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Blurred lines or clear boundaries? Synchrony and social dominance shape domain-specific self–other processing

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ABSTRACT

Synchronous behaviour is widespread across social species and is a common feature of human social interaction. Prior research demonstrates that synchrony can alter self–other processing, yet findings are inconsistent, potentially due to task differences and individual variability. In this preregistered study (54 dyads), we examined whether synchronous finger tapping influences self–other cognition across three domains: episodic memory, source memory, and emotion. Synchrony increased source memory performance but did not affect item memory. In contrast, synchrony heightened emotional egocentric bias, suggesting that synchrony can sharpen self–other differentiation in memory while increasing reliance on one's own affective state when inferring others' emotions. Social dominance moderated certain effects. Dyads with higher combined dominance exhibited stronger synchrony, and dominant individuals showed greater egocentric responding in memory tasks, maintaining a self-referential bias in source memory after synchronous movement. These findings highlight domain-specific consequences of synchrony and the importance of interpersonal traits in shaping synchrony outcomes.

1. Introduction

Synchronized movement is widespread across social species and is a pervasive feature of human social life (Greenfield et al., 2021). Across cultures, people regularly move together in dance, religious rituals, military drills, and everyday coordinated activities (Reddish et al., 2013). Synchrony is associated with broad social and psychological benefits, including increased affiliation, cooperation, prosocial behaviour, trust, and feelings of connectedness (Mogan et al., 2017; Rennung & Göritz, 2016; Valdesolo et al., 2010; Wiltermuth & Heath, 2009). These outcomes have contributed to the widespread assumption that synchrony exerts a general influence on social cognition, promoting alignment between individuals and strengthening interpersonal bonds. However, findings on how synchrony affects cognitive processes underlying self and other representations are mixed and often contradictory (Hu et al., 2022). One contributing factor is that most studies examine a single outcome measure, making it difficult to determine whether synchrony influences self–other processing uniformly or whether its consequences are domain specific. A second factor is that individual differences have largely been overlooked, particularly personality traits that may shape how individuals respond to synchronous interaction within dyads.

Synchronous movement can be experimentally induced using relatively simple tasks such as joint finger tapping, which reliably produces interpersonal alignment and mutual adaptation (Konvalinka et al., 2010). When partners can hear each other while tapping, both individuals modulate their timing to minimize temporal mismatch and maintain synchrony, creating a dynamic coupling process that reflects continuous action–perception updating (Heggli, Cabral, et al., 2019). Mutual adaptation contrasts with leader–follower dynamics, in which one individual sets the tempo and the other adjusts based on the leading partner (Konvalinka et al., 2010). Under predictive processing accounts, mutual adaptation reduces representational discrepancy between predicted and observed actions, thereby minimizing processing costs associated with self–other distinctions (Hoehl et al., 2021; Koban et al., 2019). Finger tapping paradigms provide an ideal platform to study cognitive consequences of synchrony because they elicit real-time interpersonal adjustments without requiring complex motor planning or semantic processing. In the present study, we use this paradigm to examine how synchrony influences self–other processing across multiple

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cognitive domains and to test whether individual differences in social dominance modulate these effects. We further characterize synchrony-related alignment using a computational modeling framework to verify that dyads engaged in mutual adaptation rather than independent timing strategies.

Self–other integration is central to social cognition, supporting functions such as mentalizing, empathic responding, and joint action planning (de Guzman et al., 2016; Lamm et al., 2016). A large literature has examined how self-referential processing varies across memory, attention, emotion, and perception. For example, information related to the self is typically remembered better than information related to others, known as the self-reference effect (Dent & Martin, 2023; Martin et al., 2017; Symons & Johnson, 1997). This self-bias is not fixed; it diminishes when the other person is psychologically close or socially meaningful (Chen et al., 2021; Kokici et al., 2023; Sui et al., 2012). Synchrony appears to modulate these biases. Some studies show that synchronized movement reduces the self-reference effect and increases memory for partner-related information (Miles, Nind, et al., 2010), while others find either no effect or increased self-referential effect following synchrony (Cross et al., 2021). These divergent outcomes have led to different theoretical accounts of how synchrony may influence self–other cognition. Notably, prior studies vary in whether synchrony is performed concurrently with the cognitive task or separately. For example, in Miles, Nind, et al. (2010), encoding occurred during synchronous movement, potentially engaging overlapping attentional and motor processes. In contrast, the present study examines whether synchrony influences subsequent self–other processing after the interaction has ended, allowing us to assess downstream effects across multiple cognitive domains.

One influential view proposes that synchrony increases overlap between self- and other-related representations. According to the shared circuits model, performing an action and observing a partner's action engage overlapping neural processes, which may blur agentic boundaries (Hove, 2008; Hurley, 2008). On this account, closer coupling during synchrony produces greater representational merging, facilitating prosocial behaviour by increasing perceived similarity and shared identity (Hove & Risen, 2009; Paladino et al., 2010; Tarr et al., 2014). An alternative account emphasizes shifts in attentional prioritization. Rather than collapsing boundaries between self and other, synchrony may increase attention toward the synchronous partner, leading to enhanced encoding of partner-related information simply because they become attentionally prioritized (Macrae et al., 2008; Woolhouse & Lai, 2014). A third account proposes that synchrony induces positive affective states, which in turn enhance social alignment and performance in general across social interaction tasks (Isen, 2008; Tschacher et al., 2014). Each of these accounts can explain some findings in the literature, but none fully resolves why synchrony improves performance in some contexts while impairing or biasing performance in others.

An important consideration is that self–other biases are not uniform across cognitive domains. Studies report that self-biases in attention, perception, memory, and motor representation are often dissociable (Amodeo et al., 2021; Nijhof et al., 2020; Pronizius et al., 2022). Even within episodic memory, item memory and source memory rely on partially distinct cognitive and neural mechanisms (Chirtop et al., 2025; Slotnick et al., 2003). Whilst item memory and source memory may both reflect offline representational binding, they do not require active, online control of self-other representations. In contrast, online tasks demand the active inhibition of one's own perspective to adopt that of another. For instance, perspective-taking tasks require individuals to suppress their own viewpoint to accurately infer another's perspective (e.g., Martin, Huang, et al., 2019; Martin, Perceval, et al., 2019; Santiesteban et al., 2012). Similarly, the emotional egocentricity paradigm developed by von Mohr et al. (2020) assesses the online ability to suppress either their own or their partner's emotional experience. Participants were presented with congruent or incongruent emotional stimuli and reported on either their own or another's emotional experience. During incongruent trials, participants' emotional responses shifted toward the alternate perspective, with this shift being more pronounced when they were required to inhibit their own emotional experience, a phenomenon known as the emotional egocentricity bias. Examining these domains within the same experimental framework therefore provides a critical test of whether synchrony promotes general self–other merging or exerts selective effects depending on the underlying cognitive demands.

This domain-specific perspective generates distinct predictions for the three theoretical accounts. If synchrony promotes self–other overlap, it should reduce self-bias broadly, leading to enhanced encoding of partner-related information and reduced egocentric interference during affective judgments. In contrast, if synchrony primarily reflects attentional prioritization, its effects should be more selective, enhancing processing of partner-related information in memory tasks, particularly source memory, which depends on accurate contextual binding, without necessarily reducing egocentric bias. Finally, if synchrony operates via affective alignment, it may increase reliance on one's own internal states when interpreting others, resulting in greater emotional egocentricity bias, potentially alongside more general effects on memory. Assessing multiple domains within the same participants therefore provides a critical test of whether synchrony produces consistent or dissociable cognitive effects.

Individual differences likely contribute to variability in how synchrony affects self–other processing. Factors such as social competence, punctuality, and group membership have been shown to influence spontaneous synchrony (Miles et al., 2011; Miles, Griffiths, et al., 2010; Schmidt et al., 1994). Here, we focus on social dominance, defined as a preference for controlling social interactions and exerting influence (Hawley, 2002). Dominance has been linked to differences in decision making and confidence (Belotelova & Martin, 2025; da Cruz et al., 2018), but little is known about how dominance shapes cognitive consequences of synchronous movement. Because synchrony depends on partner coordination, personality traits may influence not only how synchrony unfolds but also how individuals encode and interpret information during shared activity.

In this preregistered study (https://osf.io/gv3hd), we examined whether synchronous movement influences self–other processing in three tasks: item memory, source memory, and emotional egocentricity bias. We also investigated how social dominance within dyads relates to both synchrony and cognitive outcomes. Joint finger tapping was used to induce synchrony, and computational alignment measures were used to confirm mutual adaptation within dyads. By assessing multiple cognitive domains within the same participants, we aimed to determine whether synchrony exerts domain-general or domain-specific cognitive effects and to identify whether personality traits contribute to variability in these effects.

2. Method

A comprehensive methods section is included in supplementary section A.

2.1. Participants

An a priori power analysis was conducted in R using the WebPower package (Zhang & Yuan, 2018), based on a repeated-measures design with four groups and one within-subject condition with two levels ($\alpha = 0.05$, power $= 0.80$). Assuming a medium-to-large effect size ($f = 0.325$), consistent with prior synchrony research (e.g., Cross et al., 2021; Miles, Nind, et al., 2010), the required sample size was estimated at $N = 108/54$ dyads. We note, however, that while this sample size provides adequate power to detect medium-to-large effects, higher-order interactions are typically smaller in magnitude and therefore more difficult to detect. Accordingly, interaction effects are interpreted with appropriate caution. One hundred and eight healthy adults (54 dyads, M age = 20.70, SD = 3.08) were recruited via a research participation scheme or local advertisements at The University of Kent, UK. The sample comprised 78 women, 26 men, and 6 participants who identified as another gender. Dyad members were unfamiliar with each other, reported no diagnosed mental health conditions, and provided informed consent. Participants received course credit or monetary compensation. Dyads with identical social dominance scores were excluded and replaced to maintain the target sample of 54 dyads.

2.2. Design and overview

The study used a between-dyad manipulation of movement synchrony (synchronous vs asynchronous). Each dyad first completed a joint finger-tapping manipulation and then, in separate cubicles, completed cognitive tasks indexing self–other processing: item memory, source memory, and emotional egocentricity bias (EEB). Social dominance was assessed at baseline and used to classify dyad members as dominant versus non-dominant for analysis. All tasks were coded in PsychoPy3 (Peirce et al., 2019)

2.3. Movement manipulation

Dyads sat side-by-side at a single keyboard. Each participant was assigned a key ("A" or "L"). Five one-minute tapping trials were completed with short breaks. In the synchronous condition, partners attempted to match their taps in time with each other, using auditory feedback from their taps, while refraining from verbal or non-verbal communication. In the asynchronous condition, each participant tapped to an independent metronome presented through headphones (63 vs 100 bpm) without auditory feedback from their partner's taps. Although participants remained physically co-present, performed the task concurrently, and could observe one another's movements, the use of independent metronomes prevented mutual temporal adaptation between partners. An experimenter remained in the room to monitor compliance.

2.4. Cognitive measures and questionnaires

2.4.1. Self-referential memory (item and source)

During encoding, participants rated 60 trait adjectives (30 self, 30 partner) on a 1–9 scale for accuracy with respect to themselves or their partner. Adjectives were matched for valence and arousal (Warriner et al., 2013). Following the EEB task, a recognition test presented the 60 studied adjectives interleaved with 60 matched lures. Participants first made an item recognition judgment (new v old word) and, for items judged old, made a source judgment (self vs partner). Responses were self-paced.

2.4.2. Emotional egocentricity bias (EEB)

We employed the von Mohr et al. (2020) paradigm. On each trial, participants heard an affective sound while viewing an image that was described as depicting the partner's concurrent experience. Trials were either congruent (sound and image of the same valence) or incongruent (opposite valence), with incongruent trials creating a conflict between self- and other-related affective information. Participants were instructed to rate either their own emotional experience or that of their partner, depending on the trial cue. Emotional egocentricity bias was indexed by the extent to which ratings were shifted toward the irrelevant affective perspective on incongruent trials, relative to congruent trials. The task comprised 36 trials with randomized presentation (nine congruent and nine incongruent per agent).

2.5. Self–other overlap measure

We used the Other-in-the-Self Scale (Aron et al., 1992; Gächter et al., 2015), which displays seven Venn diagrams depicting varying degrees of overlap between self and other. Participants selected the diagram best representing perceived closeness. Scores range 1–7.

2.6. Social dominance

Trait dominance was measured with the Dominance subscale of the Personality Research Form E (PRF; Jackson, 1974). Each dyad member was classified as dominant or non-dominant based on their relative scores within the dyad. This classification was selected because the present hypotheses concerned dominance as a social position within a specific interaction rather than absolute trait dominance across the sample. As synchrony occurs between interacting partners, we examined whether occupying the relatively dominant versus relatively non-dominant role within a dyad influenced cognitive responses following synchronous movement. Full item wording, scoring details, and reliability information are provided in the Supplementary Materials.

2.7. Procedure

After consent and baseline questionnaires, dyads completed the movement manipulation. Participants were then seated in separate cubicles to complete the self-referential memory task (encoding phase), the EEB task, and the memory recognition test. Finally, participants completed the self–other overlap measure and were debriefed.

2.8. Statistical analysis

The study was preregistered; data and analysis scripts are available at https://osf.io/gv3hd. Item and source memory were analyzed using 2 (Condition: synchronous, asynchronous) × 2 (Dominance: dominant, non-dominant) × 2 (Agent: self, partner) mixed ANOVAs on sensitivity (d') and response bias (criterion). EEB was quantified as congruency effects and analyzed with Condition, Dominance, Agent, and Valence as factors. Formulas for d' and criterion followed standard signal detection theory. To verify that the manipulation induced interpersonal synchrony, we conducted computational alignment analyses on the tapping data; full modeling procedures and outcomes are reported in the Supplementary Materials.

3. Results

The synchronous (M = 20.81 years) and asynchronous (M = 20.09 years) groups did not differ significantly in age, $t(106) = -1.43$, $p = .16$, or gender distribution, $\chi^2(4) = 5.40$, $p = .25$. The synchronous group included 42 women, 10 men, and 2 participants who identified as other. The asynchronous group included 34 women, 16 men, and 4 participants who identified as other. Synchronous (M = 7.85) and asynchronous (M = 7.22) groups did not differ in social dominance, $t(106) = -0.83$, $p = .41$.

As expected, participants classified as the dominant member of the dyad scored significantly higher on the PRF Dominance scale ($M = 10.02$, $SD = 3.28$) than participants classified as the non-dominant member ($M = 5.06$, $SD = 2.80$), $t(53) = 12.83$, $p < .001$.

Means and standard deviations across all self-other task conditions are provided in Table 1.

3.1. Item memory sensitivity

We observed a significant main effect of Agent, $F(1,103) = 24.82$, $p < .001$, $\eta^2_p = 0.19$, indicating that self-encoded words ($M = 1.89$) were remembered better than other-encoded words ($M = 1.70$).

A significant interaction between Dominance and Agent was also found, $F(1, 103) = 4.35$, $p = .04$, $\eta^2_p = 0.04$. Post hoc tests revealed that the effect of Agent was stronger in the dominant partner (*Self*: $M = 1.98$, *Other*: $M = 1.72$) compared to the non-dominant partner (*Self*: $M = 1.80$, *Other*: $M = 1.69$). Specifically, the effect of Agent was significant for the

Table 1
Task Performance as a Function of Movement Synchrony and Dyad Dominance: Means and Standard Deviations.

		Asynchronous M (sd)	Synchronous M (sd)
Item Memory d'	*Dominant Member*		
	Self	1.92 (0.53)	2.04 (0.45)
	Partner	1.70 (0.44)	1.73 (0.58)
	Non-Dominant Member		
	Self	1.78 (0.79)	1.81 (0.45)
	Partner	1.63 (0.73)	1.75 (0.39)
Item Memory Criterion	*Dominant Member*		
	Self	1.15 (0.18)	1.24 (0.24)
	Partner	0.60 (0.28)	0.65 (0.29)
	Non-Dominant Member		
	Self	1.14 (0.41)	1.16 (0.29)
	Partner	0.67 (0.40)	0.65 (0.35)
Source Memory d'	*Dominant Member*		
	Self	2.21 (0.69)	2.61 (0.74)
	Partner	2.15 (0.66)	2.41 (0.77)
	Non-Dominant Member		
	Self	2.29 (0.75)	2.53 (0.64)
	Partner	2.28 (0.85)	2.50 (0.58)
Source Memory Criterion	*Dominant Member*		
	Self	0.15 (0.23)	0.17 (0.30)
	Partner	0.40 (0.23)	0.42 (0.29)
	Non-Dominant Member		
	Self	−0.01 (0.28)	0.17 (0.19)
	Partner	0.59 (0.32)	0.36 (0.21)
EEB Congruency Effect	*Dominant Member*		
	Self Positive	−0.90 (2.01)	−0.41 (0.88)
	Self Negative	−0.95 (1.60)	−0.28 (0.83)
	Partner Positive	−2.48 (2.34)	−3.15 (2.56)
	Partner Negative	−2.22 (2.60)	−3.11 (2.47)
	Non-Dominant Member		
	Self Positive	−1.00 (1.73)	−0.47 (0.90)
	Self Negative	−0.50 (1.71)	−0.27 (0.95)
	Partner Positive	−2.00 (2.39)	−2.74 (2.53)
	Partner Negative	−1.40 (2.33)	−2.72 (2.62)

dominant partner, $t(52) = 5.00$, $p < .001$, d = 0.69, and significant but weaker for the non-dominant partner, $t(52) = 2.06$, $p = .04$, d = 0.28 (see Fig. 1).

The main effects of Condition, $F(1, 103) = 0.53$, $p = .47$, $\eta^2_p = 0.005$, and Dominance, $F(1, 103) = 1.06$, $p = .31$, $\eta^2_p = 0.01$, were not significant. Likewise, the interaction between Condition and Dominance was not significant, $F(1, 103) = 0.001$, $p = .98$, $\eta^2_p < 0.001$. Similarly, the interaction between Condition and Agent was not significant, $F(1, 103) = 0.001$, $p = .98$, $\eta^2_p < 0.001$. Finally, the three-way interaction among Condition, Dominance, and Agent was also not significant, $F(1, 103) = 1.60$, $p = .21$, $\eta^2_p = 0.02$.

3.2. *Item memory criterion*

A main effect of Agent was identified, $F(1,103) = 272.73$, $p < .001$, $\eta^2_p = 0.73$, with a higher criterion for responding self (M = 1.17) than responding other (M = 0.64). All interactions with Condition, Dominance were non-significant (p's between 0.25 and 0.99).

3.3. *Source memory sensitivity*

Sensitivity for sourcing self-encoded words (M = 2.41) was greater than for other-encoded words (M = 2.34), $F(1,104) = 4.79$, $p = .03$, $\eta^2_p = 0.04$. Participants in the synchronous condition showed greater source sensitivity compared to those in the asynchronous condition (M = 2.51 v M = 2.23), $F(1,104) = 4.40$, $p = .04$, $\eta^2_p = 0.04$, see Fig. 2. All other main effects and interactions were non-significant (p's between 0.12 and 0.71).

3.4. *Source memory criterion*

A main effect of Agent was identified, with a higher criterion for other-sourced words (M = 0.44) compared to self-sourced words (M = 0.12), $F(1,104) = 45.81$, $p < .001$, $\eta^2_p = 0.31$.

An interaction between Agent x Condition x Dominance was

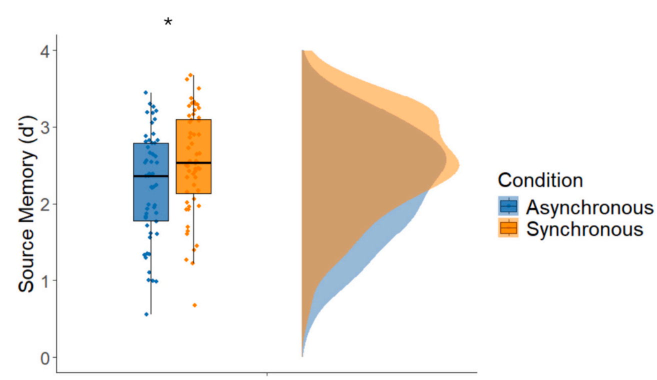

Fig. 2. Synchronous movement improved source memory overall.

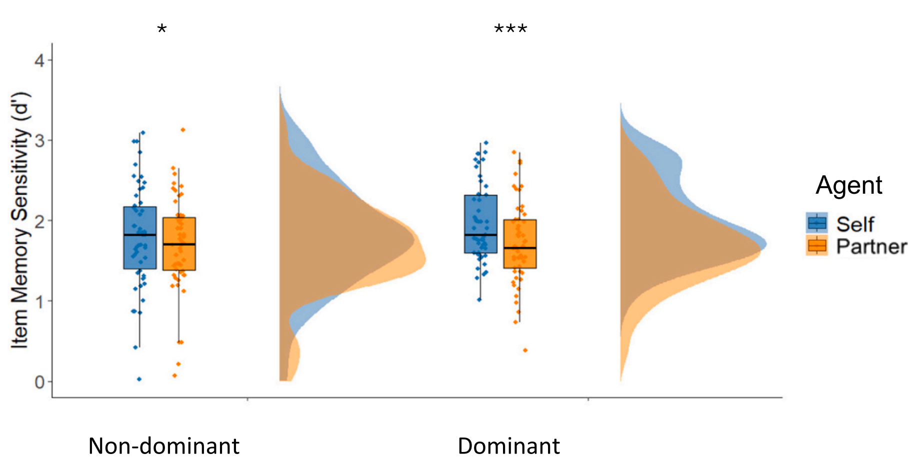

Fig. 1. Self-Reference Effect in Item Memory Across Non-Dominant and Dominant Partners. *Note.* Larger self-reference effect in the dominant compared to non-dominant members of the dyads.

identified, $F(1,104) = 4.12$, $p = .04$, $\eta^2_p = 0.04$. To explore this interaction we computed separate analyses for the dominant member and the non-dominant member, respectively. For the dominant member, no Agent x Condition effect was found, $F(1,52) = 0.001$, $p = .97$, $\eta^2_p < 0.001$. Whereas, for the non-dominant member, a significant interaction was identified, $F(1,52) = 8.33$, $p = .006$, $\eta^2_p = 0.14$. Simple effects analysis demonstrated that synchronous movement shifted responses to sourcing to the partner, $t(52) = 3.03$, $p = .004$, $d = 0.29$ and away from the self, $t(52) = -2.60$, $p = .01$, $d = 0.29$. Alternatively, the self-referential effect observed in the asynchronous movement condition, $t(26) = -5.20$, $p < .001$, $d = -1.00$, was reduced in the synchronous movement condition, $t(26) = -2.60$, $p = .02$, $d = -0.50$. See Fig. 3.

3.5. Emotional egocentricity bias

We identified main effects of Agent, $F(1, 104) = 46.89$, $p < .001$, $\eta^2_p = 0.31$, and Valence, $F(1, 104) = 4.33$, $p = .04$, $\eta^2_p = 0.04$. The congruency effect was stronger for the other perspective ($M = 2.48$) compared to the self perspective ($M = 0.60$), indicating greater emotional interference from the self perspective, indicative of an EEB. The congruency effect for positive stimuli ($M = 1.64$) was greater than for negative stimuli ($M = 1.43$), demonstrating that interference was greatest when trying to inhibit non-relevant negative content.

A significant Agent × Condition interaction was also identified, $F(1, 104) = 6.27$, $p = .01$, $\eta^2_p = 0.06$. Follow-up analyses showed that interference from the self perspective was greater in the synchronous group compared to the asynchronous group, $F(1, 52) = 50.3$, $p < .001$, $\eta^2_p = 0.49$, and $F(1, 52) = 8.30$, $p = .01$, $\eta^2_p = 0.14$, respectively. In summary, participants in the synchronous condition exhibited greater interference from their own emotional experience when judging their partner's emotional experience compared to those in the asynchronous condition (see Fig. 4).

The main effects of Condition, $F(1, 104) = 0.77$, $p = .38$, $\eta^2_p = 0.007$, and Dominance, $F(1, 104) = 1.50$, $p = .22$, $\eta^2_p = 0.01$, were not significant. For the two-way interactions, Condition × Dominance, $F(1, 104) = 0.21$, $p = .65$, $\eta^2_p = 0.002$; Agent × Dominance, $F(1, 104) = 0.69$, $p = .41$, $\eta^2_p = 0.007$; Condition × Valence, $F(1, 104) = 1.27$, $p = .26$, $\eta^2_p = 0.01$; Dominance × Valence, $F(1, 104) = 1.30$, $p = .26$, $\eta^2_p = 0.01$; and Agent × Valence, $F(1, 104) = 0.06$, $p = .81$, $\eta^2_p = 0.001$, were all non-significant.

Similarly, none of the three-way interactions reached significance, including Condition × Dominance × Valence, $F(1, 104) = 1.05$, $p = .31$, $\eta^2_p = 0.01$; Condition × Agent × Valence, $F(1, 104) = 1.43$, $p = .23$, $\eta^2_p = 0.01$; Dominance × Agent × Valence, $F(1, 104) = 0.24$, $p = .63$, $\eta^2_p = 0.002$; and Condition × Dominance × Agent, $F(1, 104) = 0.003$, $p = .96$, $\eta^2_p < 0.001$.

Finally, the four-way interaction among Condition, Dominance, Agent, and Valence was also not significant, $F(1, 104) = 0.06$, $p = .80$, $\eta^2_p = 0.001$.

Movement synchrony and exploratory analyses are presented in Supplementary Section B.

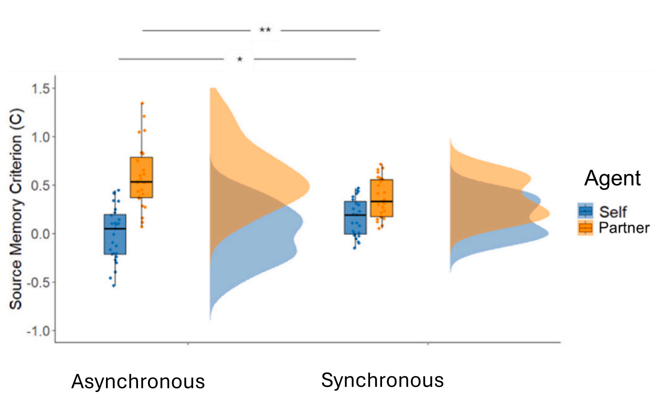

Fig. 3. In the non-dominant member of the dyad, synchronous movement reduced the difference between response bias (criterion) for self and other.

3.6. Self-other overlap

No significant differences in explicit self–other overlap, as measured by the Other-in-the-Self Scale, were observed as a function of synchronous versus asynchronous finger-tapping (2.67 v 2.19), $F(1,104) = 2.24$, $p = .14$, $\eta^2_p = 0.02$. Social dominance also did not influence self–other overlap (non-dominant: 2.61 v dominant: 2.24), $F(1,104) = 1.32$, $p = .25$, $\eta^2_p = 0.01$, and there was no interaction between synchrony and dominance, $F(1,104) = 1.32$, $p = .25$, $\eta^2_p = 0.01$.

4. Discussion

The present findings demonstrate that synchronous movement does not exert a uniform influence on self–other processing. Instead, the consequences of synchrony vary across cognitive domains. Synchronous finger tapping enhanced source memory performance, while increasing emotional egocentric bias. This dissociation indicates that synchrony does not reflect a single mechanism that globally shifts representational boundaries between self and other. Rather, the effects of synchrony appear shaped by the representational demands of the task. When precise contextual discrimination is required, synchrony was associated with improved source memory. When inferring another's affective state, synchrony was associated with greater projection from one's own emotional state. This domain specificity provides a potential explanation for why prior research reports both increased prosocial alignment and increased self–other blurring following synchronous interaction.

The findings can be interpreted in light of three theoretical accounts that make distinct predictions across cognitive domains. First, self–other overlap accounts propose that synchrony increases representational overlap between self and other (Hove, 2008; Hove & Risen, 2009; Hurley, 2008; Paladino et al., 2010; Tarr et al., 2014). This increased overlap may influence self–other processing by altering the degree to which representations are shared or distinguished, but does not make a single directional prediction for self-bias. We did not observe a uniform shift in self-bias: synchrony did not reduce the self-referential effect in item memory and was associated with increased egocentric bias in the emotional task. This pattern suggests that synchrony does not produce a consistent change in self–other distinction across domains.

Second, attentional prioritization accounts propose that synchrony enhances processing of partner-related information, particularly in tasks requiring contextual binding (Macrae et al., 2008; Woolhouse & Lai, 2014). Consistent with this, synchrony improved source memory performance, which depends on accurately linking information to its origin.

Third, affective accounts propose that synchrony induces positive affective states, which can facilitate cognitive processing more broadly, particularly in socially relevant contexts (Isen, 2008; Tschacher et al., 2014). On this view, synchrony should lead to general improvements in performance across tasks, rather than domain-specific effects. We did not observe this pattern: synchrony did not enhance item memory and was associated with increased egocentric bias in the emotional task. This suggests that the effects of synchrony cannot be explained solely by a general affective facilitation mechanism. Taken together, these findings do not support a single domain-general mechanism, but instead suggest that synchrony engages multiple processes depending on task demands.

Notably, synchrony did not influence self-reported self–other overlap as measured by the Other-in-the-Self Scale. This may appear inconsistent with the observed increase in emotional egocentricity bias. However, these effects likely reflect dissociable processes. The Other-in-the-Self Scale captures explicit, reflective judgments about interpersonal closeness (Aron et al., 1992), whereas emotional egocentricity bias reflects online inferential processes that rely on one's own affective state when judging another (von Mohr et al., 2020). The present findings therefore

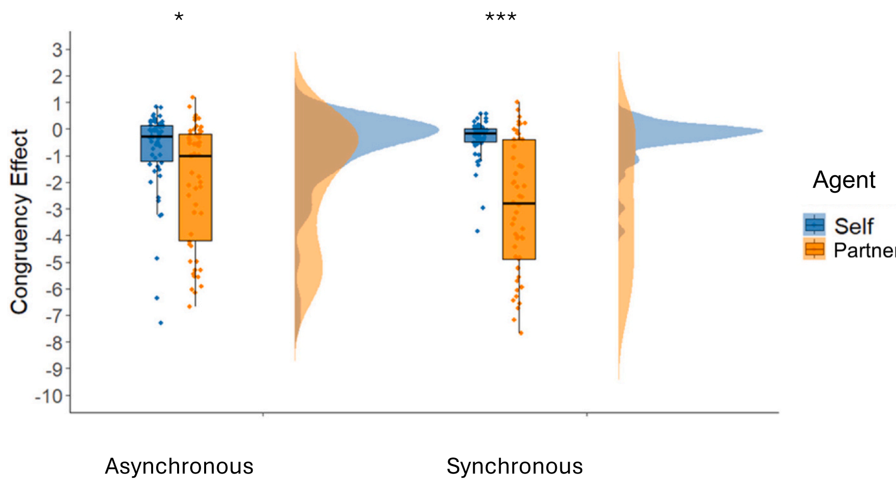

Fig. 4. Congruency effect in the emotional egocentricity bias task across conditions.

suggest that synchrony does not necessarily increase perceived self–-other merging at an explicit level, but may instead modulate how self-related information is used during social inference. In this sense, increased egocentric bias may reflect a shift in processing strategy rather than a change in perceived self–other overlap.

Mutual adaptation in synchronous movement supports a mechanistic interpretation of these domain-specific effects. Our computational alignment analysis showed that dyads achieved close temporal coupling and that both partners adjusted their actions over time. Prior work indicates that mutual adaptation is the dominant strategy when individuals attempt to synchronize movements and that it reflects continuous monitoring of both internal motor plans and external sensory cues from a partner (Konvalinka et al., 2010). From a representational perspective, this form of coordination likely requires tracking both self and other signals, creating an opportunity for enhanced encoding of contextual information that supports source memory. Synchrony therefore may enhance memory not by collapsing self and other representational boundaries, but by increasing the salience of both agents within the interaction. At the same time, this same heightened attunement could increase reliance on self-generated affective states when judging emotionally ambiguous or incongruent experiences, producing greater egocentric projection.

The improvement in source memory following synchrony aligns with research showing that contextual binding contributes to accurate source discrimination (Chirtop et al., 2025; Slotnick et al., 2003). Synchrony may increase attention to relational details and strengthen binding between agent and content. In contrast, the increased emotional egocentricity following synchrony is consistent with the idea that emotional inference relies heavily on one's own affective state as a heuristic (Nickerson, 1999; O'Brien & Ellsworth, 2012; Steinbeis, 2016). When individuals feel increased connection or alignment with another person, they may overgeneralize from their own internal state to the other. This pattern is consistent with work showing that self–other attunement can enhance affiliative intentions, but at a cost to accuracy under certain emotional contexts (e.g., Kirsch et al., 2023). Similarly, research using empathic accuracy paradigms suggests that while some forms of behavioral alignment can facilitate understanding, interactional synchrony does not necessarily improve, and may even reduce, the accuracy of inferring a partner's internal state (Fujiwara & Daibo, 2022). Synchrony therefore appears to modulate the balance between representational precision and affective resonance depending on task demands.

Social dominance further shaped these effects. Although synchrony improved source memory generally across the sample, dominance moderated response bias. After the synchronous interaction, less dominant individuals were more likely to attribute items to their partner and more conservative when attributing items to themselves. This suggests that synchrony influenced decision strategies rather than sensitivity for this group. One interpretation is that non-dominant individuals became more socially oriented toward their partner after synchrony, increasing the likelihood of selecting this response when uncertain. Dominance may therefore serve as a boundary condition on the cognitive consequences of synchronous behaviour. Dominant individuals may maintain independence in encoding strategies even during coordinated action, consistent with evidence that dominance is associated with more self-directed social behaviour (Cheng et al., 2010; Johnson et al., 2012). These findings highlight the importance of considering individual differences not only in isolation, but relative to the specific social partner.

Our exploratory analyses indicated that dyads higher in combined dominance synchronized more tightly. Although preliminary, this supports theoretical accounts proposing that dominance can facilitate coordination by providing clarity and decisiveness during joint action (Anderson & Kilduff, 2009). Because these findings were correlational and not preregistered hypotheses, they should be interpreted cautiously. However, they point toward the possibility that dominance may not only shape the cognitive consequences of synchrony, but the success of synchrony itself.

A key methodological difference between the present study and prior work (e.g., Miles, Nind, et al., 2010) is that synchrony and encoding were performed sequentially rather than simultaneously. In Miles, Nind, et al. (2010), participants encoded information while engaging in synchronous movement, which may introduce dual-task demands and potential interference between motor coordination and encoding processes. In contrast, the present design separated the synchrony manipulation from subsequent cognitive tasks to isolate the downstream effects of interpersonal coordination on self–other processing. This approach allowed us to examine whether synchrony induces a transient shift in cognitive processing that persists beyond the interaction itself, rather than reflecting online attentional or motor coupling effects. Moreover, the sequential design enabled the inclusion of multiple cognitive measures (item memory, source memory, and emotional egocentricity bias), some of which are not compatible with concurrent movement paradigms. While these differences limit direct comparison of effect sizes across studies, both paradigms converge on the question of how synchrony modulates self–other processing. As such, the present findings are best interpreted as complementary, suggesting that synchrony may influence cognition both during interaction and in subsequent offline processing stages.

Additionally, Miles, Nind, et al. (2010) employed a whole-body synchrony task, which may have involved deeper or more complex predictive processes and coordination compared to finger-tapping. However, despite using a relatively subtle finger-tapping paradigm compared to whole-body synchrony tasks, evidence from interpersonal synchrony research indicates that finger tapping with auditory feedback is sufficient to induce robust perceptions of coordination when supported by contingent sensory feedback (Konvalinka et al., 2010). Our findings are therefore consistent with this broader literature on low-level motor synchrony effects.

Several limitations qualify these interpretations. Our dominance measure was not designed specifically for student samples, and future research could employ dominance assessments validated specifically for younger adult populations or integrate measures of social power, which may have dissociable effects (Gilad & Maniaci, 2022). In addition, dyads were not explicitly assigned based on dominance differences, and future studies could manipulate high versus low dominance partner pairings. The asynchronous condition minimised mutual temporal adaptation through independent metronomes. Consequently, the manipulation contrasted synchronous and asynchronous physical movement, but did not capture forms of asynchronous interpersonal coordination in which partners actively monitor and adapt to one another despite remaining temporally misaligned. Future research could directly compare coupled asynchronous coordination, uncoupled asynchronous movement, and synchronous coordination to determine whether the cognitive effects observed here arise from temporal alignment itself or from the broader process of interpersonal coupling. Task order in the present study was fixed due to task structure, and future designs could examine whether temporal proximity between synchrony and task performance is necessary for domain-specific effects to emerge. Our sample included both men and women, but gender differences in synchrony and self–other processing merit further study (Gaggioli et al., 2019; Zhang et al., 2023). Finally, two-person neuroscience frameworks offer opportunities to examine neural mechanisms underlying these effects (Redcay & Schilbach, 2019). Hyperscanning designs could test whether neural coupling during synchrony predicts domain-specific cognitive consequences and whether dominance influences coupling strength.

Despite these limitations, these findings advance understanding of how synchronous behaviour influences social cognition. The present work suggests that synchrony may exert beneficial or biasing effects depending on the situational demands of the cognitive domain. Rather than assuming a single synchrony mechanism, this research suggests that synchrony modulates self–other processing selectively, sharpened in contexts where agent differentiation supports successful behaviour and blurred in contexts reliant on inference from internal states. Moreover, individual differences in dominance alter how people interpret and respond to synchronous interaction, highlighting the need to account for personality when predicting variability in synchrony outcomes. Together, these findings motivate a move toward theoretical models that consider synchrony not as a single process, but as a context-sensitive social coordination signal that interacts with both cognitive architecture and interpersonal traits.

CRediT authorship contribution statement

C.M. Bates: Writing – review & editing, Writing – original draft, Visualization, Supervision, Investigation, Formal analysis, Data curation, Conceptualization. **S. Dias Salgado:** Writing – original draft, Investigation, Data curation, Conceptualization. **M. Von Mohr:** Writing – original draft, Supervision, Methodology, Formal analysis. **I. Konvalinka:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Formal analysis. **A.K. Martin:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare no conflict of interests. The project was funded by internal PhD funds awarded to Chloe Bates. No Artificial Intelligence assisted technologies were used in this research or in the creation of this article. Ethical approval was granted by The School of Psychology at The University of Kent [Ethics ID: 202316764833608347. The hypotheses and methods were preregistered prior to data collection (https://osf.io/gv3hd). Exploratory analyses not preregistered were included in the supplementary section. Data and analysis scripts are available at the above address.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cognition.2026.106632.

Data availability

link in manuscript

References

Amodeo, L., Wiersema, J. R., Brass, M., & Nijhof, A. D. (2021). A comparison of self-bias measures across cognitive domains. *BMC Psychology, 9*(1), 132. https://doi.org/10.1186/s40359-021-00639-x

Anderson, C., & Kilduff, G. J. (2009). Why do dominant personalities attain influence in face-to-face groups? The competence-signaling effects of trait dominance. *Journal of Personality and Social Psychology, 96*(2), 491–503. https://doi.org/10.1037/a0014201

Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology, 63*, 596–612. https://doi.org/10.1037/0022-3514.63.4.596

Belotelova, A., & Martin, A. K. (2025). Confidence does not equal competence: Socially dominant individuals are more confident in their decisions without being more accurate. *Personality and Individual Differences, 236*, Article 113037. https://doi.org/10.1016/j.paid.2024.113037

Chen, L., Mo, D., Zou, Q., & Lin, S. (2021). Closeness impeded self-perspective inhibition whereas facilitated explicit perspective calculation. *Acta Psychologica, 220*, Article 103387. https://doi.org/10.1016/j.actpsy.2021.103387

Cheng, J. T., Tracy, J. L., & Henrich, J. (2010). Pride, personality, and the evolutionary foundations of human social status. *Evolution and Human Behavior, 31*(5), 334–347. https://doi.org/10.1016/j.evolhumbehav.2010.02.004

Chirtop, G., Bates, C., & Martin, A. K. (2025). The self and friend reference effects in episodic memory are maintained in older adults. *Aging, Neuropsychology, and Cognition, 32*(6), 992–1010. https://doi.org/10.1080/13825585.2025.2554155

Cross, L., Atherton, G., & Sebanz, N. (2021). Intentional synchronisation affects automatic imitation and source memory. *Scientific Reports, 11*(1), 1. https://doi.org/10.1038/s41598-020-79796-9

da Cruz, J., Rodrigues, J., Thoresen, J. C., Chicherov, V., Figueiredo, P., Herzog, M. H., & Sandi, C. (2018). Dominant men are faster in decision-making situations and exhibit a distinct neural signal for promptness. *Cerebral Cortex, 28*(10), 3740–3751. https://doi.org/10.1093/cercor/bhy195

Dent, E., & Martin, A. K. (2023). Negative comments and social media: How cognitive biases relate to body image concerns. *Body Image, 45*, 54–64. https://doi.org/10.1016/j.bodyim.2023.01.008

Fujiwara, K., & Daibo, I. (2022). Empathic accuracy and interpersonal coordination: Behavior matching can enhance accuracy but interactional synchrony may not. *The Journal of Social Psychology, 162*(1), 71–88.

Gächter, S., Starmer, C., & Tufano, F. (2015). Measuring the closeness of relationships: A comprehensive evaluation of the 'inclusion of the other in the self' scale. *PLoS ONE, 10*(6), Article e0129478. https://doi.org/10.1371/journal.pone.0129478

Gaggioli, A., Falletta, E. M., Ferrise, F., Graziosi, S., Gallace, A., D'Ausilio, A., … Chirico, A. (2019). Effects of interpersonal sensorimotor synchronization on dyadic creativity: Gender matters. *Frontiers in Psychology, 9*. https://doi.org/10.3389/fpsyg.2018.02604

Gilad, C., & Maniaci, M. R. (2022). The push and pull of dominance and power: When dominance hurts, when power helps, and the potential role of other-focus. *Personality and Individual Differences, 184*, Article 111159. https://doi.org/10.1016/j.paid.2021.111159

Greenfield, M. D., Honing, H., Kotz, S. A., & Ravignani, A. (2021). Synchrony and rhythm interaction: From the brain to behavioural ecology. *Philosophical Transactions of the Royal Society, B: Biological Sciences, 376*(1835), 20200324. https://doi.org/10.1098/rstb.2020.0324 de Guzman, M., Bird, G., Banissy, M. J., & Catmur, C. (2016). Self–other control processes in social cognition: From imitation to empathy. *Philosophical Transactions of the Royal Society, B: Biological Sciences, 371*(1686), Article 20150079. https://doi.org/10.1098/rstb.2015.0079

Hawley, P. H. (2002). Social dominance and prosocial and coercive strategies of resource control in preschoolers. *International Journal of Behavioral Development, 26*(2), 167–176. https://doi.org/10.1080/01650250042000726

Heggli, O. A., Cabral, J., Konvalinka, I., Vuust, P., & Kringelbach, M. L. (2019). A Kuramoto model of self-other integration across interpersonal synchronization strategies. *PLoS Computational Biology, 15*(10), Article e1007422. https://doi.org/10.1371/journal.pcbi.1007422

Hoehl, S., Fairhurst, M., & Schirmer, A. (2021). Interactional synchrony: Signals, mechanisms and benefits. *Social Cognitive and Affective Neuroscience, 16*(1–2), 5–18. https://doi.org/10.1093/scan/nsaa024

Hove, M. J. (2008). Shared circuits, shared time, and interpersonal synchrony. *Behavioral and Brain Sciences, 31*(1), 29–30. https://doi.org/10.1017/S0140525X07003202

Hove, M. J., & Risen, J. L. (2009). It's all in the timing: Interpersonal synchrony increases affiliation. *Social Cognition, 27*(6), 949–961. https://doi.org/10.1521/soco.2009.27.6.949

Hu, Y., Cheng, X., Pan, Y., & Hu, Y. (2022). The intrapersonal and interpersonal consequences of interpersonal synchrony. *Acta Psychologica, 224*, Article 103513. https://doi.org/10.1016/j.actpsy.2022.103513

Hurley, S. (2008). The shared circuits model (SCM): How control, mirroring, and simulation can enable imitation, deliberation, and mindreading. *The Behavioral and Brain Sciences, 31*(1), 1–22. https://doi.org/10.1017/S0140525X07003123

Isen, A. M. (2008). Some ways in which positive affect influences decision making and problem solving. In *Handbook of Emotions* (3rd ed., pp. 548–573). The Guilford Press.

Jackson, D. N. (1974). *Personality Research Form Manual*. Research Psychologists Press.

Johnson, S. L., Leedom, L. J., & Muhtadie, L. (2012). The dominance behavioral system and psychopathology: Evidence from self-report, observational, and biological studies. *Psychological Bulletin, 138*(4), 692–743. https://doi.org/10.1037/a0027503

Kirsch, L. P., Tanzer, M., Filippetti, M. L., von Mohr, M., & Fotopoulou, A. (2023). Mothers are more egocentric towards their own child's bodily feelings. *Communications Psychology, 1*(1), 1–12. https://doi.org/10.1038/s44271-023-00038-5

Koban, L., Ramamoorthy, A., & Konvalinka, I. (2019). Why do we fall into sync with others? Interpersonal synchronization and the brain's optimization principle. *Social Neuroscience, 14*(1), 1–9. https://doi.org/10.1080/17470919.2017.1400463

Kokici, L., Chirtop, G., Ferguson, H. J., & Martin, A. K. (2023). Loneliness is associated with a greater self-reference effect in episodic memory when compared against a close friend. *British Journal of Psychology (London, England: 1953)*. https://doi.org/10.1111/bjop.12646

Konvalinka, I., Vuust, P., Roepstorff, A., & Frith, C. D. (2010). Follow you, follow me: Continuous mutual prediction and adaptation in joint tapping. *Quarterly Journal of Experimental Psychology, 63*(11), 2220–2230. https://doi.org/10.1080/17470218.2010.497843

Lamm, C., Bukowski, H., & Silani, G. (2016). From shared to distinct self–other representations in empathy: Evidence from neurotypical function and socio-cognitive disorders. *Philosophical Transactions of the Royal Society, B: Biological Sciences, 371*(1686), Article 20150083. https://doi.org/10.1098/rstb.2015.0083

Macrae, C. N., Duffy, O. K., Miles, L. K., & Lawrence, J. (2008). A case of hand waving: Action synchrony and person perception. *Cognition, 109*(1), 152–156. https://doi.org/10.1016/j.cognition.2008.07.007

Martin, A. K., Dzafic, I., Ramdave, S., & Meinzer, M. (2017). Causal evidence for task-specific involvement of the dorsomedial prefrontal cortex in human social cognition. *Social Cognitive and Affective Neuroscience, 12*(8), 1209–1218. https://doi.org/10.1093/scan/nsx063

Martin, A. K., Huang, J., Hunold, A., & Meinzer, M. (2019). Dissociable roles within the social brain for self–other processing: a HD-tDCS study. *Cerebral Cortex, 29*(8), 3642–3654. https://doi.org/10.1093/cercor/bhy238

Martin, A. K., Perceval, G., Davies, I., Su, P., Huang, J., & Meinzer, M. (2019). Visual perspective taking in young and older adults. *Journal of Experimental Psychology: General, 148*(11), 2006–2026. https://doi.org/10.1037/xge0000584

Miles, L. K., Griffiths, J. L., Richardson, M. J., & Macrae, C. N. (2010). Too late to coordinate: Contextual influences on behavioral synchrony. *European Journal of Social Psychology, 40*(1), 52–60. https://doi.org/10.1002/ejsp.721

Miles, L. K., Lumsden, J., Richardson, M. J., & Neil Macrae, C. (2011). Do birds of a feather move together? Group membership and behavioral synchrony. *Experimental Brain Research, 211*(3), 495–503. https://doi.org/10.1007/s00221-011-2641-z

Miles, L. K., Nind, L. K., Henderson, Z., & Macrae, C. N. (2010). Moving memories: Behavioral synchrony and memory for self and others. *Journal of Experimental Social Psychology, 46*(2), 457–460. https://doi.org/10.1016/j.jesp.2009.12.006

Mogan, R., Fischer, R., & Bulbulia, J. A. (2017). To be in synchrony or not? A meta-analysis of synchrony's effects on behavior, perception, cognition and affect. *Journal of Experimental Social Psychology, 72*, 13–20. https://doi.org/10.1016/j.jesp.2017.03.009

von Mohr, M., Finotti, G., Ambroziak, K. B., & Tsakiris, M. (2020). Do you hear what I see? An audio-visual paradigm to assess emotional egocentricity bias. *Cognition & Emotion, 34*(4), 756–770. https://doi.org/10.1080/02699931.2019.1683516

Nickerson, R. S. (1999). How we know—And sometimes misjudge—What others know: Imputing one's own knowledge to others. *Psychological Bulletin, 125*(6), 737–759. https://doi.org/10.1037/0033-2909.125.6.737

Nijhof, A. D., Shapiro, K. L., Catmur, C., & Bird, G. (2020). No evidence for a common self-bias across cognitive domains. *Cognition, 197*, Article 104186. https://doi.org/10.1016/j.cognition.2020.104186

O'Brien, E., & Ellsworth, P. C. (2012). More than skin deep: Visceral states are not projected onto dissimilar others. *Psychological Science, 23*(4), 391–396. https://doi.org/10.1177/0956797611432179

Paladino, M. P., Mazzurega, M., Pavani, F., & Schubert, T. W. (2010). Synchronous multisensory stimulation blurs self-other boundaries. *Psychological Science, 21*(9), 1202–1207. https://doi.org/10.1177/0956797610379234

Peirce, J., Gray, J. R., Simpson, S., MacAskill, M., Höchenberger, R., Sogo, H., … Lindeløv, J. K. (2019). PsychoPy2: Experiments in behavior made easy. *Behavior Research Methods, 51*(1), 195–203. https://doi.org/10.3758/s13428-018-01193-y

Pronizius, E., Bukowski, H., & Lamm, C. (2022). Self-Other Distinction Across Motor, Cognitive, and Affective Representations is Neither Unitary Nor Domain-General. https://psyarxiv.com/b2pv9/.

Redcay, E., & Schilbach, L. (2019). Using second-person neuroscience to elucidate the mechanisms of social interaction. *Nature Reviews Neuroscience, 20*(8), 8. https://doi.org/10.1038/s41583-019-0179-4

Reddish, P., Fischer, R., & Bulbulia, J. (2013). Let's dance together: Synchrony, shared intentionality and cooperation. *PLoS ONE, 8*(8), Article e71182. https://doi.org/10.1371/journal.pone.0071182

Rennung, M., & Göritz, A. S. (2016). Prosocial consequences of interpersonal synchrony. *Zeitschrift für Psychologie, 224*(3), 168–189. https://doi.org/10.1027/2151-2604/a000252

Santiesteban, I., Banissy, M. J., Catmur, C., & Bird, G. (2012). Enhancing social ability by stimulating right Temporoparietal junction. *Current Biology, 22*(23), 2274–2277. https://doi.org/10.1016/j.cub.2012.10.018

Schmidt, R. C., Christianson, N., Carello, C., & Baron, R. (1994). Effects of social and physical variables on between-person visual coordination. *Ecological Psychology, 6*(3), 159–183. https://doi.org/10.1207/s15326969eco0603_1

Slotnick, S. D., Moo, L. R., Segal, J. B., & Hart, J. (2003). Distinct prefrontal cortex activity associated with item memory and source memory for visual shapes. *Cognitive Brain Research, 17*(1), 75–82. https://doi.org/10.1016/S0926-6410(03)00082-X

Steinbeis, N. (2016). The role of self–other distinction in understanding others' mental and emotional states: Neurocognitive mechanisms in children and adults. *Philosophical Transactions of the Royal Society, B: Biological Sciences, 371*(1686), 20150074. https://doi.org/10.1098/rstb.2015.0074

Sui, J., He, X., & Humphreys, G. W. (2012). Perceptual effects of social salience: Evidence from self-prioritization effects on perceptual matching. *Journal of Experimental Psychology: Human Perception and Performance, 38*(5), 1105–1117. https://doi.org/10.1037/a0029792

Symons, C. S., & Johnson, B. T. (1997). The self-reference effect in memory: A meta-analysis. *Psychological Bulletin, 121*, 371–394. https://doi.org/10.1037/0033-2909.121.3.371

Tarr, B., Launay, J., & Dunbar, R. I. M. (2014). Music and social bonding: "Self-other" merging and neurohormonal mechanisms. *Frontiers in Psychology, 5*. https://doi.org/10.3389/fpsyg.2014.01096

Tschacher, W., Rees, G. M., & Ramseyer, F. (2014). Nonverbal synchrony and affect in dyadic interactions. *Frontiers in Psychology, 5*. https://doi.org/10.3389/fpsyg.2014.01323

Valdesolo, P., Ouyang, J., & DeSteno, D. (2010). The rhythm of joint action: Synchrony promotes cooperative ability. *Journal of Experimental Social Psychology, 46*(4), 693–695. https://doi.org/10.1016/j.jesp.2010.03.004

Warriner, A. B., Kuperman, V., & Brysbaert, M. (2013). Norms of valence, arousal, and dominance for 13,915 English lemmas. *Behavior Research Methods, 45*(4), 1191–1207. https://doi.org/10.3758/s13428-012-0314-x

Wiltermuth, S. S., & Heath, C. (2009). Synchrony and cooperation. *Psychological Science, 20*(1), 1–5. https://doi.org/10.1111/j.1467-9280.2008.02253.x

Woolhouse, M. H., & Lai, R. (2014). Traces across the body: Influence of music-dance synchrony on the observation of dance. *Frontiers in Human Neuroscience, 8*. https://doi.org/10.3389/fnhum.2014.00965

Zhang, Z., & Yuan, K. H. (2018). *Practical Statistical Power Analysis Using Webpower and R [Computer software]*. ISDSA Press.

Zhang, W., Qiu, L., Tang, F., & Sun, H.-J. (2023). Gender differences in cognitive and affective interpersonal emotion regulation in couples: An fNIRS hyperscanning. *Social Cognitive and Affective Neuroscience, 18*(1), Article nsad057. https://doi.org/10.1093/scan/nsad057