How do team-based activities affect touching behaviours in male-to-male dyads?

2024 | Annabel Pleavin

Word Count: 28,126

A thesis submitted to the

School of Anthropology and Conservation

for the degree of

Masters of Science by Research in Biological Anthropology

Annabel Pleavin
Dr Sarah Johns
Dr Nicholas Newton-Fisher

Abstract

Touch is shown to be crucial for many species, as often it is the primary and most fundamental sense to develop (Gallace and Spence 2010; Barnett 2005; Schanberg 1987). Despite this, touch is often under-recognised within the literature, with the other sensory modalities favoured (Gallace and Spence 2010; Hertenstein *et al.* 2006; Major 1984; Heslin and Boss 1980). To date, sex, homophobia, culture and setting have been recognised as extremely influential factors on touching behaviours (Suvilehto *et al.* 2023; Derlega 2001; Major 1984; Heslin and Boss 1980). To greater understand these factors, a two-methodology approach was favoured, to investigate how the performance and perceptions of touching behaviours alter between male team-based activities. The first methodology was an observational study comprised of 32 participants from two different team-based activities, dodgeball and theatre. From this, touching behaviours were observed, evaluating changes based on *status, stress, setting, state* and *homophobia.* The second methodology was an online questionnaire, where 88 participants outlined their perceptions on individuals within a touching-dyad. The same independent variables were used, allowing comparative analysis across both studies. The results from the current studies were largely non-significant. However, in Study 1 the frequency of touching behaviours significantly increased if the team-based activity was in the sports setting. This creates an interesting foundation for future research, as it suggests that the sports environment may be unique compared to other team-based activities.

Acknowledgements

First and foremost, I would like to give my deepest gratitude to my supervisors Dr Sarah Johns and Dr Nicholas Newton-Fisher. Without their continued support, wisdom, and advice this dissertation would still be a blank page. Thank you for your consistent guidance, especially through the turmoil of data analysis. To all the societies that welcomed me into their group, you have my upmost gratitude. Also, to all participants who completed the survey, thank you for your contribution. The research for this project was financially provided by the University of Kent.

Secondly, I would like to thank my friends and colleagues, who have kindly put up with me talking about touch for 3 years. Your kind words and constructive feedback have shaped this dissertation, and kept me sane.

Last, but definitely not least, thank you to my wonderful family. Your persistent love and frequent cups of tea helped me through the tough times. You kept me going even when I could not see the end.

List of Tables and Figures

Table of Contents

"How do team-based activities affect touching behaviours in male-to-male dyads?"

Chapter 1: Introduction

Introduction

Within a growing body of literature, touch is shown to be essential for many species, especially in human and non-human primates (Suvilehto *et al.* 2023; Gallace and Spence 2010; Hertenstein *et al.* 2006; Derlega 2001). Touch encapsulates several functions, such as communication, social bonding, intimacy, attachment, emotional regulation, and physical development (Hertenstein *et al.* 2006; Derlega 2001; Major 1984; Heslin and Boss 1980). Nonetheless, the acknowledged importance of touch has not received main stream recognition (Suvilehto *et al.* 2023; Derlega 2001; Major 1984). This dissertation aims to develop on the growing body of literature surrounding touch; outlining its functions and associated influential factors. In terms of structure, this dissertation is broken into four chapters. Starting in Chapter 1, focusing upon previous literature, touch and communication will be defined, and their significance outlined. The factors sex, culture and setting will be discussed, as these modalities are recognised for having a strong influence on touching behaviours (Suvilehto *et al.* 2023; Derlega 2001; Major 1984; Heslin and Boss 1980). This will lead to the crux of this project, where the two studies described in Chapter's 2 and 3 will aid in the understanding of these modalities and their influences. To conclude, Chapter 4 will focus on the results of the previous chapters and broaden them into current literature, providing further insight into these behaviours. From this, aims for future research can be discussed.

Literature review

The next section of Chapter 1 will describe and evaluate previous research surrounding touch, outlining key theories within the literature. From this, current gaps can be discussed, which will be used to create a rationale for this dissertation's methodologies and hypotheses.

Defining touch

The word *touch* is extremely versatile, with hundreds of lines in the Oxford Dictionary emphasising its semantic richness (Hertenstein *et al.* 2006). This is displayed in humanities' own cognition, as our brains distinguish between interpersonal touch, intrapersonal touch,

and the passive touch of an object (Gallace and Spence 2010, pp. 252). Developed further, touch has extreme variability, with the intensity, location, duration, and the size of the surface area all being adaptable (Gallace and Spence 2010; Hertenstein *et al.* 2006; Major 1984). Therefore, providing a concrete definition is more convoluted than initially perceived. Touch can be distinguished into two phenomena: one to the action itself (tactile), and the other in the sensory reception of the action (feel) (Gallace and Spence 2010; Hertenstein *et al.* 2006). The two combined form *tactile communication,* where through the function of touch a person's thoughts, emotions and behaviour is systematically altered (Hertenstein *et al.* 2006). In regards to communication, the intentionality of touch has been a controversial debate amongst theoreticians, in relation to its relevance (Hertenstein *et al.* 2006). Whether an accidental or artificial touch communicates the same sensory messages as intentional touch is difficult to determine, and has not been well researched, therefore this project will focus on the latter (Gallace and Spence 2010). Secondly, the variability of *tactile communication* cannot be understated, as gripping someone's shoulder can refer to dominance, anger, emotional support or fear depending on the social and cultural contexts (Gallace and Spence 2010). This is often dependent on the individuals' own beliefs and the larger historical, social, and economic context. Thus, this project will evaluate how the perception of touch is variable, and what factors affect the believed function of the behaviour. Finally, as Major *et al.* (1990) highlights, touch is always bidirectional in its nature, and thus both the actor and receiver will be examined within this dissertation.

The evolution of touch

Before discussing *how* touch is presented, there must first be some discussion on *why* we have touch in the first place. Recognising the evolved function of touch creates a more mindful understanding of how the behaviour is displayed currently, and prevents conflation between the *how* and *why* (Suvilehto *et al.* 2023). For example, a handshake is often a ritualised greeting, but in the phylogenetic past the outcome of greeting someone was unlikely to be the primary selective pressure for the behaviour. Therefore, understanding the building blocks of touching behaviours and their initial roles provides greater insight into the variety of functions relating to touch today (Suvilehto *et al.* 2023).

For many species, touch is a crucial form of non-verbal communication, as often it is the first and most fundamental sense to develop (Gallace and Spence 2010; Barnett 2005; Schanberg 1987). Within the womb, sound vibrations and amniotic fluid movements are the primary source of communication between the mother and the foetus (Barnett 2005). Therefore, touch

rapidly develops, and becomes the most mature compared to all other senses (Gallace and Spence 2010). For humans, the sensual system of touch begins as early as seven and a half weeks after conception (Barnett 2005). Therefore, with infants, touch is the most developed sensory modality, and is used as the primary form of communication until later years in life (Hertenstein *et al.* 2006; Barnett 2005). Typically, in anthropoid primates', infants are born helpless and critically dependent on the parents, and thus a strong attachment between the two is vital for survival (Suvilehto *et al.* 2023). Thus, having a form of communication that reinforces their bond both physically (a hug keeps an infant warm, and closer to the parent) and emotionally (touching feels soothing and relieves stress) has extreme evolutionary benefits. Schanberg (1987) develops on this idea through his experimentation with rats, stating that tactile communication between mother and infant is a primitive survival mechanism within mammals. His experiment focused on the measurement of beta-endorphins, which affects the development of growth hormones and insulin (Schanberg 1987). He discovered that the presence of the mother was less important than the infant receiving artificial 'licking' by simulating a particular pattern. This pattern inhibited the production of beta-endorphins and thus improved the infant's metabolism and growth rates. Schanberg (1987) hypothesised that infants rely on their mothers for survival, and thus when her touch is absent the infant's metabolism will slow, and thus its need for nourishment. Then, when the mother interacts with the infant again, the process is reversed and growth may resume at a normal rate (Schanberg 1987). This phenomenon is not just limited to rats, and is shown in non-human primates (Suvilehto *et al.* 2023; Hertenstein *et al.* 2006; Barnett 2005). One of the most infamous, and ethically controversial experiments in this area was Harlow's (1958) work with baby rhesus monkeys who were removed from their mothers. Instead, they were randomly assigned one of two artificial surrogate mothers; one covered in terrycloth that provided no food, and the other made of wire that did provide food (Harlow and Zimmerman 1959; Harlow 1958). The baby monkeys clung to the terrycloth mother over the wire mother, and when shown a frightening stimulus, they ran to the cloth mother for protection and comfort, regardless of whether it provided food (Harlow and Zimmerman 1959; Harlow 1958). Later within the experiment, monkeys with the wire mother suffered with digestive issues and frequent diarrhoea despite both groups gaining weight at the same rate (Harlow and Zimmerman 1959; Harlow 1958). Harlow (1958) concluded that the lack of tactile comfort was causing psychological distress to the monkeys, even when resources for survival, such as food were available.

Within humans, the importance of touch within the gestation period and early stages of life for both the mother and infant cannot be understated (Gallace and Spence 2010; Hertenstein *et al.* 2006; Barnett 2005). For example, Field (1996) conducted research on massage therapy with premature babies. The control group were left in their incubators, while the research group were massaged for 15 minutes, three times a day. The massage was across the baby's back, legs and neck in gentle but firm strokes, allowing for sensory reception of the pressure without causing pain. The massaged babies gained weight 47% faster than the control group, even though both groups consumed the same amount of food. After eight months, the massaged babies had maintained their increased weight and scored better on mental and motor mobility tests. Anderson (1995) conducted similar research on premature babies through the development of 'kangaroo care'. This practice refers to the mother or care taker holding the baby to their chest skin-to-skin. Measuring the heart rates of two groups, one in bassinets and the other in kangaroo care, Anderson (1995) observed that only the babies in kangaroo care had stability in breathing and heart rate. Meanwhile, the babies in the bassinet had extremely slow heartbeats to the point of health concerns and difficulty breathing. Furthermore, the babies in kangaroo care gained much more weight and their time in hospital was reduced. This furthers the notion on how fundamental touch is for attachment bonding, as both studies were with premature babies rather than more mature individuals (Field 1996; Anderson 1995). A more direct observation of parent-offspring attachment to touch was Anisfeld's (1990) research on baby carriers. One group was given soft baby carriers and the control group was given plastic infant seats for 13 months. Afterwards, they were blindly assessed to whether they were securely or insecurely attached; for the experimental group 83% were securely attached, while only 38% of control group were. These research studies strongly suggest that the frequency and proximity of touch between the parent and child directly affects the strength of the attachment bond, and thus the chance of the offsprings survival (Anisfeld 1990). Unfortunately, most research to date focuses on the mother-child relationship, due to pregnancy and lactation being dependent on the mother within mammals, so further research on the father-child touch and attachment would be greatly beneficial.

Tactile communication also affects parents' relationship with their offspring, often causing greater attachment towards the infant and improving their overall wellbeing (Gallace and Spence 2010; Glover 1995; Klaus 1995). Klaus (1995) demonstrated that for mothers, touch by an experienced women (known as a doula) throughout the labour dramatically reduced

stress and anxiety, improving overall mental and physical wellbeing. Furthermore, the degree of pain, length of labour, and the need for caesarean section operations was reduced. This suggests that touch heightens the chance of reproductive success, as it lowers the health risks for the mother during childbirth. Glover (1995) found similar results to Klaus (1995), working with mothers diagnosed with post-natal depression. The experimental group had weekly massage classes, attending five sessions over eight weeks, while the control group had none (yet both still had a direct support group). Face-to-face interactions were recorded between mother and infant, both at the start and at the end of the experiment. Within the control group, the interactions between mother and infant did not change, however the massage group were significantly warmer and more engaged in comparison to the start (Glover 1995). Further, their scores on the Edinburgh Postnatal Depression Scale (EDPS) improved into the normal range. Glover (1995) concluded that massage-based therapies are highly beneficial, improving/ the mother's personal well-being and the bond between her and the child. It is interesting that both groups had direct support, and yet only the massage group improved, highlighting the influence touch, even in comparison to other sensory based therapies. From an evolutionary perspective, a neglectful parent is less likely to have successful offspring, due to their extreme vulnerability (Gallace and Spence 2010). Therefore, it is important that touch provides benefit for the parent as it incentivises their parental investment into the child.

In relation to human and non-human primates, observing the neurophysiological mechanisms relating to touch aid in the understanding of its phylogenetic primacy (Suvilehto *et al.* 2023; Jablonski 2021; Gallace and Spence 2010). Phylogenetic primacy refers to the notion that touch came before language within evolutionary history (Hertenstein *et al.* 2006). One of the most obvious examples being our largest and oldest sensory organ: the skin (Gallace and Spence 2010). Both human and non-human primate's have unmyelinated afferent nerves in their hairy skin, known as CT afferents, belonging slow tactile system (Jablonski 2021). CT afferents are activated by slow, gentle stimulation of the hairy skin, such as stroking, grooming and cuddling (Jablonski 2021). Not only does this stimulation release a pleasant sensation, but it also affects the autonomic nervous system; causing reductions in heart rate and blood pressure (Jablonski 2021). Pleasant sensations are also created by the opioid system during and after tactile communication (Jablonski 2021). As Jablonski (2021) describes, grooming (and in humans stroking) affect the release of oxytocin in the μ-opioid receptor (MOR). Oxytocin, also known as the "love hormone", promotes an individual's

affiliative behaviour, which often leads to greater chances of social bonding within interactions (Eckstein et al 2020). Unfortunately, the relationship between the opioid system and tactile communication is extremely complex, and has been under-researched within primate studies to date (Jablonski 2021). Despite this, for both human and non-human primates, there is strong evidence between tactile communication and foundational neurophysiological mechanisms (Suvilehto *et al.* 2023; Jablonski 2021; Gallace and Spence 2010). Primates in general are highly social creatures, often living in large groups throughout their lifespans (Jablonski 2021; Hertenstein *et al.* 2006). The pleasant sensations of touch created through the CT afferent system and opioid system promotes social cohesion, improving survival, reproductive success and preventing conflict (Jablonski 2021; Eckstein *et al.* 2020; Hertenstein *et al.* 2006). This is also shown through non-human primates who have become ostracised from a group, as those who receive less social touch often display higher levels of anxiety and stress (Jablonski 2021).

As Eckstein and colleagues (2020) highlight in their comprehensive review, a multitude of psychological research has shown a connection between touch and the activation of neurocircuitry. This is displayed through a 'bottom up' approach, where stimulated CT-fibres cause the activation of the insula, mPFC and dorsal- anterior cingulate cortex (dACC) (Eckstein *et al.* 2020). Shown through connectivity analyses, activating these aspects of the brain also causes a co-activation of the amygdala. The amygdala is responsible for social cognition, processing emotional and sensory response (Eckstein *et al.* 2020). Consequently, as Eckstein and colleagues (2020) develop, these results suggest touch has a more influential role in stress regulation than previously detailed, due to its possible relation to activating the amygdala via the insula. This would mean that touch acts a social signal of safety, preventing the amygdala from exhibiting fear and stress responses (Eckstein *et al.* 2020). This furthers the ontogenetic and phylogenetic primacy of touch within humans, as the amygdala is one of the older parts of human's (and other animals) neurology (Sander *et al.* 2003).

Across species, touch is used to form attachments and improve social cohesion, as the behaviour often promotes physical and mental wellbeing; whether this is within the parent-offspring dynamic or in larger social groups (Jablonski 2021; Gallace and Spence 2010; Barnett 2005). This is shown through multiple neurophysiological mechanisms, including beta-endorphins, CT afferents and oxytocin release (Suvilehto *et al.* 2023; Jablonski 2021; Gallace and Spence 2010). The presence of this relationship throughout the animal kingdom

and in primitive survival mechanisms emphasises the deep roots of touch in our evolutionary history. However, touch is not always beneficial, and often can be the cause of violence, pain and fear (Suvilehto *et al.* 2023). For example, not many people who have been on a train in rush hour will describe touch as "pleasant". Therefore, when analysing the function of touch, the *how* must also be viewed through the lens of individual, environmental, and sociocultural factors, as well as the evolutionary underpinnings.

Touch in non-human primates

For primates, and by extension our primate ancestors, tactile communication is a crucial element within social life to maintain harmony within group living (Yates *et al.* 2022; Jablonski 2021; Hertenstein *et al.* 2006; Kaburu and Newton-Fisher 2013). Compared to other mammals, primates have long life spans and slow life histories, with both the gestation period and the infant maturation period being relatively long (Yates *et al.* 2022; Jablonski 2021). Multiple generations can overlap and live with one another for years, meaning that the maintenance of kin bonds is necessary for group stability (Jablonski 2021; Hertenstein *et al.* 2006). Further, grooming can establish relationships between non-kin, creating political benefits within a hierarchal system (Yates *et al.* 2022; Jablonski 2021). Therefore, touch is a crucial commodity and is deeply ingrained within the social behaviours of primates (Kaburu and Newton-Fisher 2013; Newton-Fisher and Lee 2011). Observing touch within non-human primates can provide insight into our own behaviours due to our intertwined evolutionary development. Within the literature, grooming is often used as a synonym for tactile communication, and thus this project will replicate the same logic (Hertenstein *et al.* 2006). The word *grooming* is often used instead of *touch* because primates are covered in thick hair, compared to humans (Hertenstein *et al.* 2006). This is a noteworthy distinction, as the physical differences may alter the causality and performance of the behaviour. For example, long hair may be brushed through the fingertips without touching the skin underneath: this may register as a different level of intimacy, as the closeness and pressure of the touch is different. Despite this, due to the phylogenetic closeness between non-human and human primates, comparisons should not be disregarded, but rather the differences acknowledged.

Functions of touch

One of the primary benefits of living within a group is the support of others for survival and protection (Yates *et al.* 2022; Jablonski 2021). In relation to grooming, one of the functions of the behaviour would be hygiene care, as other primates could help to remove ticks and ectoparasites that others could not reach themselves (Yates *et al.* 2022; Hertenstein *et al.*

2006). This process is known as allogrooming, which relates to the cleaning of individuals within the same species, regardless of close kin and offspring interactions (Yates *et al.* 2022; Alberts 2019). Within evolutionary history, prevention of disease would be a strong selective pressure, due to the resultant longer life spans improving the chance of reproductive success (Jablonski 2021). Alberts (2019) studied the health benefits of allogrooming in both yellow baboons (*Papio cynocephalus)* and olive baboons (*P. Anubis)*. They observed that baboons with higher tick loads due to limited allogrooming, had a lower volume of red blood cells, causing more health risks long term. However, the importance of allogrooming has been contested amongst researchers, suggesting the prevalence of grooming has expanded outside of its hygienic functions (Suvilehto *et al.* 2023; Yates *et al.* 2022; Aureli *et al.* 1999). This is supported by the frequency and variation of the behaviour; for example, non-human primates in captivity groom just as much as those in the wild, even though they have little to no parasites to remove (Hertenstein *et al.* 2006). Furthermore, it has been observed that lower status primates are groomed less than higher status primates, despite the fact that they are just as susceptible to parasites (Hertenstein *et al.* 2006; Sparks 1967). Therefore, though one of the functions of grooming is hygiene, but it is unlikely to be the primary stressor.

Another short-term benefit of allogrooming outside of ectoparasite removal is stress relief (Yates *et al.* 2022; Kaburu and Newton-Fisher 2013; Aureli *et al.* 1999). For example, within Aureli et al's (1999) Study of rhesus macaques (*Macaca mulatta*), they observed that heart rate was significantly reduced after a stressful experience if the individual was groomed, compared to those who were not. Obviously, an elevated heart rate may be influenced by many factors, such as physical activity, therefore to prevent these confounds the paradigm was compared with matched controlled observations. The stressful experience in question related to the approach of a dominant individual, most likely due to the risk of aggression (Aureli *et al.* 1999). This is heightened with rhesus macaques, who have extremely despotic dominance hierarchies, meaning mechanisms to reduce tension are particularly beneficial. Another study with female lion-tailed macaques (*Macaca Silenus)* was conducted by Yates and colleagues (2022), which focused on self-directed behaviours, such as yawning, self-grooming, self-biting and shaking. These behaviours are a clear indicator of psychological and physical stress as they dramatically increase in frequency after stressful situations, such as conflict, threats, and labour (Yates *et al.* 2022). Further, these behaviours are decreased by anxiety-inhibiting drugs. The results from the study suggest that self-directed behaviours were significantly shorter in duration after a bout of allogrooming for both groomers and

recipients (Yates *et al.* 2022). Surprisingly, they found that the strength of the social bond between the two individuals had no effect on the duration of self-directing behaviours, suggesting that the grooming itself is more influential than the relationship towards the grooming partner. Although, this insight must be carefully considered as the macaques were in captivity and thus had a high level of relatedness between members (Yates *et al.* 2022). Despite this, both of these studies highlight that allogrooming has a tension-reduction function, which within a group is crucial for the maintenance of physical and emotional homeostasis, particularly in times of social agitation (Hertenstein *et al.* 2006). Observations of non- human primates also support this notion, with intensive grooming sessions post intergroup conflict, being shown in including vervet monkeys (*Chlorocebus aethiops*); Chimpanzees (*Pan troglodytes)*; Hamadryas baboons (*Papio hamadryas)*; and samago monkeys (*Cercopithecus erythrarchus*) (Yates *et al.* 2022; Judge *et al.* 2006; Payne *et al.* 2003; Cheney and Seyfarth 1992; Goodall 1968).

Grooming models for touch

Reducing stress and improving hygiene are key benefits of allogrooming in non-human primates, and thus are a social commodity among groups (Kuburu and Newton-Fisher 2013; Newton-Fisher and Lee 2011). In order to receive these benefits, individuals will groom others with the goal of the behaviour being reciprocated back to them (Kuburu and Newton-Fisher 2013). This structure of reciprocal exchange may be one of the evolutionary driving factors for grooming strategies in primates (Kuburu and Newton-Fisher 2013). One of the leading models surrounding this notion is biological market theory, where the selective pressures on behavioural strategies is modelled as a marketplace; animals can be viewed as 'traders', and behavioural interactions are 'goods' which can be offered an exchanged (Kuburu and Newton-Fisher 2013). Within a group this notion is particularly beneficial, as it can limit intergroup conflict and drive reproductive success. However, the problem with this model is it predicts that more exchange of grooming, reciprocated at some level, will occur in the absence of rank related benefits, which for many primate species is not the case (Kuburu and Newton-Fisher 2013; Newton-Fisher and Lee 2011). Newton-Fisher and Lee (2011) develop on this critique within their study of chimpanzees (*Pan troglodytes),* to test the suitability of the biological market theory while regarding the factor of status. As they describe, in social groups with strict dominance hierarchies and differences in resource-holding potential, high-ranking individuals can exchange behavioural commodities for the benefits of grooming (Newton-Fisher and Lee 2011). For example, a high-ranked individual

may be groomed by a lower-ranked individual in exchange for tolerance and support in future agonistic interactions. They elaborate that in chimpanzee social groups, there can be high fluidity, with members not seeing one another for days, such as separating a female during oestrous (Newton-Fisher and Lee 2011). This puts a risk on grooming being reciprocated, which would be considered cheating and thus inflating stress levels. Performing allogrooming is costly, as it decreases time for other activities such as resting or foraging. Therefore, the uncertainty of future interactions changes the currency of the trade: with increased social tension, the benefit of stress reduction is more valuable to receive than alternatives (Newton-Fisher and Lee 2011). Consequently, allogrooming trading can be seen as 'buyers' giving up grooming for benefits as well as 'sellers' providing services to acquire the benefits. These models and strategies provide a backbone to describe the complexity of tactile communication within primates, where touch is a commodity to be traded amongst a hierarchal structure. Another example outside of chimpanzees includes *Cebus apella* (tufted capuchin), where the dominant male and female are involved in 63% of all grooming dyads, and receive double the amount of grooming than they give (Robinson and Janson 1987). Consequently, in primate species with despotic dominance hierarchies, allogrooming may have an alternative function of being a social commodity related to status benefits (Kuburu and Newton-Fisher 2013; Newton-Fisher and Lee 2011).

Male vs female grooming behaviours

Alongside status, the sex of the individual has a strong effect on the grooming strategies amongst primates (Hertenstein *et al.* 2006; Mitchell and Tokunaga 1976). For example, the menstrual cycle of adult females, and if they are pregnant, alters the frequency and duration of grooming bouts (Mitchell and Tokunaga 1976). As Mitchell and Tokunaga (1976) describe, in common marmosets (*Callithrix jacchus*) males are more likely to make attempts at grooming towards females postpartum than vice versa. Also, at postpartum females are more likely to refuse males invitations to groom than vice versa. Therefore, often young females are groomed frequently within a group because they either have an infant or are in oestrous (Hertenstein *et al.* 2006). Of course, this phenomenon is mainly recognised within groups where paternity uncertainty is more prevalent. This is emphasised with chimpanzee males, where Van Hooff (1973) found a positive correlation between the possessiveness of an adult male towards an adult female to the amount of time he spent grooming her. In relation to grooming strategies, the benefits of allogrooming are a commodity to be exchanged for

sexual relationships, and thus reproductive success (Hertenstein *et al.* 2006). This is furthered as the female oestrus cycle changes the relevant dominance, social composition and kinship relations within the group. However, this relationship between tactile communication and reproductive success varies greatly among primate species, as is dependent on the formation, sexual dimorphism and mating strategies within the group.

Despite certain differences, there are some more generalised observations among non-human primates. For example, there seems to be an overall trend that females participate in more social grooming than males (Hertenstein *et al.* 2006; Mitchell and Tokunaga 1976). This is observed in both platyrrhine and catarrhine species from multiple studies, such as green monkeys (*Cercopithecus sabaeus*), mangabey (Cercocebus atys); bonnet macaques (*Mucucu rudiutu*); and gorillas (*Gorilla gorilla*) just to name a few (Flinn and Nash 1975; Dunbar 1974; Bernstein 1976; Rosenblum *et al.* 1966; Reynolds 1965). In Missakian's (1973) research on rhesus macaques, she believed that intra-female grooming was so important that it defined whether the group even existed, believing it to be at the core of troop fission. Instead, males often receive more grooming than they reciprocate, and male-to-male grooming is the least common grooming interaction among primate species (Hertenstein *et al.* 2006; Mitchell and Tokunaga 1976). For example, in Dunbar's (1974) observations of green monkeys (*Cercopithecus* sabaeus), males never groomed other males. Only females groomed the males, and often it was directed towards the central alpha male (Dunbar 1974). The reasoning for this lack of touch in males is caused by a multitude of factors, such as many species having only one single dominant male within a troop, and thus males are more likely to be isolated (Hertenstein *et al.* 2006). This intertwines to the aforementioned relationship between touch and status, as males are more likely to be dominant within a primate group they will more likely receive grooming than initiate it. One of the few exceptions is *Pan troglodytes* (chimpanzee), where male-to-male dyads are four times more likely to be observed compared to female-to-female dyads (Goodall 1986). Chimpanzees are a multi-male and multi-female group, meaning there is high competition for mate access and social status. Therefore, males rely on alliances to reduce tension and promote the survival of the community (Goodall 1986; Harcourt 1979). This dyadic interaction is most commonly observed between young male primates towards the dominant male, with the aim to establish themselves as an ally rather than a threat, increasing their change of survival (Chadwick-Jones 1998).

In conclusion, touch is a crucial form of non-verbal communication within non-human primates, to the point where it has become a commodity to be bought and exchanged (Yates *et al.* 2022; Jablonski 2021; Kuburu and Newton Fisher 2013 Newton-Fisher and Lee 2011; Hertenstein *et al.* 2006). With this enhanced complexity, touch has been shown to have a multitude of functions, such as social cohesion of the community; reducing tension; maintaining alliances; mate control; and improving hygiene (Yates *et al.* 2022; Jablonski 2021; Kuburu and Newton Fisher 2013 Newton-Fisher and Lee 2011; Hertenstein *et al.* 2006). Despite these benefits, the frequency and intimacy of touch is strictly controlled and can be prohibited due to a multitude of social factors, such as the strict dominance hierarchy of some primate groups (Hertenstein *et al.* 2006). The sex, age, and status of the individual all have significant effects on the touching behaviour observed (Kuburu and Newton Fisher 2013 Newton-Fisher and Lee 2011; Hertenstein *et al.* 2006; Mitchell and Tokunaga 1976). In regards to humans, this primate-based research displays how important touch is within our evolutionary history and the complexity of its nature.

Touch in humans

From our evolutionary history and our similarities to non-human primates, the importance of touch in humans cannot be disputed: effecting social, emotional, psychological and physiological domains (Camps *et al.* 2013; Guéguen and Jacob 2006; Stier and Hall 1984; Major 1984). The literature surrounding touch can be more easily categorised into the certain aspects of the behaviour itself: frequency, belief, intention, placement, and response (Dolinski 2013, Roese *et al.* 1992, Stier and Hall 1984). This has been demonstrated from a range of studies, including observation-based, laboratory-based, self-reports and questionnaires (Hall and Veccia 1990; Jones 1986; Major 1984; Henley 1973). Despite its importance, touch has been neglected within academia, with research on the topic being a fraction of those investigating the other somatic senses (Camps *et al.* 2013; Guéguen and Jacob 2006). Major (1981) suggests this may be due to the sanctions relating to touch within social culture, as particularly intimate touch may be seen as inappropriate, or at worst harassment. This makes navigating the ethical landscape tricky, perhaps deterring researchers from this area. Furthermore, natural observations of touch can be scarce, causing methodological difficulties (Major 1984). Yet, as shown in the aforementioned research, the importance of touch cannot be overstated. Therefore, this project aims to conduct an overview of previous research, highlighting the crucial function of touch, and develop on previous ideas.

Stress reduction

Comparative to non-human primates, one of the primary functions of touch in humans is it aids in the reduction of stress (Dreisoerner *et al.* 2021; Sumioka *et al.* 2013; Grewen *et al.* 2003; Light *et al.* 2005; Ferrell-Torry and Glick1993). This has been primarily shown in research through the physiological responses within humans after tactile communication. For example, Grewen and colleagues (2003) conducted a Study analysing blood pressure and heart rate post-stress in cohabitating couples. In the experimental group, prior to the stress the couple watched a romantic video, held-hands for 10 minutes and then had a 20 second hug. Meanwhile, the control group rested quietly together and did no touch at all. After the stressor, which was a public speaking task, the couples' heart rate and blood pressure was measured. For the experimental group, participants had lower systolic blood pressure, diastolic blood pressure, and heart rate compared to the control group (Grewen *et al.* 2003). Similar results have been found in other research, such as Light and colleagues' (2005) Study with premenopausal women. They discovered that receiving frequent hugs from partners not only lowered resting blood pressure levels, but also increased oxytocin activity. Therefore, touch improved their health not only by reducing negative physiological effects, but also by promoting beneficial ones. Though the results of the above studies are insightful, the relationship between the individuals may be a confounding factor within the results. Simply put, a romantic partner is more likely to relieve stress than a stranger, and thus how the potency of touch as a de-stressor is questionable. However, more recent research on artificial touch devices counters this critique, as no other person is present and yet the touch is still effective (Jablonski 2021; Sumioka *et al.* 2013). For example, Sumioka and colleagues' (2013) experiment consisted of participants speaking over the phone to a partner, with some also using a huggable device. The participants that used the huggable device showed a significant reduction of cortisol levels, compared to the control group who did not. Supplemented further, a study by Dreisoerner *et al.* (2021) showed that self-soothing touch (i.e. stroking or hugging oneself) also showed reduced cortisol secretion compared to those who did not touch. These results suggest that the touch more than the presence of a partner has an effect on stress reduction, highlighting its potency. The importance of touches' analgesic effects has been recognised within the medical field, and now therapeutic massage is often used on patients (Eckstein *et al.* 2020; Ferrell-Torry and Glick 1993). This has been supported by studies such as Ferrell-Torry and Glick's (1993) research on therapeutic massage in cancer patients. Nine hospitalised males with cancer were given 30 minutes of therapeutic massage and self-reported their levels of pain, anxiety and relaxation. Also,

physiological measures (i.e. heart rate, blood pressure, and respiratory rate) were taken before and after the massage therapy. After the massage, patients' perceptions of pain and anxiety were significantly reduced, while relaxation was significantly improved. Also, all physiological measures significantly decreased from the baseline. Based upon the literature, the function of touch as a de-stressor in humans cannot be disputed, and thus it's importance on mental and physiological wellbeing (Dreisoerner *et al.* 2021; Sumioka *et al.* 2013; Light *et al.* 2005; Grewen *et al.* 2003; Ferrell-Torry and Glick 1993).

Interestingly, this effect is not just related to humans, with touch from animals, and even robots also producing similar physiological responses (Eckstein *et al.* 2020; Willemse 2019; Wilson 1987). For example, one study conducted by Wilson (1987), had 92 students either reading aloud, quietly reading, or petting a dog for 10 minutes. Both before and after the experiment, blood pressure, heart rate and mean arterial pressure were measured. Compared to all other activities, students who touched the dog had significantly lower blood pressure, heart rate and mean arterial pressure (Wilson 1987). In a more experimental study conducted by Willemse (2019), 67 participants had their heart rate, respiration rate, and galvanic skin response recorded while watching scary movies with a robot called "NAO". When the participants were touched by the robot, heart rate significantly decreased, whereas participants who only received words of affirmation had a significant increase in heart rate (Willemse 2019). Compared to other studies, the physiological response from touch is seemingly weaker than expected, as only heart rate was affected. This could be for a multitude of reasons, such as the notion of 'uncanny valley' where people feel uncomfortable with an object that displays human characteristics but is not one (Eckstein *et al.* 2020). Despite this, the fact that any physiological response was found, even when touched by an inanimate object shows how strong the stress response to touch is within humans.

Increased compliance and reciprocity

In addition to the analgesic affects, numerous studies evidence that touch increases human's compliance and reciprocity (Camps *et al.* 2013; Guéguen and Jacob 2006; Stier and Hall 1984; Major 1984). Generally, humans are more likely to accept requests if the person touches them upon asking (Major 1984). For example, Kleinke (1977) conducted an experiment where a female confederate requested money for a telephone booth to strangers passing by. When the request was coupled with a touch on the arm 51% or people gave

money compared to only 29% when asked vocally. This experiment was repeated by Brockner *et al.* (1982), showing that in the no touch condition 63% of people returned a dime compared to 96% when lightly touched on the arm. This has been shown in other request scenarios, where 81% of people were willing to sign a petition when touched, compared to 55% not touched (c). In a more recent study by Guéguen and Fischer-Lokou (2002), a passerby was asked to look after a large and excitable dog by a male confederate for 10 minutes while he went into the pharmacy. When the request was made with a touch 55% of subjects agreed, whereas only 35% agreed in the no-touch condition. Also, when no request for help was made, touch significantly increased people volunteering to help. This increase in compliance also has been shown within hospitality, where a waitress touching the customers arm significantly increased tips and how the business is rated overall (Hornik 1992; Smith *et al.* 1982). These studies all signify that people are more likely to comply to a request if a touching behaviour is accompanied. Further studies have shown that, not only does touch increase compliance for that specific action, but often can have broader long-term effects on the individual. For example, Eaton *et al.* (1986) had staff who worked with the elderly use touch to encourage eating; not only did it significantly increase the number of calories and proteins ingested; but the positive effect lasted five days afterwards. In another experiment, Wheldall *et al.* (1986) focused on touch affecting behaviour within a classroom setting. In one class, the teacher followed a compliment of behaviour or results with a touch, while the other class no touch was accompanied. Observers in the class then measured disruptive behaviours by pupils and their overall work effort, both before and during the tactile encouragement was introduced. In the class with touch, disruptive behaviour was reduced by 60% compared to before, and completion of school tasks increased to 20%. This suggests that tactile communication does not just improve compliance to a specific action, but encourages it in an individual's behaviour overall. This may be related to the physiological effect of oxytocin being released, as aforementioned in the previous chapter, as hormones and their affects will often last longer than the tactile communication.

Factors affecting touch

Similar to non-human primates, the functions and performance of touch can be altered dramatically due to a multitude of factors, such as status, sex and environment (Derlega 2001; Stier and Hall 1984; Major 1984). As current research indicates, the intimacy, frequency and body placement of the touch is significantly different between males and females (Derlega 2001; Stier and Hall 1984; Major 1984). This also reflects in the perceptions surrounding

touch, as shown in Nguyen *et al.* (1975) study of individuals ascribing meaning to touch. The more men rated touches as sexual, the more they also rated them pleasant and loving, while for woman the more sexual they rated the touch, the less playful and loving it was rated. Also, both men and women reported significantly more touching interactions between opposite-sex dyads than with same-sex dyads. Henley's (1977) research supported this notion, with both sexes reporting that someone of the same-sex was less likely to touch them compared to the opposite sex. Also, both sexes believed that if the interaction was same-sex, it was more likely to be female-to-female than male-to-male. The observation that males touch less frequently and intimately is shown consistently throughout the literature (Dolinski 2013; Derlega 2001; Stier and Hall 1984; Major 1984). For example, in Greenbaum and Rosenfeld's (1980) observational study, which focused on greeting behaviours within an airport, their results showed that males used fewer intimate gestures in both same sex and opposite sex dyads compared to females (Greenbaum and Rosenfeld 1980). However, this result is limited by an extremely small sample size. Anderson and Leibowitz (1978) used a larger, more diverse range of participants for their experimental study, including a touch avoidance scale. Subjects were asked how much they agree with 18 statements, relating to same sex and opposite sex touch (Anderson and Leibowitz 1978). In summary, males were much more likely to support touch avoidance in all settings, compared to females (Anderson and Leibowitz 1978). Another study by Henley (1973) observed 101 touches; 42% were men to women; 25% were women to men; and both same-sex interactions were 17% (Major 1984, pp 19). This highlights that men are more likely to be the initiator in a touching behaviour, and women are more likely to be the receiver (Major 1984; Henley 1973). Testing this research, Major and Williams (1980) replicated Henley's (1973) on a much broader scale of 799 touches. Their results corresponded with Henley's (1973), with the most frequent touch being males to females, and males being significantly more likely to be the initiator of the touch. In relation to intimacy, Silverman *et al.* (1973) asked college students to communicate 'love, as if to a friend' through touch. Both sexes were more likely to use intimate touch to the female confederate than to the male. This is also shown in physiological affects as shown in Whitcher and Fisher's (1979) study, which focused on how touch is perceived by male and female hospital patients taking an elective surgery. For females, if they were touched, they reported significantly less anxiety; they perceived the nurse being more interested in them; they had a lower blood pressure; and tended to read more information in the preoperative booklet. Meanwhile, males that were touched had significantly higher levels of anxiety, systolic and diastolic blood pressure (Whitcher and Fisher 1979). This seems contradictory to

previous research, which highlights touch having an analgesic effect (Dreisoerner *et al.* 2021; Sumioka *et al.* 2013; Light *et al.* 2005; Grewen *et al.* 2003; Ferrell-Torry and Glick 1993).

Most of this research was completed in the 1970s and 80s, leading to question whether a more contempary society would emphasise the same sex differences in tactile intimacy. As cultural views have shifted regarding the stereotypes of gender, the behaviours associated with that norm would also develop. Recently, Bowling and colleagues (2024) focused their research on how societal change and individuals themselves affect touching behaviours. They collected this data from an online self-report survey in the UK, with a large response sample of 15,166 individuals. The survey was posted for 3 months between January and March 2020, providing more contempary data compared to Henley (1973) and Major's (1984) studies. Their hypothesis outlined that women would look more favourably towards touch than men, which their results largely supported. As they outline, women significantly reported more positive attitudes towards tactile self-care than men (Bowling *et al*. 2024). However, they did not find significant differences towards day-to-day social touch, and men rated more positive attitudes towards unfamiliar touch than women. They suggest that another predictor derived from the individual's personal traits may be affecting the results. For example, they also found that older individuals rated touch significantly more positive than younger adults. Therefore, individual predictor factors must be recognised as well as more generalised factors. Another contempary study by Webb and Peck (2018) created the CIT, which was a scale developed to measure an individual's comfort with interpersonal touch (Webb and Peck 2018). Their results found women's scores on the CIT scale were significantly higher than men, suggesting overall women were more comfortable with interpersonal touch. Trotter and colleagues (2018) focused their research on how different sexes experience touch, to outline underlying attitudes. This was through the creation of the TEAQ questionnaire, meaning Touch Experiences and Attitudes Questionnaire (Trotter *et al.* 2018). Over 1,507 participants responded, strengthening the statistical validity of their research. Their results support the studies outlined previously, showing overall females responded to having significantly received more physical touch throughout their lifetime than males (Trotter 2018). This further emphasises that males would be more uncomfortable with touch, as they experience it less throughout their lives. These more contempary studies suggest that despite cultural changes, sex differences between tactile intimacy still seem to pervade, both in attitudes and experience (Bowling *et al.* 2024; Trotter *et al.* 2018; Webb and Peck 2018).

Therefore, it seems that the sex of an individual can change the primary functions and meaning of tactile communication. This raises questions about the detrimental effects of emotional and physiological wellbeing attempts towards males. If males are significantly touching/touched less, this leads to broader discussions on impacts on mental and physical health, as they are not receiving the necessary positive benefits (Saarinen *et al.* 2021; Dolinski 2013; Derlega *et al.* 2001; 1989). For example, in regards to social cohesion, if males are more uncomfortable with touch, their ability to form and strengthen touch-based bonds may be hindered. Hence, understanding the factors that affect touch may help elaborate to the reasoning behind response difference between sexes, and thus aid in preventing any harmful effects.

Another factor that influences touching behaviours is the environment where the touch takes place. For example, Jourard (1966) observed male and female dyads in coffee shops across the world, recording their touching behaviours. Their results showed a significant difference on the frequency of touch dependent on the country of residence, with some having as much as 180 touches (San Jaun, Puerto Rico) and others having none at all (London, Great Britain). Lomranz and Shapira (1974) focused on a self-report Study in an Israeli high school, where the students themselves recorded their touching behaviours after they happened. Interestingly, males reported engaging in significantly more touching behaviours than females. Compared to research from western-based cultures where male to male touch is significantly less compared to females, their results highlight the power of culture on touching behaviours. In a more recent study by Sorokowska *et al.* (2021), over 14,000 participants completed self-report studies from 45 different countries, comprising of both community members and university students. Each participant was presented four different icons displaying an embrace, caress, kiss, and a hug, with a verbal descriptor associated stating “have you performed this type of touch in the last week?” (translated to each countries’ language: Sorokowska *et al.* 2021, pp 1709). Afterwards the participant had to specify who the behaviour was towards, “your youngest child, your partner, a female friend, a male friend, a male stranger and a female stranger” (Sorokowska *et al.* 2021, pp 1709). From this research multiple conclusions were drawn, including that touch was more prevalent in warmer temperature, less conservative and less religious countries. In relation to temperature, they draw from previous research by Sorokowski *et al.* (2013), which showed a significant positive relationship between emotional expressivity and climates with a higher temperature. As they elaborate, in warmer climates with more pleasant weather, the frequency of social

interactions increases, leading to more tactile intimacy. Also, in colder climates, people often have to wear more clothing, preventing skin-skin contact. In opposition, conservativism hinders emotional expression, and thus a more conservative culture will have a reduction in touching (Sorokowska *et al.* 2021). Religion and conservativism are often intertwined, as religious organisations often have strict structures on what are acceptable behaviours, especially in relation to sexuality. This includes, condemning premarital sex, use of contraception and having sex for pleasure rather than procreation (Sorokowska *et al.* 2021). Therefore, any form of close contact and intimate gestures are more likely to be frowned upon within conservative societies.

Consequently, if culture influences touching behaviours, the gender stereotypes within that culture may explain the observed sex differences in touch. As Major (1981) elaborates, within western culture, the traditional masculine image relates to being aggressive, unemotional, and independent. Meanwhile, women are traditionally seen to be emotionally expressive, passive and dependent. She then leads on to relate the causality of touching recipients often being women due to their gender role of passivity (Major 1984). Previous studies have shown the distinctions between males and females in their emotional expressivity, such as Buck's (1980) research on electrodermal responses to emotional reactions. Their results showed that both sexes had the same electrodermal imaging but male's facial patterns were a lot more subdued, suggesting they were more likely to 'conceal' their emotions (Buck 1980). If touch is known to express emotions through physicality, men may feel more uncomfortable with the behaviour due to traditional gender norms. This theory was developed by Henley (1973), who linked the gender stereotypes of status, in relation to touching behaviours. As she states, in western society men are often more socially powerful than women, and thus are more likely to initiate touch with women than vice versa: this has been coined the *power hypothesis* (Henley 1973). Male to male touch is often less acceptable, as there may be a conflict of dominance and power as neither wish to be the recipient of touch, which can be seen as a more passive role (Major 1984; Henley 1973). As Henley (1973) elaborates, a handshake is often preferred between males because it is a ritualised behaviour of equal status, whereas more intimate behaviours have looser cultural meanings, and thus are limited. However, there have been some fundamental critiques to Henley's (1973) research, mainly centred around the limitations in the data collected, mainly due to social status being derived from approximate visual characters, causing an extreme detriment to the reliability of the study (Goldstein and Jeffords 1981; Major 1984; Scroggs 1979). Despite critiques, Henley's (1973)

power hypothesis, has been one of the most influential theories relating to the differences in touching behaviour and sex.

Homophobia and touch

Derlega *et al.* (2001) built upon Henley's (1973) research, further looking at how social stereotypes of gender affect touching behaviours, including sexuality as an influencing factor. In their experiment, subjects were shown line drawings of different touching behaviours, with variance in the sex of the individuals and the tactile intimacy (Derlega *et al.* 2001). Afterwards, the subject rated how appropriate they believed the touch was, based on a Likert-type scale (Derlega *et al.* 2001). Both heterosexual males and females rated high tactile intimacy in male-to-male pairs as less appropriate than any other dyad (Derlega *et al.* 2001). Interestingly, this correlation was not found in LGBTQ+ individuals (Derlega *et al.* 2001). Therefore, Derlega *et al.* (2001) concluded that heterosexual males, in fear of being seen as homosexual, are more likely to avoid same-sex touching. Similar results have been found in other research, such as Roese *et al.* 's (1992) focus on 'homonegativity', which relates to negative thoughts and feelings towards LGBTQ+ individuals. Males that scored higher on homonegativity were less comfortable with touching behaviours in general, and there was a significant inverse correlation towards attitudes in regards to same-sex tactile intimacy (Roese *et al.* 1992). This observation would be further extrapolated in more homophobic environments; homophobia referring to the discrimination and prejudice towards individuals within the LGBTQ+ community (Dolinski 2013). This is highlighted by Dolinski's (2013) research, on touch compliance within Poland, where as he describes, homophobia is particularly prevalent. In this study, a confederate asked a stranger to complete a request, accompanied with either a touch on the arm or no touch at all (Dolinski 2013). Interestingly, in general touching the arm increased the levels of compliance towards the request, except in male-to-male dyads, where it had a significant negative effect (Dolinski 2013). Dolinski (2013) hypothesised that the underlying communicative function of the touch changed in male dyadic interactions compared to the others, which was particularly affected by the high levels of homophobia within the country. These results imply that a lack of touch in males may be connected to other factors such as homophobia and toxic masculinity (Dolinski 2013; Roese *et al.* 1992). Therefore, further research needs to evaluate how the homophobia within the social setting may impact touching behaviours in males and their beliefs.

Social setting and touch

Not only the broader scale of the cultural environment is important within tactile intimacy, but also the localised setting in which the action took place (Major *et al.* 1990; Heslin and Boss 1980; Henley 1977). In Henley's (1977) self-report sudy, participants described the frequency and intimacy of touch dependent on the setting they were in. Overall, in affiliative settings (e.g. a party), people were much more likely to touch others, and be comfortable with being touched, than public settings like work. This was developed from Henley's (1973) observational study, where gender differences in touching behaviours were only evidenced in outdoor, and not indoor settings. In affiliative settings, people are more likely to have a more intimate bond with one another, and thus are more likely to display tactile intimacy (Major *et al.* 1990). From another perspective, in affiliative settings, social norms tend to be more relaxed, and thus the 'taboo' nature of touch may be alleviated (Major *et al.* 1990). On another note, in some settings, touch may be ritualised, and thus seen as more normalised compared to other environments, such as greeting and leaving someone at an airport (Heslin and Boss 1980). Major *et al.* (1990) aimed to replicate Henley's (1973) original study, testing whether gender differences in touch alter due to certain factors such as age and setting. In public non-intimate settings, the difference between male and female touching behaviours were significantly different, with females touching more than males. Meanwhile, in greeting and leaving settings, there were no gender linked patterns observed. Further, in recreational settings, the reverse was true, where males touched significantly more than females (Major *et al.* 1990). This research highlights that when investigating touch, the setting must be accounted for, as it could dramatically vary the behaviour observed.

Touch in sports

In some settings touch is seen as much more acceptable, due to tactile communication being necessary within that environment. One example of this being the sports environment, where touch is extremely frequent and intimate in both sexes despite broader social context (Kerr *et al.* 2015; Kneidinger *et al.* 2001). Kerr *et al.* (2015) outlined the importance of touch in sports, and interviewed 10 coaches and 10 athletes from a multitude of sports fields to understand why this might be the case. All of the participants concurred that touch is crucial, if not a necessity, within sports for a variety of reasons including; safety; teaching specific movements; regaining focus; sportsmanship; team cohesion; camaraderie; celebrating wins; and expressing victory or consolation (Kerr *et al.* 2015). Some of these functions work synonymously, for example a pre-game huddle may be used to increase cohesion of the team

and to aid in regaining focus prior to a match. The pre-game huddle can also be defined as a 'ritualised behaviour', meaning it has a level of symbolism when it is performed, and thus is frequently used (Kerr *et al.* 2015). It is important to note that the participants were not from the same sport, suggesting the relationship between touch and the sports environment is intertwined on a more universal scale (Kerr *et al.* 2015). Although, there were some clear differences in how appropriate touch was due to certain criteria like uniform: a chest grab on a heavily padded American football player is much less intimate than the same action being performed on a swimmer. Despite this, all coaches still agreed that touch was a necessity within sports, and could not be prevented within any sport (Kerr *et al.* 2015). A similar study was conducted by Miller *et al.* (2007), which conducted interviews of 8 college coaches and athletes. Synonymous with Kerr et al's (2015) results, all interviewees concluded that touch was crucial among sports, emphasising that touch could exchange messages in heightened states of emotion that other somatic senses could not. Therefore, touch in sports was suggested to be the most influential at major events and competitions, where emotion, tension and stress were heightened. The importance of touch has also been shown through observational research, such as Kraus et al's (2010) study on NBA players. For one season, 30 NBA teams were observed, with the duration of the touch, the players involved and the type of touch recorded. In addition, the amount of co-operation was coded by behaviours displaying reliance on other teammates, even at the expense of the own individual's performance. This was measured against the success of the team, to see if touch affected performance. Overall, touch significantly improved performance at the beginning of the season, and team co-operation throughout the season (Kraus *et al.* 2010). They explain the pattern of results through a predictive model, where touch increases co-operation between teammates, which in turn improves performance. Therefore, especially within team-based sports, touch can be crucial in determining the success of a team, due to its influential function on social cohesion.

From an alternative perspective, the importance of touching behaviours in sports may relate to more harmful practices. As Sappington (2021) describes, hazing cultures, especially within team-based sports, often have ritualised invasive touch to initiate new members to the team. Players may also use touch to establish dominance, by forcing younger recruits to demonstrate their subservience (Sappington 2021). As Sappington (2021) describes, it often can be quite brutal, to the point of sexual harassment in some cases. In this regard, it may be that some men are forced to be comfortable with more intimate touch as a result of the hazing

culture within their sports team, than they otherwise would be. The obvious negative mental health effects on sexual harassment cannot be understated, and thus is an important area of research (Sappington 2021). The appropriateness of touch within sports is a prolific issue, as Kerr *et al.* (2015) details, when interviewing both athletes and coaches often they detailed feeling more uncomfortable with touch due to previous allegations and political culture within their field. As one coach details, due to recent policies, a diagram was given to them showing which parts of the body were appropriate for touching behaviours making them feel extremely uncomfortable (Kerr *et al.* 2015). This notion is more influential in some sports, especially those who have to wear more explicit uniforms and have a more controversial history such as swimming or gymnastics (Kerr *et al.* 2015). Expanding research on touching behaviours, especially observational studies, may help protect individuals within sports as a clearer picture can be derived on how, when and why tactile intimacy is displayed.

Unfortunately, outside of the coach-player dynamic, observations of touching behaviours in sports are extremely sparse (Kerr *et al.* 2015; Miller *et al.* 2007). One of the few studies was completed by Kneidinger *et al.* (2001), which consisted of observing softball and baseball varsity teams, both in home and away games. Most observations followed previous theories, such as females demonstrate more frequent tactile intimacy than males. However, in away games males touched each other significantly more and were significantly more intimate than females. Compared to the aforementioned studies which showed male-to-male touch was the most limited type (within western-based cultures), this setting presents a contradictory observation. This contradictory result is more interesting when taking sexuality into account, as sports often has a high prevalence of homophobia, and yet males displayed high tactile intimacy (Out on the fields 2020; Kneidinger *et al.* 2001). *Out on the Fields* (2020) was the first and largest international study into LGBTQ+ individuals within sports, providing insight into their perceptions and experiences within sport. The results were conducted by over 12,000 participants internationally, with "80% of gay, bisexual and straight people have witnessed or experienced homophobic behaviour in sport" and "nearly 90% of LGBTQ+ people in 2019 believe homophobia and transphobia remain current problems in sport" (Out on the Fields 2020). The large and varied demographic of the participants emphasises the prevalence of homophobia regardless of the sport, individual or country. Comparing this to Derlega et al's. (2001) and Dolinski's (2013) research, the expectation would be that tactile intimacy, especially within males would be hindered because of the fear of being seen as gay. Yet as mentioned prior, Kneidinger et al's (2001) results suggest that not only is male-to-male

touch intimate, but sometimes is even more so than seen between females. Seemingly, the sports environment has altered tactile communication compared to other settings, which needs further exploration. Perhaps if this is greater understood, some of the challenges males face today due to limited tactile intimacy can be approached from a new dimension.

Conclusion

In conclusion, the objective of this dissertation is to further evaluate the effect of team-based activities, in particular sports, on tactile intimacy, and explore underlying causational factors. To date, research on touch in sports has focused on sexual abuse towards athletes, particularly within youth sports (Kerr *et al.* 2015; Brackenridge 2001). This has been primarily fuelled by the multitude of allegations recognised in the 1990s, shifting the cultural perspective to provide more protection towards athletes (Kerr *et al.* 2015; Brackenridge 2001). Literature has been driven to create a safer environment within sports, preventing inappropriate and unwanted touch. This is particularly the case for the coach-player dynamic, due to a frequent imbalance of power and status (Kerr *et al.* 2015). Outside of this research area, tactile intimacy within sports is often sparse, and only focuses on interview-based data rather than observational research (Kerr *et al.* 2015; Miller *et al.* 2007; Kneidinger *et al.* 2001). This dissertation aims to supplement this scarcity by focusing research on tactile communication in sports outside of the coach-player dynamic. Understanding how and why touch is crucial within sports will create a clearer distinction of what is appropriate, creating an overall safer environment. This dissertation will utilise a comparative methodology, where sports is compared to another team-based activity to determine if, how and why touch in this environment is unique. For example, if the function of touch is to decreases stress and increases team-cohesion, then this behaviour would be prioritised in all team-based activities and thus be more common than in other environments. This will be broken into two separate methods of data collection, with Chapter 2 being based an observation study and Chapter 3 focusing on survey responses. This two-study approach was favoured to evaluate both how touch is performed and perceived within male team-based activities.

Chapter 2: Study 1, Observations of touching behaviours in team-based activities

Introduction

Building upon previous literature, to further understand touch in team-based activities, Study 1 focuses on observing these behaviours in relation to the motivational factors addressed

within Chapter 1. These include: *stress, status, homophobia* and celebratory behaviours (i.e. winning or losing). An observational method was favoured to provide ecological validity on the variation of tactile intimacy in different environments. The hypotheses below focus upon previous theories on the function of touch, providing an explanation to why we see frequent and intimate touching behaviours within team-based activities:

Hypotheses

Hypothesis 1: High stress environments promote touching behaviours.

One of the functions of touch is to reduce stress and cortisol levels within individuals (Dreisoerner *et al.* 2021; Sumioka *et al.* 2013; Grewen *et al.* 2003; Light *et al.* 2005; Ferrell-Torry and Glick 1993). Therefore, in high stress environments it would be expected to see more frequent touching behaviours, as individuals use the behaviour to reduce tension. Sports is often an environment with a high level of stress due to it being competitive (Kerr *et al.* 2015; Miller *et al.* 2007). In scenarios where there is a competitive goal, there is an increased pressure for the individual to achieve success and prevent failure. As Miller *et al.* (2007) proposed with their study, touch in sports is often most relied upon in times of heightened emotion and tension, such as major competitive events. They detailed this was due to touch often providing comfort to the players, that other somatic senses could not.

Hypothesis 2: If a teammate has high levels of homophobia, it will inhibit their own touching behaviours.

This hypothesis is based of Derlega *et al.* (2001) and Dolinski's (2013) research on tactile intimacy. As they state, individuals with high levels of homophobia are more likely to find touch inappropriate and thus avoid the behaviour. Therefore, within a sports team, the expected result would be that on the whole touch may be more frequent, but individuals with high levels of homophobia will touch less than those with low levels of homophobia.

Hypothesis 3: Being of higher status within a team-based activity will promote the individual's touching behaviours.

Based upon Henley's (1973) *power hypothesis,* those of higher status are more likely to touch those of lower status. In other words, the initiator of the touch is more likely to high status than low status. In sports, status is clearly defined, with dynamics such as coach, captain, and player. Therefore, it may be that the frequency and intimacy of touch is varied depending on

the status of the individual within the team. For example, a captain is more likely to be intimate towards a player, even if they are both same-sex males, because he is of higher status.

Hypothesis 4: The sports environment prompts touching behaviours compared to other team-based activities.

The literature currently shows that touch is a necessity within the sports environment, but there has been no comparison to other settings (Kerr *et al.* 2015; Kneidinger *et al.* 2001). All of the previous hypotheses could relate to numerous environments outside of sports. For example, the military is also high stress, has clear status ranks and prevalence in homophobia (Heward *et al.* 2024; Sinclair 2009). Therefore, this hypothesis focuses on whether it is the sport itself, or the above factors that are more influential in the variation of tactile intimacy. Within sports, there are some touches that are ritualised, such as the pre-game huddle, and handshakes at the end of the match (Kerr *et al.* 2015). In result, touch has become fundamental within sports, with some behaviours created specifically for that environment. As Sorokowska *et al.* 2021 demonstrated, the culture of the environment dramatically alters the level of tactile intimacy. In consequence, it is not just the environment itself, but perhaps the culture of sports that promotes touching behaviours.

Hypothesis 5: Winning in team-based sports provokes increased touching between teammates.

As mentioned by Kneidinger *et al.* (2001) within their research, touch is often used as a form of emotional expressivity, especially in heightened situations. Within sports, there is always a form of winning, whether it is completing a marathon; scoring a goal; or an individual beating their personal best. Obviously, winning creates extreme heightened emotions in the form of celebration. In a team-based sport, if an individual scores a point, the other team mates are likely to go over and congratulate them, as a form of camaraderie. Therefore, touch is used after a win as a way to communicate support and celebration within the team. If the primary focus of sports is related to a subordinate goal of success, anything that will enhance the chance of winning is favoured, including normal prohibitions surrounding touch (Csikszentmihalyi 1990, Garfield & Bennett 1985).

Participants

The participants in this study comprised of individuals from 2 sports teams (n = 21) and 2 theatre groups (n= 11), totalling to 32 males. The sports environment was comprised of two dodgeball teams, one within the University of Kent (n = 10), and the other being a local competitive team in Canterbury (n = 11), with 21 males ranging in age from 18 to 29 years. The theatre environment contained the 'musical theatre' societies from the University of Kent (n = 7) and Canterbury Christ Church University (n = 4). This totalled to 11 males ranging in age from 18 to 23 years. In regards to ethnicity, the majority were white European, so no analysis on this demographic as undertaken due to the heterogenous sample. Within team-based activities, connection between individuals can be more readily identified, compared to public non-intimate settings where relationships are harder to identify (Major 1990; Goldstein and Jeffords 1981). Further, using teams means the purpose of touch is more likely related to platonic social bonding and cohesion, rather than sexual intimacy, which could be more likely when observing the public (Spink 2007; Goldstein and Jeffords 1981). A theatre crew provides a strong comparative group to the sports environment due to their similarities; they are also a team with a pressurised subordinate goal (putting on a great performance vs. winning a competition); they have status roles (lead to understudy vs. captain to player); they have a direct variance of stress (rehearsal night to opening night vs. training to competition); there is a necessity for touch (acting often involves touch vs. contact sports); and both are sometimes under public observation, in the form of an audience (Ferguson 2023; Kneidinger *et al.* 2001). Despite this, these are two distinct settings with theatre fundamentally focusing on artistic expression and sports on physical activity.

Procedure

The observation period was a total of 100 hours, over a period of 8 months; with each group being observed for 22-27 hours. The dodgeball group had a mean duration of 24 hours, and theatre had a mean duration of 26 hours. Prior to observations, each player was verbally told the information regarding Study 1, with the hypotheses redacted (see appendix 1). There was an opt-out consent form available for both groups, and thus data was collected only on those whose consent had been obtained. Once completed, participants were presented with a thorough explanation of the entire study and thanked for their co-operation. A longitudinal study was favoured to prevent any short-term phenomena skewing the data collected (Heslin and Boss 1980). For example, if data-collection was only over the two weeks of Christmas, the celebratory mood of the holidays could cause higher rates of touch compared to normal.

One of the key frustrations with studies surrounding touch is that observation-based research often has a low-rate of data collected (Roese *et al.* 1992; Major 1984; Heslin and Boss 1980; Henley 1973). As Henley (1973) describes, her results displayed the norm of two touches per hour. The alternative would be a controlled laboratory experiment, to incentivise the amount of touch needed within a shorter space of time (Heslin and Boss 1980). However, an observational approach was favoured as it would provide ecological validity to the behaviours observed (Heslin and Boss 1980). The most comparable methodology to this project was Kneidinger et al's (2001), who also observed sports teams using a longitudinal approach. Unfortunately, the authors did not specify the exact length of time, but rather equated the observation period to games observed. In total they observed 20 games, with 11 games being softball and the other 9 being baseball (Kneidinger *et al.* 2001). It is approximated that each softball game is 2 hours, and each baseball game on average is 3 (Gough 2024; NCSA College Recruiting All Rights Reserved 2024). Therefore, the observation period for Kneidinger et al's (2001) study is 49 hours (softball: 22 hours, baseball: 27 hours). In my study, the methods were designed to dramatically lengthen the observation period to yield more accurate and reliable results.

Experimental Stimuli and Manipulations

Animal Behaviour Pro

To record touch, the application '*Animal Behaviour Pro'* (Newton-Fisher 2021) was used on an iPhone provided by the University of Kent. This app was originally created for primate grooming studies, with the aim to directly digitalise what would previously have been hand-written records (Newton-Fisher 2021). There are a multitude of benefits from using this application. For example, data protection is more reliable with password protection; and the simplicity of pressing buttons over writing observations is faster and more reliable. The setting used on the app was focal behaviour, which noted a touch between an actor and recipient to a specific time stamp (i.e. instantaneous point samples within a defined group observation window) (Newton-Fisher 2021). Other studies, such as Heslin and Boss (1980), used a focal participant strategy, meaning they observed how one or two participants interacted with others for the specified duration. This approach is not applicable to group settings, as often multiple touches are happening at once with multiple individuals. I wished to record all occurrences of touches made by members, and thus the 'focal behaviour' setting was favoured. This is because it allowed for multiple participants and their behaviours to be

recorded in each discrete observation period. Therefore, this provided a more well-rounded approach to how the entire group is interacting at any given time, and player/performers relationships with one another. In addition, the app allows for the specification of 'modifiers', which are numerical codes that can be attached to each touching behaviour recorded (see ethogram in the next section).

Sampling of touch was undertaken during competitive matches, performance nights, training and recreational time; all occurrence (group) sampling of touch behaviours was conducted during multiple 10-minute observation windows. I was stationed near other audience and/or team members to be less noticeable and to prevent disruption. Being less aware of my presence allows for more relaxed participants, and thus, more natural behaviours (Kneidinger *et al.* 2001). Only deliberate touch was recorded, where this was not part of the performance or game (e.g., a hug from two actors delivering a scene, or two players bumping hands as they pass the ball to one another). For the sports teams, who were based in a larger court space, I split the room in half because I could not watch the whole space. Prior to each 10-minute sampling interval, I would choose one half to focus on, using a random number generator, and observed touching behaviour within that section. The participants within the sports environment were easily discernible by the numbers on their sports vests. However, the theatre group constantly swapped costumes, and thus wearing a number was not possible. Instead, a 3-letter code was assigned to them, detailing certain physical features such as hair texture. This code was then changed into an ID number for analysis.

Ethogram

To date, there is no universal coding system for touching behaviours, creating a lack of consistency, and thus replicability, within the literature (Kneidinger *et al.* 2001). Within Kneidinger and colleagues' study (2001), they address this major hindrance, creating an ethogram (see appendix 2) to be used as a standardized classification systems across other studies. To check reliability, they used Cramer's *V* over three measures, with all being statistically significant; supporting that using this ethogram will produce reliable results (Cramer 1946: Kneidinger *et al.* 2001). Based on the similarities between this project's methodology and Kneidinger *et al.* (2001), the ethogram was replicated and utilised within *'Animal Behaviour Pro'.* However, certain alterations were made to tailor to the requirements of this study. For example, "glove tap" and "double glove" were both removed, as gloves

were not worn by any of the observation groups. Further, the "group touch" category was also removed, as this could not be collected by the 'focal behaviour setting' (Newton-Fisher 2021). Further, the "Pound-Hug" behaviour was added, as this is the behaviour focused upon within Study 2 (Chapter 3). This 'pound hug' shown in the video is associated as a common affectionate behaviour in numerous types of relationships and environments, such as familial greeting, platonic support and romantic affection (Floyd 2000). Therefore, the touch itself would be less likely seen as taboo compared to a "butt pat", due to the commonality of the action (Floyd 2000). Plus, having a gesture that can be applied universally allows for greater interpretation. Therefore, this was determined to be an applicable addition to the ethogram. Finally, the 'other to other' category was added, to include hugging. The finalised ethogram can be shown in Table 1 below:

Table 1

Ethogram of touching behaviours, as first derived in Pleavin (2022)

Category	Behaviour	Definition
Hand-Hand	High five	A participant raises one of their hands vertically and slaps it against another participant's raised hand.
	High ten	Same action as the high-five, but both hands are used.
	Low five	One participant lowers their hand to waist height or below with their palm facing upwards. Then another participant slaps the lowered hand.
	Low ten	Same action as the low-five, but both hands are used.
	Hand slap	The action is similar to a high-five, but the hands are kept at a horizontal angle.
	Double slap	The participants perform the hand-slap action, then reverse the direction to slap the back of their hands together.

	Circle Slap	Both participants perform a high five above their heads and continue the arm motion in a vertical circle to a low-five.
	Hand shake	A participant uses one hand to grasp another participant's opposite hand at a horizontal angle. Then both joined hands perform up-and-down motions.
	Hand clasp	Similar to a hand shake, but no up-and-down motion occurs.
Hand-Other	Butt slap	A participant's hand slaps the rear end of another participant.
	Back pat	A participant raises their hand to another participants back and taps firmly them with their palm, often repeatedly.
	Back slap	Similar movement to the back pat, but the palm is slapped on the back instead, and often not repeated.
	Arm grasp	A participant grabs the arm of another participant.
	Pound Hug	The movement starts with a hand clasp, then one participant pulls the other one into a hug using the clasped hand.
	Head tap	A participant uses their palm to pat the top of another participant's head.
	Head rub	A participant uses their palm to rub the top of another participant's head.
	Head shake	A participant uses their palm to grab the top of another participant's head, then uses their hand to shake the head.
	Chest grab	A participant uses their hand to grasp the front of another participant's shirt at chest height.

	Chest slap	A participant uses their hand to slap another participant's chest.
	Leg tap	A participant uses their palm to tap another participant's leg.
Other-Other	Half hug	A participant uses one of their arms to wrap around another participant, with both facing one another.
	Full hug	A participant uses both of their arms to wrap around another participant, with both facing one another.
	Back hug	A participant, facing another participant's back, uses both of their arms to wrap around the other, with both facing the same direction.
	Chest press	A participant jumps upwards and bangs their chest against another participant's chest.
	Forearm bump	A participant raises their forearm and bumps it against another participant's forearm.
	Leg bump	A participant bumps their leg against another participant's leg.
	Side bump	A participant bumps the side of their body against the side of another participant's body.
	Side lean	A participant leans the side of their body against the side of another participant's body.
	Side embrace	A participant leans the side of their body against the side of another participant's body and wraps either one or both arms around them.

Measurement of independant variables

Five independent variables were calculated to develop greater insight into touching behaviours and provide more detailed responses to the hypotheses.

Intimacy

Within touching dyads, the intimacy of the touch can signify fundamental behaviours just as much as the frequency (Major *et al.* 1990). As an example, a business meeting might have a higher frequency of touches but a lower intimacy level, as it is the social norm to shake someone's hand, but not to give them a full hug (Major *et al.* 1990). Having an *intimacy* variable within this project was crucial. Both Heslin and Boss (1980) and Derlega *et al.* (1989) used Likert-scale responses to create an *intimacy* variable within their research. Derlega et al's (1989) ethogram was not synonymous enough for an accurate replication within this project, and thus Heslin and Boss' (1980) was favoured. This was furthered by Heslin and Boss' (1980) scale being used by a multitude of other studies, providing cohesive data across the literature (Derlega *et al.* 1989). They created the scale by having 25 participants rate the 11 observed touches on how intimate they believe the touch to be, from 0 (not at all intimate) to 10 (very intimate) (Heslin and Boss 1980). Afterwards, the mean ratings for each touching behaviour were accumulated, and they were separated into a 5 Likert-scale as shown below:

- ***0*** *No touch*
- ***1*** *(a) Handshake or (b) touch on head, arm, or back*
- ***2*** *(a) Light hug, (b) arm around waist or back, (c) holding hands, (d) kiss on cheek, or two from* ***1***
- ***3*** *(a) solid hug, (b) kiss on mouth, or (c) three from* ***1*** *and/or* ***2***
- ***4*** *(a) Extended embrace, (b) both kiss on mouth and solid hug, or (c) either kiss on mouth or solid hug and two from* ***1*** *and* ***2***
- ***5*** *(a) Extended kiss, (b) extended embrace plus kiss on mouth, (c) extended embrace plus solid hug plus any other, or (d) four or more of any categories above* ***2***

(Heslin and Boss 1980, p. 249-250)

Creating a scale prevents researcher bias because a population sample was used, promoting reliability. However, Heslin and Boss' (1980) touching behaviours included kissing, which is not applicable to this study. As this study collected specifically and only instantaneous point samples, information on duration was not recorded. Therefore, these touches were omitted, creating the scale below:

1- *Hand to Hand touch*
2- *Hand to Arm touch*

3- *Hand to more intimate body part (chest, back and butt)*
4- *Light Hug* (e.g., Side embrace, half hug), *or less intimate body components touching* (e.g., leg bump)
5- *Full hug* (e.g., Back hug, full hug, side embrace)

For data analysis, the mean *intimacy* value for each participant was calculated based on how many touches they performed at each intimacy level.

Stress

Observations took place in a multitude of settings, which were grouped into two categories: *low stress* and *high stress.* In dodgeball these were distinct; low stress being when the team was practicing, and high stress when the team was competing. In comparison, the theatre group did not compete, and the stress category was determined by proximity of the rehearsal to opening night. Both theatre groups gave me access to their timetable, which was colour coded by importance in relation to opening night. From this, high stress and low stress settings were derived, with high stress being 'high importance events' and low stress being 'low importance events'. For analysis, each observation of touching was assigned to one of these two categories to identify in which context it occurred. Individual stress was not calculated, as this would be too subjective towards each participant; the focus of this variable was the external stress the entirety of the team was under, rather than the internal stress of the individual.

State

Hypothesis 5 related to touching behaviours being more frequent after a team won. To test this hypothesis, within *Animal Behaviour Pro* (Newton-Fisher 2021) the modifiers "win", "neutral" and "loss" were added. I added the modifier to the touching behaviour dependent on the circumstance observed. This was easily decipherable through the referee stating when a point had been won and by who: if the group being observed scored this was counted as a win, while if the opposing team scored this was counted as a loss. All other touching behaviours were recorded as neutral. When the groups were training, whichever side I had chosen for the 10-minute increment was the scoring team. The theatre groups did not have a discernible win/loss distinction, as there was no opposing team. Therefore, these modifiers were not added within the theatre groups' observations.

Questionnaire

After the observation period, each participant was asked to complete a short questionnaire, prior to being aware of the project's intentions. They were made aware that the survey was voluntary, and could opt out if desired. Questions related to the independent variable's *homophobia* (the participant's attitudes towards homophobia) and *status* (the perceived status of the individual); the origins of both described below. These questions were chosen because, as detailed in Chapter 1, both homophobia and status are factors that can influence touching behaviours (Derlega et al 2001; Major 1984). To greater understand their effect, especially within team-based activities, comparative analysis could be performed between observed touches by the participants and their recorded levels of status and homophobia. Questions regarding homophobia can often be perceived as socially uncomfortable (Logie et al 2007), and thus it was listed as "optional" within the survey, allowing for the participant to just complete the *status*-based questions. Also, the questions surrounding *homophobia* did not require a participant's detailed opinion and were more generalised to societal statements. In regards to *status,* the measurements chosen were based on basic-demographic question, to further maintain non-invasive questions. To correlate these answers to the observation-study the participants outlined their shirt number at the beginning of the questionnaire (as seen in appendix 3); for the theatre groups, a random number was generated for each of the three letter codes assigned. The short-survey was made on Qualtrics online, so the participants could answer the questions discretely on their phone rather than a paper copy, allowing for greater data protection. After the project was completed, survey responses were then destroyed.

Status

Henley's (1973) paper catalysed research towards the relationship between status and touch, yet it has been heavily critiqued due to the ambiguity of her measurements (Goldstein and Jeffords 1981; Major 1984; Scroggs 1979). Within her study, the status variable was determined by visually approximated age, sex, and socioeconomic status (Henley 1973). As Goldstein and Jeffords (1981) describe, status cannot be inferred independently of social context, as older age may traditionally suggest higher status, but in a nursing home this may not be the case. Instead, a status-based scale should consider a multitude of aspects considering the social context when collecting data (Goldstein and Jeffords 1981). Further, a more quantifiable method should be preferred, as visual approximation is often heavily influenced by human error (Goldstein and Jeffords 1981). Therefore, the status scale of this

project was derived from Jacob and Carron (1998), who focused on evaluating which factors best represented status in sports athletes. Also, Jacob and Carron's (1998) study analysed athletes in both India and Canada, preventing the restrictions of cultural bias. This scale included seventeen status attributes, later abbreviated to fourteen; however, my scale will only use five: *age, role* (what role did they have in the group)*, experience* (how long had they been within sports/theatre)*, consistency* (how frequently did they attend sessions)*,* and *education* (what current stage of education were they in). Other attributes would not have been permissible within the ethical confines of this study (e.g., "parents' income") or were irrelevant to the study (e.g., urbanity). Each attribute was included as a 5-staged Likert Scale, where the higher score connotated someone of higher status, for example:

How long have you been playing dodgeball?

- *+3 years' experience*
- *+2 years' experience*
- *+1-year experience*
- *A couple of months of experience*
- *A couple of weeks experience*

Some questions had to be altered to relate to both environments, but the nature of the questions did not change. For example, the above question would state "how long have you been performing in theatre?" instead. To see the full survey for both activities, please see appendix 3. The mean value was then calculated across the items for each participant.

Attitudes towards homophobia

The final dependant measure within the questionnaire was the ATH (attitudes towards homophobia) scale, derived from the LGBTAS ("LGBT Assessment Scale") scale in the paper by Logie and colleagues (2007, pp 208). Being cited as recently as 2022 (Williams *et al.* 2022), this paper is more current, and thus more relevant, compared to previous scales like the renowned Greene and Herek's (1994) 'Attitudes Toward Lesbians and Gay-Men Scale (ATLG). Though Greene and Herek's (1994) work was extremely influential and psychometrically sound, it was a 20-item scale, preventing it's use in other studies because of its length. Further, it omitted bisexual and transgender populations, limiting its demographic validity (Logie *et al.* 2007). To rectify these critiques, Logie and colleagues (2007) created the LGBTAS scale. Even with reducing the survey size considerably, and adding in new more inclusive language, the LGBTAS scale maintained a high level of reliability as

determined by Cronback's alpha (Logie *et al.* 2007). Despite these strengths, certain alterations were made so it was applicable to the current project, with 5 of the original questions used. The whole scale was not considered because the community aspect of the questionnaire was removed as this primarily related to social care workers, the focus of Logie and colleagues' (2007) study. Another change to the scale was the removal of the transgender-related questions. As this project is heavily based on Derlega's (2001) research, which focused only on sexuality, questions relating to gender were withdrawn.

For the LGBTAS scale, the participants were shown a series of statements, and were asked to rate them from 1 = strongly disagree to 5 = strongly agree. These related to societal perceptions regarding the LGBTQ+ population. Due to ethical concerns, participants were not asked to describe their personal opinions. An example statement is shown below:

If a person has homosexual feelings, they should do everything to overcome those feelings

For a full list of the statements, see appendix 3. The mean rating of the Likert-scale responses was taken for each participant, with a higher score connotating higher levels of homophobia. Compared to Logie and colleagues (2007) study, the ratings relating to two of the statements were flipped, so a higher score indicated a higher level of homophobia.

Data analysis and results

A total of 206 touching behaviours (dodgeball n = 183, theatre n = 23), were observed during this study. The theatre groups were observed 52 hours total, with 24 hours taking place in high stress situations and 28 hours collected in low stress situations. In comparison, the dodgeball groups were observed for 48 hours total, with 28 hours taking place in high stress situations and 20 hours collected in low stress situations. Due to this difference, four hours of low stress from theatre were removed using a random number generator. This meant both groups then had the same total of 48 hours observed, preventing a bias from more hours collected. Due to logistical constraints, the high and low stress hours did not align, but taking 4 hours from low stress theatre meant each setting only had 4 hours differently comparatively. This was the most parsimonious way of making the data comparative while maintaining as many observation hours as possible. Some of the participants did not consent to completing the questionnaire, so the number of respondents was reduced to 22.

Analytical strategy

Overall, there was a variety of statistical tests used, including Kruskal-Wallis, general linear modelling and T-tests. This allowed for each hypothesis to be appropriately addressed. All data transformation and analysis were conducted in R studio, using a multitude of packages including; tidyverse, readxl, dplyr, car, ggplot2, and RColorBrewer. The alpha value and for all analyses were set to 0.05, being the most commonly used value (Thiese *et al.* 2016). Data analysis will be structured by each hypothesis, to detail specific variable alterations for each one.

Hypothesis 1

The first hypothesis predicted that environments of higher stress would promote touching behaviours. To test this hypothesis, the data was subdivided into four groups, "High stress theatre, low stress theatre, high stress dodgeball, and low stress dodgeball". To make sure the data was standardised across all four groups, 4 hours were removed at random from the low stress condition. This prevented any artificial inflation on the high stress condition due to duration. A Kruskal-Wallis test showed that the frequency of touches did not differ between the four groups ($X^2_2 = 14.8$, $p=0.68$). Therefore, Hypothesis 1 was not supported.

Hypothesis 2

Hypothesis two predicted that higher levels of homophobia reduce the frequency of touching behaviours by an individual. Unfortunately, not all of the participants fully completed the homophobia questionnaire at the end of the observation period, reducing the number to 22 (6 theatre, 15 dodgeball). For analysis, the mean was taken from the *ATH* survey, to create an overall average of their opinion. See Table 3 below to see the mean the distribution of *homophobia* from the two groups. For this hypothesis, a general linear model was used. The response variable was the mean value of homophobia, while the predictor variables were *touches* (the overall frequency of touches)*, actor* (the number of touches when the participant was the actor) *and intimacy* (the mean intimacy value). The *receiver* (number of touches when they were the receiver) was removed due to multicollinearity with the other variables in the regression. This was assessed through the VIF values produced. The results of the regression are displayed in Table 2 below:

Table 2: Regression results of *touches, actor* and *intimacy*

Variable name	Coefficient β	P value
Touches	-0.01	0.73
Actor	0.003	0.93
Intimacy	-0.95	0.36

R^2 = - 0.1

This suggests that there is no significant relationship between homophobia and touching behaviours, and the levels of homophobia do not describe any variance within the data.

Hypothesis 3

Hypothesis three predicted that touching behaviours will increase if the individual is of higher status. Similar to the *homophobia* variable, the mean status score was created for each individual by averaging their response to the 5- Likert-scale questions. See Table 3 below to see the mean the distribution of *homophobia* across the two groups.

Table 3: Participant's Mean Scores of *Status* and *Homophobia*

Club	Status	Homophobia
Dodgeball	3	1
Dodgeball	3.6	1.3
Dodgeball	3	1
Dodgeball	2	2.2
Dodgeball	3	1
Dodgeball	3	NA
Dodgeball	2	1
Dodgeball	2	2.3
Dodgeball	3.2	1.7
Dodgeball	4.5	1
Dodgeball	3.2	1
Dodgeball	3.4	1.3
Dodgeball	2	1
Dodgeball	3.2	1
Dodgeball	2.8	1.7

Two general linear models were developed, with one relating to the frequency of the touches (*touches),* and the other relating to the intimacy of the touches *(touches)*. The first model contained the response variable *Touches,* to the predictor variables *club* (what team-based activity were they in) *status* and *homophobia*. This analysis contained participants from both dodgeball and theatre, to determine if the relationship was across team-based activities in general. With the variable *homophobia* 40% of the variation was described in the model, while this was reduced to 21% without. Therefore, to improve the model overall, the variable was included.

Table 4: Regression results of *status, club* and *homophobia* in relation to *touches*

Variable name	Coefficient β	p
Status	-5.38	0.23
Club	-16.20	0.01
Homophobia	-6.46	0.27

$R^2 = 0.25$

This shows no significant relationship between the number of touches and level of status within team-based activities, and the levels of status do not describe any variance within the data either.

A similar regression was made with the response variable being *intimacy,* and the predictor variables being *club, status and homophobia.*

Table 5: Regression results of *status, club* and *homophobia* in relation to *intimacy*

Variable name	Coefficient β	P value
Status	-0.16	0.46
Club	0.05	0.85
Homophobia	-0.32	0.26

$R^2 = - 0.8$

This shows no significant relationship between the intimacy of the touch and level of status within team-based activities, and the levels of status do not describe any variance within the data either.

For both, the only variable that predicted a significant relationship was *club,* however this was only in relation to the frequency of touches. This suggests that the type of team-based

activity affects the number of touching behaviours observed, but not how intimate they are. This leads on to Hypothesis 4.

Hypothesis 4

Hypothesis 4 focused on the differences of touching behaviours within the sports environment compared to other team-based activities. It predicted that the sports environment would have a higher frequency of touching behaviours compared to theatre. Dodgeball had significantly more touching behaviours (Mean 18.3, SD = 12.8) than theatre (Mean 4, SD =2.68; $t20 = 5.35$, $p < 0.001$). This is shown in Figure 4 below. A separate analysis for the *intimacy* of touches was also explored, which found no significant difference between dodgeball (Mean = 2.06, SD = 0.44) and theatre (Mean 2.14, SD = 0.57; $t12 = -1.1$, $p = 0.31$).

Hypothesis 5

The final hypothesis for Study 1 related to winning and losing; specifically, that winning in a sports team provokes touching between the team mates. The theatre group was omitted from this analysis, due to the lack of clear parameters on "winning" and "loosing". In the dodgeball group, there was a total of 153 of touches recorded, with 49 being winning, 19 being losing and 85 neutral. This was an additional hypothesis added later to the study, and thus the observation period had already begun when the win/loss modifiers were added. Therefore, less touching behaviours were recorded with this additional modifier. Despite logarithmic transformations, the data remained non-parametric so the Wilcox signed test was used. There was no significant difference in touching behaviours in the sports team when they were winning (Mean = 5, SD = 6) to when they were losing (Mean 2, SD = 2; $W=194$, $p = 0.5$).

Chapter 3: Study 2, Perceptions of touching behaviours in team-based activities

Introduction

Within this dissertation, both the performance of touching behaviours and their associated perceptions were key aspects to focus upon. This provides a more well-rounded evaluation to how touch alters within different team-based activities. Furthermore, previous literature highlights, the perceptions of tactile communication from onlookers can be entirely different

to the intention of the actor (Jablonski 2021; Heslin and Boss 1984; Stier and Hall 1984). That is to say, due to the varied and complex nature of touch, both internal and external perceptions can be entirely different, and sometimes contrasting. As Suvilehto and colleagues (2023) outline, factors such as a history of trauma, attachment styles, mental health and personal preferences can have dramatic effects on how an individual perceives touching behaviours. This raises questions on how touch in team-based activities is perceived, and if those perceptions contrast those behaviours observed. This distinction provides secondary insight into the underlying social norms that outline touching behaviours, particularly within the two settings detailed in Study 1 (sports and theatre).

For this reason, the primary aim of Study 2 is to further understand perceptions relating to touching behaviours within team-based activities. This was achieved through an online survey, which asked participants questions based upon the environments and motivational factors presented within Study 1. Participants observed a touching behaviour detailed to be in either dodgeball or theatre and in either high stress or low stress situations. In addition, the same *ATH* (attitudes towards homophobia) questionnaire was asked, to determine whether the participant's level of homophobia affected their perceptions. Consequently, how *status*, *setting* and *homophobia* affect both the performance and perceptions of touching behaviours could be better understood, providing a more concrete explanation to the variation of touch within team-based settings. One reason why a survey was favoured, compared to interviews, is that it allows for more anonymity, which improves the chances of individual's answering honestly. Furthermore, an online survey was chosen as it allows the questionnaire to reach a larger demographic of people, broadening its inference capabilities. Both studies' data collection was during the same time frame, and thus none of the participants in Study 1 could complete Study 2. This is because the details of Study 2 would provide insight into the overall hypotheses of the project, which could have affected the participants observed behaviours. Therefore, Study 2 consisted of a random sample outside of the participants from Study 1.

Hypotheses

As this is a development from Study 1, the hypotheses are similar, but have switched the focus to be on the perceptions of the behaviour, rather than the behaviour itself.

Hypothesis 1: Individuals will view touching-dyads more favourably when the behaviour observed is within a high stress environment.

Hypothesis 2: An individual with high levels of homophobia will view touching behaviours between the same sex as more taboo, and look upon individuals within the dyad less favourably.

Hypothesis 3: An individual is more likely to be perceived as higher status if they are the actor within a touching dyad.

Hypothesis 4: Individuals will view touching-dyads more favourably when the behaviour observed is within a sports environment.

As mentioned in Chapter 1, touch within sports is often a necessity, being used to teach movements, keep individuals safe, show sportsmanship and promote team cohesion (Kerr *et al.* 2015; Kneidinger *et al.* 2001). This is shown through the frequency of touch-based ritualised behaviours observed in sports, both supportive (a team hand pile before a match) and harmful (inappropriate touch from team hazing). Consequently, the importance of touch is widely recognised especially by members within the sports community (Kerr *et al.* 2015; Miller *et al.* 2007). Therefore, compared to other environments, touch is more normalised within sports, and thus is more likely to be seen as acceptable.

Participants

In total 88 adults completed the online survey, ranging in age from 18 to 73 years (M=34, SD=14). As the survey was anonymous, there were no prior-requirements of the participants. However, anyone under the age of 18 was excluded, due to the necessity for parental permission. For further analysis of the basic demographic of participants, see Table 6 and 7.

Table 6- Gender of participants for Study 2

	"Is your gender identity the same as your sex at birth?"		
	Yes	No	Prefer not to say
Man	19	2	0
Man, non-binary	0	1	0
Non-binary	0	3	0
Questioning	0	1	0
Woman	61	0	0
Prefer not to say	0	0	1

Table 7- Location of participants for Study 2

Europe	Asia	North America	Other
77	2	5	4

One of the key critiques of the literature surrounding touch is its extreme bias towards the western and in particular, the North American population (Suvilehto *et al.* 2023; Derlega 2001; Major 1984; Heslin and Boss 1980). Furthermore, as Derlega *et al.* (1989) highlights, most research has focused on heterosexual individuals, displaying a lack of recognition towards the LGBTQ+ population. As shown in the results of their paper, a homosexual man is more likely to find male-to-male touch acceptable, and surprisingly less likely to find the act sexual compared to heterosexual males (Derlega *et al.* 1989). Study 2 aimed to address these critiques by making the survey accessible to global online platforms, and the basic demographic questions to be more inclusive while still keeping the participant's anonymity. For example, both the sexuality and nationality questions had a "prefer to self-describe" category, allowing the freedom of self-expression (Hughes *et al.* 2021). Also, the question asking about sexuality allowed the participant to check multiple boxes, acknowledging that individuals may ascribe to more than one gender. However, the majority of respondents were heterosexual (69%) and white British (68%) preventing any comparative data analysis between demographics. Please look at Table 8 and 9 below for a more in-depth description of the ethnicity and sexuality of the participants.

Table 8- Ethnicity of participants for Study 2

Self-described ethnicity	Frequency of respondents
British white	40
White	17
British	3
Asian-Indian	2
English	2
Irish	2
Pakistani	2
White European	2
White Irish	2
Asian-Chinese	1

British Caucasian	1
British-Bangladeshi	1
Caucasian	1
English-Irish	1
Euro-American	1
Mediterranean white	1
Mixed	1
Mixed Caribbean (white/black)	1
Mixed Hispanic (white/black)	1
South East Asian	1
Sri-Lankan Canadian	1
Turkish	1
White African	1
White Caucasian	1
White Scottish	1

Table 9- Sexuality of participants for Study 2

Sexuality	Frequency of respondents
Heterosexual/Straight	61
Bisexual/Bi	13
Asexual	4
Gay Women/Lesbian	2
Asexual, Bisexual/Bi,Queer	1
Asexual, Bisexual/Bi,Questioning or unsure	1
Asexual, Gay Man	1
Bisexual/Bi,Queer	1
Heterosexual/Straight, Questioning or unsure	1
Pansexual	1
Queer	1
Questioning or unsure	1

Procedure

A link to the survey was published onto online platforms such as Reddit, Instagram and the University of Kent's graduate school bulletin. This was chosen over an in-person paper format because it reduced financial constraints (e.g. costs of paper printing) and it increased the sample's size and diversity. The survey was created on Qualtrics, which is one of the most commonly used software platforms for data collections to date (Qualtrics 2024). Situated with the link to the survey was a brief description, excluding the specified hypotheses of the study (appendix 4). When clicking on the link, the participant is greeted with more detailed information of the study and a consent form, that still excluded the research hypotheses (appendix 5). Once all consent boxes were checked, the participant was initially asked to fill in basic demographic information. Afterwards, they were presented with a 17 second video of two male actors performing a touching behaviour, and an associated written description (please see appendix 6 for a link to the full video). Afterwards, the participants completed a questionnaire relating to the video which was divided into three sections. The first was 15 semantic scale questions that asked the participants to rate both males in terms of personality traits (such as likeable, powerful etc). The second was 7 Likert-style questions that asked the participants to rate the relationship between the two males, and the dynamics between them. Finally, the third section of the survey was the same *ATH* scale that was used in Study 1. The participant was able to go back and rewatch the video as many times as desired. Once completed, they were presented with a thorough explanation of the entire study, and thanked for their co-operation.

Experimental Stimuli and Manipulations

Draft Questionnaire

Prior to the official questionnaire being released, a small number of volunteers completed a draft questionnaire to check for readability and technical performance. From their responses, alterations were made to the published questionnaire. For example, some participants did not finish, commenting on the extreme duration. To reduce the length, questions surrounding manipulation checks were removed, because they had been completed in Scroggs (1979) research and the pilot study. Other alterations were made from Scrogg's (1979) replicated study, such as additional measures were added to the Likert-scale changing them from 5 options to 7. This was decided from the trial version of the survey, as participants found there wasn't enough options encapsulating their belief. In relation to the video, the participants

found it difficult to visualise high stress and low stress examples in association with the clip, therefore a description detailing the reason for the stress level was added.

Touching behaviour: Actor vs. Recipient

Previous studies, like Derlega *et al.* (2001), have used pictures or drawings for touching behaviours, however this limits the dynamic nature of touch. A picture cannot clearly determine how firm the grasp was, how long it lasted, and how the recipient responded (Derlega *et al.* 2001). As shown in Heslin and Boss' (1980) intimacy survey, individuals rated the same touching behaviour as more intimate if one had a longer duration over the other. Further, as Major (1981) describes, touch is bi-directional, and both the actions of actor and recipient are significant, with non-reciprocated touch being seen as less intimate. Therefore, a video clip was favoured as it could specify these details, while still aiming to limit confounding factors where possible.

The clip detailed two males, both of white ethnicity in their late-20s, performing a 'pound hug' in casual clothes with a non-descript background. The video is short with high resolution and has no sound distractions, making it clear to watch and understand. Licensing was paid by the University of Kent, as the video was provided by Shutterstock, a large online photography business (Shutterstock 2024). Using a non- descript background prevented any distractions from the focus of the video. Furthermore, as the focus of the project is on the effect of different social environments, a non-descript background was preferred so the written description could manipulate the condition. As Scroggs (1979) highlights, facial expressions can influence respondents' perceptions to touch, with warm expressions making the gesture more intimate. Therefore, to prevent this confounding factor, the faces of the two male subjects (video actors) were cropped out, so just the touch between the two could be seen. This also meant that the actors in the clip would remain anonymous. However, due to visual stereotypes and the associated written description stating they were males, their sex could still be clearly identified. The justification for choosing two males who were similar in appearance was based on Jacob and Carron's (1998) research on status. They argued that the appearance of an individual, in line with the social context, would have an effect on their perceived status (Jacob and Carron's 1998). This was not the focus on the project, and thus two males who had no visible status differences were chosen. Yet, the two males wore clearly distinct outfits so they were easily discernible from one another. The gesture itself starts with an outstretched hand from the initiator, which is then grasped by the recipient. This meant the participants were less likely to become confused with the roles of the actor and recipient

when answering questions pertaining to them. The 'Actor' was the male in the video in the grey shirt (i.e. Subject A), and the 'Recipient' was the male in the checkered shirt (i.e. Subject B). This is shown through Figure 1 below, which is a screengrab of the video. For the full video, please use this link: https://www.shutterstock.com/video/clip-25391453-pan-mid-section-good-friends-casually-pound-hugging

Figure 1- Screengrab of video used in questionnaire

Stress and Environment

There were five different scenarios included, with four of them related to the different environments; low stress dodgeball, high stress dodgeball, low stress theatre and high stress theatre. The other was a control group with limited detail in the written description, other than outlining which man was Actor and Receiver. This was to maximise the number of measures used, while still maintaining a high enough sample size for each subgroup of data. Each participant only saw one example, which was randomised upon clicking the link, for a between-subjects analysis of variance. As an example, the high stress sports written description was as follows:

> "The two individuals in the video will be referred to as Subject A (grey shirt) and Subject B (checkered shirt), who are both members of an international football team. Currently, both teammates are in a high stress environment, as they are about to play the last match of the season that will determine their overall ranking, and thus

whether they win or not. Participant A responds to this scenario by initiating a hug with Participant B (as shown in the video above), before leaving to get ready."

The descriptions used were based upon the observed low/high stress environments from Study 1. Therefore, the example used is justified through real-world evidence, rather than my own beliefs, and so results from both studies would be more comparable. However, this meant the visual media did not directly align with what was being described in the video, from the non-descript background and the clothes they are wearing. To counter-act this affect the text "before leaving to get ready" was added to justify the previous discrepancies. Even though the example is clearly sports related, the written description directly stated the environment to prevent misinterpretation. This reasoning was also used when describing the touching behaviour.

The final design of the experiment included four groups, including two levels of the environment factor (sports and theatre) and two levels of stress (high and low). This was combined with the two touch factors: Actor and recipient.

Measurement of dependant variables

The measurements used within this paper are predominantly replicated from Scroggs (1979) paper. They evaluated the effects on perceptions surrounding touch in regard to the variance of status and gender, which was the primary focus of Study 2 (Scroggs 1979). However, certain alterations were made such as the length of the survey. To reduce the length questions surrounding manipulation checks were removed, because they had been completed in Scroggs (1979) research and the pilot Study. Also, the *ATH* questionnaire was added, as this related to the research question posed within this project. Another theoretical different was *gender* not being a factor within this project's analysis, as the focus was on male-to-male touch specifically.

Semantic differential scales

The semantic differential scales focused on participant's perceptions of both Actor and Receiver independently. How someone can be viewed was based of Mehrabian's (1971) research, who created three dimensions of perception that align with non-verbal behaviours. The first dimension is immediacy and proximity, as individuals are more likely to move towards things they like, and be repelled by things they dislike. The second is dominance (power to powerless, high status to low status). The third relates to the individual's ability to

react and change in response to their environment (attentive to non-attentive, competent to incompetent). From these dimensions, 15 semantic scales were created, with one word at each end to represent the extreme of that theme. The list of words was:

1. Unintelligent/Intelligent
2. Submissive/Dominant
3. Shy/Sociable
4. Blunt/Polite
5. Cold/Warm
6. Insincere/Sincere
7. Incompetent/Competent
8. Conforming/Independent
9. Inattentive/Attentive
10. Weak/Strong
11. Unlikeable/Likeable
12. Forceful/Gentle
13. Neglectful/Nurturant
14. Unattractive/Attractive
15. Feminine/Masculine

Between the words there was a slider, and the participant was asked to put the slider as close to whichever pole that they believed best described the Actor and the Receiver. The scale was between 1-100, to allow as much as variance as possible within data collection. However, only the slider itself was displayed to prevent confusion between the difference of consecutive digits (Scroggs 1979).

Likert scales

The purpose of the Likert-Scales was to assess the participant's perceptions towards the relationship between the Actor and Receiver, mainly in relation to power and affection. In total there was four 5-point scales and three 7-point scales. These can be categorised into the following themes; the intimacy of the relationship; the length of the relationship; how much they liked one another; who had more control and who had more interest in the relationship (see appendix to see these items). As Major (1981) highlights, touch is a dynamic movement

with a bi-directional nature. Therefore, not only is the viewpoint of each subject important, but how they correspond to one another. This creates a good supplementary to the semantic scale, to see how the two correlates to one another. These scales were replicated from Scroggs (1979) scales, because of the similarity in research questions. However, to allow more data variation within participant responses, the range of the scale was lengthened to 1-100.

Attitudes towards homophobia scale

To be synonymous with Study 1, the same ATH scale was used (page number 42).

Data analyses and results

Factor Analyses

The hypotheses in Study 2 focus on favourability of perceptions surrounding tactile intimacy. These independent variables on their own just focus on a variety of individual characteristics and the relationship between the two men. A series of factor analyses was performed on the results drawn from the 15 semantic differential scales and the 7 Likert-scales. This was to determine the underlying dimensions relating to the participant's responses, both to their opinion on each subject (the Actor and Receiver) and the relationship between them (Scroggs 1979). To achieve this, three separate analyses was made; one being the raw scores for the Actor, another the scores for the Receiver, and finally the ratings of their relationship. Maximum likelihood factor analyses were preferred compared to principal axis for every analysis, as the cumulative variance was higher, and the BIC value smaller. Also, all resultant factors were varimax rotated and computed for each subject for use in multivariate analyses of variance. Only the positive words for each scale are used to describe each loading, for clearer understanding in writing and data analysis. This is because the positive words relate to more favourable attributes, such as 'Warm' compared to 'Cold'. An individual rating each subject higher on the semantic scale would describe them more favourably, as they are connotating them with more positive attributes. Consequently, a loading with a negative value describes that the factor correlates to the antonym instead. Arguably, feminine/masculine does not incur the same rating, which was why factor analysis was favoured instead of just analysis against the raw semantic scales. It allowed for overall themes of favourability to be drawn from the semantic scales, such as 'friendliness', preventing one scale driving the results. All data transformation and analysis were conducted in R studio.

Ratings of the Actor

The analysis of ratings of the Actor resulted in three eigenvalues greater than 1.0. This measurement was preferred over a scree plot, as this method of accuracy was quantifiable compared to visual approximation. The first factor seemed to reflect "responsiveness", with high loadings in the following scales: *intelligent* (.81), *competent* (.83), *attentive,* (.49), *powerful* (.73), *nurturant* (.6), *attractive* (.78), *masculine* (.52), and *independent* (.63). It had an eigen value of 5.62, and a cumulative variance of 0.48. The term "responsiveness" was based of Scrogg's (1979) factor, as the scales and their loadings were almost equivalent. The second factor related to "friendliness", with loadings in the following scales: *dominant* (-.68), *warm* (.93), *sincere* (.55), *likeable* (.61), and *sociable* (.6). It had an eigen value of 2.45, and a cumulative variance of 0.62. The third factor seemed to relate to "respect", with the two scales *polite* (.51) and *gentle* (.51). It had an eigen value of 1.51, and a cumulative variance of 0.71. For multivariate analysis, loadings from both the Actor and Receiver were combined so comparative analysis could be performed, which will be described below. Therefore, the third factor included additional scales, and thus the name was later changed to "dominance".

Ratings of the Receiver

The analysis of ratings of the Receiver resulted in three eigenvalues greater than 1.0. The first factor seemed to reflect "responsiveness", with high loadings in the following scales: *intelligent* (.77), *sincere* (.65), *competent* (.87), *attentive,* (.58), *gentle* (.49), *nurturant* (.55), *attractive* (.64), *masculine* (.58). It had an eigen value of 6.53, and a cumulative variance of 0.22. The second factor related to "friendliness", with loadings in the following scales: *polite* (.68), *warm* (.69), *likeable* (.61). It had an eigen value of 2.29, and a cumulative variance of 0.51. The third factor seemed to relate to "power", with the three scales *dominant* (.72), *sociable* (.67), *independent* (.51) and *powerful* (.56). It had an eigen value of 1.31, and a cumulative variance of 0.39.

Combining factors

For the multivariate analysis, the ratings of the Actor and Receiver were combined, as shown in Table 10 below. This was possible due to the same number of factors for both Actor and Receiver, and the similarity of the distribution of scales. To make sure the data was represented as accurately as possible, each scale is related to a factor where the at least one subject showed it as the highest loading (Scroggs 1979).

Table 10- Factor loadings of Actor and Receiver

		Loadings	
Factor name	Scale name	Actor	Receiver
Responsiveness	Intelligent	0.81	0.77
	Competent	0.83	0.87
	Attractive	0.78	0.64
	Nurturant	0.6	0.55
	Attentive	0.49	0.58
	Masculine	0.58	0.52
Friendliness	Warm	0.93	0.69
	Likeable	0.61	0.7
	Sociable *b*	0.6	0.38
	Sincere *b*	0.55	0.39
	Polite	0.07?	0.68
Dominance	Powerful *a*	-0.44	0.56
	Dominant *a*	-0.68	0.72
	Gentle *b*	0.65	-0.43
	Independent *a*	0.22	0.51

a) *This factor loaded higher on another factor for Actor*
b) *This factor loaded higher on another factor for Receiver*

Ratings of relationships

The analysis of ratings of the relationship between the Actor and Receiver resulted in three eigenvalues greater than 1.0. The first factor accounted for number of the variance, seemed to reflect "Friendship", with high loadings in the scales: *relationship* (.76)*, duration* (.54)*, A likes B* (.93)*, and B likes A* (.83). This had an eigen value of 2.79, with a cumulative variance of 0.35. The second factor accounted for number of the variance, and resembled "Control" with high loadings on *Influence* (0.56) *and Status* (0.99). This had an eigen value of 1.57, with a cumulative variance of 0.54. The only scale variable with a high loading in this factor was *interest* (0.53)*,* referring to the how interested each subject was in maintaining the relationship. This had an eigen value of 1.04, with a cumulative variance of 0.62.

Table 11- Factor loadings of the relationship between Actor and Receiver

Factor Name	Scale Name	Loadings
Friendship	Relationship	0.76
	Duration	0.54
	A likes B	0.93
	B likes A	0.83
Control	Influence	0.56
	Status	0.99
Interest	Interest	0.53

Data analysis and results

The factor scores were then used for analyses, to determine if participants responded differently to the Actor and Recipient in relation to the five scenarios presented. Also, participants completed the ATH questionnaire at the end, to determine if levels of their own homophobia influenced responses. Normality tests were performed showing the factors were unevenly distributed, even with the removal of outliers and logging the data, therefore non-parametric statistical tests were favoured.

Hypothesis 1 and Hypothesis 4

The five *scenarios,* same as Study 1, were "low stress sport, high stress sport, low stress theatre, high stress theatre". This was converted into the factor *environment,* which contained each of these five scenarios. Both of these were detailed in the written description, and thus the data was based off the same approach. Hypothesis 1 states that participants will view touching-dyads more favourably when observing the behaviour within a high stress environment. While Hypothesis 4 focuses on individuals will view touching-dyads more favourably when observing the behaviour within a sports-based environment. Due to the nature of the scenarios, both of these hypotheses were analysed using the same statistical test, which was a Kruskal-Wallis between *environment* and the factors scores. This is allowed for the different group settings could be compared for statistical differences, as well as the level of stress. The Actor, Receiver and the relationship scores were all analysed separately from one another. All tests were not significant, showing that participants ratings of the factored

characteristics did not change between the five different environments. Please see Table 12 below for a summary of the results.

Table 12: Results of factor loadings from the Kruskal-Wallis test

Factor	Kruskal-Wallis Chi-Squared	Degrees of Freedom	P value
Actor: Responsiveness	7.24	4	0.12
Receiver: Responsiveness	2.84	4	0.58
Actor: Friendliness	6.78	4	0.15
Receiver: Friendliness	4.11	4	0.39
Actor: Dominance	3.09	4	0.54
Receiver: Dominance	2.51	4	0.64
Friendship	7.61	4	0.11
Control	3.89	4	0.42
Interest	8.89	4	0.06

Hypothesis 2

Hypothesis 2 states that an individual with high levels of homophobia will view touching behaviours between the same sex as more unnatural, and look upon individuals within the dyad less favourably. The *homophobia* variable was transformed into a categorical variable by scaling the means as shown below:

- Very Low: 1-1.9
- Low: 2-2.9
- Medium: 3-3.9
- High: 4-4.9

- Very High: 5

This was then used for a Kruskal-Wallis test, between the factored characteristics and *homophobia.* The Actor, Receiver and the relationship scores were all analysed separately from one another. Out of the 9 factor scores analyses, 1 showed significance, with *dominance of the receiver* being significantly different between the *levels of homophobia* from the participants (Kruskal-Wallis $X^3_3 = 10.51$, $p = 0.01$). For post-hoc analyses, the Dunn's test was used, showing differences between low levels of *homophobia* and medium levels of *homophobia* (p=0.002), the low to very low levels (p = 0.05) and medium to very low (p = 0.02). Please see Table 13 for the mean scores of rating *dominance of receiver* dependent on the participants *levels of homophobia*.

Table 13- Dunn's test of levels of homophobia towards dominance of the receiver

Level of Homophobia	Mean	SD
Very Low	61.5	14.6
Low	70.3	13.5
Medium	47.5	6.33
High	65.8	NA

Hypothesis 3

Hypothesis 3 states that Actor will be perceived as higher status compared to the recipient. The differences between the factor scores of the Actor and the Receiver were tested using the Wilcoxon signed rank test. Participants scored the Actor as significantly less dominant (mean = 57.26, SD = 13.68) than the Receiver (mean = 62.9, SD = 14.72; V = 2926.5, p 0.005). None of the other factor scores were significant.

Conclusion

Both studies explored tactile communication varies within team-based activities, outlining how different scenarios alter the function, motivational factors and perceptions or touch. Study 1's primary aim was to detail how and why touching behaviours were performed differently dependent on the team-based activity they were in, highlighting motivational factors such as stress, status and homophobia. To support this research, Study 2's primary aim was to focus on how perceptions of touching behaviours change dependent on the previously outlined motivational factors: setting, stress, homophobia and status. The results from both

studies will now be combined for Chapter 4 to provide further insight into touching behaviours within team-based activities.

Chapter 4: The Discussion

Introduction

Chapter 4, the final chapter of this dissertation, will summarise the key findings from both studies collaboratively and build this knowledge into current research. This will include key themes such *setting, stress, homophobia* and *status*; a reflection of the influential factors recognised in Chapter 1. Further, strengths and limitations from both studies will be addressed and guided into future research directions.

Differences in team-based activities

In Study 1, touching behaviours were significantly different in dodgeball compared to theatre; with dodgeball having more frequent touch. However, in Study 2, participants did not rate the subject's differently between the two activities. One perspective is the dodgeball environment affects the frequency and intimacy of the touch itself, rather than attitudes towards the behaviour. Meanwhile, in theatre, there is less opportunity for touch, and thus touch is not observed as frequently. In Study 1, the dodgeball teams would wait on the sidelines together if they were eliminated, and cheer on the remaining players. This meant they were physically together for an extended period of time, creating the perfect opportunity for touching behaviours. Meanwhile, in Study 2, when performing, actors need to rush to get ready, often having mere minutes to change into a new costume or run for a new stage direction, leaving little time to touch (Ferguson 2023). Furthermore, due to the presence of an audience, actors must remain quiet back stage, to prevent disruption (Essin 2021). This may hinder engagement with one another during rehearsals and performances, limiting the amount of touching behaviour observed. Also, actors in a company are often more split up than players within a dodgeball team, as often scenes only contain a few actors at a time (Essin 2021). Within many plays, certain actors will not have any scenes together, and hence may not have the same rehearsal times or backstage placement (Essin 2021). In conclusion, touch may be perceived in other team-based activities, but the dodgeball setting allowed for more opportunities of touching behaviours, and thus more frequent touching behaviours were observed.

Another aspect to consider is the difference in the intentionality of touch between dodgeball and theatre. As Ferguson (2023) describes, for actors to convey a multitude of information to the audience per scene, they must rely on visual, auditory, and physical demonstration. Touch can be used to enhance key emotional tones, such as a gentle caress denotes lovers, while an aggressive slap shows resentment. Either themselves, set pieces, props, or other actors, touch is used by performers to communicate non-linguistic meaning to the audience, and further enhance their craft (Fergurson 2023). The importance of touch in theatre is not just limited to the performance, with costume fittings, prop changes and set changes relying on touch backstage too (Ferguson 2023). As Kapadocha (2023) observes, touch in theatre is necessity in training actors, for them to understand the how to manipulate their physicality when performing. This may explain the results presented in Study 2: as touch is a necessity, and thus normalised, in both settings, there is no significant difference in how the touch would be perceived. Though, in Study 1 there was significantly fewer touching behaviours in the theatre groups compared to the dodgeball groups. The reason for this difference could lie in the intention and function of the touching behaviours between the different settings. Within theatre, often touch is used as an instrument by the actor as part of a performance, and represents a role they play rather than the intention being derived from themselves personally. That is to say, when they are hugging another actor on stage, their intention is to replicate the script of the play, rather than wanting the hug themselves. Meanwhile in dodgeball, if a player hugs another player, often their intention is to celebrate with their teammate. It could be suggested that touch within theatre is often falsified, and relational to the performance, and thus does not carry the same underlying functions to the sport-based setting (Ferguson 2023).

Stress and touching behaviours

In both studies, the participant's frequency, intimacy and perceptions of touch were not influenced by the activity being in a low or high stress setting. Within Chapter 1, the analgesic effects of touch are discussed, showing how prior and post-stressor, touch reduces physiological effects within the body. These symptoms include a reduction of heart rate, blood pressure, lower cortisol levels and reporting less feelings of anxiety (Dreisoerner *et al.* 2021; Sumioka *et al.* 2013; Light *et al.* 2005; Grewen *et al.* 2003; Ferrell-Torry and Glick 1993). This leads to question why touch was not shown more frequently in higher stressed environments within the results of both studies. One explanation may be that touch has longer lasting physiological effects on the body, and thus, perhaps there is less pressure for the behaviour to be immediately after the stressor. One study by Eaton and colleagues (1986),

had staff working with the elderly use touch to encourage eating; not only did it significantly increase the number of calories and proteins ingested; but the positive effect lasted five days afterwards. hormonal responses from patients after touch lasted for 5 days afterwards. This is because the endocrine system has a longer activation (and thus duration) compared to the reflex parasympathetic activation of the nervous system, which is short lived and immediate (Ulrich-Lai and Herman 2014). Therefore, as the physiological effects are longer lasting and slower acting, the response to a stressful stimulus, in this case touch, is less immediate.

Another explanation may be provided by Eckstein and colleagues (2020), who detail that the whole context of the scenario, including expectations and beliefs of the individual, must be considered when determining the effects of touch. As they elaborate, if the person is known to the individual, the stress response is significantly more impacted by touch than if the person is not known. Moreover, in some cases, stress response and arousal can actually increase if the person receiving the touch determines the initiator as threatening or potentially dangerous (Eckstein *et al.* 2020). Harris and colleagues (2019) advance this notion, stating that individuals with previous trauma or in a heightened state of anxiety often prefer no physical contact due to the risk of re-traumatisation. This provides one explanation to the lack of difference in Study 2, as the respondents had no knowledge of the relationship between the two subjects within the video. For some respondents, if they saw the subjects as acquaintances, they may not have found the touching behaviour as analgesic compared to if they knew the individuals to be friends. In relation to Study 1, due to ethical considerations there was no data collected in regards to the relationship between individuals, and thus no conclusions can be drawn. This will be further explored within the limitations section of this chapter. On another note, exercise itself has an analgesic effect on the body, through the improvement of dopamine neural pathways and overall enhancement of mental health (Basso and Suzuki 2017). Both team-based activities within this project were extremely physically strenuous, with the implicit nature of dodgeball and the dancing routines within musical theatre. Thereby, it may be that the analgesic effects of exercise prevent the need for tactile-based stress relief.

From another perspective, it may be that other factors in team-based activities, such as social-cohesion, are more influential to touch than stress. In team-based activities, co-operation is crucial for success as no individual can win on their own, regardless of their talent. Büttner and colleagues (2014) evaluated how touch affects success within sport, specifically focusing

on basketball free-throws. Within basketball, a free throw is when unopposed attempts can be made at the basket to score points. Free throws, similar to penalties in football, can be the deciding points in a game, and thus creates a highly stressful environment for athletes. Their results showed that touching a teammate after they missed the first throw significantly improved the chance of success on the second throw. Furthermore, touch did not predict winning in singular games, but increased touch within a team significantly improved the team's performance over the season. As Büttner and colleagues (2014) explain, touch utilised as a form of social support between players may improve confidence and also lessen the effect of stress. Therefore, compliance and reciprocity may be a more important function of touch in team-based settings instead of its analgesic effects. Both Kerr *et al.* (2015) and Miller *et al.* (2007) develop on this notion through their research on ritualised touching behaviours within sports. Often teams use ritualised behaviours to display camaraderie and sportsmanship between players, such as a pre-game hand-pile or post-game handshake with the opposing players. These behaviours may offset the physiological effects of stress, despite it not being the observed primary purpose.

As noted in Chapter 1, the variability of touch can make it hard to discern between the underlying functions and observed behaviours (Major 1984; Heslin and Boss 1980). As Büttner and colleagues (2014) observed in their paper, touch aided with co-operation which then positively affected performance, but the touch itself did not directly affect performance. Consequently, even if the level of stress influences touch, the strength of the relationship may not be noticeable due to the complexity of other confounding factors; explaining the lack of a significant relationship in both studies. This notion also relates to Hypothesis 5 in Study 1, which focused on the differences in touching behaviours dependent on the team winning or losing. It was expected that when the team won, there would be a higher frequency and intimacy of touching behaviours in accordance to heightened emotional expressions within celebrations (Kneidinger *et al.* 2001). However, Hypothesis 5 was not supported. As Büttner and colleagues (2014) emphasise within their study, maintaining social cohesion despite team performance of a singular game improves performance overall. Consequently, team cohesion is more of an influential factor to touch than winning or losing. Furthermore, there may be stronger emotional expressions during a winning celebration, but a consolatory touch after failure prevents fractures and insecurity within the team dynamic (Kerr *et al.* 2015). That is to say, touch provides different necessary functions dependent on the context of the environment, but the level of necessity does not change between the two. This would explain

why touch did not change in the observation groups, despite the levels of stress and performance.

Homophobia and touch

In Study 1, how homophobic the participants were caused no significant effect on their touching behaviours, both in relation to frequency and intimacy. Meanwhile, for Study 2, dependent on how homophobic the respondent was significantly altered how dominant they viewed the receiver. However, there was no directionality in the results, with medium levels of homophobia scoring the receiver the least dominant (mean = 47.5) and low levels of homophobia scoring the receiver as the most dominant (mean = 70.3). All other levels of homophobia scored within that range respectively, with very low scoring 61.5 and high scoring 65.8. These results suggest that other factors may have caused the difference in the result, rather than the levels of homophobia, due to the lack of directionality. For this reason, combining the results from both studies suggests that overall, the levels of homophobia from an individual do not significantly affect either perceptions or performance of touching behaviours. This is an unexpected and interesting result as previous literature has shown a strong correlation between homophobia and touch avoidance responses, in both observational studies (Dolinski 2013) and experimental studies (Derlega *et al.* 1989). One reason may relate to participants with more extreme levels of homophobia decided to opt out of the ATH (*attitudes towards homophobia*) scale, biasing the data within a small sample. As described in Chapter 2, only 22 of the original 32 participants completed the homophobia questionnaire. No reason had to be given for their choice, as the question was described as optional due to ethical considerations. This means that some of the participants may have other rationales for not completing the ATH scale, such as time constraints, misunderstanding the questions or triggering personal life history. Moreover, all of the participants in Study 2 completed the ATH scale, and Hypothesis 2 remained unsupported. Hence, the results from both studies will be discussed within the broader literature.

One explanation for the results observed in both studies may be that in some social contexts where homophobia is exceptionally prevalent, the fear of being homosexual is removed because no-one would be openly gay. In other words, there is no fear to be seen as a homosexual because there is no possibility that you could be. This has been shown through observational studies where male to male touch is heightened despite the extreme prevalence of homophobia. For example, in a study by Lomranz and Shapira (1974), they observed that

in an Israeli high school, male-to-male touch was much more frequent and intimate than female-based touch. As shown in a survey conducted in Israel by Inbari and Bumin (2024), a predominant number of the population follow traditional or orthodox Judaism, with over 50% of respondents confirming they pray often and believe Judaism is the only true religion. Often within this religion, homosexuality is strongly prohibited due to religious law, though this is not the case for some practitioners who are becoming more accepting (Vulakh *et al.* 2023). Hence, in some social circles within the country, cultural norm would strongly reject any notion of homosexuality. This research suggests that in areas with extremely prevalent levels of homophobia, the uncertainty of male-to-male touch becomes reduced, as no behaviours would be determined to be homosexual. Unfortunately, the sports environment has been known to contain high levels of sexism and homophobia outside of the traditional norms expected within the broader culture (Sappington 2021; Out on the Fields 2020; Messner 1990). Literature within sociology (Messner 1990), and sports psychology (Sappington 2021) have prioritised explaining this phenomenon focusing on the western-based gender roles within sports. Messner (1990) details that the origins of organised sport were a response to male's traditional patriarchal power being threatened by the 'feminisation' of western society through political movement. Initially, sport was a predominantly male-dominated cultural sphere, providing separation from women and strengthening homosocial bonding. Also, the competitive nature of the sport contains undertones of dominance and power, refuting against the more politically inclusive world (Messner 1990). As Forbes and colleagues (2006) describe, certain sports such as American football are "training grounds for sexism, misogyny, violence and homophobia" (page 449). Sappington (2021) focused on how the ideal of masculinity within sports may influence sexually violent attitudes of male athletes. One of his participants, a heterosexual athlete (coined Jay for confidentiality), self-reports that outside of sports, masculinity to him does not coincide with the traditional gender norms. However, when playing, Jay feels pressured from teammates to adhere to this radicalised version of manhood.

This details that athletes, and the larger social context they are in, have reduced levels of homophobia, but are coerced within this specific setting. This is demonstrated through Forbes and colleagues (2006) research, which showed that males who participated in high school sports were significantly more likely to use aggression and sexual coercion towards dating partners than those who did not. Although, this correlation was not found in 'non-aggressive' sports such as tennis, badminton and golf. In regards to 'aggressive sports (contextualised as

contact sports such as American football, ice hockey and rugby,) similar studies detail athletes within these sports are more likely to exhibit heightened sexism and rape myth acceptance (Sappington 2021; Forbes *et al.* 2006). From these findings, it seems that in some sports, particularly team-based aggressive ones, high levels of homophobia are common despite the broader cultural environment. It may be one of the reasons why these projects results were not significant, as both studies focused on the participants personal beliefs on homophobia, rather the status quo of the setting. If the participants were asked to share their results to other team-mates, they might have marked higher than when completed privately. Consequently, males may perform touch frequently because of the extreme beliefs of masculinity, power and homophobia within that setting. Meanwhile, for Study 2, as the participants were not in the sports setting themselves, they perceived no significant difference between the two team-based settings.

Status and touch

Within Study 1, status had no effect on tactile communication of the participants, such as whether they were the actor or receiver; frequency of touches; and intimacy of touches. In contrast, for Study 2 participants rated the actor as significantly less dominant than the receiver in all scenarios. These results imply that status had little to no impact on the performance of touching behaviours, but it does significantly affect the perceptions of those observing. This is an interesting premise, as it suggests that the beliefs relating to touch are not always synonymous with the behaviour themselves. As shown in a multitude of studies, certain factors about the individual can have major effects on how they perceive behaviours, in this case relating to touch (Suvilehto *et al.* 2023; Sorokowska 2021; 2017; Derlega 2001; Major 1984). Chapter 1 highlighted how the sexuality, cultural background and sex of the individual can have dramatic effects on beliefs surrounding tactile intimacy (Hertenstein *et al.* 2006; Derlega 2001; Major 1984; Heslin and Boss 1980). Suvilehto *et al.* (2023) expands on this further, stating traits such as neurological conditions, attachment styles and personal history will cause variability in an individual's touching behaviour and correlated perceptions. For example, individuals on the autistic spectrum may display more touch avoidance behaviours and describe tactile intimacy as less acceptable despite other factors (Suvilehto *et al.* 2023). This is supported by Bowling and colleagues (2024) research, who found an individual's attachment styles and how extraverted they were had significant effects on their perceptions towards tactile communication. Consequently, the variation shown between the two studies may relate to differences in the participants between Study 1 and

Study 2. This notion is supported with Sorokowska and colleague's (2021) analysis of individual predictors on touching behaviours, including; age, sex, conservatism, and interpersonal distance preferences. Throughout these demographics there was a consistent negative correlation between touching behaviours and age. As Sorokowska *et al.* (2021) elaborates, younger people are often at the beginning of relationships, whether platonic or romantic, and thereby spend more time using tactile intimacy to reaffirm bonds. Furthermore, their results associate the older population with more conservative ideals, which often relate to prohibiting frequent and intimate touch. In relation to this project, there was a distinction in the age of participants, with Study 1 having a range of 18 to 29, compared to Study 2 with a range of 18 to 73. One explanation to the different results between each study may relate to the age variation, as the older participants within Study 2 may have more conservative beliefs on tactile intimacy and status. Additionally, the majority of the participants in Study 1 were university students compared to Study 2 with a more varied demographic. University is often known as a time for socialising, with most students leaving home for the first time and wanting to create an independent life with peers (Buote *et al.* 2007). Therefore, it may be in university-based settings touch is more frequent and intimate, due to the increased desire to form relationships.

Kraus *et al.* (2010) research on basketball teams provides an alternative explanation through the lens of touch, team-cooperation and performance. As they describe, team co-operation would relate to the reliance on one another, even if it meant to the expense of an individual's own performance. If a player prioritises themselves, such as not passing the ball or taking shots even when heavily defended, this could cause disadvantages to the group as a whole (Kraus *et al.* 2010). Consequently, displaying different touching behaviours dependent on the status of individuals may segregate the group's cohesion, and thus decrease performance overall. This effect would be stronger when playing within the team, and thus explains the variation in the results between both studies. This idea is supplemented by Major et al's (1990) research, which observed the effects of status on touching behaviours in different settings. Their results describe status differences were observed in public non-intimate settings but not in affiliative settings. It is important to note that for all groups in Study 1, every participant played within the team and there were no 'coach' positions. Another term used in musical theatre would be 'director'. The coach/director is responsible for training, discipline and management of the team as a whole, and thus is often seen as higher status compared to the rest of the team (de Albuquerque *et al.* 2021). Also, they most likely do not

play in the game/perform on the stage themselves, compared to other high-status players like the team captain/lead role (de Albuquerque *et al.* 2021). Therefore, if the coach was included, results relating to status differences in touch might be altered, as the necessity for team-cohesion is reduced. Perhaps some respondents within Study 2 prescribed one of the subjects as being the coach/director, as their roles are not specified within the written description, and thus assumed status differences in touching behaviours.

On a broader, interdisciplinary note, the results in Study 2 are more comparative to research in non-human primates. As Kuburu and Newton-Fisher (2013) outline, within non-human primate species, especially those with despotic hierarchies, often lower status individuals groom higher status individuals rather than the reverse; to trade the benefits of grooming for tolerance and lowered aggression. From this stand-point, seeing the initiator of the touch as less dominant aligns with perceptions of trading the benefits of touch for commodities provided by those of higher status. That is to say, touch may be used within humans to non-verbally communicate dominant relationships as shown within non-human primate research. The touch displayed within the video was a 'pound-hug' which is traditionally used to greet individuals (Floyd 2000). Within these greeting interactions, a lower status individual may initiate the behaviour to acknowledge and reassure the higher status individual of the difference in power. Similar to non-human primates, the functional benefits of touch are immediately received by the higher status individual upon the greeting, and thus are exchanged for status-derived benefits, such as respect or tolerance. Goldstein and Jeffords (1981) observational study of legislators' touching behaviours support this notion. Their results detail that lower status individuals were significantly more likely to be the initiator of touch compared to those of higher status. As Goldstein and Jeffords (1981) describe, junior legislators would use a 'greeting touch', such as a handshake, to make connections towards those in more prominent positions with the aim of furthering their own career. The effects of status on touching behaviours within humans may be greater understood through the lens of non-human primate studies, and should be considered within future research.

Strengths and limitations

This next section will focus on the strengths and limitations of both Studies 1 and 2, providing context to the justifications made within each methodology.

Size of participants

Within Study 1, the number of participants were limited, especially within the theatre setting. This could have affected the significance of the results, as a small sample size will reduce the chances of statistical power. This was primarily due to logistical constraints, as I relied on the groups to respond with confirmation, and have availability within their schedule. In regards to theatre, the larger companies did not feel comfortable with an observer, due to copyright issues of a person repeatedly watching the performance without paying. Further, the backstage is known for being small and hectic, and thus having an unnecessary person would be a hinderance (Essin 2021). Instead of a large number of participants, Study 1 focused upon having a longer duration, collecting 100 hours of observational research in total. In comparison, other observational studies of touch such as Kneidinger and colleagues (2001) sports study consisted of 49 hours, less than half of the data collected in comparison. A longitudinal study is extremely beneficial when analysing touching behaviours because it prevents short term phenomena from biasing the results, increasing its ecological validity. Touch is notoriously difficult to observe, with some settings providing little to no touch at all (Major *et al.* 1990; Henley 1973).

Furthermore, using *Animal Behaviour Pro* (Newton-Fisher 2021) presents a new multi-disciplinary approach when observing touching behaviours, that greater aligns with research in non-human primates. This broadens research on tactile intimacy in humans towards comparisons with other species, deepening our understanding of its evolutionary basis. In addition, one of reasons for creating Study 2 was to have more participants, offsetting some of the limitations from Study 1. With the study being online, it was less constrained by logistical concerns and thus more accessible to a wider audience. In total, Studies 1 and 2 combined had 129 participants, strengthening data analysis when evaluating collaboratively. Therefore, by certain circumstances the data is limited, but as a whole it provides a broad approach.

Diversity of participants

Unfortunately, most research on touching behaviours has been predominantly western-based, especially within North America (Derlega 2001; Stier and Hall 1984; Major 1984). I live in the UK, and was financially restricted, making me unable to collect any observational data abroad for Study 1. Though Study 2 was distributed globally online, the majority of

participants were white British. The most likely cause was the study being published in English, restricting foreign speakers. Also, for Study 2, the sexuality of the participants was asked, but there were not enough LGBTQ+ respondents to perform reliable data analysis. As shown by Major *et al.* (1990) and Sorokowska *et al.* (2021), the culture and environment of a place significantly effect the tactile intimacy displayed. Therefore, if the literature is predominantly western-based, it may be demonstrating biased results due to an under-representation of other cultures. Regardless that the UK is based in the west, it still has considerable differences to North America, and thus has broadened the locality of research to date (Morris 1977). For example, as Morris (1977) describes, "patting someone on the butt" was observed to be more commonplace in North America compared to other cultures, and thus this behaviour was more socially acceptable. In addition, the two group settings of dodgeball and theatre have little to no representation within the literature currently, meaning this project provides new insight into these activities. Dodgeball is more niche compared to sports observed in other papers, such as softball, baseball and basketball (Kerr *et al.* 2015; Kneidinger *et al.* 2001). In a more mainstream sport, there is more money, a larger audience, and greater publicity (Greenhalgh *et al.* 2011). These functions may strengthen the need for social cohesion within the team, as the stakes are heightened from a larger, more competitive, and more lucrative industry. Therefore, the selective pressure for tactile intimacy may be stronger in specific sports settings, particularly more popular sports. Observing dodgeball provides further insight into sports culture as a whole, as a more niche setting compared to popular sports. Moreover, there has been little to no comparative studies of sports to other environments (Kneidinger *et al.* 2001). Comparative studies are beneficial to determine which factors, such as setting, are affecting the touching behaviours. Further, observational studies of touch within theatre are scarce, as the focus primarily has been on the use of touch when performing (Ferguson 2023; Kapadocha 2023). Consequently, this project may not focus on a different cultural environment, but it does provide a developed insight into new and unique settings.

Relationships between individuals

Within Study 1, limited knowledge about the participants relationships and sexuality were known. This was primarily due to ethical considerations, as it would hinder confidentiality. As Major and Helsin (1982) elaborate in their research, the prior perceptions and relationship amongst individuals have significant effects on their tactile intimacy. For example, if two

individuals recently had a conflict, they may display more tactile intimacy than normal for reconciliation (Major and Heslin 1982). In regards to the participants in Study 1, if some had been playing/rehearsing for years together and were closer friends, they are more likely to have close and frequent tactile intimacy regardless of other factors. Taking this into account, it may be that social relationships between individuals was a confounding factor on the results of the study. However, previous research suggests that closeness and relatedness are influential but do not always supersede other factors (Derlega *et al.* 1989; Major 1984; Stier and Hall 1984). For example, a study by Derlega *et al.* (1989) had friends role-play greetings between one another. Interestingly, male to male greetings were the least intimate and tactile of the dyads, regardless of the closeness or duration of the friendship. Out of the four groups, three were university societies. Most university courses are based over three years, and thus have a high turnover of members within societies (University of Kent 2024). In regards to the group outside of university, due to a change of leadership, they also had experienced a high level of turnover. This reduces the likelihood of some members having vastly stronger social connections compared to others, as most would have known one another for a shorter duration. Also, the data was collected over a period of 10 months, which means any short-term changes to tactile intimacy due to relationship conflicts would be less likely to skew the results. As the two groups were observed in relation to one setting, either dodgeball or theatre, if a specific group was displaying different tactile intimacy due to a confounding factor, it would be more apparent within data analysis.

Another aspect to consider regarding the participant's relationships, is how connected they are to the team-based activity. As aforementioned, university societies have a high level of turnover, limiting the duration of how long they can participate (University of Kent 2024). Consequently, there could be great variation in how participants regarded the team-based activity; with some wishing to pursue professionally, while others considering it a hobby. This was heightened in Study 1, as the participants were not randomly allocated to each group, allowing for personal differences to be a confounding factor. Furthermore, there may be certain personality traits, who prefer certain societies creating overall group differences. For example, dodgeball can be quite painful, due to the ball being thrown at the players. Certain personalities who are more competitive, do not mind pain, and possibly more aggressive might favour this sort of activity. In comparison, theatre is not known to have a painful element, and thus these traits are less favoured. It may be that the individuals themselves who choose these activities are more of the driving factors than the team-based

activities themselves. As Sappington (2021) described in their study on "locker room culture", the sports environment has been known to force beliefs and behaviours onto individuals through hazing-based rituals. As he describes, the social pressure of fitting into the team often causes players to perform more intimate behaviours than they normally would feel comfortable with (Sappington 2021). This would suggest that certain environments, especially those with strong themes of social cohesion, may overrule an individual's personal beliefs on tactile intimacy. In both theatre and dodgeball, the participants were working towards a subordinate goal, either to put on a good performance or win competitions. Expanding further, even if a participant regarded the activity as more of a past-time, it is likely that the pressure of team-cohesion to achieve these goals would overrule. For future research, an interesting study would be to replicate this study, but have the participants play in both dodgeball and theatre, to see determine the importance of individual differences on tactile intimacy.

Future research

Derived from the above discussion, this next section will focus on directing new areas of research. This will be discerned from an overview of previous literature combined with the results from this dissertation.

Audience

In Kneidinger and colleagues (2001) observational study, one of the key points within the discussion focused on the importance of an audience on tactile intimacy within sports. Within their observations, they discovered that males touched more frequently at away games and females touched more in home games. When playing at home, there is often a larger audience filled with members known to the players. Hence, Kneidinger and colleagues (2001) conclude that in the home condition, the pressure of a known audience forces players to fufill gendered stereotypes, touching more or touch less accordingly. Meanwhile, in an away game, there is more anonymity from the audience, and thus players may feel less social pressure to heighten these gender norms (Kneidinger *et al.* 2001). These findings present the importance of both locality and the presence of an audience on touching behaviours. This was supported by research on masculinity within sports, which describe the socialisation of the traditional western male role constructed within the sports space (Sappington 2021; Messner 2002; Brown *et al.* 2002). Expanded further, previous literature outside of the sports environment have shown the effects of an audience on tactile intimacy (Eagly and Wood 1991; Chapman 1973). As they elaborate, there may be a greater selective pressure for males to magnify their

‘masculine image’ in front of a larger audience, and thus reduce touching behaviours. Therefore, in front of an audience, sex differences in tactile intimacy might be heightened (Eagly and Wood 1991; Chapman 1973). Surprisingly, Brown and colleagues (2002) within their research demonstrated that audience members who did not participate, but watched the activity also demonstrated this heightened perception of masculinity, due to their involvement within the culture. Based on this notion, for future research, it would be interesting to study the touching behaviours within the audience themselves. This would provide greater insight into how ‘sports culture’ affects touching behaviours and their perceptions. Also, factors like social cohesion, may be altered due to the audience not actually performing within the team. That is to say, the audience does not have the same necessity for touch compared to players, and therefore a comparison of their tactile intimacy could provide deeper insight into these behaviours.

Alternatively, the publicity from having an audience may influence tactile intimacy and associated perceptions (Kerr *et al.* 2015; Kneidinger *et al.* 2001). This was developed in Kerr et al’s (2015) research, where some coaches detailed that their comfortability with tactile intimacy dramatically increased when the behaviour was public. As a female diving coach states “The touch definitely occurs in a public area like on deck cause that’s the moment where it happened… I think I would be hesitant and think twice in giving a hug if it was a private situation” (Kerr *et al.* 2015, pp. 62). On a broader note, both Major *et al.* (1990) and Henley (1973) elaborated within their research that settings in public often had the lowest frequency and intimacy of touching behaviours, due to societal norms. In other words, being very intimate in public within western culture is often frowned upon by societal norms, and thus is less common compared to recreational settings (Major *et al.* 1990; Henley 1973). In relation to theatre, the audience has paid to watch the actors demonstrate a specific performance. Therefore, unregulated touch would be prohibited when on stage, preventing tactile intimacy. As Kapadocha (2023) describes, when on stage in front of an audience, the actor loses themselves to the role they are playing, and all physicality is no longer their own. For future research, it would be interesting to observe touch in theatre when the performers are not aware of the researcher, to determine if being watched causes them to put on ‘an act’.

Different types of sports

Future research may want to focus on observing tactile intimacy within different sports. As previous literature details, the nature of the sport can determine the importunate of touch and

how it is performed (Ker *et al.* 2015; Miller *et al.* 2007). For example, in a sport such as rugby, physical, and often aggressive contact is frequent and necessary due to the nature of the game. Meanwhile, in a game such as baseball, which is a non-contact sport, the need for touch is lessened. Perhaps in these two examples, tactile intimacy within baseball would be less frequent than in rugby, due to the variation in necessity for touch. Another aspect of team-based sports, is there are two groups, the 'in-group' (your team), and the out-group (the opposing team). As previously highlighted within the literature, one of the fundamental aspects of touch in sports is team-cohesion (Kerr *et al.* 2015; Büttner *et al.* 2014). This would suggest that tactile intimacy between teammates would be much higher than with opposing players. However, in aggressive sports, touch may be used to intimidate other players, or to create analgesic effects against violence. For example, in American football, an opposing player may help one another up and pat each other on the back after a particularly rough tackle. This would promote healthy sportsmanship between players, and prevent hostility. Based off this, it would be interesting to see if the function of tactile intimacy changes between in-group and out-group players. Saarinen et al., 2021, Neuroscience & Biobehavioural Reviews).

In regards to this project, both settings were team-based to evaluate the function of social cohesion on tactile intimacy. Consequently, to deepen understanding it would be beneficial to observe touching behaviours in solo-sports as well as team-based sports. This would provide greater insight into whether tactile intimacy is more frequent and intimate in sports in general, or if being in a team plays an important contribution. This project primarily focuses on touching between individuals, but touch can also be to the self. As shown by Dreisoerner and colleagues (2021), in stressful environments not only is touch between individuals heightened, but also people are more likely to self-soothe using touch. If the primary function of touch in sport is to promote cohesion between teammates, then the predicted result would be that self-soothing touch would be lower in team-based activities compared to solo sporting events. Research within this area would provide a more conclusive answer to the prediction presented within this dissertation. Self-touch can be broadened to other literature, as it may be that individuals who feel prohibited touching others, may rely on themselves to produce the same benefits.

Sex and culture in the sports environment

This project specifically focuses on male-to-male tactile touch to provide further insight into why male touch is less frequent and less intimate compared to females. However, for Study 2, female and non-binary participants also completed the questionnaire. The results from these studies recognise there is a difference in touch between sports and non-sports environments, and thus it would be beneficial to broaden this research to both genders. Previous literature underlines there are distinct sex differences in tactile communication, with females often touching more intimately and more frequently (Derlega 2001; Stier and Hall 1984; Major 1984). However, both Major *et al.* (1990) and Heslin (1973) highlighted that in certain settings these differences are less severe. This leads to question whether sports would be one of these environments, due to the necessity of touch in sports (Kerr *et al.* 2015; Büttner *et al.* 2014; Kneidinger *et al.* 2001). In Kneidinger and colleagues (2001) study, both sexes were observed, and they found sex differences were replicated within the sports environment, except for the away game condition, where males touched more than females. This provides interesting detail, as it suggests that sex differences may be present in sports, but touch overall is more frequent and intimate. However, this is just one observational study, and it would be beneficial to use a more comprehensive methodology to see more touching behaviours. As shown by Major (1984) and Henley (1973), females are traditionally known to be more emotionally expressive than males. Therefore, 'victory behaviours' may be more expressive, and thus more touch-based in females compared to males. Expanding on Henley's (1973) work on gender roles in touch, arguably sports often counters most of the traits of a stereotypical woman. As Sappington (2021) and Messner (2002) describe within their research, sport has been a male-dominated space, often perpetrating views of hegemonic masculinity. Often aggression, physicality and toughness are reinforced within sports to further the masculine image, which juxtapose the gender norms of female passivity (Sappington 2021; Major *et al.* 1990). Consequently, for females to navigate this space, there is often conflict with traditional gender roles, and thus behaviours surrounding this notion. This may be the case particularly in co-ed sports, where there is more situational conflict between these norms. Therefore, future research on tactile intimacy within sports should also integrate sex differences.

As described in Chapter 1, previous literature has highlighted the effect of societal culture and nationality on touching behaviours (Sorokowska *et al.* 2021; Jourard 1966). To date, a high majority of observational studies have focused on North-American mainstream sports. Dependent on the country, the culture regarding a specific type of sport may be different. For example, football in the UK is hugely prolific, and it is common for football fans to watch together in mass celebration or commiseration (Birdsall-Strong 2022). Meanwhile, in America, football is a much smaller sport (referred to as 'soccer' as opposed to American Football – an altogether different sport) and does not have the same cult following (Francis 2011). For future studies it could be intriguing to observe the same sport across different cultures. This could create interesting research on the difference between the broader social environment and the localised setting. This relationship is shown with certain cultures have ritualised behaviours when competing in sports. For example, within rugby, teams from New Zealand perform a ritualised dance known as the haka to the opposing team before the game (Alim 2023). As this ritualised behaviour details, there is an intertwined relationship between sports culture and the broader cultural environment which could be investigated further. In Jacob and Carron's (1998) study regarding status in sports, they studied athletes from both India and Canada, preventing restrictions of cultural bias. Surprisingly, they found no difference in status rankings between the two groups, suggesting that culture is not a moderator for status in sports. They suggest that the globalisation of sport has created a unique culture outside of a country's own nationality, with its own societal norms (Jacob and Carron 1998). This interesting concept could provide further explanation to the unique nature of touching behaviours in sports, and thus should be investigated further.

Sexuality and touch

Within a growing body of research, including Derlega and colleagues' (2001) study, results have shown a significant correlation between the sexuality of a participant and their attitudes surrounding touch (Dolinski 2013; Roese *et al.* 1992). Derlega and colleagues' (2001) study focused on line drawings, with different drawings detailing multiple dyadic interactions within different genders. Within their study participants had to rate the intimacy and relationship of line drawing, Heterosexual males and females correlated more sexual connotations in male-to-male dyads, while LGBTQ+ males and females rated no sexual involvement to the same drawing. Derlega *et al.* (2001) concluded that LGBTQ+ individuals would not be afraid of being seen as homosexual, and consequently the selective pressure to

avoid male-to-male tactile intimacy would be limited. Stier and Hall's (1984) literature review supplements this research, highlighting that heterosexual males and females would frequently regard male same-sex tactile intimacy as conflicting with the 'traditional masculine role', while LGBTQ+ individuals did not. However, one key flaw with Derlega's (2001) *homophobia hypothesis*, is it assumes that LGBTQ+ individuals are less homophobic than heterosexual individuals. This may be too simplistic of an oversight, as within the LGBTQ+ community itself there can be high levels of homophobia (Chard 2015). As shown through Chard and colleagues (2015) research on the experiences of gay and bisexual men, internalised homophobia is also a prolific issue. Developing upon this, a homosexual individual who is struggling with their own identity may display higher levels of homophobia than a heterosexual individual. On another note, to prevent homophobic discrimination LGBTQ+ individuals may feel more pressure to adhere to traditional gender norms. For example, a homosexual man may fulfil the 'traditional masculine role' stronger to dissuade the homophobic stereotype of being more feminine. These studies highlight the complexity of sexuality and homophobia, and thus must be recognised within future research to present a more well-rounded approach.

Conclusion

Even though the results from this dissertation were largely non-significant, exploring influential factors such as *homophobia, status* and *stress* in team-based activities opens doors for future research. For example, identifying how status affects touching behaviours within team-based hazing cultures may provide further guidance on preventing invasive and inappropriate touch. Further, some results were significant, such as within Study 1, the frequency of touching behaviours significantly increased if the team-based activity was dodgeball over theatre. This creates an interesting foundation for future research; outlining how and why touching behaviours are different within sports compared to other environments. Also, this dissertation provided a primate-based observational method to touch, creating a multi-disciplinary approach that can be utilised. Understanding these motivational factors not only furthers our understanding of touch in sports, but also why it may be prohibited in other environments. Touch is a fundamental aspect of physiological and psychological health in humans, and thus should not be overlooked within current literature (Suvilehto *et al.* 2023; Gallace and Spence 2010; Hertenstein *et al.* 2006; Derlega 2001).

Appendix

1: Introductory information for observation groups

Hello!

My name is Annabel Pleavin and I am currently a postgraduate research student within the University of Kent. I would like to invite you to participate in this project, which is concerned with observing different perceptions towards human behaviours, and how they are shaped by certain environments and political beliefs. I cannot state what the exact behaviours are before you have completed the Study as it would affect the results, but I can confirm that it is not personal or stigmatising in any terms. This has been approved by the 'School of Anthropology and Conservation' ethics committee (#255).

Would it be possible for me to come to your sessions and observe for approximately 2-3 months? What the observations would entail is me sitting in the background out of the way and collecting data on my phone: there will be no interference on your routine. At the end of the observation period, there will be a brief questionnaire handed out to participants, taking approximately 5-10 minutes to complete. This project has been considered to be low risk to participants, and your society/group will be one of others observed.

All the participants would be referred to by identification number only in the Study and the data collected will be entirely confidential, shared between my academic supervisors and I. It is important to note, that the participants will be distinguished by sex within the Study, and possibly their role within the team (noted as captain, vice-captain, player), yet these will be coded numerically, again preventing identification. The participants ability and their performance will not be assessed in any way. After completion of the project the data will then be safely deleted. If anyone feels uncomfortable with these terms, the individual may sign below, no questions asked, and they simply will not be observed.

Most importantly, anyone who participants will be given free baked goods on the last session!

Warm regards,

Annabel

If you do not wish to consent to this observation Study, please sign below:

2: Touching Behaviour in Sport Ethogram (Kneidinger *et al.* 2001, p. 57-60)

Category	*Type of touch*	*Definition*
Hand-Hand	High-Five	Both participants lift an arm so that the hand is above the head. Both hands are then moved toward each other in a motion vertical to the ground and slapped against each other.
	High-ten	Same as "high five" except both arms perform the action at the same time.
	Low-Five	Same as "high five" except the upper arms are extended downward, below the participant's waist.
	Low Ten	Same as "high ten" except both arms are extended downward, below the participant's waists (both arms performing a "low five").
	Hand Shake	Hands are at an angle near to horizontal with the ground. Hands are clasped and perform multiple up-and-down motions.
	Hand Bob	Same as "hand shake" except participants' hands perform one up-and-down motion.
	Hand Clasp	Lower arms are held at an angle above the horizontal to the ground and clasped together as if a hand shake were to be performed, except no motion occurs.
	Hand Slap	Combination of "hand clasp" and "high five/low five." Lower arm is at an angle near to horizontal with the ground. Both participants' lower arms swing from behind the body to in front of the body, moving horizontally to the ground. Participants'

	hands slap while swinging around to the front.
Glove-Hand	Same as “hand slap” except one participant uses their bare hand and one uses their gloved hand.
Glove Tap	Same as “glove-hand” except both participants use their gloved hands.
Slap Pull	Players perform a “hand slap.” When hands make contact, players grasp each other’s fingers and snap them while pulling them apart.
Double Slap	Double Slap Participants perform hand slap, then reverse the direction of arm movement and participants slap the back of their hands.
Double Glove	Double Glove Same as “double slap” except both participants use their gloved hands.
Vertical Hand Slap	Vertical Hand Slap Same as “hand slap” except arms move in a vertical motion. At waist height, one participant’s arm moves down, the other’s moves up, and the hands slap as forearms near the horizontal to the ground.
Circle Slap	Circle Slap Both participants lift arms and perform a “high five,” then continue moving arms in a forward vertical circle, slapping each other’s hands at the bottom of the circle as well.
High Ten Circle	Participants perform a “high ten,” then maintain contact between their hands while

		moving arms in a downward circle until arms are at their sides
Hand-other	Butt Slap	The palm side of one participant's hand is used to slap the rear end of another participant.
	Butt Tap	Same as "butt slap" except glove is used instead of hand.
	Back Pat	The palm side of one participant's hand is used to pat the back of another participant: greater than one hand-to-back contact occurs
	Back Slap	The palm side of one participant's hand is used to slap the back of another participant
	Arm Slap	The palm side of one participant's hand is used to slap the arm of another participant.
	Arm Grab	One participant grasps the upper arm of another player.
	Head Tap	One participant uses a hand to tap the top of another participant's head or helmet.
	Head Rub	One participant uses a hand to rub the top of the other participant's head.
	Head Shake	One participant uses a hand to grasp the top of another participant's head or helmet and shake it.
	Pants Grab	One participant grabs the waist of the other participant's pants
	Chest-Grab	One participant grabs the front of the other participant's shirt.

	Chest-Slap	One participant uses a hand to slap the chest of another participant.
Other-Other	Forearm Bump	Participants each lift a forearm in front of their body and bump their forearms into each other. An X is made by the forearms when in contact.
Embrace	Half Hug	One arm of one participant is wrapped around another participant.
	Double Half Hug	Each participant wraps one arm around the other participant.
	Full Hug	One participant wraps both arms around the other participant.
	Double Full Hug	Each participant wraps both arms around the other participant.
	Team Hug	One participant puts each of their arms around other participants.
Group Touch	Hand Pile	Participants put their flat hands, palms down, on top of each other in a pile.

Glove Pile	Same as “hand pile” except participants use their gloved hands.
Potato Fists	Participants put their clenched fists end-to-end on top of each other.

3: Questionnaire for Observation Groups

Please type in your shirt number (dodgeball)/ assigned number (theatre) below:

_____

How old are you?

- ○ 30+
- ○ 27-29
- ○ 24-26
- ○ 21-23
- ○ 18-21

What is your role within the society?

- ○ President
- ○ Vice-President
- ○ Captain
- ○ Member of the committee
- ○ Player

How long have you been playing dodgeball/ performing in theatre?

- ○ +3 years' experience
- ○ +2 years' experience
- ○ +1-year experience
- ○ A couple of months experience
- ○ A couple of weeks experience

How frequently do you come to this society?

- ○ Every Session
- ○ Almost all sessions
- ○ Most sessions
- ○ Some sessions
- ○ No sessions

What year of university are you in?

- ○ Postgraduate Study (PhD equivalent)
- ○ Year 4
- ○ Year 3
- ○ Year 2
- ○ Year 1
- ○ Have left education

	Please rate your level of agreement with each of the following statements below: *Please note this section is optional*				
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
If a person has homosexual feelings, they should do everything to overcome those feelings	○	○	○	○	○
Bisexuality is merely a different kind of lifestyle that should not be condemned	○	○	○	○	○
Homosexuality is merely a different kind of lifestyle that should not be condemned	○	○	○	○	○
Bisexuality is a threat to many of our basic social institutions	○	○	○	○	○

If a person has bisexual feelings, they should do everything to overcome these feelings	○	○	○	○	○
Homosexuality is a threat to many of our basic social institutions	○	○	○	○	○

4: Written text associated with link

If you are over the age of 18 and have 10 minutes of free time, please consider this survey! The topic focuses on analysing perceptions of human behaviours, and how they are shaped by specific environments and belief systems. However, if you are part of the musical theatre or dodgeball society, please DO NOT complete this survey, as this will affect current observations.

5: Qualtrics survey for Study 2

Introduction

I would like to invite you to participate in this project, which is concerned with observing different perceptions towards human behaviours, and how they are shaped by certain environments and political beliefs. I cannot state what the exact behaviours are before you have completed the survey as it would affect the results, but I can confirm that it is not

personal or stigmatising in any terms. This has been approved by the 'School of Anthropology and Conservation' ethics committee (#255).

Why am I doing this project?

This project is the main body of work for my research at the University of Kent. It is hoped that the project could provide more insight into human behaviours and interactions.

What will you have to do if you agree to take part?

1. Please check the consent form on the next page, so that I know you are interested.

2. Complete all the questions in the survey to the best of your ability and knowledge

3. When finished press complete to get a full debrief of the project

Prior to consenting, you are more than welcome to ask any questions you have via email to behaviourStudy@kent.ac.uk

How long will this survey take?

This questionnaire will take 10-15 minutes to complete.

Will your participation in the project remain confidential?

If you agree to take part, your name and contact information will not be recorded and your answers to the questions will only be disclosed to myself and my supervisory team. Your responses to the questions/behaviours observed will be used for the purpose of this project only and I will not have access to any other personal records. You can be assured that during your time in the project you will remain anonymous, and the basic demographic data I will collect cannot reveal your identity. At the end of the survey, you will be briefed on the purpose of this Study.

What are the advantages in taking part?

You may find the project interesting and enjoy representing your experiences and perceptions of human behaviours.

Are there any disadvantages with taking part?

It could be that you feel uncomfortable discussing your perception on human behaviours.

Do you have to take part in the Study?

No, your participation in this project is entirely voluntary. If you do not wish to take part, you do not have to give a reason and you will not be asked again. Similarly, if you do agree to

participate you are free to withdraw prior to completing the survey, and all the information you have provided will be removed.

What happens now?

If you are interested in taking part in the Study, continue to the next page for the consent form. If you decide you would rather not participate in this Study you need not continue onto the survey and you will not be asked to participate again.

Have you read the information above and would like to continue?

○ Yes

○ No

Skip To: End of Survey If Have you read the information above and would like to continue? = No

Please read and check **ALL** the consent boxes before continuing onto the survey.

☐ I confirm that I have listened/read and understand the information sheet for the above Study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

☐ I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason

☐ I understand that my data will be treated confidentially and any publication resulting from this work will report only data that does not identify me. My anonymised

responses, however, may be shared with other researchers or made available in online data repositories

- [ ] I freely agree to participate in this Study
- [ ] I am over 18

Skip To: End of Survey If Condition: Selected Count Is Less Than 5. Skip To: End of Survey.

How would you describe your gender?

- [ ] Man
- [ ] Woman
- [ ] Non-binary
- [ ] Prefer to self-describe

_____

- [ ] Prefer not to say

Is your gender identity the same as your sex at birth?

- ○ Yes
- ○ No
- ○ Questioning
- ○ Prefer to self-describe

_____

- ○ Prefer not to say

Which of the following best describes your sexual orientation?

- ☐ Heterosexual/Straight
- ☐ Asexual
- ☐ Bisexual/Bi
- ☐ Gay Man
- ☐ Gay Women/Lesbian
- ☐ Pansexual
- ☐ Queer
- ☐ Questioning or unsure
- ☐ I prefer to self-describe

_____

- ☐ Prefer not to say

How old are you? Please write in years below

_____

Where are you currently living?

- ○ North America/Central America
- ○ South America
- ○ Europe
- ○ Africa
- ○ Asia
- ○ Australia
- ○ Other

_____

- ○ Prefer not to say

How would you describe your ethnicity?

_____

(Written description- Each participant was randomly assigned one alongside the video)

Please Study the written description and graphic carefully before continuing onto the questions on the next page. You can refer back to this page at any time.

(Video)

The two individuals in the video will be referred to as Subject A (grey shirt) and Subject B (checkered shirt), who are both members of an international football team. Currently, both teammates are in a high stress environment, as they are about to play the last match of the season that will determine their overall ranking, and thus whether they win or not. Subject A

responds to this scenario by initiating a hug with Subject B (as shown in the video above), before leaving to get ready.

Q58 Please Study the written description and graphic carefully before continuing onto the questions on the next page. You can refer back to this page at any time.

(Video)

The two individuals in the video will be referred to as Subject A (grey shirt) and Subject B (checkered shirt), who are both members of an international football team. Currently, both teammates are in a low stress environment, as they are heading to practice with the rest of their team. Subject A responds to this scenario by initiating a hug with Subject B (as shown in the video above), before leaving to get ready.

Q57 Please Study the written description and graphic carefully before continuing onto the questions on the next page. You can refer back to this page at any time.

(Video)

The two individuals in the video will be referred to as Subject A (grey shirt) and Subject B (checkered shirt), who are both international actors cast into the same musical. Currently, both cast members are in a high stress environment, as they are about to perform the first opening night of the season that will determine their initial success, and thus overall popularity of the show. Subject A responds to this scenario by initiating a hug with Subject B (as shown in the video above), before leaving to get ready.

Q56 Please Study the written description and graphic carefully before continuing onto the questions on the next page. You can refer back to this page at any time.

(Video)

The two individuals in the video will be referred to as Subject A (grey shirt) and Subject B (checkered shirt), who are both international actors cast into the same musical. Currently, both cast members are in a low stress environment, as they are about to begin a rehearsal of the production. Subject A responds to this scenario by initiating a hug with Subject B (as shown in the video above), before leaving to get ready.

Q60 Please Study the written description and graphic carefully before continuing onto the questions on the next page. You can refer back to this page at any time.

(Video)

The two individuals in the video will be referred to as Subject A (grey shirt) and Subject B (checkered shirt). Subject A initiates a hug with Subject B (as shown in the video above).

Given the information you have, what would your assumptions about each Subject be? You can refer back to the previous page at any time for reference. For each Subject, move the slider towards the word that you believe accurately describes them. The closer you put the slider to the word suggests how strongly that word represents them. There are no right or wrong answers.

Subject A (grey shirt) is:

Intelligent _____ Unintelligent

Dominant _____ Submissive

Sociable _____ Shy

Polite _____ Blunt

Warm _____ Cold

Sincere _____ Insincere

Competent _____ Incompetent

Independent _____ Conforming

Attentive _____ Inattentive

Strong _____ Weak

Likeable _____ Unlikeable

Gentle _____ Forceful

Nurturant _____ Neglectful

Attractive _____ Unattractive

Masculine _____ Feminine

Subject B (checkered shirt) is:

Intelligent _____ Unintelligent

Dominant _____ Submissive

Sociable _____ Shy

Polite _____ Blunt

Warm _____ Cold

Sincere _____ Insincere

Competent _____ Incompetent

Independent _____ Conforming

Attentive _____ Inattentive

Strong _____ Weak

Likeable _____ Unlikeable

Gentle _____ Forceful

Nurturant _____ Neglectful

Attractive _____ Unattractive

Masculine _____ Feminine

What is your impression of the interpersonal relationship between the two Subjects you just looked at? They are probably...

- ○ acquaintances
- ○ casual friends
- ○ good friends
- ○ very good friends
- ○ Friends with a sexual relationship
- ○ In a short-term relationship
- ○ In a long-term relationship

How long would you guess they have known each other?

- ○ A few hours
- ○ A few days
- ○ A few weeks
- ○ A few months
- ○ More than a few months

How much do you think Subject A likes Subject B?

- ○ Dislike a great deal
- ○ Dislike a moderate amount

- ○ Dislike a little
- ○ Neither like nor dislike
- ○ Like a little
- ○ Like a moderate amount
- ○ Like a great deal

How much do you think Subject B likes Subject A?

- ○ Dislike a great deal
- ○ Dislike a moderate amount
- ○ Dislike a little
- ○ Neither like nor dislike
- ○ Like a little
- ○ Like a moderate amount
- ○ Like a great deal

Who would you say probably has the most influence or control in the relationship?

- ○ Subject A has a lot more influence
- ○ Subject A has a little more influence
- ○ they have equal influence or control
- ○ Subject B has a little more influence

- ○ Subject B has a lot more influence

Who would you guess is more interested in maintaining the relationship and keeping it running smoothly?

- ○ Subject A has a lot more interest
- ○ Subject A has a little more interest
- ○ they are equally interested
- ○ Subject B has a little more interest
- ○ Subject B has a lot more interest

Who would you guess was of higher status between the two Subjects?

- ○ Subject A is of much higher status
- ○ Subject A is of a slightly higher status
- ○ they have equal status
- ○ Subject B is of slightly higher status
- ○ Subject B is of much higher status

	Please rate your level of agreement with each of the following statements below:				
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
If a person has homosexual feelings, they should do everything to overcome those feelings	○	○	○	○	○
Bisexuality is merely a different kind of lifestyle that should not be condemned	○	○	○	○	○
Homosexuality is merely a different kind of lifestyle that should not be condemned	○	○	○	○	○
Bisexuality is a threat to many of our basic social institutions	○	○	○	○	○

If a person has bisexual feelings, they should do everything to overcome these feelings	○	○	○	○	○
Homosexuality is a threat to many of our basic social institutions	○	○	○	○	○

Thank you for taking part in this survey!

Your contribution is greatly appreciated. This Study was an investigation following male-to-male touching behaviours in sports. Compared to other environments, previous studies have shown that in sports, male-to-male touch is extremely frequent and intimate. This is surprising, as observations from other literature suggests that male-to-male touch is often the least common and intimate between all gender-based interactions, often because the touch is perceived to be homosexual. Therefore, I wanted to see if the perceived function of touch is altered in certain environments, and how that is the case. For example, in settings of higher stress, where there is a greater need for co-operation between people, touch may be viewed differently.

You were not informed prior to this Study that the project focused on touch because if you were aware of this fact, it may have caused an alteration to your natural perception. You were asked to complete questions relating to the perceived normality, warmth and assigned power from the video and written description of a touching behaviour between two males. Also, you were asked an "attitudes towards homosexuality" questionnaire, to see if that affected the results of the previously mentioned questions. However, what you were not aware of was that there were five different written examples: with two different environments described (theatre group or sports team); and the level of stress in the environment changing from high to low. Also, there was a control group with none of the above factors described. Therefore, your

answers were divided into one of the five groups, which will be analysed to see the differences between each. This is to see if people's views on touch change depending on these circumstances. The reason why we asked for your basic demographic information is to see if they have any effect on your answers provided, and that the sample collected is representative to the general population.

I anticipate that regardless of stress, touch between males will be perceived as more normal in the sports environments than in the theatre environment. If this is true, then the role of touch in sports is understood in greater depth.

Please contact me and my supervisor Sarah Johns at the following e-mail address (behaviourStudy@kent.ac.uk) if you have any questions or complaints regarding this Study.

THANK YOU AGAIN FOR YOUR CO-OPERATION

Researcher: Annabel Pleavin, University of Kent | Supervisor: Sarah Johns, School of Anthropology and Conservation, University of Kent, CT2 7NR

6: Video used in Qualtrics survey

https://www.shutterstock.com/video/clip-25391453-pan-mid-section-good-friends-casually-pound-hugging

Bibliography

Alberts, S.C. (2019) 'Social influences on survival and reproduction: Insights from a long-term study of wild baboons', *Journal of Animal Ecology*, 88(1), pp. 47–66. Available at: https://doi.org/https://doi.org/10.1111/1365-2656.12887.

de Albuquerque, L.R. *et al.* (2021) 'Influence of the Coach's Method and Leadership Profile on the Positive Development of Young Players in Team Sports.', *Journal of sports science & medicine*, 20(1), pp. 9–16. Available at: https://doi.org/10.52082/jssm.2021.9.

Alim, A. (2023) 'Haka as a Representation of Cultural Philosophy through Rugby'. Available at: https://doi.org/10.33258/birci.v5i2.4919.

Andersen, P.A. and Leibowitz, K. (1978) 'The development and nature of the construct touch avoidance', *Environmental Psychology and Nonverbal Behavior*, 3(2), pp. 89–106. Available at: https://doi.org/10.1007/BF01135607.

Anisfeld, E. *et al.* (1990) 'Does Infant Carrying Promote Attachment? An Experimental Study of the Effects of Increased Physical Contact on the Development of Attachment', *Child Development*, 61(5), pp. 1617–1627. Available at: https://doi.org/10.1111/j.1467-8624.1990.tb02888.x.

Aureli, F., Preston, S.D. and de Waal, F.B.M. (1999) 'Heart rate responses to social interactions in free-moving rhesus macaques (Macaca mulatta): A pilot study.', *Journal of Comparative Psychology*, 113(1), pp. 59–65. Available at: https://doi.org/10.1037/0735-7036.113.1.59.

Barber, K., Bridges, T. and Nelson, J.D. (2019) 'Mitigating the Harms of Masculinity: A Symposium on the APA Guidelines for Psychological Practice with Boys and Men', *Men and Masculinities*, 22(5), pp. 905–908. Available at: https://doi.org/10.1177/1097184X19874855.

Barnett, L. (2005) 'Keep in touch: The importance of touch in infant development', *Infant Observation*, 8(2), pp. 115–123. Available at: https://doi.org/10.1080/13698030500171530.

Basso, J.C. and Suzuki, W.A. (2017) 'The Effects of Acute Exercise on Mood, Cognition, Neurophysiology, and Neurochemical Pathways: A Review.', *Brain plasticity (Amsterdam, Netherlands)*, 2(2), pp. 127–152. Available at: https://doi.org/10.3233/BPL-160040.

Birdsall-Strong, L. (2022) ‘S01-3 Determining the social and economic value of football in England’, *European Journal of Public Health*, 32(Supplement_2), p. ckac093.004. Available at: https://doi.org/10.1093/eurpub/ckac093.004.

Boccia, M.L. *et al.* (2013) ‘Immunohistochemical localization of oxytocin receptors in human brain’, *Neuroscience*, 253, pp. 155–164. Available at: https://doi.org/10.1016/j.neuroscience.2013.08.048.

Bowling, N. *et al.* (2018) ‘Extraversion and adult attachment dimensions predict attitudes towards social touch’, *Journal of Research in Personality*, 111, Available at: https://doi.org/10.1016/j.jrp.2024.104514

Brackenridge, C. (2002) *Spoilsports*. Routledge. Available at: https://doi.org/10.4324/9780203478936.

Brown, T.J., Sumner, K.E. and Nocera, R. (2002) ‘Understanding Sexual Aggression Against Women: An Examination of the Role of Men’s Athletic Participation and Related Variables’, *Journal of Interpersonal Violence*, 17(9), pp. 937–952. Available at: https://doi.org/10.1177/088626050201700900 2.

Buck, R. (1980) ‘Nonverbal behavior and the theory of emotion: The facial feedback hypothesis.’, *Journal of Personality and Social Psychology*, 38(5), pp. 811–824. Available at: https://doi.org/10.1037/0022-3514.38.5.811.

Buote, V.M. *et al.* (2007) ‘The Importance of Friends: Friendship and Adjustment Among 1st-Year University Students’, *Journal of Adolescent Research*, 22(6), pp. 665–689. Available at: https://doi.org/10.1177/0743558407306344.

Büttner, C.M., Kenntemich, C. and Williams, K.D. (2024) ‘The power of human touch: Physical contact improves performance in basketball free throws’, *Psychology of Sport and Exercise*, 72, p. 102610. Available at: https://doi.org/https://doi.org/10.1016/j.psychsport.2024.102610.

Camps, J. et al (2013) ‘A situational touch: How touch affects people’s decision behavior’, *Social influence*, 8(4), pp. 237–250. Available at: https://doi.org/10.1080/15534510.2012.719479.

Chadwick-Jones, J.K. (1998) *Developing a social psychology of monkeys and apes*. Taylor & Francis.

Chapman, A. (1973) ‘Social facilitation of laughter in children’, *Journal of experimental social psychology*, 9(6), pp. 528–541. Available at: https://doi.org/10.1016/0022-1031(73)90035-8.

Chard, A.N. *et al.* (2015) ‘Experiences of homophobia among gay and bisexual men: results from a cross-sectional study in seven countries’, *Culture, Health & Sexuality*, 17(9/10), pp. 1174–1189. Available at: http://www.jstor.org/stable/24741940.

Cheney, D.L. and Seyfarth, R.M. (1992) ‘Précis of *How monkeys see the world*’, *Behavioral and Brain Sciences*, 15(1), pp. 135–147. Available at: https://doi.org/10.1017/S0140525X00067911.

Coetzee, M.-H. and Groves, K. (2023) ‘Touch and consent: towards an ethics of care in intimate performance’, *Theatre, Dance and Performance Training*, 14(2), pp. 103–118. Available at: https://doi.org/10.1080/19443927.2023.2184855.

Cramér, H. (1946) *Mathematical methods of statistics.*, *Mathematical methods of statistics.* Princeton, NJ, US: Princeton University Press.

Csikszentmihalyi, M. (1990) *Flow: the psychology of optimal experience*. 2. print. New York: Harper & Row.

Dean Sinclair, G. (2009) ‘Homosexuality and the Military: A Review of the Literature’, *Journal of Homosexuality*, 56(6), pp. 701–718. Available at: https://doi.org/10.1080/00918360903054137.

Derlega, V. et al (1989) ‘Gender Differences in the Initiation and Attribution of Tactile Intimacy’, *Journal of nonverbal behavior*, 13(2), pp. 83–96. Available at: https://doi.org/10.1007/BF00990792.

Derlega, V. et al (2001) ‘Perceptions About Tactile Intimacy in Same-Sex and Opposite-Sex Pairs Based on Research Participants’ Sexual Orientation’, *Psychology of men & masculinity*, 2(2), pp. 124–132. Available at: https://doi.org/10.1037/1524-9220.2.2.124.

Doliński, D. (2013) ‘Male homophobia, touch, and compliance: A matter of the touched, not the toucher’, *Polish Psychological Bulletin* [Preprint], (4). Available at: https://doi.org/10.2478/PPB-2013-0051.

Dreisoerner, A. *et al.* (2021) ‘Self-soothing touch and being hugged reduce cortisol responses to stress: A randomized controlled trial on stress, physical touch, and social

identity', *Comprehensive Psych neuroendocrinology*, 8, p. 100091. Available at: https://doi.org/https://doi.org/10.1016/j.cpnec.2021.100091.

Dunbar, R.I.M. (2022) 'Virtual touch and the human social world', *Current Opinion in Behavioral Sciences*, 43, pp. 14–19. Available at: https://doi.org/https://doi.org/10.1016/j.cobeha.2021.06.009.

Eagly, A. and Wood, W. (1991) 'Explaining Sex Differences in Social Behavior: A Meta-Analytic Perspective', *Personality & social psychology bulletin*, 17(3), pp. 306–315. Available at: https://doi.org/10.1177/0146167291173011.

Eaton, M., Mitchell-bonair, I.L. and Friedmann, E. (1986) 'The Effect of Touch on Nutritional Intake of Chronic Organic Brain Syndrome Patients', *Journal of Gerontology*, 41(5), pp. 611–616. Available at: https://doi.org/10.1093/geronj/41.5.611.

Eckstein, M. *et al.* (2020) 'Calming Effects of Touch in Human, Animal, and Robotic Interaction—Scientific State-of-the-Art and Technical Advances', *Frontiers in Psychiatry*, 11. Available at: https://www.frontiersin.org/journals/psychiatry/articles/10.3389/fpsyt.2020.555058.

Essin, C. (2021) *Working Backstage*. Ann Arbor, MI: University of Michigan Press. Available at: https://doi.org/10.3998/mpub.11434091.

Ferguson, M. (2023) 'Touching Theater: Practice, Criticism and Aesthetics of Touch in the Flourishing Theatrical Moment', in H. Young (ed.) *Theater and Human Flourishing*. Oxford University Press, New York, pp. 220–236. Available at: https://doi.org/10.1093/oso/9780197622261.003.0011.

Ferrell-Torry, A.T. and Glick, O.J. (1993) 'The use of therapeutic massage as a nursing intervention to modify anxiety and the perception of cancer pain.', *Cancer nursing*, 16(2), pp. 93–101.

Field, T. *et al.* (1996) 'Massage therapy for infants of depressed mothers', *Infant Behavior and Development*, 19(1), pp. 107–112. Available at: https://doi.org/https://doi.org/10.1016/S0163-6383(96)90048-X.

Floyd, K. (2000) 'Affectionate same-sex touch: The influence of homophobia on observers' perceptions', *The Journal of Social Psychology*, 140(6), pp. 774–788. Available at: https://doi.org/https://doi.org/10.1080/00224540009600516.

Forbes, G.B. *et al.* (2006) 'Dating Aggression, Sexual Coercion, and Aggression-Supporting Attitudes Among College Men as a Function of Participation in Aggressive High School Sports', *Violence Against Women*, 12(5), pp. 441–455. Available at: https://doi.org/10.1177/1077801206288126.

Francis, J.D. (2011) 'Learning from Failure: Is Major League Soccer Repeating the Mistakes of the North American Soccer League?', in H. Dolles and S. Söderman (eds) *Sport as a Business: International, Professional and Commercial Aspects*. London: Palgrave Macmillan UK, pp. 213–227. Available at: https://doi.org/10.1057/9780230306639_12.

Fuller, J. (2020) *What are the most popular sports in the UK?* Available at: https://blog.pitchero.com/what-are-the-most-popular-sports-in-the-uk.

Gallace, A. and Spence, C. (2010) 'The science of interpersonal touch: An overview', *Neuroscience & Bio behavioral Reviews*, 34(2), pp. 246–259. Available at: https://doi.org/https://doi.org/10.1016/j.neubiorev.2008.10.004.

Garfield, C. and Bennett, H.Z. (1984) *Peak Performance: Mental Training Techniques of the World's Greatest Athletes*. Boston: Houghton Mifflin.

Goldstein, A.G. and Jeffords, J. (1981) 'Status and touching behavior', *Bulletin of the Psychonomic Society*, 17(2), pp. 79–81. Available at: https://doi.org/10.3758/BF03333673.

Goodall, J. (1986) 'Social rejection, exclusion, and shunning among the Gombe chimpanzees', *Ethology and Sociobiology*, 7(3–4), pp. 227–236. Available at: https://doi.org/10.1016/0162-3095(86)90050-6.

Gough, C. (2024) *Average length of Major League Baseball games from 2000 to 2024*. Available at: https://www.statista.com/statistics/1310998/mlb-game-length/ (Accessed: 17th December 2024)

Greenbaum, P. and Rosenfeld, H. (1980) 'Varieties of touching in greetings: Sequential structure and sex-related differences', *Journal of nonverbal behavior*, 5(1), pp. 13–25. Available at: https://doi.org/10.1007/BF00987051.

Greenhalgh, G. *et al.* (2011) 'Spectator support: Examining the attributes that differentiate niche from mainstream sport', *Sport Marketing Quarterly*, 20, pp. 41–52.

Grewen, K.M. *et al.* (2003) 'Warm Partner Contact Is Related to Lower Cardiovascular Reactivity', *Behavioral Medicine*, 29(3), pp. 123–130. Available at: https://doi.org/10.1080/08964280309596065.

Guéguen, N. and Fischer-lokou, J. (2003) 'Tactile Contact and Spontaneous Help: An Evaluation in a Natural Setting', *The Journal of Social Psychology*, 143(6), pp. 785–787. Available at: https://doi.org/10.1080/00224540309600431.

Guéguen, N. and Jacob, C. (2006) 'The effect of tactile stimulation on the purchasing behaviour of consumers: An experimental study in a natural setting', *International Journal of Management*, 23, pp. 24–33.

Hall, J. and Veccia, E. (1990) 'More "Touching" Observations', *Journal of personality and social psychology*, 59(6), pp. 1155–1162. Available at: https://doi.org/10.1037/0022-3514.59.6.1155.

Harcourt, A.H. (1979) 'Social relationships between adult male and female mountain gorillas in the wild', *Animal Behaviour*, 27, pp. 325–342. Available at: https://doi.org/https://doi.org/10.1016/0003-3472(79)90166-0.

Harlow, H.F. (1958) 'The nature of love.', *American Psychologist*, 13(12), pp. 673–685. Available at: https://doi.org/10.1037/h0047884.

Harlow, H.F. and Zimmermann, R.R. (1959) 'Affectional Response in the Infant Monkey', *Science*, 130(3373), pp. 421–432. Available at: https://doi.org/10.1126/science.130.3373.421.

Harris, S.J. *et al.* (2019) 'Interpersonal touch interventions for patients in intensive care: A design-oriented realist review', *Nursing Open*, 6(2), pp. 216–235. Available at: https://doi.org/https://doi.org/10.1002/nop2.200.

Henley, N. (1973) 'Status and Sex: Some Touching Observations', *Bulletin of the Psychonomic Society*, 2(2), pp. 91–93. Available at: https://doi.org/10.3758/BF03327726.

Henley, W.E. (1977) 'A touch of the hand.', *The New Zealand medical journal*, 86(592), pp. 100–2.

Hertenstein, M.J. *et al.* (2006) 'The Communicative Functions of Touch in Humans, Nonhuman Primates, and Rats: A Review and Synthesis of the Empirical Research', *Genetic, Social, and General Psychology Monographs*, 132(1), pp. 5–94. Available at: https://doi.org/10.3200/MONO.132.1.5-94.

Heslin, R. and Boss, D. (1980) 'Nonverbal Intimacy in Airport Arrival and Departure', *Personality & social psychology bulletin*, 6(2), pp. 248–252. Available at: https://doi.org/10.1177/014616728062010.

Heward, C. *et al.* (2024) 'A Scoping Review of Military Culture, Military Identity, and Mental Health Outcomes in Military Personnel', *Military Medicine*, 189(11–12), pp. e2382–e2393. Available at: https://doi.org/10.1093/milmed/usae276.

van Hooff, J. (1973) 'A structural analysis of the social behaviour of a semi-captive group of chimpanzees. M. von Cranach & I. Vine (eds.), European Monographs in Social Psychology 4, 75-162', in, pp. 75–162.

Hornik, J. (1992) 'Tactile Stimulation and Consumer Response', *The Journal of consumer research*, 19(3), pp. 449–458. Available at: https://doi.org/10.1086/209314.

Hughes, P., Harless, C. and Leach, K. (2021) 'Methods and strategies for effectively surveying the LGBTQ+ population', *Research in Social and Administrative Pharmacy*, 17(5), pp. 997–1003. Available at: https://doi.org/https://doi.org/10.1016/j.sapharm.2020.06.024.

Inbari, M. and Bumin, K.M. (2024) 'Israeli Jewish Attitudes toward Core Religious Beliefs in God, the Election of Israel, Eschatology, and the Temple Mount—Statistical Analysis', *Religions*, 15(9), p. 1076. Available at: https://doi.org/10.3390/rel15091076.

Jablonski, N.G. (2021) 'Social and affective touch in primates and its role in the evolution of social cohesion', *Neuroscience*, 464, pp. 117–125. Available at: https://doi.org/10.1016/j.neuroscience.2020.11.024.

Jacob, C. and Carron, A. (1998) 'The association between status and cohesion in sport teams', *Journal of sports sciences*, 16(2), pp. 187–198. Available at: https://doi.org/10.1080/026404198366894.

Jones, S. (1986) 'Sex Differences in Touch Communication', *Western Journal of Speech Communication*, 50(3), p. 227. Available at: http://eric.ed.gov/ERICWebPortal/detail?accno=EJ339885.

Jourard, S.M. (1966) 'An Exploratory Study of Body-Accessibility', *British Journal of Social and Clinical Psychology*, 5(3), pp. 221–231. Available at: https://doi.org/10.1111/j.2044-8260.1966.tb00978.x.

Judge, P.G., Griffaton, N.S. and Fincke, A.M. (2006) 'Conflict management by hamadryas baboons (Papio hamadryas hamadryas) during crowding: a tension-reduction strategy', *American Journal of Primatology*, 68(10), pp. 993–1006. Available at: https://doi.org/https://doi.org/10.1002/ajp.20290.

Kaburu, S.S.K. and Newton-Fisher, N.E. (2013) 'Social instability raises the stakes during social grooming among wild male chimpanzees', *Animal Behaviour*, 86(3), pp. 519–527. Available at: https://doi.org/https://doi.org/10.1016/j.anbehav.2013.06.003.

Kapadocha, C. (2023) 'Tactile renegotiations in actor training: what the pandemic taught us about touch', *Theatre, Dance and Performance Training*, 14(2), pp. 201–215. Available at: https://doi.org/10.1080/19443927.2023.2187872.

Kerr, G. et al (2015) 'The Importance of Touch in Sport: Athletes' and Coaches' Reflections', *International journal of social science studies*, 3(4), pp. 56–68. Available at: https://doi.org/10.11114/ijsss.v3i4.803.

Kleinke, C. (1977) 'Compliance to requests made by gazing and touching experimenters in field settings', *Journal of experimental social psychology*, 13(3), pp. 218–223. Available at: https://doi.org/10.1016/0022-1031(77)90044-0.

Kneidinger, L.M., Maple, T.L. and Tross, S.A. (2001) 'Touching behavior in sport: Functional components, analysis of sex differences, and ethological considerations', *Journal of Nonverbal Behavior*, 25(1), pp. 43–62. Available at: https://doi.org/10.1023/A:1006785107778.

Kraus, M.W., Huang, C. and Keltner, D. (2010) 'Tactile communication, cooperation, and performance: An ethological study of the NBA.', *Emotion*, 10(5), pp. 745–749. Available at: https://doi.org/10.1037/a0019382.

Light, K.C., Grewen, K.M. and Amico, J.A. (2005) 'More frequent partner hugs and higher oxytocin levels are linked to lower blood pressure and heart rate in premenopausal women', *Biological Psychology*, 69(1), pp. 5–21. Available at: https://doi.org/https://doi.org/10.1016/j.biopsycho.2004.11.002.

Logie, C., Bridge, T.J. and Bridge, P.D. (2007) 'Evaluating the Phobias, Attitudes, and Cultural Competence of Master of Social Work Students Toward the LGBT Populations',

Journal of Homosexuality, 53(4), pp. 201–221. Available at: https://doi.org/10.1080/00918360802103472.

Lomranz, J. and Shapira, A. (1974) 'Communicative Patterns of Self-Disclosure and Touching Behavior', *The journal of psychology*, 88(2), pp. 223–227. Available at: https://doi.org/10.1080/00223980.1974.9915732.

Major, B. (1981) 'Gender Patterns in Touching Behavior', in *Gender and Nonverbal Behavior*. New York, NY: Springer New York, pp. 15–37. Available at: https://doi.org/10.1007/978-1-4612-5953-4_2.

Major, B., Schmidlin, A.M. and Williams, L. (1990) 'Gender patterns in social touch: The impact of setting and age.', *Journal of Personality and Social Psychology*, 58(4), pp. 634–643. Available at: https://doi.org/10.1037/0022-3514.58.4.634.

Mehrabian, A. (1971) 'Nonverbal communication', *Nebraska Symposium on Motivation*, 19, pp. 107–161.

Messner, M.A. (1990) 'When bodies are weapons: Masculinity and violence in Sport', *International Review for the Sociology of Sport*, 25(3), pp. 203–220. Available at: https://doi.org/10.1177/101269029002500303.

Miller, M.J., Franken, N. and Kiefer, K. (2007) 'Exploring Touch Communication Between Coaches and Athletes', *Indo-Pacific Journal of Phenomenology*, 7(2), pp. 1–13. Available at: https://doi.org/10.1080/20797222.2007.11433953.

Missakian, E.A. (1973) 'The timing of fission among free-ranging rhesus monkeys', *American Journal of Physical Anthropology*, 38(2), pp. 621–624. Available at: https://doi.org/https://doi.org/10.1002/ajpa.1330380277.

Mitchell, G. and Tokunaga, D.H. (1976) 'Sex differences in nonhuman primate grooming', *Behavioural Processes*, 1(4), pp. 335–345. Available at: https://doi.org/10.1016/0376-6357(76)90015-2.

Morris, D. (1977) 'Manwatching : a field guide to human behaviour'. New York: H.N. Abrams.

NCSA College Recruiting All Rights Reserved (2024) *College Softball*. Available at: https://www.ncsasports.org/articles-1/college-softball (Accessed: 17th December 2024)

Newton-Fisher, N. (2021) ‘Animal Behaviour Pro’. App.

Newton-Fisher, N.E. and Lee, P.C. (2011) ‘Grooming reciprocity in wild male chimpanzees’, *Animal Behaviour*, 81(2), pp. 439–446. Available at: https://doi.org/https://doi.org/10.1016/j.anbehav.2010.11.015.

Out on the Fields (2020) *Homophobia in Sport*. Available at: https://outonthefields.com/ Accessed: 17th December 2024)

Payne, H., Lawes, M. and Henzi, S.P. (2003) ‘Competition and the Exchange of Grooming Among Female Samango Monkeys (Cercopithecus Mitis Erythrarchus)’, *Behaviour*, 140(4), pp. 453–471. Available at: https://doi.org/https://doi.org/10.1163/156853903322127931.

Qualtrics (2024) *How we roll*. Available at: https://www.qualtrics.com/about/ (Accessed: 17th December 2024)

Van Raalte, J.L. *et al.* (2007) ‘The relationship between hazing and team cohesion.’, *Journal of Sport Behavior*, 30(4), pp. 491–507.

Roese, N. *et al.* (1992) ‘Same-sex touching behavior: The moderating role of homophobic attitudes’, *Journal of Nonverbal Behavior*, 16, pp. 249–259. Available at: https://doi.org/10.1007/BF01462005.

Saarinen, A. et al (2021) ‘Social touch experience in different contexts: A review’, *Neuroscience and bio behavioral reviews*, 131, pp. 360–372. Available at: https://doi.org/10.1016/j.neubiorev.2021.09.027.

Sander, D., Grafman, J. and Zalla, T. (2003) ‘The Human Amygdala: An Evolved System for Relevance Detection’, *Reviews in the Neurosciences*, 14(4). Available at: https://doi.org/10.1515/REVNEURO.2003.14.4.303.

Sappington, R. (2021) *‘Locker Room (Rape) Culture’ and Male Athletes’ Attitudes Toward Sexual Violence: Exploring Psychosocial Dimensions of Masculinity in Sport*. ProQuest Dissertations & Theses.

Schanberg, S.M. and Field, T.M. (1987) ‘Sensory Deprivation Stress and Supplemental Stimulation in the Rat Pup and Preterm Human Neonate’, *Child Development*, 58(6), pp. 1431–1447. Available at: https://doi.org/10.2307/1130683.

Scroggs, G. (1979) *Sex, Status, and solidarity: Attributions for interpersonal touching*. Doctoral Dissertation. University of New Hampshire.

Silverman, A.F., Pressman, M.E. and Bartel, H.W. (1973) 'Self-Esteem and Tactile Communication', *Journal of Humanistic Psychology*, 13(2), pp. 73–77. Available at: https://doi.org/10.1177/002216787301300209.

Smith, D. et al (1982) 'Interpersonal Touch and Compliance with a Marketing Request', *Basic and applied social psychology*, 3(1), pp. 35–38. Available at: https://doi.org/10.1207/s15324834basp0301_3.

Sorokowska, A. *et al.* (2021) 'Affective Interpersonal Touch in Close Relationships: A Cross-Cultural Perspective', *Personality and Social Psychology Bulletin*, 47(12), pp. 1705–1721. Available at: https://doi.org/10.1177/0146167220988373.

Sorokowski, P. *et al.* (2013) 'Montesquieu hypothesis and football: players from hot countries are more expressive after scoring a goal', *Polish Psychological Bulletin*, 44(4), pp. 421–430. Available at: https://doi.org/10.2478/ppb-2013-0045.

Sparks, J. (1967) 'Allogrooming in Primates: A Review.', in *Primate ethology.* New Brunswick, NJ, US: Aldine Transaction, pp. 148–175.

Spink, K.S. (1992) 'Group cohesion and starting status in successful and less successful elite volleyball teams', *Journal of Sports Sciences*, 10(4), pp. 379–388. Available at: https://doi.org/10.1080/02640419208729934.

Stier J, D.H. (1984) 'Gender Differences in Touch: An Empirical and Theoretical review', *Journal of Personality and Social Psychology*, 47(2), pp. 440–459. Available at: https://content.apa.org/fulltext/1985-01241-001.pdf?auth_token=62795cab7fc2151c64c4b180c645232cf880f481&returnUrl=https%3A%2F%2Fcontent.apa.org%2Frecord%2F1985-01241-001.

Sumioka, H. *et al.* (2013) 'Huggable communication medium decreases cortisol levels', *Scientific Reports*, 3(1), p. 3034. Available at: https://doi.org/10.1038/srep03034.

Suvilehto, J.T., Cekaite, A. and Morrison, I. (2023) 'The why, who and how of social touch', *Nature Reviews Psychology*, 2(10), pp. 606–621. Available at: https://doi.org/10.1038/s44159-023-00217-5.

Thiese, M.S., Ronna, B. and Ott, U. (2016) 'P value interpretations and considerations.', *Journal of thoracic disease*, 8(9), pp. E928–E931. Available at: https://doi.org/10.21037/jtd.2016.08.16.

Trotter, P. D., *et al.* (2018). Construction and validation of the touch experiences and attitudes questionnaire (TEAQ): A self report measure to determine attitudes toward and experiences of positive touch. Journal of Nonverbal Behavior, 42(4), 379–416. Available at: https://doi.org/10.1007/s10919 018-0281-8

Ulrich-Lai, Y.M. and Herman, J.P. (2009) 'Neural regulation of endocrine and autonomic stress responses.', *Nature reviews. Neuroscience*, 10(6), pp. 397–409. Available at: https://doi.org/10.1038/nrn2647.

University of Kent (2024) *What makes a degree?* Available at: https://www.kent.ac.uk/courses/undergraduate/apply/how-courses-work (Accessed: 17th December 2024)

Vulakh, G. *et al.* (2023) 'Attributions of LGBTQ+ Identity and Religious Views on Homosexuality to Disaffiliation from Orthodox Judaism', *Religions*, 14(3), p. 381. Available at: https://doi.org/10.3390/rel14030381.

Webb, A., & Peck, J. (2015). Individual differences in interpersonal touch: On the development, validation, and use of the 'comfort with interpersonal touch' (CIT) scale. Journal of Consumer Psychology, 25(1), 60–77. Available at: https://doi.org/10.1016/j. jcps.2014.07.002

Wheldall, K., Bevan, K. and Shortall, K. (1986) 'A Touch of Reinforcement: the effects of contingent teacher touch on the classroom behaviour of young children', *Educational Review*, 38(3), pp. 207–216. Available at: https://doi.org/10.1080/0013191860380301.

Whitcher, S.J. and Fisher, J.D. (1979) 'Multidimensional reaction to therapeutic touch in a hospital setting.', *Journal of Personality and Social Psychology*, 37(1), pp. 87–96. Available at: https://doi.org/10.1037/0022-3514.37.1.87.

Willemse, C.J.A.M. and van Erp, J.B.F. (2019) 'Social Touch in Human–Robot Interaction: Robot-Initiated Touches can Induce Positive Responses without Extensive Prior Bonding', *International Journal of Social Robotics*, 11(2), pp. 285–304. Available at: https://doi.org/10.1007/s12369-018-0500-9.

Willer, R. *et al.* (2013) 'Overdoing Gender: A Test of the Masculine Overcompensation Thesis', *American Journal of Sociology*, 118(4), pp. 980–1022. Available at: https://doi.org/10.1086/668417.

Williams, N.D. *et al.* (2022) 'Professional expectations of provider LGBTQ competence: Where we are and where we need to go', *Journal of Gay & Lesbian Mental Health*, 28(2), pp. 286–311. Available at: https://doi.org/10.1080/19359705.2022.2146825.

Wilson, C.C. (1987) 'Physiological Responses of College Students to a Pet', *The Journal of Nervous and Mental Disease*, 175(10). Available at: https://journals.lww.com/jonmd/fulltext/1987/10000/physiological_responses_of_college_students_to_a.5.aspx.

Yates, K., Stanley, C.R. and Bettridge, C.M. (2022) 'The effects of allogrooming and social network position on behavioural indicators of stress in female lion-tailed macaques (Macaca silenus)', *Behavioural Processes*, 202, p. 104740. Available at: https://doi.org/https://doi.org/10.1016/j.beproc.2022.104740.