the future (e.g., self-reports in the Leverhulme project). With regards to a coding scheme's capturing perfectionism-related parents' behaviours, different behaviours may be more likely to occur during certain tasks (e.g., Bloomquist et al., 1996; Donenberg & Weisz, 1997) and different coding schemes may be used in different observational contexts (e.g., Halty and Berástegui, 2021; Palmer et al., 2021; Perzolli et al., 2021), and thus it may be unrealisable for a single coding scheme to capture multiple perfectionism-related parents' behaviours. Also, such capturing of multiple perfectionism-related behaviours would require clear knowledge of behaviours that should be included in the coding scheme, when, as Chapter 1 explained, current research is still investigating how and what behaviours may lead to the development of perfectionism. Thus, instead of focusing on coding specific perfectionism-related behaviours (which also turned out unsuccessful in Majewska, 2017), it may be more informative to investigate different behaviours captured by my coding scheme, and their relation to the development of children's perfectionism, adding new insights to the knowledge about perfectionism theory through the application of observational methods.

Moreover, as different behaviours may occur during different tasks, problem-solving tasks were initially employed in the Leverhulme project due to their challenging nature that may elicit parents' behaviours that have been shown to be related to children's perfectionism. Problem-solving tasks may remain a good place to look for perfectionism-related behaviours because some behaviours in my coding scheme resemble such behaviours (e.g., parents' controlling behaviours; Affrunti & Woodruff-Borden, 2015). However, potentially perfectionism-related behaviours were not the only ones observed during this study, and other behaviours' inclusion in the coding scheme allowed for a richer and more accurate analysis of parents' behaviour. Furthermore, behaviours that resemble perfectionism-related behaviours coded in my coding scheme were discussed in detail, allowing for an accurate refinement of code definitions that would reflect what kind of behaviours occurred within the data when employing a problem-solving task, not how they may be predefined deductively. For example, parents' controlling behaviours that may be related to the child's perfectionism (Affrunti & Woodruff-Borden, 2015) were defined and grouped based on a detailed inductive analysis of parents' expressions during interactions, forming codes such as *direct instruction*. This ensured their reliable application, compared to the previous deductive perfectionism-related code development that proved unreliable (Majewska, 2017).

7.3.4 Importance of Coding Disagreement Discussions

As this thesis demonstrates, coding disagreement discussions were an inseparable part not only of the coding scheme development phases (Chapters 3, 4, and 5), but also of the implementation of the final coding scheme (Chapter 6). Where discussions were expected during the coding scheme development (i.e., discussions provided insights into the coding scheme amendments needed), their use during the implementation revealed that future researchers may likely employ coding disagreement discussions beyond coder training, because, due to the complexity of observational data, challenging segments are likely to come up during all coding phases. Moreover, coders' potential observer drift should be continuously monitored (Taplin & Reid, 1973); and in cases where observed drift is noticed, coding disagreements may be discussed to improve the IRA and coding accuracy (Margolin et al., 1998). Such continuous inclusion of coding disagreement discussions in the coding scheme application process throughout the present study was in line with researchers' recommendations when aiming to improve coders' understanding of a coding scheme or coding reliability and accuracy, and to mitigate against observer drift (e.g., Crittenden & Hill, 1971; Hennessy et al., 2016; Margolin et al., 1998; Mile & Huberman, 1994).

In addition, upon reflection, I could have recorded the coding disagreement discussions between me and the coders for further illustration of what they entailed. Future researchers may consider recording their discussions as it may be interesting to share what different researchers' discussions entail, how different coders may express their questions and insights, and how researchers resolve different coding disagreements (e.g., discussions may be analysed for indications of why and how disagreement resolution occurs).

7.3.5 Interdependence Between the Coding Scheme's and Coders' Improvement in the Present Study

The necessity for coding disagreement discussions and the resulting coding scheme improvements during the coding scheme development were interdependent with the coders' improving understanding of the coding scheme and the data. That is, the coders continued to actively improve their understanding of the coding scheme and the data through discussions during both the coder training (Chapter 4) and the pilot coding scheme testing (Chapter 5) phases, although the usual practice is to train coders to satisfactory levels of agreement and accuracy before further independent coding (Chorney et al., 2015; Margolin et al., 1998).

However, the coder training in this study was carried out using the pilot coding scheme (i.e., the incomplete coding scheme version), and the pilot coding scheme testing required coding new video fragments and discussing coding disagreements for each video fragment to ensure that the coding scheme could accurately capture a wide spectrum of parents' behaviours and that the coding scheme is sufficiently amended (i.e., the testing phase did not resemble the independent coding that would usually follow the coder training when the final coding scheme is used). Thus, through discussing new video fragments and gaining insights into the coding scheme amendments needed during the testing phase, the coders' understanding of the coding scheme and the data simultaneously and continuously improved. Such interdependence was not unusual because testing a newly developed coding scheme involves discussions with independent coders (Chorney et al., 2015), and through discussing the data and amending the coding scheme, coders' understanding would inevitably improve.

Moreover, although such interdependence between the coding scheme amendments and the coders' improvement may have appeared as lack of differentiation between the coder training and the pilot coding scheme testing, the interdependence was expected given the necessity to improve the coding scheme through discussion, novelty of the video fragments coded, and incompleteness of the coding scheme during the coder training. Also, despite the interdependence, the coder training and the pilot coding scheme testing in this study can still be differentiated. During the coder training, several video fragments used to train coders had been previously coded and discussed with the RA, and thus only minor coding scheme amendments were made during the coder training after gaining insights into the coders' coding disagreements. That is, the focus remained on training the coders rather than further developing the coding scheme. In comparison, the pilot coding scheme testing included coding only new video fragments that contained novel and complex segments, and aimed to test and finalise the coding scheme. Because the coding scheme has now been fully developed, no testing of the pilot coding scheme (i.e., no testing of the coding scheme that is incomplete and in early development) would be needed in future research, and thus coder training should be more defined (i.e., significantly less interdependent with other coding phases) and satisfactory IRA should be ensured before proceeding to independent coding. However, as noted in Section 7.3.4, coding disagreement discussions should remain part of the coding scheme application, and should be used to improve coders' understanding of the coding scheme beyond the coder training in cases where unsatisfactory IRA or observer drift are observed.

7.3.6 Considerations for Coder Training

Chapter 4 already concluded that the coder training in this study was in line with Margolin et al.'s (1998) explanation that a universal coder training that could be applied to multiple coding schemes does not exist due to the customisation needed to ensure coders' improving understanding of the coding scheme and the data. Furthermore, Chapter 4 concluded that the coder training was of appropriate length (i.e., 23 to 27 hours depending on the coder) in relation to coder training for other coding schemes (e.g., Forehand et al., 1979; Hummel and Gross, 2001; Jabson et al., 2002), although it should be kept in mind that the training should focus on the quality, not the quantity, of coders' learning.

Just like coding disagreement discussions were important throughout the whole process of the coding scheme development, they were also a crucial part of the coder training. It was only through discussions that coding disagreements could be resolved, coders' errors could be corrected, and coders' understanding of the coding scheme could improve. Such use of discussions during coder training has been highlighted in other studies (e.g., Cotter, 2016; Gilmore-Bykovskyi, 2015; Hennessy et al., 2016), although researchers have rarely reported the specifics of challenges encountered. Accordingly, Chapter 4 explained multiple topics that the coders and I discussed, illustrating the richness of discussions and a high number of details that needed considering when applying the coding scheme and when attending to coders' challenges and errors.

Moreover, the need for such repeated discussions emphasised the importance of coder training before the independent application of the coding scheme. During the training, I noticed coders' occasionally different approaches towards the data, although this was expected due to the data's containing multiple meanings and layers, and thus coders' likely initial focusing on different data elements (Margolin et al., 1998; Vuchinich et al., 1992). Such differences in the coders' focus also supported researchers' highlighting of the need to train coders on particular aspects within the data that should be captured and attended to within each coding scheme (i.e., the participant-focused approach in my coding scheme; Margolin et al., 1998; Sipe & Ghiso, 2004; Vuchinich et al., 1992). The variety of topics discussed during the coder training demonstrated that without such discussions and coders' reaching satisfactory IRA during coder training, the coding scheme is unlikely to be applied as intended (i.e., accurately; Chorney et al., 2015; Margolin et al., 1998). Thus, in future studies, researchers should ensure reaching satisfactory IRA through discussions, and adapt coder training to include as many discussions as needed before proceeding to independent coding. Such discussions would ensure the basis for coders' accurate understanding of the coding scheme, and the IRA would serve as an indication of coders' progress.

Also, during coder training, discussions may be used to attend to differences in coders' understanding of the data and the coding scheme. In the present study, this was illustrated through encountering difficulties with Coder 3's understanding of the coding scheme which Coder 3 attributed to their differences in cultural background. This further contributed to the notion that the data contains different meanings that coders' may attend to (Margolin et al., 1998; Sipe & Ghiso, 2004; Vuchinich et al., 1992), however in addition considering coders' potentially different understanding of behaviours due to their cultural or language differences that may be challenging to adjust through training. Although my coding scheme employed the participant-focused approach where the codes were assigned through identifying observable behavioural elements, such elements were more complex than, for example, the ones required to identify in a non-verbal smile, which may be relatively simple (although, in fact, examples where difficulty to identify subtle non-verbal behaviours caused coding disagreements were also discussed in this thesis). Instead, identifying more complex behavioural elements such as negative talk may require more sophisticated and appropriate inference from coders (Bakeman & Gottman, 1997) which may be influenced by their cultural and linguistic habits and perceptions. For example, *criticism, accusation, complaint* includes behaviours that convey a negative message and can be expressed in a negative or neutral voice tone, and the perception of such behaviours may differ among coders from different cultural backgrounds, thus influencing coders' ability to identify these elements as intended.

Indeed, differences depending on cultural background have been reported in parents' behaviour during parent–child interactions (e.g., Aytac et al., 2019) and in people's understanding of linguistic elements and behaviours such as a voice tone (e.g., Ishii et al., 2003; Min & Schirmer, 2011), but it was beyond the scope of this thesis to examine such aspects further. However, should influence of coders' differences be encountered in future studies, related difficulties and uncertainties could be detected through monitoring the IRA, and specified and discussed through coding disagreement discussions. This would assist researchers in noting when a coder's unsatisfactory IRA may not reflect difficulties or ambiguities within the coding scheme or coder training but instead within the coder's innate understanding of behaviour.

7.4 Considerations About the Coding Scheme's Application

This section discusses considerations related to the coding schemes application in future research.

7.4.1 Observational Context

As Chapter 1 explained, coding schemes may be difficult to generalise across multiple study contexts and a careful consideration should be given to research questions, observational settings and tasks, and populations when selecting or developing a coding scheme. During the present study, parents' behaviours reflected this consideration in that code examples contain parents' statements about, for example, moving the cars on the board which is specific to "Rush Hour Jr." Furthermore, the problem-solving nature of "Rush Hour Jr." allowed parents to take up specific roles such as expressing more controlling or guiding behaviours. This potentially reflected the notion that different tasks may evoke different behaviours in participants (e.g., Bloomquist et al., 1996; Donenberg & Weisz, 1997; Palmer et al., 2021; Perzolli et al., 2021) because such controlling or guiding behaviours may not be observed in observational contexts where tasks employed do not include problem-solving elements, and where parents thus may not be able to take up various instructional roles.

Thus, future researchers should be aware of the importance of observational context when applying my coding scheme and employ problem-solving tasks, specifically ones where it is possible for the parent to play an instructional role. That is, the parent may not necessarily take up a role of instructing the child towards a solution, but the nature of the task should allow for that. That way, parents' behaviours of the same type as were captured by the coding scheme throughout this thesis would be likely observed and accurately coded, whichever way of collaborating with the child the parent may choose (e.g., more controlling or guiding).

For use in different contexts (i.e., for use in studies that employ tasks that do not contain problem-solving elements), the coding scheme may need additional testing to ensure its ability to capture parents' behaviour accurately and reliably. Moreover, even the coding scheme's application when employing different problem-solving tasks may require some consideration (the coding scheme's application to only one problem-solving task in this thesis—that is, "Rush Hour Jr."—is noted as a limitation of this study, see Section 7.5). Although the coding scheme is likely to capture all parental behaviours within a similar problem-solving context, such attentive coding scheme testing (especially considering the novelty of the coding scheme) through establishing the coding scheme's psychometric properties in future studies that would employ different tasks would be in line with other researchers' practice of ensuring coding schemes' applicability in different observational contexts (e.g., Brumfield & Roberts, 1998; Oliver & Pike, 2021; Schrock & Woodruff-Borden, 2010).

7.4.2 Video Coding Software Selection

Although I segmented and coded video fragments in Transana, future researchers could employ any video coding software that allows for granular (i.e., second-by-second) segmentation and code assignment to each segment. Nowadays, researchers may be unlikely to transcribe and code observational data out-of-software because this would be time-consuming, but it may be worth noting that out-of-software transcriptions would also be unlikely to allow for the segmentation and coding granularity that was achieved throughout this study. This was supported by data examples noted in Chapter 3, when employing Transana resulted in a significant segmentation and coding granularity improvement compared to the previous out-of-software transcriptions.

7.4.3 The Coding Manual and Written Examples

Although I developed a comprehensive coding manual (see Appendix E) where each code was illustrated by multiple data examples, some subtle behavioural nuances may have been difficult to convey through text despite my selecting the clearest and most understandable examples and explaining their context. In addition to written data examples, access to video recordings has occasionally been provided when, for example, analysing parent–child interactions using conversational analysis (Forrester, 2013). However, unfortunately, this study could not provide access to video examples to future researchers due to maintaining participants' confidentiality. Thus, should future researchers find a way to provide access to video examples that could be examined alongside written examples (in such case, new examples for my coding scheme would need providing), this would help improve the understanding of the coding scheme in some cases (e.g., if coders show difficulty understanding some examples or codes). Otherwise, as Chapter 4 suggested, should some written examples appear challenging to some coders, future researchers could replace current written examples with video examples from their own data after ensuring that such video examples accurately match code descriptions through careful analysis and consideration of identifiable behavioural elements and key code characteristics.

7.5 Limitations and Future Directions

Several recommendations for future coding scheme applications have already been discussed in this chapter, so this section further discusses the main limitations within this study and related future directions.

The first limitation within this study was some codes' continuing to show unsatisfactory IRA between some coders (e.g., *prompt*, *direct instruction*, *decision-making)* up until the implementation of the final coding scheme (Chapter 6), which demonstrated that such codes may need continuous examination and discussion to improve the IRA and coding accuracy. Accordingly, future researchers should report the IRA and insights from their studies to gain further information about ways to improve the IRA for these codes. Furthermore, future researchers' reporting of IRA would provide an increasingly broader picture of my coding scheme's suitability for application across different studies and when employing different coders.

Another limitation of the present coding scheme development was the analysis of parent–child interactions during participants' completion of only one, not both, puzzles used in the Leverhulme project (i.e., the coding scheme was developed based on the videos of parents' and children's playing "Rush Hour Jr." whereas the videos of their doing the "GoKi Circle Puzzle" together were not used). Because both puzzles were of the problem-solving nature, it is unlikely that parents' behaviour when completing the circle puzzle would differ from behaviour when completing the traffic jam puzzle to the extent that the coding scheme could not accurately and reliably capture all parental behaviours. However, different expression (e.g., phrasing) of parental behaviours may be observed during the completion of different puzzles because of, for example, parents' focusing on different items within the game (e.g., when playing "Rush Hour Jr.," parents focused on the cars, whereas when playing "GoKi Circle Puzzle," parents would focus on puzzle pieces), providing further examples for each code and evidence for the coding scheme's versatility. Thus, future researchers should apply my coding scheme to different puzzles of problem-solving nature, and report the IRA and insights gained. Moreover, future researchers may apply and test the coding scheme with different tasks that do not include problem-solving elements, providing information about the scheme's applicability in different observational contexts.

Furthermore, after Chapter 1 described researchers' concerns about the lack of reporting of coding schemes' psychometric properties, this thesis attended to this issue by reporting the IRA results for each video fragment and individual categories and codes throughout Chapters 3-6. However, this thesis did not investigate different types of validity of the coding scheme. *Validity* refers to a measure's ability to capture variables that it states to capture, and contains different types such as *convergent validity* (a measure's positive correlation with other measures that capture the same variable) and *criterion validity* (the extent to which variables in a measure positively correlate with other variables they are expected to correlate with; Price, Jhangiani, & Chiang, 2015). Where other types of validity are assessed formally (i.e., through statistical analyses), *face validity*, which refers to a measure's capturing what it appears it should capture, is usually assessed informally—that is, through observation (Price et al., 2015). For example, in my coding scheme, at first sight, the code *direct instruction* would appear to include a parent's instruction, which it does. Thus, I may suggest that face validity of my coding scheme is high due to its being developed through observation and different coders' confirming their understanding of the codes. However, future researchers should attend to other types of validity that have not been assessed in this thesis. This would also address researchers' concerns about the lack of reporting of different types of validity when applying coding schemes to examine parent–child interactions and within other areas of observational research (e.g., Girard & Cohn, 2016; Gridley et al., 2019; Lotzin et al., 2015).

Lack of information regarding segmentation reliability was another limitation of this study. However, this was also consistent with other researchers' noting that segmentation maintains a level of arbitrariness due to people's subjectivity and that segmentation rules are necessary to help ensure segmentation consistency and replicability (Chorney et al., 2015; Yoder & Symons, 2010). It appears that this limitation would likely remain present in future studies. Accordingly, future researchers should ensure careful referring to the segmentation rules and, if possible, more than one researcher should be involved in the segmentation (at least initially) to ensure appropriate agreement and sufficient discussion regarding the consistency and replicability of segments in future studies.

7.6 Theoretical and Practical Implications

The coding scheme developed in this thesis is novel in its being developed inductively and capturing parents' behaviour only (i.e., the child's behaviour was not coded but was considered as contextual guidance for coding the parent's behaviour). Given that a suitable coding scheme that could examine all parental behaviours in a play-based instructional context did not yet exist, the development of my coding scheme added to the observational research in that a novel examination of all parental behaviours has been conducted and is now possible through the application of my coding scheme.

With regards to the topics of consideration within observational research of parent–child interaction explained in Chapter 1, this study added to the consideration of the importance of different study elements when applying a coding scheme in that a scheme cannot be generalised to all observational contexts. Indeed, my coding scheme contains code examples that convey references to a problem-solving task (e.g., the phrasing of examples such as "move this car"), which may not occur during tasks that do not contain problem-solving elements, and thus illustrate the applicability of the coding scheme to a specific observational context. Moreover, such examples illustrate the possibility that different tasks may evoke different behaviours in participants (e.g., Bloomquist et al., 1996; Donenberg & Weisz, 1997; Palmer et al., 2021; Perzolli et al., 2021) due to the observed specificity of phrasing and parents' task-related statements.

This thesis also added to the current knowledge of challenges encountered during the inductive coding scheme development and each of its phases, particularly because most coding schemes used when observing parent–child interactions are developed deductively and do not provide such insights, or opportunities to report such insights are not attended to (e.g., Matias, 2006). In addition to the specific examples of challenges presented throughout this thesis, the coding scheme development process also reflected other researchers' explanations that inductive data analysis and code development are complex, cyclical, and time-consuming, although serve to produce rich and detailed information about the data

(Creswell & Poth, 2018; Liu, 2016; Percy et al., 2015; Saldana, 2009; Sipe & Ghiso, 2004; Thomas, 2006; Vuchinich et al., 1992). This thesis illustrated and detailed this process for future researchers' reference.

Furthermore, developing my coding scheme added to the use of observational methods within perfectionism research (because it was used in the Leverhulme project) which would allow researchers to address recommendations of combining observational methods and self-reports (as discussed in Chapter 1; Cook & Kearney, 2014; Fong & Cai, 2019; Karababa, 2020; Kenney-Benson & Pomerantz, 2005; Smith et al., 2016; Smith et al., 2017). Moreover, the theoretical and practical implications of the development of this coding scheme also expand to different areas of developmental psychology, where this novel coding scheme would allow for the examination of parents' behavioural tendencies and the relationship between parents' behaviour and different parents' or children's behaviours and traits.

Regarding parents' behaviour, the coding scheme development process allowed insights into the wide variety of behaviours that the parents demonstrated, and the differences in behaviours even when the same code was assigned (i.e., *direct instruction* may be expressed in different ways depending on the phrasing, context within the game, and a combination of verbal and non-verbal elements). Such insights may contribute to further parenting research and also the coding scheme's practical implications regarding parenting practices. This may include investigating how parents choose to communicate with children, how certain behaviours are expressed (i.e., analysing differences between behaviours that are assigned the same code), and engaging parents in the coding and analysis of their behaviours.

7.7 Conclusion

This thesis outlined and explained in detail the development of the inductive coding scheme that granularly captures parents' behaviour in a play-based instructional context.

After the cyclical inductive analysis of the data, involvement of the RA and the coders, multiple coding scheme amendments, and coding disagreement discussions, the coding scheme was deemed successfully developed for the use in the Leverhulme project. Accordingly, the coding scheme adds to the application of observational methods within perfectionism research which, as Chapter 1 explained, has been reported as lacking. Furthermore, the coding scheme may be used by future researchers in other studies that examine parent–child interactions in a play-based instruction context. The coding scheme development process also provided unique insights into what the inductive analysis of parents' behaviour during parent–child interactions may entail, what challenges may arise, and how they may be resolved.

Future researchers' applying the coding scheme to different studies would provide further information about the coding scheme's psychometric properties and generalisability, and researchers' challenges and insights. However, as explained in Chapter 1, a coding scheme should not be adopted thoughtlessly (Bakeman & Gottman, 1997), and this should remain applicable to the coding scheme developed in this thesis. Accordingly, a careful consideration should be given to aspects such as observational context (because, as explained in Chapter 1, coding schemes may require attentive testing when applied to different contexts), so that the application of my coding scheme remains appropriate.

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Appendix A: Outline of Majewska's (2017) coding scheme

Codes, definitions, and examples for this outline are taken from Majewska (2017).

Code	Definition	Examples
Parental expectations	Any instance in which the parent communicates his/her expectation of the child. Instances of challenging the child, but not necessarily in a negative way. Communicating expectations to comply. Future-directed.	• "Look, let's put it so it's up that way, like that" "Now you've got…. you've got to put the cards…." "Let's put it there so I • can see, ..." "I know what we • should do…"
Parental criticism	Instances in parent's communications where parent criticises the child (or provides negative feedback). Past/present-directed. Explicit rejection, disagreement, disapproval.	• "No, no looking on the other side!" • "Excuse me! You can't turn the corner like that, it will get…"
Intrusive overcontrol/Parental negative control	Mainly behavioural, but not exclusively "Intrusive/negative"- the parental behaviours MUST intrude on the child's attempt at the task, they must be negative and interfere with the task, not general controlling behaviours. "Intrusive"- intruding on the child's actions. Using intrusive forms of control Interrupting the child's ideas or initiatives. Overly facilitating the child in the task (e.g., providing the answers). Might also present itself with conditioning (changing) the child's performance using love withdrawal, rewards, and threats.	• Taking materials away from the child. • Correcting the child's posture. • Manipulating materials as the child is attempting the task.

Parental positive affect	Parents display clear demonstrations of affection and express enjoyment when interacting with their child. Parents introduce an element of play or humour when interacting with their child. Parents praise their child's behaviours, task performance or reasoning, or they praise the way they have worked together as a team.	• "Yay!" • "Good girl!" • "Well done!" • "I totally • underestimated you."
Engaged parental support	This category focuses on how much engagement, attention and support parents give to the child during the game(s). This should NOT be actual physical support or doing the task for the child (that would be Intrusive overcontrol/Parental negative control). There must be a clear sense of engagement from the parent (e.g., looking at the child). Parent should be involved in the child's learning and discovery. Communication: what the parent says should be helping the child with the task. There should be a two-way interaction between the child and parent, in which the parent's part of the interaction should be carried out with the aim of helping the child, similar to the Zone of Proximal Development. Support given by the parent should be a process to what the child is doing, not the reaction to the outcome before (e.g., is the parent trying to help the child if he/she is stuck?).	• "Does this one fit around the edge?" • Child: "Wait!" Parent: gives the child time and space to try a new move.

Appendix B: Pre-Pilot Coding Scheme

Code Summary Table

Category	Code
Positive	
	Praise
	Supportive comment, encouragement
	Confirmation, acknowledgement
	Positive gesture/expression
Negative	
	Disagreement, disapproval
	Criticism, accusation, complaint
Control	
	Direct instruction
	Decision-making
	Attention request
	Process control
Engagement	
	Asking for input/assistance
	Parental investigation
	Mutuality
	Monitoring
Guidance	
	Explanation, teaching
	Indirect instruction, suggestion, prompt
	Assistive clue

Statements	
	Thinking out loud
	Apology
Other	
	Other

Positive Category

Praise

Short compliments and positive expressions with regards to the child's behaviours.

***Differs from* confirmation, acknowledgement**

Praise serves as positive feedback about the child's behaviour and *confirmation, acknowledgement* only serves as the parent's demonstration that they either confirm or acknowledge the child's behaviour and is neutral, the expression is not of positive nature.

Examples

- "Well done."
- "You've done well."
- "That's good."
- "Good."
- "Brilliant."
- "Awesome."

Non-Examples

- "Yeah" (after the child moved a car correctly).

Although the parent confirms that the child's move is correct, the expression does not contain an additional praising message.

Supportive Comment, Encouragement

The parent's positive remarks that may encourage a positive attitude towards the process of the game. This does not provide information about the next moves in the game but demonstrates the parent's attempts to create a positive game atmosphere for the child and/or comfort the child. Includes the parent's comforting and support attempts towards the child, and phrases that may help the child look at the process of the game more enthusiastically, positively, constructively.

Examples

- "You did the easy one really easily but with the hard one just needed a little bit of help."
- "That's a good one, isn't it?"
- "That's fine, you don't need to worry about that one, you only have to worry about…"

Confirmation, Acknowledgement

The parent's expressions that do not provide any new information about the game but are used either as the parent's confirmation of the child's behaviours or an acknowledgement that the parent has been observing the child.

Differs from **thinking out loud**

Confirmation, acknowledgement follows the child's behaviour that the parent responds to, whereas *thinking out loud* contains the parent's comments not directed at the child.

Examples

- "Yes," "yup," "yeah," "okay" (after the child's verbal or non-verbal behaviour as regards the process of the game).
- "No…" (after the child made a move in the game and said "no" first).
- "You know. Do you?" (after the child said "I know know know know!" as regards the next move in the game).

- The parent asking the child to repeat what the child has just said – this way the parent is acknowledging that they have heard the child speak.

Non-Examples

- In cases where the parent's expressions fall under *confirmation, acknowledgement* but the child's behaviour that could be confirmed/acknowledged is not present prior to the parent's, a different code should be assigned (e.g., "okay" could be assigned *thinking out loud*).

Positive Gesture/Expression

The parent's non-verbal positive expressions towards the child. This code should be assigned when the non-verbal behaviour is observed without the accompanying verbal behaviour.

Examples

- Smiling.
- Giggling.
- Laughing.
- High five.

Negative Category

Disagreement, Disapproval

The parent's disagreeing with or disapproving of the child's verbal and/or non-verbal behaviour.

***Differs from* explanation, teaching**

Disagreement, disapproval does not include further information about the game but rather just expresses that what has been done is incorrect and that the parent does not agree with/approve of it. Whereas *explanation, teaching* also provides information on why the parent may disagree with the move the child made, and what and why could be done next.

Examples

- “That’s not that one” (after the child moves a car).
- “No” (after the child says “you’re doing super hard since you helped me with that one”).
- “You can’t move it.”
- “Please, don’t look at the answers!” (after the child took the card to look at the answers).
- “You can’t, can you, move that one.”

Non-Examples

- “No, you’ve blocked the entrance now, haven’t you?”

  This is *explanation, teaching* because even though the parent disapproves of the move made by the child, this disapproval comes with an explanation of why this move is incorrect.

Criticism, Accusation, Complaint

The parent’s criticism, accusations, blaming, and/or complaints about the child or the child’s behaviours. Such complains can also be expressed as threats.

Examples

- “I told you you should do an easy first.”
- “That’s it, I’m not going to play.”
- “You always sometimes do this, when you can’t win, you think, oh, you know, well, I just do that.”

Control Category

Direct Instruction

The parent’s instruction to the child as regards the process and/or the next moves in the game. The parent aims to direct the child’s behaviour in a specific way, and this is expressed directly (i.e., in an instructive rather than suggestive way).

Examples

- "The white one, go back."
- Parent points at the car on the board for the child to move it.
- "Okay, just wait for a moment, okay?"
- "You set it up."
- "Let me help you."
- "Hold on."

Non-Examples

- "You don't look at the answers, please" (after the child has looked at the answers on the opposite side of the card).

  Despite having an instructive aspect to it, this is *disagreement, disapproval* – the parent expressing disapproval of the child's behaviour in the game.

Decision-Making

The parent makes a decision in the game and communicates it to the child. The parent is not suggesting it but making a statement about what is to come.

***Differs from* indirect instruction, suggestion, prompt**

Indirect instruction, suggestion, prompt holds a suggestive component to it which makes the expression "softer," whereas *decision-making* provides the information about what the parent has decided to do and is not inviting the child to contribute to deciding what the next step may be.

Examples

- "I'll do it, you watch, okay?" (even though the parent says "okay?" at the end as if to ask for the child's opinion, the decision has been made and the parent proceeds with the action straight away).

- "I'm not gonna help you, I'm gonna give some advice how to do it."
- "Let's restart the game" (although the parent's statement implies that both, the parent and the child, will be restarting the game, the decision about the next step—restarting—has been made).
- "Let's work our way backwards, alright?"
- "Then we maybe move that one" (while saying it, the parent also moves a car).
- "Okay, I think I will start the easy ones."
- "Let's give you a really super easy one" (the parent has decided on it and the child's input is not needed).

Non-Examples

- "Let's reset it and then let's talk it through, and find a solution, alright?"

  This is an *indirect instruction, suggestion, prompt* because even though the parent has thought of a plan for the next steps which the parent thinks should be followed, the parent expresses interest in the child's contribution to this decision rather than informs the child about the decision that has already been made.

Attention Request

The parent's verbal and non-verbal behaviours used to attract the child's attention.

Differs from **direct instruction**

Attention request can be similar to *direct instruction*. If the aim of the behaviour appears to be to only attract the child's attention and it does not carry any additional information, it should be coded as *attention request*.

Examples

- "Right, watch this, okay, watch that."
- "Listen, listen."

- "Oh, here we go, look."

Non-Examples

- "Okay, so just wait for a moment, okay?"

  Even though the parent aims to attract the child's attention, this phrase also carries additional information about what the parent would like the child to do: The parent is instructing the child to wait. Therefore, this should be coded as *direct instruction*.

Process Control

The parent's attempts to contribute to the game by making specific moves without discussing them with the child or by correcting what has been done. Most frequently occurs as a non-verbal behaviour not accompanied by verbal explanations.

Examples

- The parent looks at the answers on the other side of the card without consulting the child or sharing the answers with the child.
- The parent takes the card pile from the child.
- The parent takes the car off the board and puts it to a different place.
- The parent adjusts a knocked over car on the board.

Engagement Category

Asking For Input/Assistance

The parent's asking the child for input or assistance as regards the process of the game. It is task-oriented and serves as the parent's invitation to the child to help the parent. Can be expressed as a question or a statement.

***Differs from* parental investigation**

When in form of a question, *asking for input/assistance* is a game progress-oriented expression whereas *parental investigation* is the parent's attempt to better understand the child's thinking process and approach towards the game rather than receive the child's input as regards the progress of the game.

Examples

- "Where was it [the car], like this?"
- "Which one?" (after the child said to know what the next car to move is)
- "Should we just do a different one or not?"

Non-Examples

- "So how are you thinking about this?"

  By asking the child this question, the parent aims to find out about the child's thinking process, and not to gain task-oriented input from the child as regards the game. Therefore, this is *parental investigation*, and not *asking for input/assistance*.

Parental Investigation

The parent's questions about the child's thinking process and approach towards the game. This is an investigative expression and does not have a suggestive component to it. Where expressed as a question about the child's next move, the question is not suggestive of any direction the child should take.

***Differs from* indirect instruction, suggestion, prompt**

Parental investigation does not hold a suggestive component to it whereas *indirect instruction, suggestion, prompt* implies a certain direction that should be taken in the game.

***Differs from* assistive clue**

In question form, *parental investigation* is used when the parent does not know the answer to the question and aims to learn about the child's thinking process as regards the game. Whereas *assistive clue* is used to provide the child with a hint and the child may find out what the next move in the game could be after answering the question.

Examples

- "So how are you thinking about this?"
- "So what did you learn here?"
- "You're setting it up, what are you gonna do?"

Non-Examples

- "Which one do you think you need to move for the ice cream van to get out?"

  This is an *assistive clue* because the parent knows the answer and by providing the child with this question, the parent may help the child to proceed with the game.
- "Okay, which one [the car] are you gonna move?"

  This is an *indirect instruction, suggestion, prompt* because, even though the parent aims to find out (investigate) which car the child is going to move first, this question holds a suggestive component about the next step being moving one of the cars rather than doing something else.

Mutuality

Includes situations where both, the parent and the child, are focused on the same item/aspect of the game or on each other.

***Differs from* monitoring**

During *monitoring*, the parent is observing the game and/or the child while the child is engaged in the game, whereas during *mutuality*, both, the parent and the child, are not performing any actions in the game but are focused and/or observing the same detail of the game.

Examples

- The parent and the child look at the card together in silence.

- The parent and the child achieved the goal of the game; the parent says “awesome!” and the child says “yes!” and both look at each other at the same time.

Non-Examples

- The parent looks at the board while the child is moving the cars on the board.
  This is *monitoring* because it is only the parent that is observing the game and the child is engaged in the game.

Monitoring

The parent’s observation of the child and/or the game while the child is engaged in the game.

Examples

- The parent is quiet and glimpses at the child while the child is talking.
- The parent is watching the board while the child is moving the cars on the board.
- The child is engaged in the game and the parent stretches the hand towards the game but then withdraws and puts the hand back without intervening with the game.
  The parent is monitoring the child and with this non-verbal behaviour, the parent demonstrates that they are aware of what the child is doing and that the child may need help. Furthermore, by withdrawing and not intervening, the parent once again demonstrates that they are monitoring the child’s behaviour as the situation changes and the child may not need the parent’s help.

Guidance Category

Explanation, Teaching

The parent’s explanation or teaching of the game-related aspects or reinforcing the rules of the game. Contains new information about the process of the game.

Differs from **disagreement, disapproval**

Disagreement, disapproval does not include further information about the game but rather just expresses that what has been done is incorrect and that the parent does not agree with/approve of it. Whereas *explanation, teaching* also provides information on why the parent may disagree with the move the child made, and what and why could be done differently. Furthermore, *explanation, teaching* can occur without the child's behaviour that the parent may disagree with/disapprove of.

Examples

- "Then… We need to get that [the car] out the way."

  The parent explains to the child what step should be done next.
- "No, you've blocked the entrance now, haven't you?"

  Although the parent disapproves of the move the child made by saying "no," this expression also holds additional information about why the parent disagrees. The parent explains to the child that the entrance has been blocked.
- "I looked to see which one, I had a funny feeling we had to move the ice cream van."

  The parent explains to the child the rationale behind the parent's behaviour within the game.
- "It's after one road which is here."

  The parent explains to the child how to approach setting up the game.
- "For me to move that one [the car], this one [the car] is in my way."
- "You did the medium one really easily and then when we got to the hard one just needed a little bit of help."

Non-Examples

- "You can't knock the purple one off" (after the child knocked the purple car off).

This is *disagreement, disapproval* because this expression follows the child's behaviour the parent disapproves of, and the parent points out that the move in the game was incorrect.

Indirect Instruction, Suggestion, Prompt

The parent's attempts to direct the child's behaviour as regards the process and the moves in the game, expressed in a suggestive way. This includes prompts that may not hold a concrete suggestion of the next move but imply that some action should be taken (i.e., a suggestion to proceed with the game).

***Differs from* assistive clue**

Indirect instruction, suggestion, prompt provides the information about the next move indirectly, whereas *assistive clue* provides a hint which the child should use to figure out themselves what the next move may be.

***Differs from* decision-making**

Indirect instruction, suggestion, prompt holds a suggestive component to it which makes the expression "softer," whereas *decision-making* provides the information about what the parent has decided to do and is not inviting the child to contribute to deciding what the next step may be.

Examples

- "We should try a harder one?"
- "Do you want to try a medium one?"
- "Maybe if you move this across a little bit?"
- "So let's just have a little think about it."
- "Should we just do a different one?"
- "Let's start with the basic of the basic first."

- "Then which one would you move?"
- "And then?" (directed at the child, prompts the child to make a move).

Non-Examples

- "And then…" (not directed at the child, the parent is *thinking out loud*).
- "Is that the right place?"

  The parent is not indirectly instructing, suggesting, or prompting the child to make a certain move but is providing a clue which the child should use to figure out the next move (in this case, based on the parent's clue, the child should decide whether the car is in the right place or not, and act accordingly). This is an *assistive clue*.
- "Right, let's restart the game, okay."

  The parent is inviting the child to join the next move in the game that the parent has decided on. The parent does not suggest to restart the game but states their decision. Thus, this should be coded as *decision-making*.

Assistive Clue

The parent's attempts to provide the child with a helpful hint as regards the next move in the game. The child may have to figure out what the hint means as the parent does not provide full information.

Differs from **parental investigation**

In question form, *parental investigation* is used when the parent does not know the answer to the question and aims to learn about the child's thinking process as regards the game. Whereas *assistive clue* is used to provide the child with a hint and the child may find out what the next move in the game could be after answering the question.

***Differs from* indirect instruction, suggestion, prompt**

Indirect instruction, suggestion, prompt provides the information indirectly about the next move, whereas an *assistive clue* provides a hint, based on which the child should figure out what the next move may be.

Examples

- "Is that the right place?" (the parent only hints that the child may want to check whether the car is in the correct place but does not provide the answer that the car, in fact, is not in the right place).
- "Which one do you think you need to move for the ice cream van to get out?"
- "No, which one would you move? Which is the only vehicle that can move?"

Non-Examples

- "So, what did you learn there?"

  The parent is not providing the child with a hint about the next move and is investigating the child's thinking process. This is *parental investigation*.
- "So, let's just have a little think about it."

  The parent is suggesting and prompting the child to think about the game together. This expression does not hold any information that could be used as clues about the next moves in the game, and should, therefore, be coded as *indirect instruction, suggestion, prompt*.

Statements Category

Thinking Out Loud

The parent's verbal behaviours that are not directed at the child but are only used to vocalise what the parent may be thinking/doing at a given moment.

***Differs from* confirmation, acknowledgement**

Confirmation, acknowledgement follows the child's behaviour that the parent responds to, whereas *thinking out loud* contains the parent's comments not directed at the child.

Thinking out loud can be linguistically similar to some other codes (e.g., *decision-making*) but here the parent is not oriented towards the child and the comments are not directed at the child. The parent sounds as if they are just expressing their thoughts out loud, focused on what the parent is thinking or doing and somewhat excluding the child from the process at that moment.

Examples

- "Okay" (the parent's expression without the child's behaviour prior to it that could be confirmed or acknowledged).
- "Let me see if I can… Um… Attempt to work this out" (the parent's comment while moving the cars around).
- "That's super hard, that's hard, okay, right" (the parent's comment while looking through different cards).
- "That can stay there…" (the parent's comment while moving a car on the board).
- "No… I've done that wrong."

Non-Examples

- "Okay" (after the child says "yup, I'm done" having set up the game).

  This is *confirmation, acknowledgement* because the parent's behaviour comes after the child's behaviour, and is used to communicate the parent's acknowledgement of hearing what the child had said.

Apology

The parent's apologising to the child.

Other Category

Other

Other behaviours that cannot be assigned any of the codes. This could be due to the inaudibility of the segment or where the verbal behaviour is unfinished/interrupted and could not be identified as assignable of any other codes. If a coder can choose a different code, that would be preferred and more informative.

Appendix C: Pilot Coding Scheme

Code Summary Table

Category	Code
Positive	
	Praise
	Supportive comment, encouragement
	Confirmation, acknowledgement
	Positive gesture/expression
Negative	
	Disagreement, disapproval
	Criticism, accusation, complaint
Control	
	Direct instruction
	Decision-making
	Attention request
Engagement	
	Asking for input/assistance
	Parental investigation
	Mutuality
Guidance	
	Explanation, teaching
	Indirect instruction, suggestion, prompt
	Assistive clue
Statements	
	Self-reference

	Apology
Monitoring	
	Monitoring
Process control	
	Process control
Other	
	Other

Positive Category

Praise

Short compliments and positive feedback about the child's verbal and/or non-verbal behaviours. This is expressed shortly after the child's behaviour that is being complimented.

***Differs from* confirmation, acknowledgement**

Praise serves as positive feedback about the child's behaviour. *Confirmation, acknowledgement* is more neutral and serves as the parent's demonstration that they have observed the child's behaviour and/or confirmation of the child's behaviour.

Examples

- "Well done."
- "Good."
- "Brilliant."

Non-Examples

- "Yeah" (after the child moved a car correctly).

  Although the parent confirms that the child's move is correct, the expression does not contain additional positive feedback—praising—message. Thus, this is *confirmation, acknowledgement*.
- "You've done well, okay" (after the child shows frustration in the game).

This expression does not follow the child's behaviour to be complimented, and the parent aims to support the child. Thus, this is *supportive comment, encouragement*.

Supportive Comment, Encouragement

Includes the parent's attempts to comfort and support the child and/or expressions that may encourage a more enthusiastic, positive, flexible, constructive outlook on the game. This does not provide new information about the next moves in the game.

***Differs from* praise**

Praise is expressed briefly after the child's behaviour that is being complimented. Whereas *supportive comment, encouragement* does not have to follow the child's behaviour and can be expressed at any time.

***Differs from* confirmation, acknowledgement**

Supportive comment, encouragement holds positive remarks about the process of the game that may comfort and encourage the child. Whereas *confirmation, acknowledgement* only serves as the parent's demonstration of observing the child or confirmation of the child's behaviour.

Examples

- "You did the medium one really easily but with the hard one just needed a little bit of help."
- "You've done well, okay."
- "Yeah, a good one, isn't it?"
- "That's fine, you don't need to worry about that one, you'd only have to worry about…"
- "That's good."
- "You did realy well, you did really well."
- "I'm sure you can do it" (emphasises that the cars can be set up on the board in any

order).

Non-Examples

- "Well done" (after the child moved a car correctly).

  This expression follows the child's behaviour that the parent compliments. The expression does not hold an additional supportive, encouraging message about the game. Thus, this is *praise*.

- "It's okay" (while the child tries to set up the cars on the board).

  The parent supports and encourages the child about the process of the game but does not confirm the child's moves in the game as correct. Thus, this is a *supportive comment, encouragement*.

Confirmation, Acknowledgement

The parent's brief expressions that do not provide any new information about the game but demonstrate that the parent has been observing the child's verbal and/or non-verbal behaviours or confirm the child's behaviours as correct. Includes the parent's questions to clarify what the child had said, instant repeating of what the child had said, or brief comments about what the child had done.

***Differs from* praise**

Praise serves as positive feedback about the child's behaviour. *Confirmation, acknowledgement* is more neutral and serves as the parent's demonstration that they have observed the child's behaviour and/or confirmation of the child's behaviour.

***Differs from* supportive comment, encouragement**

Supportive comment, encouragement holds positive remarks about the process of the game that may comfort and encourage the child. Whereas *confirmation, acknowledgement* only serves as the parent's demonstration of observing the child or confirmation of the child's behaviour.

Examples

- "Yes," "yup," "yeah," "okay," "mhm" (as a confirmation of the child's verbal and/or non-verbal behaviours).
- "Alright" (after the child says "I'm gonna do it by myself this time").
- "Okay" (after the child says "yes, I'm done").
- The child interrupts the parent's explanation; after the child has finished talking, the parent says "okay"—acknowledges that the child spoke—and continues with the explanation.
- "You know. Do you?" (after the child said "I know know know know!" about the next move in the game).
- "No…" (after the child said "no" first).
- "Huh?" (after the child said something).
- "Mmm…" (after the child made a comment about the game).
- "Oops!" (after the child knocked the car over).
- "And then you're out" (after the child completed the game).

Non-Examples

- "Well done."

  Although the parent approves and confirms of the child's behaviour, this expression also contains positive feedback. Thus, this is *praise*.
- "It's okay."

  The parent provides support and encouragement about the process of the game but does not confirm the child's behaviour as correct. Thus, this is *supportive comment, encouragement*.
- "Okay, so" (interrupts the child while reaching towards the board).

The parent interrupts the child rather than acknowledges what the child has said. Non-verbal behaviour indicates that the parent is making a move in the game. Thus, this is *process control*.

Positive Gesture/Expression

The parent's non-verbal positive expressions towards the child. Includes positive expressions accompanied by short verbal expressions.

Examples

- Smiling.
- Giggling.
- Laughing.
- "Okay" (laughing).

Non-Examples

- "No… I've done that wrong" (smiling).

  The verbal behaviour changes the meaning of the segment and provides information that can be used to assign a different code. Thus, this is *self-reference*.

Negative Category

Disagreement, Disapproval

The parent's brief expressions of disagreement or disapproval of the child's verbal and/or non-verbal behaviour in the game.

***Differs from* direct instruction**

Through *disagreement, disapproval*, the parent expresses their disagreement/disapproval of the child's behaviour. Whereas through *direct instruction*, the parent aims to direct the child's behaviour.

***Differs from* explanation, teaching**

Disagreement, disapproval does not provide new information about the game. Whereas through *explanation, teaching* the parent provides the reason for their disagreement/disapproval of the child's behaviour, and/or explains how and what could be done differently.

***Differs from* criticism, accusation, complaint**

Disagreement, disapproval is a brief expression following the child's behaviour. Whereas *criticism, accusation, complaint* is a more elaborate explanation on why the parent disagrees/disapproves of the child's behaviour.

Examples

- "That's not that one" (after the child moves a car).
- "No" (after the child says "you're doing super hard since you helped me with that one").
- "You can't move it [the car]."
- "You can't, can you, move that one [the car]."
- The parent pushes the child's finger off the board.

Non-Examples

- "So, just wait for a moment."

  The parent may have disagreed/disapproved of the child's behaviour, but this expression provides information about what the parent would like the child to do next: The parent instructs the child to wait. Thus, this is *direct instruction*.
- "You've blocked the entrance now, haven't you?"

  The parent disagrees with the move the child has made but explains why the move is incorrect. Thus, this is *explanation, teaching*.
- "I told you you should do an easy first."

The parent elaborates on the disapproval of the child's behaviour, complains about the choice made. Thus, this is *criticism, accusation, complaint*.

Criticism, Accusation, Complaint

The parent's criticism, accusations, blaming, and/or complains about the child, the child's behaviours or the situation in the game. Such complains can also be expressed as threats.

Differs from **disagreement, disapproval**

Disagreement, disapproval is a brief expression following the child's behaviour. Whereas *criticism, accusation, complaint* is a more elaborate explanation on why the parent disagrees/disapproves of the child's behaviour.

Examples

- "I told you you should do an easy first."
- "That's it, I'm not going to play."
- "You always sometimes do this, when you can't win, you think, oh, you know, well, I just do that."
- "We can't even get through medium, let alone super hard."

Non-Examples

- "You can't move it [the car]."

  The parent expresses disapproval of the child's behaviour but does not elaborate to criticise, accuse, or complain about the child's behaviour. Thus, this is *disagreement, disapproval*.

Control Category

Direct Instruction

The parent's direct and concrete instruction to the child about the process and/or the next moves in the game. The parent aims to direct the child's behaviour and expresses it in an instructive rather than suggestive way.

***Differs from* indirect instruction, suggestion, prompt**

Indirect instruction, suggestion, prompt provides information about the next move in the game in a suggestive manner. Whereas *direct instruction* provides information about the next move in the game in an instructive manner.

***Differs from* attention request**

Through *attention request*, the parent aims to attract the child's attention. Whereas through *direct instruction*, the parent aims to direct the child's behaviour.

***Differs from* decision-making**

Through *decision-making,* the parent informs the child about the next moves/approach towards the game that both the parent and the child will be a part of. Whereas through *direct instruction,* the parent aims to direct the child's behaviour only.

***Differs from* disagreement, disapproval**

Through *disagreement, disapproval*, the parent expresses their disagreement/disapproval of the child's behaviour. Whereas through *direct instruction*, the parent aims to direct the child's behaviour.

Examples

- "The white one."
- "Go back."
- Parent points at the car on the board for the child to move it.
- "There's your pink one" (while placing the car in front of the child).
- "So just wait for a moment."
- "You set it up."
- "Let me, let me help you."
- "Hold on."
- "You don't look at the answers, please."

Non-Examples

- “That can go down…”

  The parent provides information about the next move in the game and expresses it in a suggestive rather than instructive manner. Thus, this is *indirect instruction, suggestion, prompt*.

- “Right, watch this, okay, watch that” (while raising a finger in front of the child).

  Although the parent instructs the child to watch, this expression is used to attract the child’s attention to the parent’s behaviour. Thus, this is *attention request*.

- “I’ll do it, you watch.”

  Although the parent instructs the child to watch, this includes the parent’s decision on what both the parent and the child should do next in the game. Thus, this is *decision-making*.

- “You can’t move it [the car].”

  The parent does not directly instruct the child to not move the car but rather expresses their disapproval of the child’s move in the game. Thus, this is *disagreement, disapproval*.

Decision-Making

The parent makes a decision in the game that will include both the parent and the child, and communicates this decision to the child. This is not a suggestion but a statement about the next moves and/or approach towards the game to be taken.

Differs from **direct instruction** ***and*** **indirect instruction, suggestion, prompt**

Through *decision-making,* the parent informs the child about the next moves/approach towards the game that both the parent and the child will be a part of. Whereas through *direct instruction* and *indirect instruction, suggestion, prompt,* the parent aims to direct the child’s behaviour only.

Examples

- "I'll do it, you watch."
- "I'm not gonna help you, I'm gonna give some advice how to do it."
- "Let's restart the game."
- "Let's restart…" (this expression is interrupted but provides enough information to assign *decision-making*).
- "Okay, let's work our way backwards."
- "So, let's just have a little think about it."
- "Let's give you a really super easy one."
- "Let's start with the basic of the basic first."
- "Let's reset it and then let's talk it through, and find a solution."
- "I think, I think we should do another hard one."
- "This one's super easy so I'm gonna let you do it."
- "Okay, I think then we start the easy ones."

Non-Examples

- "So just wait for a moment."

  The parent does not provide information about the next moves/approach towards the game that would include both the parent and the child. The parent aims to direct the child's behaviour only. Thus, this is *direct instruction.*

- "That can go down…"

  The parent does not provide information about the next moves/approach towards the game that would include both the parent and the child. The parent aims to direct the child's behaviour only and expresses it in a suggestive way. Thus, this is *indirect instruction, suggestion, prompt*.

Attention Request

The parent's verbal and non-verbal behaviours used to attract the child's attention to the parent's verbal and/or non-verbal behaviour or something the parent is focused on.

Differs from **direct instruction**

Through *attention request*, the parent aims to attract the child's attention. Whereas through *direct instruction*, the parent aims to direct the child's behaviour.

Examples

- "Right, watch this, okay, watch that" (while raising a finger in front of the child).
- "Listen, listen."
- "Oh, here we go, look."

Non-Examples

- "So, just wait for a moment."

  The parent does not attempt to attract the child's attention but to direct the child's behaviour: The parent instructs the child to wait. Thus, this is *direct instruction*.

Engagement Category

Asking For Input/Assistance

The parent's asking the child for help—input or assistance—about the moves or decisions to be made in the game.

Differs from **parental investigation**

Through *asking for input/assistance*, the parent asks for the child's help in the game. Whereas through *parental investigation*, the parent attempts to better understand the child's thinking process and/or approach towards the game.

Differs from **indirect instruction, suggestion, prompt**

Through *indirect instruction, suggestion, prompt*, the parent attempts to direct the child's behaviour in a suggestive manner. Whereas through *asking for input/assistance*, the parent asks for the child’s help in the game.

Examples

- “Where was it [the car], like this?”
- “Which one [the car]?” (after the child said to know what the next move is).
- “Should we just do a different one?”
- “Do you want to try a medium one?”
- “Do you wanna try a harder one?”

Non-Examples

- “So how are you thinking about this?”

  The parent attempts to better understand the child’s thinking process and does not ask for help with the game. Thus, this is *parental investigation*.
- “Then which one would you move?”

  The parent prompts the child to make a move and does not ask for help in the game. Thus, this is *indirect instruction, suggestion, prompt*.

Parental Investigation

The parent’s questions about the child’s thinking process and approach towards the game. This is an investigative expression and does not have a suggestive component to it. Where expressed as a question about the child’s next move, the question is not suggestive of any direction the child should take.

Differs from **indirect instruction, suggestion, prompt**

Through *parental investigation*, the parent attempts to better understand the child’s thinking process and approach towards the game. Whereas through *indirect instruction, suggestion, prompt*, the parent aims to direct the child’s behaviour and/or prompt the child to make a move.

***Differs from* asking for input/assistance**

Through *asking for input/assistance*, the parent asks for the child's help in the game. Whereas through *parental investigation*, the parent attempts to better understand the child's thinking process and/or approach towards the game.

***Differs from* assistive clue**

Through *parental investigation* the parent enquires about the child's thinking process and/or approach towards the game. Whereas through *assistive clue* the parent provides the child with a hint about the next move in the game.

Examples

- "So, how are you thinking about this?"
- "So, what did you learn here?"
- "You're setting it up, what are you gonna do?"

Non-Examples

- "Okay, which one [the car] are you gonna move?"

  This expression prompts the child to make a move and suggests that the next move should be moving one of the cars. Thus, this is *indirect instruction, suggestion, prompt*.
- "Do you want to try a medium one?"

  The parent asks for the child's contribution to the decisions in the game. Thus, this is *asking for input/assistance*.
- "Which one do you think you need to move for the ice cream van to get out?"

  The parent provides a hint about the next move in the game being related to the position of the ice cream van. Thus, this is *assistive clue*.

Mutuality

Includes the situations where both the parent and the child are explicitly focused on each other and/or the same item/aspect of the game and not engaged in any other activity.

***Differs from* monitoring**

During *monitoring*, the parent is observing the game and/or the child while the child is engaged in the game. Whereas during *mutuality*, both the parent and the child are focused on each other or the same item/aspect of the game, and are not engaged in any other activity.

Examples

- The parent and the child complete the game; the parent says “awesome!” and the child says “yes!” at the same time, both look at each other.
- The parent and the child focus on the card at the same time.

Non-Examples

- The child is engaged in the game and looks at the card, the parent then looks at the same card.

  The parent looks at the card because they have been monitoring the child. By looking at the card, the parent continues to monitor the activity the child is engaged in rather than focus on the card due to the parent’s own engagement. Thus, this is *monitoring*.

Guidance Category

Explanation, Teaching

The parent’s demonstration, teaching, and/or explanation of the parent’s or the child’s behaviour in the game, previous or next moves in the game and discoveries in the game or reinforcing the rules of the game.

***Differs from* disagreement, disapproval**

Disagreement, disapproval does not provide new information about the game. Whereas through *explanation, teaching*, the parent can provide the reason for their disagreement/disapproval of the child’s behaviour, and/or explain what and how could be done differently.

Examples

- "Then… We need to get that [a car] out the way."
- "You've blocked the entrance now, haven't you?"
- "I looked to see which one, I had a funny feeling we had to move the ice cream van."
- "It's after one road."
- "For me to move that one [a car], this one [a car] is in my way."
- "I think maybe you may have even done it wrong setting it up."
- As a continuation of the *teaching, explanation* sequence, the parent points at the card to show which car they just explained how to set up (no verbal behaviour).

Non-Examples

- "You can't knock the purple one off" (after the child knocked the purple car off the board).

  Although the parent reinforces the rules of the game, this expression demonstrates the parent's disapproval of the child's behaviour. It does not include further teaching or explanation. Thus, this is *disagreement, disapproval*.

Indirect Instruction, Suggestion, Prompt

The parent's attempts to direct the child's behaviour as regards the process and moves in the game, expressed in a suggestive way. Includes prompts that may not provide clear information about the next move but imply that some action should be taken (i.e., a prompt to proceed with the game).

***Differs from* direct instruction**

Indirect instruction, suggestion, prompt provides information about the next move in the game in a suggestive manner. Whereas *direct instruction* provides information about the next move in the game in an instructive manner.

***Differs from* parental investigation**

Through *parental investigation*, the parent attempts to better understand the child's thinking process and approach towards the game. Whereas through *indirect instruction, suggestion, prompt*, the parent aims to direct the child's behaviour and/or prompt the child to make a move.

***Differs from* assistive clue**

Indirect instruction, suggestion, prompt provides clear information about the next move in a suggestive manner. Whereas *assistive clue* provides a hint that the child should use to figure out the next move in the game.

***Differs from* decision-making**

Through *decision-making,* the parent informs the child about the next moves/approach towards the game that both the parent and the child will be a part of. Whereas through *indirect instruction, suggestion, prompt,* the parent aims to direct the child's behaviour only.

***Differs from* asking for input/assistance**

Through *indirect instruction, suggestion, prompt*, the parent attempts to direct the child's behaviour in a suggestive manner. Whereas through *asking for input/assistance*, the parent asks for the child's help in the game.

Examples

- "Maybe if you move this across a little bit?"
- "Then which one would you move?"
- "And then?" (directed at the child, the parent prompts the child to make a move).
- "That can go down…"
- "Will that go down?"
- "Would your the yellow one go back?"

Non-Examples

- “There’s your pink one” (while placing the car in front of the child).

  Although the parent does not instruct the child about where to put the pink car, the parent provides clear information about which car to take next. This is expressed in an instructive way. Thus, this is *direct instruction*.

- “You’re setting it up, what are you gonna do?”

  The parent enquires about the child’s thinking process in the game. Thus, this is *parental investigation*.

- “Is that the right place?” (after the child places the car on the board incorrectly).

  The parent provides the child with a hint that the child should use to figure out the next move. Thus, this is an *assistive clue*.

- “Right, let’s restart the game, okay.”

  The parent informs the child about the decision on the next moves in the game that both the parent and the child will be a part of. Thus, this is *decision-making*.

- “Should we just do a different one?”

  The parent asks for the child’s input about the next move in the game. Thus, this is *asking for input/assistance*.

Assistive Clue

The parent’s attempts to provide the child with a helpful hint about the next move in the game. The hint does not provide clear information about the next move, and the child should use the hint to figure out what the next move could be.

Differs from **parental investigation**

Through *parental investigation*, the parent enquires about the child’s thinking process and/or approach towards the game. Whereas through *assistive clue* the parent provides the child with a hint about the next move in the game.

***Differs from* indirect instruction, suggestion, prompt**

Indirect instruction, suggestion, prompt provides clear information about the next move in a suggestive manner. Whereas *assistive clue* provides a hint for the child to use to figure out the next move in the game.

Examples

- "Is that the right place?" (after the child places the car on the board incorrectly).
- "Which one do you think you need to move for the ice cream van to get out?"
- "Which is the only vehicle that can move?"

Non-Examples

- "You're setting it up, what are you gonna do?"

  The parent enquires about the child's thinking process in the game. Thus, this is *parental investigation*.
- "Maybe if you move this across a little bit?"

  The parent provides clear information about the next move in a suggestive manner. Thus, this is *indirect instruction, suggestion, prompt*.
- "Then which one would you move?"

  The parent prompts the child to make a move in the game: To move a car. Thus, this is *indirect instruction, suggestion, prompt*.

Statements Category

Self-Reference

The parent's verbalising their thinking process. This is a neutral expression, not directed at the child.

Examples

- "Let me see if I can… Um… Attempt to work this out" (while moving the cars around).
- "No… I've done that wrong."

Non-Examples

- "I'm sure you can do it" (emphasises that the cars can be set up on the board in any order).

  Although the parent verbalises what they think, the expression is directed at the child to encourage a positive outlook on the game. Thus, this is *supportive comment, encouragement*.

Apology

The parent's apologising to the child.

Monitoring Category

Monitoring

The parent's verbal and/or non-verbal monitoring—observation—of the child while the child is engaged in the game. Includes the parent's verbal monitoring after the parent addressed the child.

***Differs from* mutuality**

During *monitoring*, the parent is observing the game and/or the child while the child is engaged in the game. Whereas during *mutuality*, both the parent and the child are focused on each other or the same item/aspect of the game, and are not engaged in any other activity.

Examples

- The parent glimpses at the child while the child is talking.
- The parent watches the board while the child moves the cars on the board.

- The parent observes the child/the game while the child is thinking about the next moves.
- While the child is engaged in the game, the parent briefly stretches the hand towards the board and back without intervening with the game.
- "Alright?" or "okay?" (after the parent addressed the child to explain the next move in the game).
- "Mmm…" (while observing the child's moves in the game).

Non-Examples

- The parent and the child focus on the same card.

  The parent is engaged in the game and focuses on the card at the same time as the child. This is not due to the parent's monitoring of what the child is engaged in but due to the parent's own engagement. Thus, this is *mutuality*.
- The parent's hand hovers over the game as the parent is focused on the game.

  The parent is engaged in the game, considering the next moves without consulting the child. Thus, this is *process control*.

Process Control Category

Process Control

The parent's non-verbal attempts to contribute to the game without consulting the child. The non-verbal behaviour can be accompanied by the parent's verbalisations of their non-verbal behaviour or other short verbal expressions.

Examples

- The parent looks at the answers on the other side of the card without consulting the child.
- The parent takes the card pile from the child.
- The parent changes the car placement on the board.
- The parent adjusts a knocked over car on the board.
- The parent moves a car on the board without consulting the child

- The parent's hand hovers over the game as the parent is focused on the game
- "That one goes there" (while moving a car).
- "Okay, so" (while placing the car on the table).
- "Okay, so" (interrupts the child while reaching towards the board).

Non-Examples

- The parent briefly and quickly moves the hand forward and back.

  In *process control*, where the parent moves the hand forward, they intend to make a move in the game, and the move back is a result of an interruption (e.g., the child expressed dissatisfaction with it, or the child moved the car before the parent reached it). Whereas if the parent moves the hand forward and back on their own, without being interrupted by the child, it is a part of *monitoring*.

Other Category

Other

The behaviours that cannot be assigned a different code due to the inaudibility, incompleteness or interruption. Includes brief phrases not accompanied by an informative non-verbal behaviour.

Examples

- "Will that go… Aaah."
- "We need <inaudible>, don't we?"
- "Good, right, so" (no informative non-verbal behaviour).
- "Right, so I do…" (no informative non-verbal behaviour).
- "Or no <inaudible>."
- "Then…" (no informative non-verbal behaviour).

Non-Examples

- "Then…" (moving a car).

The verbal behaviour is accompanied by an informative non-verbal behaviour. Thus, this is *process control*.

- "Right" (reaches towards the board).

  The verbal behaviour is accompanied by an informative non-verbal behaviour. Thus, this is *process control.*

Appendix D: Coders' Confidentiality Agreement

University of Kent

The Leverhulme Project

The work to be carried out is part of the Leverhulme project titled "Development of childhood perfectionism: Early indicators and parental factors", led by Prof Joachim Stoeber (Principal Investigator), Dr Michael Forrester and Prof David Williams (Co-Investigators).

Participant Data Protection Agreement – School of Psychology

The School of Psychology at the University of Kent greatly appreciates the contribution made by its participants.

As part of our commitment to our participants, and in accordance with the General Data Protection Regulation (EU) 2016/679 and the Data Protection Act 2018, we promise to look after their personal data and only share it when we absolutely need to. As part of this commitment, we require you to sign this confidentiality agreement which sets out what you will do with any personal data and confidential information we share with you in the course of your activities with us and on our behalf.

The Agreement:

I agree, within the terms of this agreement, at all times to respect the privacy and security of all confidential and private data to which I have access within the course of my work at the University of Kent, whether in paper, electronic or other forms ("the Personal Data"). This means that I will use the Personal Data for the purposes of fulfilling my working status at the University and for no other purposes whatsoever. I will at all times act on the reasonable instructions of the University of Kent in relation to the Personal Data. I agree that I will take all reasonable care to ensure that I do not make any inadvertent or unauthorised disclosures of the Personal Data. I also agree that I will return all the Personal Data to the University at its request and once my work is finished. This agreement extends to include all data and information relating to the business and management of the University ("the Confidential Information").

Name: ____

Role (job title): ____

Signed: ____

Date: ____

Thank you again for your support.

1. Personal data shall be processed fairly and lawfully and, in particular, shall not be processed unless:
   (a) at least one of the conditions in Schedule 2 is met, and
   (b) in the case of sensitive personal data, at least one of the conditions in Schedule 3 is also met.
2. Personal data shall be obtained only for one or more specified and lawful purposes, and shall not be further processed in any manner incompatible with that purpose or those purposes.

3. Personal data shall be adequate, relevant and not excessive in relation to the purpose or purposes for which they are processed.
4. Personal data shall be accurate and, where necessary, kept up to date.
5. Personal data processed for any purpose or purposes shall not be kept for longer than is necessary for that purpose or those purposes.
6. Personal data shall be processed in accordance with the rights of data subjects under this Act.
7. Appropriate technical and organisational measures shall be taken against unauthorised or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data.
8. Personal data shall not be transferred to a country or territory outside the European Economic Area unless that country or territory ensures an adequate level of protection for the rights and freedoms of data subjects in relation to the processing of personal data.
9. Confidential information includes, but is not limited to, student information including names and contact details, all intellectual property, marketing and development information, business operations including personnel and financial information of the University, information relating to programmes of study and individual course modules, and accounting information including financial reports, asset and inventory details not already in the public domain.

Appendix E: Coding Manual and the Final Coding Scheme

This coding scheme can be applied to code parents' behaviour during parent–child interactions when employing problem-solving tasks. This manual provides information about the observational context, approach to coding, video fragment selection, coder training, independent coding, and further considerations for future researchers, and includes the segmentation and coding rules and the coding scheme.

Observational Context

The coding scheme was developed based on observations carried out in a laboratory setting, where parents and children were solving the traffic jam puzzle "Rush Hour® Jr." for 10 minutes. After a demonstration of the traffic jam puzzle, parents were instructed to collaborate with children as would be natural at home. Thus, the coding scheme was applied to code parents' behaviour during different problem-solving tasks (i.e., during tasks that contain a problem-solving element, and where it would be possible for a parent to take up an instructional role).

Participant-Focused Approach

The coding scheme should be applied following a participant-focused approach, where behaviours are coded based on identifiable behavioural elements in the data (i.e., participants' observable behaviours), not on speculations about potential meanings or cognitions of participants' behaviours (Emerson et al., 1995; Forrester, 2019; Heritage, 1984). Furthermore, because the coding scheme focuses on parents' behaviours only, the child's attention to the parent does not influence coding decisions. That is, whether the child observes the parent or not at the time of the parent's behaviours does not influence the coding decision directly.

Video Fragment Selection

This coding scheme was developed based on 5-minute video fragments selected out of 10-minute parent–child interaction videos, although future researchers may adapt the length of the video fragments to their study needs. Video fragments should be selected from the middle of the observation, when participants are already familiar with the task but not yet completing it or anticipating the end of the observation period. A video fragment should begin with a parent's behaviour that could be easily coded without the preceding behaviours (i.e., the parent's "yes" where behavioural elements for the parent's confirming the child's behaviour can be observed). That is, the video fragment should not begin mid-conversation.

Video Fragment Transcription

Selected video fragments should be transcribed in a video coding software. The coding scheme was developed using Transana Professional 3.32, but any video coding software that allows for granular (i.e., second-by-second) segmentation and coding is suitable. All verbal behaviours should be transcribed noting the parent's or the child's talking. Non-verbal behaviours are not necessary to transcribe except for subtle or potentially difficult to notice behaviours such as a smile or a nod because their transcription may improve coding accuracy.

Coder Training

Video Fragment Segmentation and Coding for Training

Before coder training, the main researcher should segment and code several video fragments (see Table 1 for an example of segmentation granularity and code assignment). Four or five video fragments may be sufficient, although more fragments may be necessary depending on coders' progress (i.e., coder training should be continued until coders reach satisfactory inter-rater agreement [IRA]). Video fragments should be transcribed, segmented, and coded by the main researcher's following the segmentation and coding rules and adhering to the coding scheme. Ideally, the main researcher should consult with another researcher about the granularity and consistency of segmentation (see Table 1 for an example of segmentation granularity that illustrates how to segment the data into the smallest identifiable behavioural units where a segment does not include multiple behavioural meanings and thus does not cause coding confusion) as well as the accuracy of coding. This could be done through another researcher's segmenting and coding video fragments independently and comparing them to the main researcher's segmentation and coding. This way, consistent and granular segments and accurate coding can be established before coder training, and the main researcher's understanding of the coding scheme and the data can be questioned and improved before proceeding with the study.

During coder training, coders should be presented with pre-segmented video fragments to ensure accurate, consistent, and granular segmentation of all fragments. However, if multiple researchers complete the segmentation, they should consult with each other to ensure mutual understanding of segmentation consistency and granularity. Furthermore, having established accurate codes through consultation with another researcher before coder training provides an opportunity to assess coders' coding accuracy (i.e., coders' agreement with accurate coding, and thus coders' application of the coding scheme as intended).

Table 1

Example of Segmentation and Coding

Segment	Verbal behaviour	Non-verbal behaviour	Code
Segment 1	P: Alright,	C: Hovers hands above the game.	Confirmation, acknowledgement
Segment 2	let me, let me help you. -- Let me- -- C: No.	P: Takes C's hand. C: Pushes P's hand back.	Direct instruction
Segment 3	P: I'm not gonna help you, I'm just gonna teach some advice how to do it. I'm not gonna tell you how to do it, just give you some advice.	C: Moves the hand back. -- P: Moves the hand to the game. -- C: Moves the cars.	Decision-making
Segment 4	P: Alright?	-- P: Hovers hand above the game. -- C: Moves the cars.	Monitoring
Segment 5	P: Now, what you've got here (C: Eek) is a situation where you've moved the ice cream van forwards a bit.	-- C: Sits back. -- P: Pointing at the cars.	Explanation, teaching, demonstration
Segment 6	P: That's good.	P: Glimpses at C.	Supportive comment, encouragement
Segment 7	P: But what you've created is, is created a little bit of a traffic jam that you can't get out of…	-- C: Leans towards the game. -- P: Pointing at the cars.	Explanation, teaching, demonstration
Segment 8	< C: Why is the ice cream van,	P: Glimpses at C while hovering hand above the game.	Monitoring
Segment 9	why is it just…	P: Glimpses at C while moving the hand back.	Monitoring
Segment 10	P: Okay.	P: Glimpses at C.	Confirmation, acknowledgement

Segment 11	P: So, what you need to do is have a think about the whole plan for the whole-whole moves before we start.	P: Looks at C. P: Pointing at the cars. C: Looks towards the door of the room.	Explanation, teaching, demonstration
Segment 12	P: Let's reset it and then let's talk it through… Umm… And find a solution.	P: Moves a car. -- P: Touches the cars. -- C: Touches the cars.	Decision-making
Segment 13	P: Alright?	-- P: Touches the cars. -- C: Touches the cars.	Monitoring

Note. P = parent, C = child, < = interruption, -- = simultaneous behaviours.

Coder Selection

Before applying the coding scheme, independent coders should be trained until satisfactory IRA is reached. At least two independent coders should be employed, although, if resources allow, employing more coders may allow for a coder's exclusion which occasionally occurs due to factors such as the coder's inability to reach a satisfactory IRA. Coders may be selected through personal contacts or interviews including the assessment of coders' availability, suitability, and motivation.

Coder Training Plan

Although this coding manual presents the coder training plan that proved useful and successfully applicable during the development of this coding scheme, the plan can be amended depending on each study. For example, the number of video fragments coded during coder training, or the number of coding disagreement discussions may vary depending on coders' progress and understanding of the coding scheme.

Introductory Meeting

During the introductory meeting, coders should be introduced to the study and the coder training plan.

Introduction to the Study. Coder should be introduced to the research context, behaviours coded (i.e., only parents' behaviours are coded during play-based instructional parent–child interactions), and coders' role within the study, noting all steps that coders will participate in (e.g., the demonstration of the observational task, IRA assessment, coding disagreement discussions, and independent coding that would follow successful coder training).

Demonstration of the Observational Task. Coders should be provided with the task instructions that participants received. This will assist coders' understanding of the task context and the role that participants performed (e.g., to collaborate on the task as would be natural at home). Furthermore, coders should receive a demonstration of the observational task to ensure their understanding of behaviours that participants demonstrate in relation to the task.

Video Demonstration. Coders should be shown a brief exemplar (e.g., 2 minutes) of a parent–child interaction to assist their understanding of the observational and interactional context. This will also assist coders' understanding of written examples in the coding scheme before the next phase of independently reviewing the coding scheme.

Introduction to Coding Approach. Coders should receive an explanation of the participant-focused approach, and the importance of following it throughout the coding scheme application should be emphasised.

Independent Reviewing of Segmentation and Coding Rules and Coding Scheme

After the introductory meeting, coders should independently review the segmentation and coding rules, and the coding scheme. Although coders will code pre-segmented video fragments, reviewing the segmentation rules will improve coders' understanding of how segments are produced. After reviewing the segmentation and coding rules and the coding scheme, coders' questions should be answered, and any potential issues discussed.

Demonstration Video Coding

One of the video fragments that was segmented and coded by the main researcher before coder training should be coded with coders in a meeting where coders may be asked to assign a code to each segment and to verbalise their decision-making process. Subsequently, as needed, the main researcher should provide hints about the accurate code (e.g., emphasise the key code characteristics), correct coders' inaccurate coding, and explain how to identify the accurate code through guiding questions and identifying observable behavioural elements for the code.

Video Coding Software Training

Coders should be trained in the use of the video coding software.

Independent Coding During Training

After the steps outlined above, coders should be prepared to independently (i.e., without consulting each other or the main researcher) code video fragments during training. Coders should code the fragments that the main researcher had coded and established accurate codes for before coder training. After coders' coding each video fragment, the IRA should be assessed, and all coding disagreements should be discussed for coders' improving understanding of the coding scheme. Such independent coding during training should be carried out until coders reach satisfactory IRA and demonstrate sufficient understanding of the coding scheme.

Inter-Rater Agreement. The IRA between coders and between each coder and the main researcher (i.e., accurate codes established before coder training) should be assessed throughout coder training to monitor coders' progress. Measures such as Cohen's kappa (1960) and percentage agreement should be employed. Different guidelines exist and could be selected by future researchers for satisfactory Cohen's kappa and percentage agreement values, although this coding scheme was developed using Bakeman and Quera's (2011) kappa guidelines and considering 70% and above percentage agreement satisfactory (e.g., Heyman et al., 2014; Jones, 1975, as cited in Hartmann & Wood, 1990).

Coding Disagreement Discussions. After coding each video fragment, coding disagreement discussions should be carried out in a meeting with coders. Given that accurate codes for each video fragment had been established by the main researcher before coder training, each discussion of coding disagreements in a 5-minute video fragment may take approximately 2 hours (although this may vary depending on the number of coders' errors).

Discussions should aim to explain and resolve each coding disagreement and improve coders' understanding of the coding scheme. Each disagreement should be discussed while observing and replaying a segment in the video coding software. A segment may be replayed on its own and within the interactional context (i.e., within a sequence of preceding segments), to emphasise identifiable behavioural elements that accurate coding decisions should be based on. When addressing a coding disagreement, each coder's inaccurate code assignment should be explained in relation to code descriptions and guiding questions, emphasising the key code characteristics that could not be identified. Similarly, the accurate code should be explained based on code descriptions and guiding questions emphasising and observing the key code characteristics that could be identified.

During discussions, coders' coding accuracy should be attended to, to ensure that coders apply the coding scheme as intended. In some cases, the IRA between coders may be satisfactory, but the IRA between a coder and the main researcher may be unsatisfactory, indicating coders' mutually inaccurate application of the coding scheme. Similarly, one coder may show unsatisfactory IRA with other coders and the main researcher, indicating that one coder's coding is inaccurate. In such cases, the main researcher should explain and discuss each coding error and the codes and elements that may be misunderstood thus contributing to coders' coding inaccuracy. Furthermore, should any concerns arise that a coder may be unable to apply the coding scheme as intended, this should be addressed in further discussions (e.g., separate discussions with the coder). Coding disagreement discussions could be recorded so as to provide future researchers with detailed information about how disagreements may be resolved.

Independent Coding

Once satisfactory IRA is reached and coders' accurate understanding of the coding scheme is established, coders can be considered trained and should proceed to independent coding where coding disagreements for each video fragment are not discussed. Just like during coder training, coders should be provided with pre-segmented video fragments.

Initially, all coders should code the same video fragments (e.g., 10-25% of the video sample), and the main researcher should continuously monitor the IRA for each fragment and for individual categories and codes (see Kvålseth, 1989, for Cohen's kappa formulas for individual categories and codes). Furthermore, the main researcher should code several random video fragments to continuously monitor the IRA between each coder and the main researcher for observer drift (i.e., a coder's drift from the intended coding scheme application, indicated by unsatisfactory IRA between the coder and the main researcher, and between the coder and other coders) or consensual observer drift (i.e., more than one coder's mutual drift from the intended coding scheme application, indicated by satisfactory IRA between the coders but unsatisfactory IRA between each of the coders and the main researcher; Johnson & Bolstad, 1972; Kazdin, 1977; Taplin & Reid, 1973). In case of unsatisfactory IRA, observer drift, or consensual observer drift, coding disagreement discussions should be carried out to improve coders' understanding of the coding scheme.

After coders' coding the same video fragments independently and observing satisfactory IRA and no observer drift, or resolving such issues if occurring, coders may separately code the remaining video fragments. The main researcher should take part in such independent coding by also coding separate video fragments independently (i.e., each and coder and the main researcher would code different video fragments). However, coders and the main researcher should occasionally code the same video fragments which would allow for a continuous assessment of the IRA and observer drift. Should the need arise, further coding disagreement discussions can be carried out to improve coders' understanding of the coding scheme.

Additional Considerations for Future Researchers

- If the coding scheme is applied to a different observational context (e.g., using other than problem-solving tasks), its application should be tested. That is, before coder training, the main researcher should examine the data and the coding scheme to assess whether the coding scheme is likely to be applicable. Moreover, if the coding scheme appears applicable and coders are involved, coders' IRA and coding accuracy should be assessed in relation to the influence of a different observational context.
- To better illustrate each code, future researchers may select several examples from their own data and present written and video examples to coders during training. Furthermore, in case a coder struggles to understand some written examples provided in the coding scheme, future researchers could replace them with examples from their own data after ensuring accurate assignment of codes (i.e., after examining all behavioural elements and key code characteristics) because that would allow for a demonstration of both written and video examples.
- Future researchers should consistently assess and report the IRA to provide a fuller picture of the coding scheme's applicability in different studies.

Segmentation Rules

Segmentation Rule 1. A segment starts and ends with a change in the parent's behaviour: verbal, non-verbal behaviour, or both.

The beginning of a new segment can be linguistically-informed (a change in the verbal behaviour, such as the intonation or topic), action-informed (a change in the non-verbal behaviour), or both (a simultaneous change in verbal and non-verbal behaviours). Behaviour changes can be subtle, and observing them cautiously and repeatedly for an indication of a new segment is necessary.

<u>Example 1:</u>

Segment 1: The parent observes the child's playing the game.

Segment 2: The parent smiles.

Segment 3: The parent continues to observe the child's playing the game.

Segment 4: The parent briefly glimpses at the child.

Segment 5: The parent continues to observe the child's playing the game.

Segment 6: The parent moves their head sideways to observe the child's playing the game.

Example 1 illustrates the segmentation of the parent's subtle non-verbal behaviours, where the segments are action-informed (i.e., by changes in the non-verbal behaviour).

<u>Example 2:</u>

Segment 1: "I'll do it, you watch."

Segment 2: "Okay?"

Segment 3: "That goes there" (simultaneously moving a car).

Segment 4: "And that one goes all the way up there" (simultaneously moving a car).

Segment 5: "And that one goes all the way up here" (simultaneously moving a car).

Segment 6: "And now, look."

Segment 7: The parent moves their hand back to observe the child's playing the game.

Example 2 illustrates the segmentation of the parent's uninterrupted speech, followed by the non-verbal behaviour. The changes in the parent's behaviour in Segments 1 to 6 are linguistically-informed (i.e., by changes in the topic and voice intonation), and Segment 7 is action-informed (i.e., by a change in the non-verbal behaviour).

Segmentation Rule 2. Consecutive segments can be assigned the same code.

The segmentation should be based on changes in the parent's behaviour, not on the anticipated codes, and thus consecutive segments can be assigned the same code.

Example 1:

Segment 1: The parent observes the child's playing the game.

Segment 2: The parent glimpses at the child.

Segment 3: The parent continues to observe the child's playing the game.

Example 1 illustrates the segmentation of the parent's subtle non-verbal behaviours where the segments were assigned the same code, *monitoring*.

Example 2:

Segment 1: "Would that go back?"

Segment 2: "Would that go back, that one?"

Example 2 illustrates the segmentation of the parent's consecutive verbal behaviours where the segments were assigned the same code, *indirect instruction, suggestion, prompt*.

Segmentation Rule 3. Over-segmenting is more informative than under-segmenting.

Over-segmenting allows for higher precision in analysing the parent's behaviour, whereas under-segmenting may pose a risk of missing information about the parent's behaviour. Behaviours in the under-segmented segments may carry multiple meanings and thus affect coding accuracy. If in doubt, over-segmenting is preferable.

Example 1:

Segment 1: “That’s it.”

Segment 2: The parent stretches their hand forward and back.

Segment 3: “No.”

Segment 4: “You’ve blocked the entrance now, haven’t you?”

During the coding scheme development, four segments in Example 1 were initially merged into one sequence which illustrated under-segmenting. The sequence contained three behaviours: (a) a verbal behaviour, (b) a non-verbal behaviour, and (c) another verbal behaviour. Furthermore, Segments 3 and 4 were initially merged into one segment although they contained the parent’s negative verbal behaviour (“no”) and the explanation about what happened in the game (“you’ve blocked the entrance now, haven’t you?”). Merging the four segments into one sequence may result in confusing and inaccurate coding due to challenges in defining and labelling the segment. Moreover, coding a large sequence may result in prioritising one behaviour over another to assign meaning—that is, a code—and thus losing information about the parent’s multiple behaviours. Thus, parsing behaviours into multiple granular segments is preferable for ensuring coding accuracy and granularity.

Segmentation Rule 4. The parent’s interrupted verbal behaviour and its continuation are merged into one segment.

If the parent’s verbal behaviour is interrupted by the child or the parent’s pausing, and the parent begins the next verbal behaviour in the same words or what appears to be a continuation of the interrupted behaviour, the interrupted part and the continuation are merged into one segment. This applies when no new behaviour occurs between the interrupted part and the continuation.

Example 1:

Parent: “For me… <interruption> For me to move that one, this one is in my way… <interruption> … and this one is in my way.”

Example 2:

Parent: “So my objective, so what is my first objective, my first objective is, is… <interruption> … is to clear this space here so that I can move the yellow…”

Coding Rules

Coding Rule 1. The coding scheme is mutually exclusive and exhaustive.

The coding scheme is mutually exclusive (i.e., only one code can be assigned to the segment) and exhaustive (i.e., every segment must be assigned a code).

Coding Rule 2. Use both the video and the transcription.

A video recording is necessary to observe all aspects of the parent’s behaviour because some behaviours are difficult, if not impossible, to convey through transcription alone (e.g., the voice intonation). The transcription ensures that all coders base their coding decisions on the same verbal behaviour and reduces the likelihood of discrepancies.

Coding Rule 3. The verbal behaviour is more informative than the non-verbal behaviour.

All aspects of the parent’s behaviour should be considered when coding, but in the same segment, the verbal behaviour is often more informative than the non-verbal behaviour. Thus, the verbal behaviour is prioritised unless the non-verbal behaviour contradicts or amends the code for the segment.

Example 1:

Parent: “I think what we did is clearly make a mistake in our first steps” (simultaneously moving the cars on the board).

Although the non-verbal behaviour indicates *process control*, the verbal behaviour indicates *explanation, teaching* which the segment is coded as.

Example 2:

Parent: "I think then we start the easy ones" (simultaneously taking the cards from the child).

Although the non-verbal behaviour indicates *process control*, the verbal behaviour indicates *decision-making* which the segment is coded as.

Coding Rule 4. Consider all aspects of the parent's behaviour.

A coder should consider all observable aspects of the parent's behaviour such as the verbal and non-verbal behaviours, orientation towards the child, voice intonation, and/or volume.

Coding Rule 5. Consider the change in the parent's behaviour within the segment.

Segments are based on changes in a parent's behaviour, and these changes should be considered when coding. A segment may include a behaviour that was present in the previous segment but the change in behaviour determining the start of a new segment holds the information for the coding decision.

Example:

Segment 1: The parent laughs.

Segment 2: The parent continues to smile and starts observing the child.

In Segment 1, the change in behaviour is the parent's starting to laugh, coded as *positive expression/gesture*. In Segment 2, although the parent continues to smile, the change in behaviour is the parent's starting to observe the child. Thus, Segment 2 is coded as *monitoring.*

Coding Rule 6. *Other* should only be assigned when no distinct code from the coding scheme is appropriate.

If a segment provides enough information to assign a code different than *other,* it is preferred and more informative. *Other* should not be assigned in cases of indecision or consideration of several codes.

Coding Rule 7. The child's behaviour provides contextual guidance.

The segmentation is based on the parent's behaviour and thus the parent's behaviour is coded. However, the child's behaviour may provide contextual guidance for coding the parent's behaviour in some instances.

<u>Example:</u>

Child: Sets up a car correctly.

Parent: "Good."

In the context of the child's behaviour—setting up a car correctly—the parent's behaviour is coded as *praise*.

Coding Rule 8. Consider the context.

To capture behaviours accurately, a segment should be coded within the context of behaviours (both the parent's and the child's), not as an isolated unit.

Coding Rule 9. Confirm coding decisions through guiding questions.

Guiding questions reflect the key code characteristics and should be answered "yes" to assign the code to the segment. If "or" is noted between the questions, at least one question should be answered "yes," and if "or" is not noted, all questions should be answered "yes."

Coding Rule 10. Consider the coding categories.

Referring to the coding categories can help to differentiate between the codes and to improve coding accuracy. For example, if deciding between *direct instruction* and *indirect instruction, suggestion*, assess whether the segment better matches the *guidance* or *control* category.

Code Summary Table

Category/Code	Code definition and guiding questions
Positive	
Praise	Short compliments or feedback containing a positive adjective or adverb about the child's verbal and/or non-verbal behaviour, expressed shortly after the child's behaviour. Guiding questions: 3. Can you name the child's behaviour that the parent responds to? 4. Does the parent positively evaluate the child's behaviour?
Supportive comment, encouragement	The parent's attempts to comfort and/or support the child. Expressions that may encourage a more enthusiastic, positive, flexible, constructive outlook on the game. Verbal behaviours that may not directly support or encourage the child but are enthusiastic and playful in their content and expression. Guiding questions: 3. Is the expression supportive, comforting, or encouraging to the child? **or** 4. Is the expression positive, enthusiastic, or playful in itself?
Confirmation, acknowledgement	The parent's brief expressions confirming the child's behaviour as correct and/or demonstrating the parent's observation of the child. The acknowledgement includes the parent's questions to clarify what the child has said, repeating what the child has said, or brief comments about what the child has done. These expressions do not provide new information about the game. Guiding question: 1. Can you name the behaviour/situation the parent reacts to?
Positive gesture/expression	The parent's non-verbal positive expressions that might be accompanied by brief verbal expressions. Guiding question: 1. Does the parent's positive gesture/expression start in this segment?

Negative	
Disagreement	The parent's brief expressions of disagreement of the child's verbal and/or non-verbal behaviour. It does not provide new information about the game. Guiding question: 1. Can you name the child's behaviour that the parent disagrees with?
Criticism, accusation, complaint, threat	The parent's criticism, accusations, blaming, or threats to the child. Complaints about the child, the child's or the parent's own behaviour, or the situation in the game. Includes expressions negative in the content but not in the voice tone. Guiding questions: 3. Does the parent's behaviour provide more information than just a disagreement? 4. Does the parent criticise, accuse, blame, threaten or complain?
Control	
Direct instruction	The parent's verbal and non-verbal attempts to direct the child's behaviour, expressed in a direct and instructive way. Guiding questions: 3. Can you name exactly what the parent wants the child to do? 4. Is the instruction expressed in a direct way?
Decision-making	The parent communicates a decision to the child, implying what both the parent and the child will do next. This is not a suggestion but a statement about the next moves and/or approach towards the game. Guiding questions: 3. Can you name the parent's decision about the next moves in the game? 4. Does the decision include both the parent and the child?
Attention request	The parent's verbal and non-verbal behaviours used to attract the child's attention to the parent or something the parent is focused on. Guiding questions:

	3. Does the parent aim to attract the child's attention? 4. Does the parent aim only to attract the child's attention and not to direct the child's behaviour?
Engagement	
Asking for input/assistance	The parent asks for the child's assistance or input about the decisions and moves in the game. Asking for input, the parent is interested in the child's opinion about the next move. Asking for the child's assistance, the parent is unsure about the next move and asks for help. Guiding questions: 3. Does the parent ask for the child's input about the next decision? **<u>or</u>** 4. Is the parent unsure about the next move in the game and asks the child to help?
Parental investigation	The parent's attempts to understand the child's thinking process, views, readiness, or approach towards the game. This is an investigative expression about the child and not the game. Guiding question: 1. Does the parent ask about the child's thinking process or approach towards the game?
Guidance	
Explanation, teaching, demonstration	The parent's demonstration, teaching, and/or explanation of the parent's or the child's behaviour in the game, previous or next moves and discoveries in the game, or reinforcing the rules of the game. Teaching, explaining, or demonstrating how or why something is done. Answering the child's question to explain or to teach something. Guiding questions: 6. Does the parent teach/explain how or why something is done? **<u>or</u>** 7. Does the parent demonstrate how something is done? **<u>or</u>** 8. Does the parent correct the child to teach the right move? **<u>or</u>** 9. Does the parent teach/explain what something is?

	or 2. Does the parent answer the child's question to explain or teach something?
Indirect instruction, suggestion	The parent's attempts to direct the child's behaviour, expressed in a suggestive, guiding way. The suggestive component is often expressed as "maybe," "what about," "can/could" or similar. Guiding questions: 3. Can you name exactly what the parent wants the child to do? 4. Is the instruction expressed in a suggestive, guiding way?
Prompt	The parent's attempts to prompt the child to proceed with the game without providing clear information about the next correct move. Guiding questions: 3. Does the parent prompt the child to proceed with the game? 4. Does the parent not provide a clear instruction or hint about the next correct move?
Assistive clue	The parent's attempts to provide a helpful hint about the next correct move. The child can use the hint to figure out the next move. Guiding question: 1. Can you name the parent's hint that can be used to figure out the next correct move?
Monitoring	
Monitoring	The parent's verbal and/or non-verbal monitoring—that is, observation—of the child or the game. The parent's verbal monitoring after addressing the child. The parent may be engaged with the game but focus on observing the child. Guiding questions: 3. Is the parent disengaged with the child and the game? 4. Is the parent observing the child or the game?
Process control	
Process control	The parent's non-verbal attempts/intention to contribute to the game without consulting the child. A brief audible and complete but uninformative verbal behaviour may

	accompany the non-verbal behaviour. Guiding questions: 3. Is the parent disengaged with the child? 4. Is the parent engaged with the game?
Other	
Other	Inaudible, incomplete, or interrupted behaviours. Behaviours that do not match any different code description.

Positive Category

Praise

Short compliments or feedback containing a positive adjective or adverb about the child's verbal and/or non-verbal behaviour, expressed shortly after the child's behaviour.

Guiding questions:

1. Can you name the child's behaviour that the parent responds to?
2. Does the parent positively evaluate the child's behaviour?

***Differs from* confirmation, acknowledgement**

Praise is positive feedback about the child's behaviour. *Confirmation, acknowledgement* is the parent's confirming the child's behaviour as correct and/or demonstrating to have observed the child.

***Differs from* supportive comment, encouragement**

Praise is expressed briefly after the child's behaviour. *Supportive comment, encouragement* can be expressed at any time.

Examples

- "Well done."
- "Good."
- "Brilliant."
- "Good idea."
- "That's good."

- "Good work."
- "Lovely."
- "Excellent."
- "Superb."

Non-Examples

- "Yeah" (after the child moved a car correctly).

  Although the parent confirms the child's move as correct, the expression does not contain additional positive feedback—that is, praising—message. Thus, this is *confirmation, acknowledgement*.
- "You've done well, okay" (after the child shows frustration in the game).

This expression does not follow the child's behaviour to be complimented, and the parent aims to support the child. Thus, this is *supportive comment, encouragement*.

Supportive Comment, Encouragement

The parent's attempts to comfort and/or support the child. Expressions that may encourage a more enthusiastic, positive, flexible, constructive outlook on the game. Verbal behaviours that may not directly support or encourage the child but are enthusiastic and playful in their content and expression.

Guiding questions:

1. Is the expression supportive, comforting, or encouraging to the child?

   <u>or</u>

2. Is the expression positive, enthusiastic, or playful in itself?

***Differs from* praise**

Praise is expressed briefly after the child's behaviour. *Supportive comment, encouragement* can be expressed at any time.

Differs from **confirmation, acknowledgement**

Supportive comment, encouragement holds positive remarks about the process of the game that might comfort and encourage the child. *Confirmation, acknowledgement* is the parent's confirming the child's behaviour as correct and/or a demonstration of having observed the child.

Examples

- "You did the medium one really easily, but with the hard one just needed a little bit of help."
- "A good one, isn't it?"
- "That's fine."
- "You don't need to worry about that one, you'd only have to worry about…"
- "You did really well, you did really well."
- "I'm sure you can do it" (emphasises that the cars can be set up on the board in any order).
- "I don't think it really matters" (after the child questions which way to place the car, the parent emphasises that the car can face either way).
- "It's alright" (after the child gets frustrated).
- "I love that you make sure you get them in the right way round."
- "Sorry, I was saying no, and you were right."
- "Give me five!"
- "Yay!"
- "Wow!"
- "Woohoo!"
- "Cool."
- "Nice ice creams, aren't they?"

- “Done the double scoop.”
- “Mmm… Yummy.”
- “Nice ice creams, aren’t they?”
- “Easy, is it? Easy, is it?” (in a playful tone).
- “Sorry.”
- “I’ve got an idea” (after the child says, “I don’t even know!”)
- “You’re silly quite frankly” (after the child playfully says, “you’re silly!”).
- “You got pranked” (after the child playfully says, “you got pranked”).

Non-Examples

- “Well done” (after the child moved a car correctly).

  This expression follows the child’s behaviour and does not hold an additional supportive, encouraging message about the game or the child. Thus, this is *praise*.

Confirmation, Acknowledgement

The parent’s brief expressions confirming the child’s behaviour as correct and/or demonstrating the parent’s observation of the child. The acknowledgement includes the parent’s questions to clarify what the child has said, repeating what the child has said, or brief comments about what the child has done. These expressions do not provide new information about the game.

Guiding question:

1. Can you name the behaviour/situation the parent reacts to?

***Differs from* praise**

Praise is positive feedback about the child’s behaviour. *Confirmation, acknowledgement* is the parent’s confirming the child’s behaviour as correct and/or a demonstration of having observed the child.

Differs from **supportive comment, encouragement**

Supportive comment, encouragement holds positive remarks about the process of the game that might comfort and encourage the child. *Confirmation, acknowledgement* is the parent's confirming the child's behaviour as correct and/or demonstration of having observed the child.

Examples

- "Yes," "yup," "yeah," "okay," "mhm" (as a confirmation of the child's verbal and/or non-verbal behaviour).
- "Alright" (after the child said "I'm gonna do it by myself this time").
- "Okay" (after the child said "yes, I'm done").
- The child interrupts the parent's explanation; after the child finishes talking the parent says "okay"—that is, acknowledges that the child spoke—and continues with the explanation.
- "You know. Do you?" (after the child said "I know know know know!" about the next move in the game).
- "No…" (after the child said "no").
- "Go go go!" (after the child said "let's go").
- "Huh?" (after the child said something).
- "Mmm" (after the child made a comment about the game).
- "Hmm" (seeing that the child struggles with the game).
- "Oops!" (after the child knocked the car over).
- "And then you're out" (after the child completed the game).
- "That's what I was thinking" (after the child moved a car).
- "Okay, ready to go" (after the child sets up the game).
- "That should be it, shouldn't it?" (while the child moves the ice cream van to complete the

game).

- "I'll just do it for you" (after the child says "just set it up").
- "You can do" (after the child asks "can we take these out?").
- The parent nods to the child's behaviour.

Non-Examples

- "Well done."

  Although the parent confirms the child's behaviour as correct, this expression also contains positive feedback. Thus, this is *praise*.
- "It's okay."

  The parent provides support and encouragement about the process of the game but does not confirm the child's behaviour as correct. Thus, this is *supportive comment, encouragement*.
- "Okay, so" (interrupts the child while reaching towards the board).

The parent interrupts the child rather than acknowledges what the child has said. The non-verbal behaviour indicates that the parent is making a move in the game. Thus, this is *process control*.

Positive Gesture/Expression

The parent's non-verbal positive expressions that may be accompanied by brief verbal expressions.

Guiding question:

1. Does the parent's positive gesture/expression start in this segment?

Examples

- Smiling.
- Giggling.

- Laughing.
- "Okay" (laughing).
- Other playful non-verbal behaviour (e.g., clapping, high-five, tickling).

Non-Examples

- "No… I've done that wrong" (smiling).

The verbal behaviour does not provide information about any code, and the non-verbal behaviour (smiling) is not directed at the child. Thus, this is *other*.

Negative Category

Disagreement

The parent's brief expressions of disagreement of the child's verbal and/or non-verbal behaviour. It does not provide new information about the game.

Guiding question:

1. Can you name the child's behaviour that the parent disagrees with?

Differs from **direct instruction**

Through *disagreement*, the parent disagrees with the child's behaviour. Through *direct instruction*, the parent directs the child's behaviour.

Differs from **explanation, teaching, demonstration**

Disagreement does not provide new information about the game. *Explanation, teaching, demonstration* provides information about why the parent disagrees, and/or what and how could be done differently.

Differs from **criticism, accusation, complaint, threat**

Disagreement is a brief expression following the child's behaviour. *Criticism, accusation, complaint, threat* is a more elaborate explanation about why the parent disagrees with the child's behaviour.

Examples

- "That's not that one" (after the child moves a car).
- "No" (after the child made a wrong move).
- "No" (after the child says, "you're doing super hard since you helped me with that one".)
- "No, stop" (after the child made the wrong move).
- "I'd say it's purple" (after the child describes the car, "pink").
- "You can't move it [the car]."
- "You can't, can you, move that one [the car]."
- "You don't look at the answers, please."
- "You don't look at the solution!"
- The parent pushes the child's finger off the board.
- The parent takes the card from the child to prevent the child's looking at the solution.

Non-Examples

- "So just wait for a moment."

  The parent may have disagreed with the child's behaviour but this expression provides information about what the parent would like the child to do next: The parent instructs the child to wait. Thus, this is *direct instruction*.
- "You've blocked the entrance now, haven't you?"

  The parent disagrees with the move the child has made but explains why the move is incorrect. Thus, this is *explanation, teaching, demonstration*.
- "I told you you should do an easy first."

  The parent elaborates on the disagreement with the child's behaviour: Complains about the choice that the child made. Thus, this is *criticism, accusation, complaint, threat*.

Criticism, Accusation, Complaint, Threat

The parent's criticism, accusations, blaming, or threats to the child. Complaints about the child, the child's or the parent's own behaviour, or the situation in the game. Includes expressions negative in the content but not in the voice tone.

Guiding questions:

1. Does the parent's behaviour provide more information than just a disagreement?
2. Does the parent criticise, accuse, blame, threaten or complain?

***Differs from* disagreement**

Disagreement is a brief expression following the child's behaviour. *Criticism, accusation, complaint, threat* is a more elaborate explanation about why the parent disagrees with the child's behaviour.

Examples

- "I told you you should do an easy first."
- "That's it, I'm not going to play."
- "You always sometimes do this, when you can't win, you think, oh, you know, well, I'll just do that."
- "We can't even get through medium, let alone super hard."
- "Well, you don't know that yet, do you, cheeky? You haven't started" (after the child said that's the easiest one yet").
- "Well, you've not even put it in the right place, that doesn't say much about how easy it is, does it?"
- "It's not as easy as it looks, is it?"
- "You don't need to get silly about it, do you?"
- "Maybe we should have stuck with the easier ones."
- "Cheating isn't the way to do it, is it?"

- "That was tricky!" (in a calm tone after completing the game).

Non-Examples

- "You can't move it [the car]."

  The parent disagrees with the child's behaviour but does not elaborate to criticise, accuse, or complain. Thus, this is *disagreement*.

Control Category

Direct Instruction

The parent's verbal and non-verbal attempts to direct the child's behaviour, expressed in a direct and instructive way.

Guiding questions:

1. Can you name exactly what the parent wants the child to do?
2. Is the instruction expressed in a direct way?

***Differs from* indirect instruction, suggestion**

Indirect instruction, suggestion provides information about the next move in a suggestive way. *Direct instruction* provides information about the next move in an instructive way.

***Differs from* attention request**

Through *attention request*, the parent aims to attract the child's attention. Through *direct instruction*, the parent aims to direct the child's behaviour.

***Differs from* decision-making**

Through *decision-making,* the parent informs the child about the next moves/approach towards the game that both the parent and the child will be a part of. Through *direct instruction,* the parent aims to direct the child's behaviour only.

***Differs from* disagreement**

Through *disagreement*, the parent disagrees with the child's behaviour. Through *direct instruction*, the parent directs the child's behaviour.

Examples

- “The white one.”
- “Purple.”
- “Go back.”
- “There’s your pink one” (while placing the car in front of the child).
- “So just wait for a moment.”
- “You set it up.”
- “Let me, let me help you.”
- “Hold on.”
- “Then it’s the school buses.”
- “Move the purple one.”
- “Move the fire engine up.”
- “Ice cream van out.”
- “Blue one back.”
- “Now up again.”
- “Pick an orange.”
- “And then you move the red one.”
- “Then…” (points at the car)
- The parent points at the car on the board for the child to move it.

Non-Examples

- “That can go down…”

  The parent provides information about the next move in a suggestive rather than instructive way. Thus, this is *indirect instruction, suggestion*.
- “Right, watch this, okay, watch that” (while raising a finger in front of the child).

  Although the parent instructs the child to watch, the parent aims to attract the child’s attention. Thus, this is *attention request*.

- "I'll do it, you watch."

  Although the parent instructs the child to watch, this includes the parent's decision about what both the parent and the child should do next. Thus, this is *decision-making*.

- "You can't move it [the car]."

  The parent does not directly instruct the child to not move the car but disagrees with the child's move in the game. Thus, this is *disagreement*.

Decision-Making

The parent communicates a decision to the child, implying what both the parent and the child will do next. This is not a suggestion but a statement about the next moves and/or approach towards the game.

Guiding questions:

1. Can you name the parent's decision about the next moves in the game?
2. Does the decision include both the parent and the child?

***Differs from* direct instruction *and* indirect instruction, suggestion**

Through *decision-making,* the parent informs the child about what both the parent and the child will do next. Through *direct instruction* and *indirect instruction, suggestion,* the parent aims to direct the child's behaviour only.

Examples

- "I'll do it, you watch."
- "Let's restart the game."
- "Okay, let's work our way backwards."
- "So, let's just have a little think about it."
- "Let's give you a really super easy one."

- "Let's start with the basic of the basic first."
- "Let's reset it and then let's talk it through, and find a solution."
- "I think, I think we should do another hard one."
- "This one's super easy so I'm gonna let you do it."
- "Okay, I think then we start the easy ones."
- "I think we'll probably need to move onto medium after that."
- "I'm gonna pick the orange" (about picking the next card to play).
- "Go on then, you lay it out, and I'll see if I can find one that's got him in it."
- "From here" (the parent decides to play from a particular position).

Non-Examples

- "So just wait for a moment."

  The parent does not provide information about the next moves that would include both the parent and the child, but aims to direct the child's behaviour only. Thus, this is *direct instruction.*
- "That can go down…"

  The parent does not provide information about the next moves that would include both the parent and the child, but aims to direct the child's behaviour only and expresses it in a suggestive way. Thus, this is *indirect instruction, suggestion*.

Attention Request

The parent's verbal and non-verbal behaviours used to attract the child's attention to the parent or something the parent is focused on.

Guiding questions:

1. Does the parent aim to attract the child's attention?

2. Does the parent aim only to attract the child's attention and not to direct the child's behaviour?

Differs from **direct instruction**

Through *attention request*, the parent aims to attract the child's attention. Through *direct instruction*, the parent aims to direct the child's behaviour.

Examples

- "Right, watch this, okay, watch that" (while raising a finger in front of the child).
- "Listen, listen."
- "Oh, here we go, look."

Non-Examples

- "So, just wait for a moment."

The parent does not attempt to attract the child's attention but to direct the child's behaviour: The parent instructs the child to wait. Thus, this is *direct instruction*.

Engagement Category

Asking For Input/Assistance

The parent asks for the child's assistance or input about the decisions and moves in the game. Asking for input, the parent is interested in the child's opinion about the next move. Asking for the child's assistance, the parent is unsure about the next move and asks for help.

Guiding questions:

1. Does the parent ask for the child's input about the next decision?

   <u>or</u>

2. Is the parent unsure about the next move in the game and asks the child to help?

Differs from **parental investigation**

Through *asking for input/assistance*, the parent asks the child to help. Through *parental investigation*, the parent attempts to understand the child's thinking process and/or approach towards the game.

***Differs from* indirect instruction, suggestion**

Through *indirect instruction, suggestion*, the parent attempts to direct the child's behaviour in a suggestive way. Through *asking for input/assistance*, the parent asks for the child's help in the game.

Examples

- "Where was it [the car], like this?"
- "Which one [the car]?" (after the child said to know what the next move was).
- "Should we just do a different one?"
- "Do you want to try a medium one?"
- "Do you wanna try a harder one?"
- "So how do we get the yellow one to move…"
- "Should I put it there?" (while moving the car).
- "What should we do first?"
- "Did we?" (after saying "I can't remember if we set it up properly in the first place").
- "Like that?" (after placing the car on the board).
- "Yeah?" (after the parent says, "let's go back to the original position").

Non-Examples

- "So, how are you thinking about this?"

  The parent attempts to understand the child's thinking process and does not ask for help with the game. Thus, this is *parental investigation*.
- "Then which one would you move?"

  The parent prompts the child to make a move and does not ask for help in the game. Thus, this is *indirect instruction, suggestion*.

Parental Investigation

The parent's attempts to understand the child's thinking process, views, readiness, or approach towards the game. This is an investigative expression about the child and not the game.

Guiding question:

1. Does the parent ask about the child's thinking process or approach towards the game?

***Differs from* indirect instruction, suggestion**

Through *parental investigation*, the parent attempts to understand the child's thinking process and approach towards the game. Through *prompt,* the parent prompts the child to make a move.

***Differs from* asking for input/assistance**

Through *asking for input/assistance*, the parent asks the child to help. Through *parental investigation*, the parent attempts to understand the child's thinking process and/or approach towards the game.

***Differs from* assistive clue**

Through *parental investigation* the parent enquires about the child's thinking process and/or approach towards the game. Through *assistive clue* the parent provides a hint about the next move.

Examples

- "So, how are you thinking about this?"
- "You're setting it up, what are you gonna do?"
- "How are you gonna start?"
- "So what did you learn there?"
- "Are you ready?"
- "Do you think we're ready?"

- “Was that one a bit easy for you?”
- “Do you want me to help you put it in?”
- “Should I help you set it up?”
- “What do you think?”
- “Can you see?” (the parent checks the child’s understanding of the game after explaining the correct moves).
- “Which blue one [card] do you wanna go for?”
- “Are you sure you wanna do this one?”

Non-Examples

- “Okay, which one [the car] are you gonna move?”
  The parent prompts the child to make a move and suggests moving one of the cars. Thus, this is *prompt*.
- “Do you want to try a medium one?”
  The parent asks the child to contribute to the decision in the game. Thus, this is *asking for input/assistance*.
- “Which one do you think you need to move for the ice cream van to get out?”
  The parent provides a hint about the next move: It is related to the position of the ice cream van. Thus, this is *assistive clue*.

Guidance Category

Explanation, Teaching, Demonstration

The parent’s demonstration, teaching, and/or explanation of the parent’s or the child’s behaviour in the game, previous or next moves and discoveries in the game, or reinforcing the rules of the game. Teaching, explaining, or demonstrating how or why something is done. Answering the child’s question to explain or to teach something.

Guiding questions:

1. Does the parent teach/explain how or why something is done?

   or

2. Does the parent demonstrate how something is done?

   or

3. Does the parent correct the child to teach the right move?

   or

4. Does the parent teach/explain what something is?

   or

3. Does the parent answer the child's question to explain or teach something?

***Differs from* disagreement**

Disagreement does not provide new information about the game. *Explanation, teaching, demonstration* provides information about why the parent disagrees, and/or what and how could be done differently.

Examples

- "Then… We need to get that [the car] out the way"
- "You've blocked the entrance now, haven't you?"
- "I looked to see which one, I had a funny feeling we had to move the ice cream van."
- "It's after one road."
- "For me to move that one [the car], this one [the car] is in my way."
- "I think maybe you might have even done it wrong setting it up."
- "See that goes like that" (while moving the car).
- "I think you do need to move that and that" (while moving the cars).
- "So, you can move that out the way" (while moving a car).
- "You know that's not allowed to fall off, is it?" (in a calm voice tone).
- "I would maybe put that back there" (while moving a car).

- "It's gonna take some working out I think."
- "That looks just like a huge bowl of ice cream" (after the child asks, "what's that?").
- "Solution is the answer" (after the child asks, "what's the solution?").
- "It's that pink" (points at the correct pink car after the child reached for the incorrect pink car).
- The parent points at the right place on the board after the child places the car incorrectly.
- "And then he can move backwards more, can't he?" (after moving another car out of the way).
- "So, each time so far, we've moved the ice cream truck first, haven't we?"
- "This shouldn't be over here, should we, we must have just moved that."
- "Could unblock" (answering the parent's own question, "what can this do now?").
- "Then there's one dot and the white one."
- "I don't think I was thinking about the fact that you might move the ice cream truck in sections, in different moves."
- "You did one move, didn't you, moved something, then moved another."
- "Oh, no, cause you can't [move the car]" (explaining the position they are in).
- "Oh, no, you can [move the car]" (explaining the position they are in).
- The parent says "look" (*attention request*), then demonstrates the correct moves (*explanation, teaching, demonstration*).
- The parent moves or points at the car after referring to it through *explanation, teaching, demonstration*.

  For example, while looking at the answers on the card, the parent says, "X goes across one" *(explanation, teaching, demonstration)* and moves the car X *(explanation, teaching, demonstration)*.

Non-Examples

- After saying "X goes across one" and moving car X (both *explanation, teaching, demonstration*), the parent continues to move other cars.
  The parent proceeds with the game without guiding the child. This is *process control*.
- After saying "we need to move this one" (*explanation, teaching, demonstration)*, the parent moves a different car.
  The parent's behaviour is unrelated to the previous explanation and the parent proceeds with the game without guiding the child. This is *process control*.
- "You can't knock the purple one off" (after the child knocked the purple car off the board).
  The parent disagrees with the child's behaviour without further teaching or explanation. Thus, this is *disagreement*.

Indirect Instruction, Suggestion

The parent's attempts to direct the child's behaviour, expressed in a suggestive, guiding way. The suggestive component is often expressed as "maybe," "what about," "can/could" or similar.

Guiding questions:

1. Can you name exactly what the parent wants the child to do?
2. Is the instruction expressed in a suggestive, guiding way?

***Differs from* direct instruction**

Indirect instruction, suggestion provides information about the next move in a suggestive way. *Direct instruction* provides information about the next move in an instructive way.

***Differs from* parental investigation**

Through *parental investigation*, the parent attempts to understand the child's thinking process and approach towards the game. Through *prompt,* the parent prompts the child to make a move.

***Differs from* prompt**

Indirect instruction, suggestion provides clear information about the next move. *Prompt* implies proceeding with the game without providing clear information about the next move.

***Differs from* assistive clue**

Indirect instruction, suggestion provides clear information about the next move in a suggestive way. *Assistive clue* provides only a hint about the next correct move.

***Differs from* decision-making**

Through *decision-making,* the parent informs the child about what both the parent and the child will do next. Through *indirect instruction, suggestion,* the parent aims to direct the child's behaviour only.

***Differs from* asking for input/assistance**

Through *indirect instruction, suggestion*, the parent attempts to direct the child's behaviour in a suggestive way. Through *asking for input/assistance*, the parent asks for the child's help in the game.

Examples

- "Maybe if you move this across a little bit?"
- "That can go down…" (pointing at the car).
- "Will that go down?" (pointing at the car that can move down).
- "Would your the yellow one go back?" (about the yellow car that can go backwards).
- "Then that's the yellow one there…"
- "I don't know, maybe we have to move the white one."
- "Then you can move the green one back."
- "So, you need a police car and another school bus, don't you?"

- "And then put the green one back maybe?"
- "Maybe move the blue one backward."
- "Could we move this one again?"
- "And what about that goes back."
- "So, maybe we need to move…"
- "So, you might have to move the ice cream van away first."
- "So, if you move it back down here…"
- "If you move the green and purple car back…"
- "Try a few more of the medium ones cause this was really hard."
- "So do you want to move that one first?"

Non-Examples

- "There's your pink one" (while placing the car in front of the child).

  The parent instructs the child to take the pink car. Thus, this is *direct instruction*.
- "You're setting it up, what are you gonna do?"

  The parent enquires about the child's thinking process. Thus, this is *parental investigation*.
- "Is that the right place?" (after the child places the car on the board incorrectly).

  The parent provides a hint that the child can use to figure out the next correct move. Thus, this is an *assistive clue*.
- "Right, let's restart the game, okay."

  The parent informs the child about what both the parent and the child will do next. Thus, this is *decision-making*.
- "Should we just do a different one?"

  The parent asks for the child's input about the next move. Thus, this is *asking for input/assistance*.

Prompt

The parent's attempts to prompt the child to proceed with the game without providing clear information about the next correct move.

Guiding questions:

1. Does the parent prompt the child to proceed with the game?
2. Does the parent not provide a clear instruction or hint about the next correct move?

***Differs from* indirect instruction, suggestion**

Indirect instruction, suggestion provides clear information about the next move. *Prompt* implies to proceed with the game without providing clear information about the next move.

***Differs from* assistive clue**

Prompt implies proceeding with the game without providing clear information about the next move. *Assistive clue* provides a hint about the next correct move.

Examples

- "Then which one would you move?"
- "And then?"
- "Alright, come on then."
- "So, off you go."
- "Go on."
- "Go go go!"
- "Well then, get him out."
- "There you go, next one" (putting the card in front of the child).
- "So, where can we move him?"
- "And then can you move the others?"
- "Where does that go? Can you see?"
- "And then, where's the ice cream truck on here?"

- "Got another one now" (to the child, while placing the card on the table).
- "Forward and backwards, let's have a go."
- "Let's do it."
- "What do I do with that?" (the parent knows the answer but prompts the child to think about the next move).

Non-Examples

- "Now, could we move that yellow one?"

  The parent hints to check if the yellow car—not any other—can move. Thus, this is *assistive clue*.
- "Will that go down?"

  The parent provides clear information about the next move in a suggestive way. Thus, this is *indirect instruction, suggestion*.

Assistive Clue

The parent's attempts to provide a helpful hint about the next correct move. The child can use the hint to figure out the next move.

Guiding question:

1. Can you name the parent's hint that can be used to figure out the next correct move?

Differs from **parental investigation**

Through *parental investigation*, the parent enquires about the child's thinking process and/or approach towards the game. *Assistive clue* provides a hint about the next correct move.

Differs from **indirect instruction, suggestion**

Indirect instruction, suggestion provides clear information about the next move in a suggestive manner. *Assistive clue* provides only a hint about the next correct move.

***Differs from* prompt**

Prompt implies proceeding with the game without providing clear information about the next move. *Assistive clue* provides a hint about the next correct move.

Examples

- “Is that the right place?” (after the child places the car on the board incorrectly).
- “Which one do you think you need to move for the ice cream van to get out?”
- “Which is the only vehicle that can move?”
- “Now, could we move that yellow one?”
- “What’s in his way?”
- “You just moved the fire engine, so what could you logically do next?”
- “Can he escape?”
- “But there’s something in the way”
- “What can this do now?”
- “Anything missing?”
- “What’s got the most space to move?”
- “Look at those three squares there” (the parent points at the card after the child places the car on the board incorrectly).

Non-Examples

- “You’re setting it up, what are you gonna do?”

  The parent enquires about the child’s thinking process in the game. Thus, this is *parental investigation*.
- “Maybe if you move this across a little bit?”

  The parent provides clear information about the next move in a suggestive way. Thus, this is *indirect instruction, suggestion*.
- “Then which one would you move?”

The parent prompts the child to make a move: To move a car. Thus, this is *prompt*.

Monitoring Category

Monitoring

The parent's verbal and/or non-verbal monitoring—that is, observation—of the child or the game. The parent's verbal monitoring after addressing the child. The parent may be engaged with the game but focus on observing the child.

Guiding questions:

1. Is the parent disengaged with the child and the game?
2. Is the parent observing the child or the game?

***Differs from* process control**

During *monitoring*, the parent may engage with the game but remain focused on observing the child and/or the game. During *process control*, the parent disengages with the child, and engages with and focuses on the game.

Examples

- "Alright?" "Okay?" or "Yeah?" (to check for understanding after addressing the child).
- "Mmm…" (while observing the child/game, not oriented towards the child).
- The parent watches the board while the child moves the cars on the board.
- The parent glimpses at the child as the child talks.
- The parent observes the child/the game while the child thinks about the next moves.
- The child is engaged in the game, and the parent briefly stretches the hand towards the board and back without intervening with the game.
- The parent touches or moves the cars but does not look at them and focuses on the child.
- The parent holds the card and waits for the child to look at the card.
- The parent addresses the child and waits for the child to answer.

Non-Examples

- After moving a car, the parent hovers hand over the game and focuses on the game. The parent engages in the game and considers the next moves without consulting the child. Thus, this is *process control*.

Process Control Category

Process Control

The parent's non-verbal attempts/intention to contribute to the game without consulting the child. A brief audible and complete but uninformative verbal behaviour may accompany the non-verbal behaviour.

Guiding questions:

1. Is the parent disengaged with the child?
2. Is the parent engaged with the game?

***Differs from* monitoring**

During *monitoring*, the parent may engage with the game but remain focused on observing the child and/or the game. During *process control*, the parent disengages with the child, and engages with and focuses on the game.

Examples

- The parent moves a car on the board without consulting the child.
- The parent looks at the answers on the other side of the card without consulting the child.
- The parent takes the card pile from the child.
- The parent changes car placement on the board.
- The parent adjusts a knocked over car on the board.
- The parent's hand hovers over the game as the parent is focused on the game.
- The parent holds the card and focuses on it; engaged in the game.
- "That one goes there" (while moving a car, oriented towards the game and not the child).

- “Okay, so” (while placing the car on the table).
- “Okay, so” (interrupts the child while reaching towards the board).
- “Let me see if I can… Um… Attempt to work this out” (while moving the cars around, not directed at the child).
- After saying “we need to move this one” (*explanation, teaching, demonstration)*, the parent moves a different car (*process control*).

Non-Examples

- After moving a car, the parent hovers hand over the game but focuses on observing the child.

  Although the parent has engaged in the game, their focus shifts to the child. Thus, this is *monitoring*.
- “Did we…” (moving a car).

  The incomplete verbal behaviour implies orientation towards the child, and the non-verbal behaviour alone is not representative of the segment. Thus, this is *other*.

Other Category

Other

Inaudible, incomplete, or interrupted behaviours. Behaviours that do not match any different code description.

Examples

- “Will that go… Aaah.”
- “So, what you have…” (interrupted).
- “We need <inaudible>, don’t we?”
- “Or no <inaudible>.”
- “Then…” (no non-verbal behaviour).
- “Right” (no non-verbal behaviour).

- “Did we…” (moving a car).
- “Oh, I know, <name>, I know, I think.”
- <inaudible> (moving a car).
- “I can’t remember if we set it up properly in the first place.”
- “Twist it a bit cause I can’t see it” (while twisting the game).

Non-Examples

- “Then…” (moving a car).

  A complete and audible but uninformative verbal behaviour is accompanied by an informative non-verbal behaviour. Thus, this is *process control*.

- “Right” (reaches towards the board).

  The verbal behaviour is accompanied by an informative non-verbal behaviour. Thus, this is *process control*.