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# Tracking mouse trajectories related to decisions about sexual interest

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## Abstract

The current research explored continuous behavioral processes by recording participants' hand movements towards a response option using Mousetracker software. Across three studies, we tested the idea that sexual interest-related decisions can be indexed using automatic movements. Using a UK sample of self-identified same and opposite-gender attracted men ($N$ = 43), Study 1 showed that the process of approaching the response button is faster, more direct, and less curved when participants respond from their own (vs. a non-preferred) perspective. Study 2 supported these findings using a German sample of self-identified same- and opposite-gender attracted men ($N$ = 66). Using a teleiophilic sample of 100 self-identified opposite-gender attracted men ($n$ = 51) and women ($n$ = 49), Study 3 examined age-specific sexual interests (i.e., responding to stimuli from a pedophilic and a teleiophilic perspective). As expected, in the teleiophilic block, participants' responses were faster, more direct, and less curved than in the pedophilic block. Collectively, the results suggest that mousetracking shows promise as a measure of sexual interest (across the dimension of both gender and age), providing grounds for future research.



**KEY WORDS:** sexual interest; mousetracking; decision-making; indirect assessment; perspective-taking

## Introduction

Sexual interest can be defined as the predisposition to respond sexually to a preferred category (Rullo, Strassberg, & Israel, 2010). These categories can include types of people (e.g., men, women) and/or activities (e.g., submission; Lammers & Imhoff, 2016). Furthermore, they can be typical categories (e.g., adults) or atypical (e.g., children). Atypical sexual interests, such as a pedophilic interest, are of particular interest to forensic researchers and clinicians as they are linked to sexual offending, both empirically (Klein, Schmidt, Turner, & Briken, 2015) and theoretically (Seto, 2017), and are predictive of sexual recidivism (Hanson & Morton-Bourgon, 2005). Thus, it is important to develop reliable and valid tools for assessing sexual interest.

Sexual interest is often assessed using direct measures, such as self-report questionnaires (Kalmus & Beech, 2005). However, individuals with an atypical sexual interest (e.g., pedophilia) may be inclined to lie on self-report measures. This may be due to the fear of stigmatization (Imhoff, 2015; Jahnke, Imhoff, & Hoyer, 2015) or, in the case of those incarcerated for a sexual offense, an anticipated repercussion (e.g., a longer sentence). An alternative approach is to measure genital responses to sexual stimuli (i.e., phallometry). However, despite demonstrating good discriminative ability (Freund, Watson, & Dickey, 1991; Looman & Marshall, 2001), phallometry is limited by being intrusive, laborious, and plagued by considerable proportions of non-responders (Fromberger et al., 2012). In light of these issues, researchers have adapted socio-cognitive tasks to indirectly assess sexual interest (Bartels, Gray, & Snowden, 2016). These 'indirect measures' of sexual interest are appealing as they are thought to provide information that is introspectively unavailable and/or affected by dissimulation.

One commonly used indirect measure is Viewing Time (VT). On VT tasks, participants rate the attractiveness of various sexual stimuli (e.g., images of adults and children). Sexual interest is inferred by a longer time spent looking at certain sexual stimuli. VT has been shown to index sexual interest in same and opposite-gender attracted men (Imhoff et al., 2010), as well as pedophilic interest (Schmidt, Babchishin, & Lehmann, 2017). However, Imhoff, Schmidt, Weiß, Young, and Banse (2012) found that VT effects are not solely due to stimulus-driven attentional processes but also task-specific effects. In other words, longer reaction-times for sexually preferred targets are mainly due to deciding if a stimulus meets subjectively relevant criteria. If it does not, the target can be quickly rejected (i.e., judged as not attractive).

Another approach involves categorizing preferred and non-preferred sexual stimuli, whereby *faster* reaction-times denote the possible presence of a sexual interest. The most commonly used measure of this kind is the Implicit Association Test (IAT; Greenwald, McGhee, & Swartz, 1998). In relation to sexual interest, the IAT works on the idea that sex-related attributes (e.g., 'sexy', 'sexually attractive') are strongly associated with a particular category of interest (e.g., men, women, children). Thus, respondents are expected to categorize stimuli related to sex and their preferred category quicker than sex and non-preferred stimuli. For example, pedophilic individuals would be expected to categorize children and sex-related stimuli faster than they categorize adult and sex-related stimuli (Babchishin, Nunes, & Hermann, 2013). However, the IAT only provides a relative, rather than absolute, measure of sexual interest, making it difficult to interpret the nature or direction of the assessed association (Snowden, Craig, & Gray, 2011). Also, it does not provide a pure measure of automatic associations. Rather, IAT responses are the product of a joint contribution of multiple processes, both automatic and controlled (Gonsalkorale, Sherman, & Klaure, 2014; Sherman, Klauer, & Allen, 2010). Thus, the resulting reaction-time data does not offer any insight into these underlying processes, as it only captures the end product.

To address these issues, an alternative option is to use a task that can inherently capture and convey these different processes. Mousetracking offers this possibility as it provides a real-time assessment of the processes at play during the categorization of stimuli, rather than just the end product (Freeman, Ambady, Rule, & Johnson, 2008; Freeman & Ambady, 2010).

**Mousetracking**

Researchers have found that motor-movements can reveal the real-time cognitive processing that occurs in parallel with the movement, rather than being the outcome of cognitive processing (Freeman, Dale, & Farmer, 2011; Goodale, Pelisson, & Prablanc, 1986). On this basis, motor-movements have been used to investigate higher-level cognitive processing that may not otherwise be revealed by traditional methods (Song & Nakayama, 2006). In particular, mousetracking (i.e., assessing hand movements by tracking mouse trajectories on a computer-based task) has become a popular method (Duran, Dale, & McNamara, 2010; McKinstry, Dale, & Spivey, 2008; Spivey, Grosjean, & Knoblich. 2005).

A common approach employed in mousetracking studies involves participants categorizing stimuli presented on-screen by moving the mouse to (and clicking) one of two category labels positioned in the top left and right corners of the screen. For each trial, the x-y-coordinates of the mouse cursor (as it moves towards a category label) are recorded. The Mousetracker software developed by Freeman and Ambady (2010) provides researchers with a freely-available means to do this. The software provides three outcomes based upon an aggregation of all trials; namely, Reaction Times (RT), Maximum Deviation (MD), and Area Under the Curve (AUC). RT is the time taken (in milliseconds) for the participant to respond to the stimuli presented, whereas MD and AUC are computations of the participants' mouse trajectories. MD is the furthest point of the averaged trajectories from an idealized, straight mouse trajectory, and AUC is the geometric area between the idealized trajectory and a participant's actual mouse trajectories.

Mousetracker has been used to study numerous aspects of social cognition. For example, Freeman et al. (2008) asked participants to categorize faces as either men or women. They found that when presented with less typical faces (e.g., men with long hair), participants' mouse movements were initially attracted towards the opposite category (e.g., women). This was demonstrated through larger MD and AUC scores; that is, the larger the scores, the greater the attraction to the unselected (or incorrect) label. Wojnowicz et al. (2009) examined participants' evaluative judgements (like vs. dislike) about Black and White people. When participants had to click the "Like" response for Black people, mouse trajectories tended to initially gravitate towards the "Dislike" option, before clicking on 'Like'. More recently, Harper, Bartels, and Hogue (2016) used mousetracking to examine people's evaluative judgments of pedophiles, while Smith, Treat, Farmer, and McMurray (2018) used it to investigate the factors that influence whether a woman is perceived (by men) as being sexually interested or rejecting. Thus, using MD and AUC data, mousetracking offers a sensitive measure of real-time processing (e.g., detecting partially committed responses, even if not ultimately selected).

## The Present Research

Mousetracking provides useful insights into the processes underlying judgments and preferential decisions. As such, it may be useful for examining the processes that underlie decisions about sexually preferred and non-preferred targets. This was the aim of the three studies reported in the present paper, given the potential implications this would have for assessing atypical sexual interests. The first study examined whether mousetracking could be used in relation to gender-specific sexual interests using a UK-based sample of same- and opposite-gender attracted men. The second study sought to corroborate and extend the findings from Study 1 using a German sample of same- and opposite-gender attracted men. The third study investigated whether mousetracking could be used in relation to age-specific sexual interests using a UK-based sample of self-identified opposite gender attracted men and women. In all three studies, Freeman and Ambady's (2010) Mousetracker software package was used to record and process mouse trajectories.

## Study 1

Before mousetracking is applied to atypical sexual interests (particularly using forensic populations), it is important to first validate whether it can be applied to decisions related to typical, gender-specific sexual interests. Thus, employing a known-groups approach, community men (who self-identified as either same- or opposite-gender attracted) were asked to respond to target stimuli from both gender-attracted perspectives. It was hypothesized that both groups of men would show less curved mouse trajectories (and faster RTs) when categorizing stimuli from their own perspective, relative to a perspective that differs from their own.

## Method

### *Participants*

Forty-seven British men were recruited from the general community and a UK-based university, with 24 self-identifying as same-gender attracted ($M_{age}$ = 22.5, *SD* = 4.2) and 23 as opposite-gender attracted ($M_{age}$ = 24.1, *SD* = 6.5). To address potential concerns about our single-item measure of sexual orientation, we examined its convergence with a sexual interest 'feeling thermometer' (Snowden & Gray, 2008, 2013). This measure assessed respondents' feeling towards the concept of "sex with men" (and "sex with women") using a scale ranging from 1 to 10 (1 = "cold/unfavorable" and 10 = "warm/favorable"). Self-identified opposite-gender attracted men reported greater sexual interest in women ($M$ = 9.93, $SD$ = 0.23) than the self-identified same-gender attracted men ($M$ = 1.32, $SD$ = 1.79), $t(23.79) = 23.44$, $p < .001$. Conversely, sexual interest in men was greater for same-gender attracted men ($M$ = 9.57, $SD$ = 0.90) relative to opposite-gender attracted men ($M$ = 0.37, $SD$ = 1.11), $t(45) = 31.34$, $p < .001$.

### *Materials*

*Stimuli.* The target stimuli used in the Mousetracker task included 48 images of adult individuals (24 men, 24 women) devised by Ó Ciardha (2010). Each image depicts the target in black underwear against a grey background. This stimulus set has been used in previous research aimed at indirectly assessing sexual interest in same and opposite-gender attracted men (Ó Ciardha & Gormley, 2013).

*Wilson Sex Fantasy Questionnaire* (WSFQ; Wilson, 1978). Using a 6-point Likert scale ranging from 0 (Never) to 5 (Regularly), the WSFQ measures how frequently 40 different sexual fantasies are used. It is comprised of four subscales; Exploratory (e.g., *Sex with two other people*); Intimate (e.g., *Kissing passionately*); Impersonal (e.g., *Intercourse with an anonymous stranger*); and Sadomasochistic (e.g., *Hurting a partner*). In the current study, the WSFQ subscales showed acceptable to good internal consistencies; Impersonal ($\alpha$ = .68); Exploratory ($\alpha$ = .74); Sadomasochistic ($\alpha$ = .85); and Intimate ($\alpha$ = .87). Each subscale was correlated with the mousetracking data to explore whether frequently fantasizing about each overarching theme is associated with automatic sexual decision-making. Also, for the purposes of this study, we were specifically interested in the item labeled 'Homosexual activity', as it was expected to converge with the mousetracking data.

***Procedure***

After consenting to take part, participants were instructed to categorize the 48 (randomly presented) images as "Arousing" or "Non-arousing" from two different perspectives (i.e., a same and opposite-gender attracted perspective). These two perspectives formed the two blocks of the Mousetracker task, which were counterbalanced across participants. To begin each trial, participants clicked on a "Start" button located at the bottom-center of the screen. Once clicked, a single stimulus (depicting either an adult man or woman) was presented in the center of the screen. Each stimulus was categorized by moving the mouse cursor to the "Arousing" or "Non-arousing" label and left-clicking. During the opposite-gender attracted block, participants would click "Arousing" for images of women and 'Non-arousing' for images of men. The opposite occurred in the same-gender attracted block. Consequently, all participants responded from both their own perspective and that of someone with a different gender-attracted sexual interest. The location of the labels (i.e., top-right corner or top-left corner of the screen) were counterbalanced across participants.

During each trial, the x and y coordinates of the mouse were continually recorded with a sampling rate of approximately 75 Hz. To ensure trajectories were capturing participants' online processing (i.e., during the formation of a decision) rather than offline processing (i.e., after a decision has been made), participants had to begin initiating movements immediately. If initiation time (the moment the mouse was first moved) exceeded 400ms from the beginning of the trial (as recommended by Hehman, Stolier, & Freeman, 2015), a message appeared instructing participants to start moving earlier. After the task was completed, participants filled in the WSFQ, were debriefed, and thanked for their time.

**Data Preparation**

Trials with latencies greater than 3000ms (0.3% of all trials) were discarded. Only trials in which participants gave the correct (i.e., normatively expected) response were analyzed. In the opposite-gender attracted perspective block, this included trials in which women were categorized as arousing and men as non-arousing, whereas in the same-gender attracted perspective block, only trials in which men were categorized as arousing or women as non-arousing were analyzed. Thus, for each participant, we had data for four different mouse trajectories: (1) categorizing women from a same-gender attracted perspective; (2) categorizing men from a same-gender attracted perspective; (3) categorizing men from a opposite-gender attracted perspective; and (4) the categorizing women from a opposite-gender attracted perspective. For each of these trajectories, the AUC, MD, and RT data served as dependent variables.

## Results

As Table 1 shows, opposite-gender attracted participants produced less direct mouse trajectories (i.e., greater AUCs and MDs) and longer RTs in the same-gender attracted perspective block, whereas same-gender attracted men exhibited longer RTs and more curved trajectories than opposite-gender attracted men in the opposite-gender attracted perspective block. Figures 1 and 2 show a graphical representation of the average mouse trajectories for both groups (i.e., same-gender vs. opposite-gender attracted individuals) in response to each category for both blocks. These figures show how the mouse trajectories were more direct when participants responded from a perspective that matched their own, but curved towards the other (incorrect) attribute label when responding from a non-congruent perspective.

Insert Table 1 here

Insert Figure 1 here

Insert Figure 2 here

The three dependent variables (AUC, MD, RT) were each subjected to a 2 (Group; opposite-gender attracted vs. same-gender attracted participants) x 2 (Block; opposite-gender attracted vs. same-gender attracted perspective) x 2 (Target Gender; men vs. women stimuli) mixed-model ANOVA, with Group as the between-subjects factor and Block and Target Gender as the within-subjects factors. The critical test of our hypothesis was the interaction between Block and Group, whereby opposite-gender attracted men should generally show greater RTs, AUCs, and MDs within the same-gender attracted perspective block (as there would be an attraction to the normatively incorrect, albeit subjectively valid, response). In contrast, same-gender attracted men were expected to exhibit greater RTs, AUCs, and MDs in the opposite-gender attracted perspective block.

The hypothesized interaction was significant for both AUC ($p$ = .039, $\eta_p^2 = .09$), and RT ($p$ <.001, $\eta_p^2 = .25$), but not MD ($p$ = .29, $\eta_p^2 = .02$) (see Supplementary Materials for full ANOVA results). For RTs, simple main effects revealed that, within the same-gender attracted group, participants were faster when responding from a congruent (same-gender attracted) perspective than from an opposite-gender attracted perspective ($p$ = .001, $d$ = 0.75). Within the opposite-gender attracted group, faster RTs were observed when participants responded from a congruent (opposite-gender attracted) perspective than from a same-gender attracted perspective ($p$ = .014, $d$ = 0.56). Also, opposite-gender attracted men responded faster to stimuli than same-gender attracted men in the opposite-gender attracted block ($p$ = .001, $d$ = 1.11). From a same-gender attracted perspective, same-gender attracted men responded slightly faster than opposite-gender attracted men, but this was not significant ($p$ = .54, $d$ = 0.18) (see Table 1).

For AUC, simple main effects indicated that, for same-gender attracted participants, mouse trajectories were less curved when responding from a same-gender attracted perspective than from an opposite-gender attracted perspective ($p$ = .012, $d$ = 0.57). However, opposite-gender attracted men showed no difference in their mouse movements when responding from an opposite-gender attracted perspective and a same-gender attracted perspective ($p$ = .69, $d$ = 0.08). Furthermore, although the opposite-gender attracted men showed less biased AUCs in the opposite-gender attracted block compared to same-gender attracted men, the difference was not significant ($p$ = .40, $d$ = 0.32). This can be seen visually in Figure 1 where the average mouse curvatures only minimally differ between groups (see also Table 1). Similarly, same-gender attracted men showed smaller AUCs within the same-gender attracted perspective compared to opposite-gender attracted men (see Figure 2), yet this difference was also non-significant ($p$ = .29, $d$ = 0.25).

Previous research using PPG and other indirect measures suggest that preference indices (e.g., the difference between 'women are arousing' and 'men are arousing' responses) are often better able to discriminate known-groups relative to absolute scores (Bartels et al., 2017; Harris, Rice, Quinsey, Chaplin, & Earls, 1992). Thus, we calculated preference indices for each dependent variable (i.e., AUC, MD, and RT), whereby positive scores indicated an opposite-gender attracted preference and negative scores indicated a same-gender attracted preference. As Table 2 shows, the RT index was in the expected direction for both the opposite-gender attracted men and same-gender attracted men, with a strong difference between the groups ($p$ <.001, $d$ = 1.13). As shown in Table 2, this was also the case for the AUC index ($p$ = .01, $d$ = 0.76).

Insert Table 2 here

Finally, the use of same-gender attracted sexual fantasies was negatively correlated with RT preference index ($r$ = -.46, $p$ = .001), the AUC index ($r$ = -.40, $p$ = .006), and the MD index ($r$ = -.33, $p$ = .022). Thus, a stronger preference for men (assessed via mousetracking) was associated with a greater use of same-gender attracted sexual fantasies. In addition, a significant negative association was observed between the Intimate subscale and the AUC index ($r$ = -.30, $p$ = .043), suggesting that a stronger preference for men is related to the frequent use of intimate sexual fantasies (see Supplementary Materials for full correlation results).

**Discussion**

Study 1 showed that the mouse movements of same-gender attracted men were faster and less curved when responding from a same-gender attracted perspective relative to an opposite-gender attracted perspective. For opposite-gender attracted men, faster mouse movements were elicited when responding to stimuli from an opposite-gender attracted perspective relative to a same-gender attracted perspective. Group differences were only observed in relation to RTs in the opposite-gender attracted block, with opposite-gender attracted men responding faster to stimuli than same-gender attracted men. However, preference indices for RT and AUC strongly differentiated between the groups. Finally, the greater use of same-gender attracted sexual fantasies was associated with a same-gender attracted preference, providing convergent validity for the Mousetracker task. The Intimate WSFQ subscale also correlated with the AUC index, suggesting that this index may measure the use of conventional/romantic sexual fantasies.

These initial results are promising. However, the lack of a difference in absolute mouse trajectories between groups highlights some possible methodological issues. For example, the category labels (i.e., ‘Arousing’ vs. ‘Non-arousing’) may lacked sufficient erotic valence. As such, they may have been less effective at inciting automatic biases. Thus, labels with more erotic valence may be more appropriate. Also, although frequently used in previous Mousetracker studies, the initiation time of 400ms may have proved difficult for participants. As such, they may have been making early random movements in order to bypass the 400ms threshold, dampening sensitivity (Hehman et al., 2015).

## Study 2

Study 2 was essentially a partial replication (and cross-cultural validation) of Study 1, employing a known-groups approach using a German sample of self-identified same-gender attracted and opposite-gender attracted men. It also included a few alternations to the Mousetracker task. First, a longer initiation time of 1000ms was utilized. Second, category labels with greater erotic valence were used (e.g. “Sexually attractive partner”). Third, a larger sample was recruited. Finally, the location of the category labels were kept constant across all participants, with “Sexually attractive partner” always on the top-right and “Not sexually attractive partner” always on the top-left of the screen.

## Method

### *Participants*

Sixty-six German self-identified men (31 same-gender attracted, 35 opposite-gender attracted) with a mean age of 27.79 years (*SD* = 7.49) participated in Study 2. The single item measure of sexual orientation showed convergence with a 10-item sexual interest questionnaire (ESIQ; Banse, Schmidt, & Clarbour, 2010) that assesses sexual interest for each target category (men vs. women). That is, self-identified opposite-gender attracted men reported more sexual interest in women, (*M* = 9.86, *SD* = 0.36) than same-gender attracted men (*M* = 1.84, *SD* = 2.22, *t*(31.36) = 19.86, *p* < .001). Same-gender attracted participants reported greater interest in men (*M* = 9.74, *SD* = 0.93) than opposite-gender attracted participants (*M* = 0.09, *SD* = 0.93), *t*(34.95) = 55.57, *p* < .001.

### *Stimuli*

Target stimuli were 64 images of men and women taken from the 'Not Real People' stimuli set (Pacific Psychological Assessment Corporation, 2004; see Laws & Gress, 2004), featuring post-pubescent men and women targets (Tanner categories 4 and 5). The NRP set has been used in previous indirect measures studies assessing sexual interest in (non-offending) same and opposite-gender attracted men (Imhoff, Schmidt, Bernhardt, Dierksmeier, & Banse, 2011; Rönspies et al., 2015). Half of the stimuli depicted targets in bathing suits, while the other half depicted them nude. The nudity factor did not yield any interpretable effects. None of the reported effects were qualified by an interaction with this factor and, therefore, no further results concerning the nudity factor are reported.

### *Procedure*

Participants categorized 64 target images from two different perspectives (i.e., a same and opposite-gender attracted perspective). As in Study 1, these two perspectives formed the two Mousetracker blocks, which were counterbalanced across participants. Each trial began by participants clicking on the "Start" button located at the bottom-center of the screen. The stimuli were presented in an identical (fixed) randomized order for all participants and were categorized by clicking either the "Attractive sexual partner" label (located in the top-right corner of the screen) or "Not attractive sexual partner" label (located in the top-left corner of the screen). If responses exceeded the 1000ms initiation time, a message appeared instructing participants to move faster. Also, if participants took longer than 8000ms on a trial, the trial was terminated without a response and all data for the trial were coded as missing values (0.3% of all trials). After all 64 trials were completed, participants filled in the ESIQ, were debriefed, and thanked for their time.

**Data Preparation**

Trials with latencies greater than 3,000ms (3.6% of all trials) were discarded. Also, only those trials in which participants gave the normatively expected (i.e., correct) response were analyzed. Thus, as in Study 1, data were obtained for the following mouse trajectories: (1) categorizing women from a same-gender attracted perspective; (2) categorizing men from a same-gender attracted perspective; (3) categorizing men from an opposite-gender attracted perspective; and (4) the categorizing women from an opposite-gender attracted perspective. The same three outcomes (i.e., RT, AUC, MD) were the dependent variables.

**Results**

The AUC, MD, and RT data were subjected to separate 2 (Block; opposite-gender attracted vs. same-gender attracted perspective) x 2 (Target Gender; men vs. women stimuli) x 2 (Group; opposite-gender attracted vs. same-gender attracted participants) mixed-model ANOVAs; with Group as the between-subjects factor and Block and Target Gender as the within-subjects factors. The critical test of the hypothesis was the interaction between Block and Group. An inspection of the means showed that opposite-gender attracted men produced less direct mouse trajectories (i.e., greater AUCs and MDs) and longer RTs in the same-gender attracted perspective (see Table 3). Conversely, same-gender attracted men showed longer RTs and more curved trajectories than opposite-gender attracted men in the opposite-gender attracted perspective. For descriptive purposes, Figures 3 and 4 show participants' mouse movements in response to each stimulus category for both conditions.

Insert Table 3 here

Insert Figure 3 here

Insert Figure 4 here

The hypothesized interaction was significant for RT ($p$ <.001, $\eta_p^2$ = .19), AUC ($p$ = .02, $\eta_p^2$ = .09), and MD ($p$ = .02, $\eta_p^2$ = .08) (see Supplementary Materials for full ANOVA results). For RTs, simple main effects indicated that same-gender attracted participants responded faster from a same-gender attracted perspective than from an opposite-gender attracted perspective ($p$ = .006, $d$ = 0.45). The opposite-gender attracted men had faster RTs when responding from an opposite-gender attracted perspective than from a same-gender attracted perspective ($p$ = .018, $d$ = 0.76). Further, opposite-gender attracted men showed faster responses compared to same-gender attracted men when responding from an opposite-gender attracted perspective ($p$ = .006, $d$ = .74). Within the same-gender attracted block, the difference between groups was not significant ($p$ = .52, $d$ = 0.16) (see Table 3).

Simple main effects showed that the MD was greatest for same-gender attracted participants in opposite-gender attracted perspective block than the same-gender attracted block ($p$ = .04, $d$ = 0.43). For opposite-gender attracted men, MD scores in the same-gender attracted perspective did not differ to that observed in the opposite-gender attracted block ($p$ = .26, $d$ = 0.12). Group differences were in the expected direction. However, opposite-gender attracted men did not significantly differ from same-gender attracted men in the opposite-gender attracted block ($p$ = .23, $d$ = 0.31) or the same-gender attracted block ($p$ = .54, $d$ = 0.15).

For AUC, same-gender attracted participants showed larger AUCs when responding from an opposite-gender attracted perspective than from a same-gender attracted perspective (see Figure 3). However, the difference was not significant ($p$ = .10, $d$ = 0.33). Similarly, opposite-gender attracted men showed larger AUCs when responding from a same-gender attracted perspective than from an opposite-gender attracted perspective, but did not reach significance ($p$ = .07, $d$ = 0.23) (see Figure 4). Similar to MD, differences in AUCs (in each block) between the groups were in the expected direction. However, the difference within the opposite-gender attracted block ($p$ = .32, $d$ = 0.23) and same-gender attracted block ($p$ = .41, $d$ = 0.20) were not significant.

A Target Gender x Block interaction also emerged for RT ($p$ <.001, $\eta_p^2$ = .53), AUC ($p$ <.001, $\eta_p^2$ = .51), and MD ($p$ <.001, $\eta_p^2$ = .54). Mean values and mouse trajectories indicated that, in both perspectives, categorization of the normatively unattractive targets was faster and more expedient (see Table 3). This could be interpreted as a default response of denying sexual attractiveness that had to be actively overcome in the case of (normatively) attractive targets (however, we address an alternative explanation in the Discussion).

Preference indices were computed for each dependent variable, with positive scores indicating an opposite-gender attracted preference and negative scores indicating a same-gender attracted preference. As Table 4 shows, all three indices were in the expected direction, although the groups only significantly differed on the RT index ($p$ = .02, $d$ = 0.66). Finally, none of indices correlated with sexual fantasies about men and women (assessed by the ESIQ), nor the ESIQ total for men and women targets (all $r$'s < .20, $p$'s >.05).

Insert Table 4 here

**Discussion**

The results of Study 2 suggest that responding to non-sexually preferred stimuli as if they are preferred is a difficult task. For example, when opposite-gender attracted men had to classify stimuli from a same-gender attracted perspective, they succeeded in eventually categorizing women as “Not sexually attractive”. However, their mouse trajectories revealed a tendency to move towards the “Sexually attractive partner” label, which needed to be actively overcome to give the correct response. Within congruent blocks, the rejection of non-preferred stimuli was consistently completed faster and with a more direct mouse trajectory compared to the acceptance of preferred stimuli. At first glance, this finding invites speculation about the rejection of sexual attractiveness as the default response that has to be actively overcome to reach a positive decision (i.e., target is sexually attractive). However, there could be an alternative explanation. That is, since most participants can be assumed to be right-handed (based on population-based frequencies), it is conceivable that a movement to the left (i.e., towards the body center) was the more natural movement, compared to moving further to the right (away from the body center). Since “Not sexually attractive partner” was always the option on the left, this could explain the seemingly more direct rejection (versus acceptance). Indeed, in Study 1, which involved counterbalanced label locations between participants, the difference (in speed and mouse trajectory) between rejecting non-preferred images and accepting preferred images was negligible. This could be taken as support for a handedness bias in Study 2, which would suggest that counterbalancing label locations helps reduce this effect. Nevertheless, the handedness bias does not discount the support for our hypothesis. That is, it cannot explain the hypothesized and observed interaction between Block and Group.

## Study 3

Study 3 aimed to test whether mousetracking can be used to assess real-time decisions about age-specific sexual interests using a non-forensic population. It was hypothesized that opposite-gender attracted men and women would exhibit faster and less curved mouse trajectories when categorizing images of adults and children from a teleiophilic perspective, and slower and more curved mouse movements when categorizing such stimuli from a pedophilic perspective. Based on the findings from Study 1 and 2, appropriate category labels with erotic valence were used (e.g., "Sexually exciting" and "Not sexually exciting"). Also, the shorter initiation time of 400ms was used, as recommended by Hehman et al. (2015).

### Method

#### *Participants*

One hundred British self-identified opposite-gender attracted participants (51 men, 49 women) were recruited from the both the general and student community in the UK ($M_{age}$ = 28.90; *SD* = 13.23). Participants' self-categorization as opposite-gender attracted showed convergence with the Kinsey Scale (Kinsey, Pomeroy, & Martin, 1948); a single item rated using a 7-point scale (0 = "Exclusively heterosexual" to 6 = "Exclusively homosexual"). Men reported greater sexual interest in women (*M* = 0.39, *SD* = 0.57), while women reported greater sexual interest in men (*M* = 0.43, *SD* = 0.65). Men and women did not differ on the Kinsey scale, $t(98) = 0.30$, $p = .77$.

#### *Stimuli*

Target stimuli included 40 images of adults (20 men; 20 women) and 40 images of children (20 men; 20 women). Women were shown only images of men (20 adults and 20 children), while men were only shown images of women (20 adult and 20 children). Adult images were derived from Ó Ciardha's (2010) stimuli set (see Study 1), while the images of children were taken from the 'Not Real People' set (Laws & Gress, 2004), with the background and clothing color amended to be consistent with the images of Ó Ciardha's set.

### *Materials*

*Wilson Sex Fantasy Questionnaire* (WSFQ; Wilson, 1978). The details of the WSFQ are described in Study 1. In the current study, the WSFQ subscales showed good internal consistencies; Impersonal ($\alpha$ = .80); Exploratory ($\alpha$ = .79); Sadomasochistic ($\alpha$ = .85); and Intimate ($\alpha$ = .88). As in Study 1, we explored whether fantasizing about these four overarching themes related to sexually categorizing adult and child targets. In addition, two specific items were of interest; namely, 'Having sex with someone much younger than yourself' and 'Seducing an innocent'. Baumgartner, Scalora, and Huss (2002) proposed that these items reflect qualities associated with children (i.e., youth and innocence). Indeed, men who have sexually offended against children, as well community men reporting an interest in sexual activity with children, report using these two fantasies more frequently than nonsexual offenders and non-offending men reporting no interest in child sexual abuse (Bartels, Lehmann, & Thornton, 2018; Baumgartner et al., 2002). Both items also correlate with the self-reported use of sexual fantasies about children (Bartels et al., 2018). Thus, both items appear to tap into a child-related sexual interest and, thus, were of interest for convergent validity purposes in the present study. However, 'Seducing an innocent' was deemed too ambiguous and so only the 'Sex with someone much younger' item was used in the analysis.

### *Procedure*

After being briefed and consenting to take part, participants completed the WSFQ and Mousetracker task. To reduce order-effects, the following strategies were implemented: (1)

half of the sample completed the WSFQ first, while the other half completed the Mousetracker task first; (2) the location of the labels ‘Sexually Exciting’ and ‘Not Sexually Exciting’ (top-left or top-right of the screen) were counterbalanced between participants; and (3) the order of the MT blocks were counterbalanced between participants.

During the Mousetracker task, 40 target images (presented in a randomized order) had to be categorized as either “Sexually Exciting” or “Not Sexually Exciting” from two different perspectives (i.e., a pedophilic perspective and a teleiophilic perspective). These two perspectives reflected the two blocks of the task (40 trials in each). Each trial began when a participant pressed the ‘Start’ button at the bottom-center of the screen. When the target image was presented, participants were required to move the mouse as soon as possible (within a 400ms window) to the ‘correct’ label. After the study, all participants were fully debriefed and thanked for participating.

**Data Preparation**

Trials with latencies greater than 3,000ms (1.6% of all trials) were discarded. Only correct trials (i.e., where normatively expected responses were made) were analyzed. One woman was removed due to a very high error rate. The following mouse trajectories were tested: (1) categorizing adults from a pedophilic perspective; (2) categorizing children from a pedophilic perspective; (3) categorizing adults from a teleiophilic perspective; and (4) categorizing children from a teleiophilic perspective. RT, AUC, and MD outcome data were used as the dependent variables.

## Results

Each dependent variable (AUC, MD, RT) was analyzed using a 2 (Block; pedophilic vs. teleiophilic perspective) x 2 (Target Age; child vs. adult) x 2 (Participant Gender; men vs.

women) mixed-model ANOVA, with Block and Target Age as the within-subjects factors and Participant Gender as the between-subjects factor. We expected to find a significant main effect of Block, whereby participants would generally show larger RTs, AUCs, and MDs during the pedophilic (vs. teleiophilic) perspective block. Descriptive data is conveyed in Table 5 (see also Figure 5).

Insert Table 5 here

Insert Figure 5 here

A main effect of Block was found for RT ($p$ <.001, $\eta_p^2$ = 0.20), AUC ($p$ =.002, $\eta_p^2$ = 0.10), and MD ($p$ =.002, $\eta_p^2$ = 0.09) (see Supplementary Materials for full ANOVA results). As hypothesized, pairwise comparisons indicated that all participants exhibited longer RTs ($p$ <.001, $d$ = 0.53), greater MDs ($p$ = .002, $d$ = 0.32), and greater AUCs ($p$ = .002, $d$ = 0.32) within the pedophilic block relative to the teleiophilic block (see Table 5). This pattern of results can be diagrammatically observed in Figure 5, where the categorization of children as 'sexually exciting' and adults as 'not sexually exciting' involved larger mouse trajectories, whereas the categorization of children as 'not sexually exciting' showed the most direct mouse trajectory.

A main effect of Target Age was also observed for RT ($p$ =.005, $\eta_p^2$ = 0.08), AUC ($p$ =.002, $\eta_p^2$ = 0.10), and MD ($p$ <.001, $\eta_p^2$ = 0.13). Pairwise comparisons showed that participants produced longer RTs ($M$ = 1159ms, $SE$ = 21.1), greater MDs ($M$ =.29, $SE$ = .01), and greater AUCs ($M$ = .41, $SE$ = .02) for adult images compared to the child images ($M_{RT}$ = 1132ms, $SE$ = 19.81, $p$ = .005, $d$ = 0.29; $M_{MD}$ = .25, $SE$ = .01, $p$ <.001, $d$ = 0.38; $M_{AUC}$ = .35, $SE$ = .02, $p$ = .002, $d$ = 0.33). No main effect was found for Participant Gender ($p$ = .44).

The interaction between Block and Target Age was significant for RT ($p$ =.005, $\eta_p^2$ = 0.08), AUC ($p$ =.01, $\eta_p^2$ = 0.06), and MD ($p$ =.004, $\eta_p^2$ = 0.08). For RTs, simple main effects revealed that, within the teleiophilic block, participants categorized children as 'Not Sexually Exciting' faster than adults as 'Sexually Exciting' ($p$ < .001, $d$ = 0.43). No difference was found between adult images and child images in the pedophilic block ($p$ = .73, $d$ = 0.03). Furthermore, participants categorized adults as 'Sexually Exciting' faster than 'Not Sexually Exciting' ($p$ = .002, $d$ = 0.31). They also categorized children as 'Not Sexually Exciting' faster than 'Sexually Exciting' ($p$ < .001, $d$ = 0.57) (see Table 5).

Simple main effects showed a similar pattern of results for both MD and AUC. That is, in the teleiophilic block, participants exhibited a larger curve when categorizing adults as 'Sexually Exciting' compared to when categorizing children as 'Not Sexually Exciting' (for MD, $p$ <.001, $d$ = 0.44; for AUC, $p$ <.001, $d$ = 0.38). No differences were observed in the pedophilic block ($p$'s > .05). Differences were also found between blocks for child images. Participants showed larger curves when categorizing children as 'Sexually Exciting' compared to when categorizing children as 'Not Sexually Exciting' (for MD, $p$ <.001, $d$ = 0.40; for AUC, $p$ <.001, $d$ = 0.39). No differences emerged for the adult images across blocks ($p$'s >.05).

Finally, a significant interaction was also found between Block and Participant Gender for each dependent variable ($p$'s <.05). As this was beyond our research interest, we will not focus on these effects but describe them in detail in the online supplementary materials. The interaction between Participant Gender and Target Age, as well as the three-way interaction, were not significant.

Insert Table 6 here

Preference indices for each outcome variable - whereby positive scores indicate a pedophilic preference, while negative scores indicate a teleiophilic preference - were in the expected (teleiophilic) direction for across the full sample, except for MD (see Table 6). For men, all indices were in the expected direction. For women, only the RT index was in the expected direction, but significantly weaker compared to men ($p$ = .039, $d$ = 0.42).

Given the apparent gender differences, correlation analyses between preference indices and the WSFQ data were conducted separately for men and women, as well as the full sample. Across the full sample, all correlations were small and non-significant. However, for men, the RT preference index was positively and moderately correlated with a greater use of sexual fantasies about 'Having sex with someone much younger than yourself' ($r$ = .31, $p$ = .03), as well as the Impersonal subscale ($r$ = .29, $p$ = .04). Thus, the greater use of sexual fantasies involving child-related characteristics (Baumgartner et al., 2002) and impersonal behaviors was related to a pedophilic response pattern assessed via RTs. For women, all correlations were very small ($r$'s < .20) and non-significant (see Supplementary Materials for full correlation results).

**Discussion**

In this study, participants showed smaller mouse curves and faster RTs when responding from a teleiophilic perspective relative to a pedophilic one, as expected from a general population sample. Also, participants found it particularly easier to reject children as being sexually exciting than to accept adults as sexually exciting. This pattern of responding may be caused by a strong aversion to the idea of judging children as sexual targets. As Glasgow (2017) notes, non-pedophilic individuals are "repulsed by the prospect of sexual activity with a child" (p. 20). Thus, the Mousetracker task may be able to detect sexual aversion, particularly in response to thinking about children in a sexual manner. Finally, in men, a stronger interest in children (i.e., a greater RT-based preference index) was associated with more frequent use of sexual fantasies involving child-related characteristics (Baumgartner et al., 2002). This attests to convergent validity for the Mousetracker task in relation to assessing a sexual interest in children in men. In addition, men's scores on the Impersonal subscale were positively associated with the RT index, suggesting that this index may measure the use of impersonal sexual fantasies. Alternatively, this finding may reflect the view that those with an interest in impersonal sex (most often men; Symons, 1979) are less sexually discriminating (Ward & Siegert, 2002).

**Integrative re-analysis: How uniquely predictive are movement trajectories?**

A noticeable finding across all three studies is that, of the three indices obtained from the mousetracking paradigm (RT, AUC, MD), the only non-spatial component produced much clearer results. That is, relative to spatial mouse-curve data (i.e., AUC and MD), it was RTs that consistently captured both within and between-group differences, often with large effect sizes. This may indicate that RTs most reliably account for differences found when responding to sexual stimuli from one's own versus a different perspective. To test this, we reanalyzed the RT data across all three studies using an ANCOVA, controlling for the effect of AUC scores (given that AUC was more effective than MD at assessing sexual interest). We also reanalyzed the AUC and MD data, controlling for RTs.

Across all three studies, the relevant Block x Group (Studies 1 & 2) and Block x Target (Study 3) interaction of RTs remained significant, even when controlling for AUC (Study 1: $p$ =.007, $\eta p^2 = .16$; Study 2: $p$ =.008, $\eta p^2 = .12$; Study 3: $p = .026$, $\eta p^2 = .05$). In contrast, the ANOVAs provided no indication on any incremental effect on AUC or MD above and beyond the effect on RTs. Specifically, testing for the same interactions but controlling for RT eliminated all effects on AUC (Study 1: $p$ =.31, $\eta p^2 = .03$; Study 2: $p$

=.11, $\eta p^2$ = .04; Study 3: $p$ = .47, $\eta p^2$ = .006), as well as MD (Study 1: $p$ =.60, $\eta p^2$ = .007; Study 2: $p$ =.24, $\eta p^2$ = .02; Study 3: $p$ = .64, $\eta p^2$ = .006).

Together, these results indicate that the RT residuals were able to reproduce the expected main and interactions effects (after partialling out mouse-trajectory effects), whereas the AUC and MD residuals (controlling for RT effects) were not (see Supplementary Materials for the full details). At present, it is not clear whether this is due to the fact that RTs just provide a more reliable estimate as they are purer measures with less noise (i.e., error variance), or whether mouse trajectories are mere epiphenomena. The latter proposition would stand in stark contrast to the assertion of a direct, deterministic, and unique link between cognitive ambivalence between two response options and spatial approximation of two button representing these (Freeman et al., 2008; Stolier & Freeman, 2016). Independent of the exact reason, however, these results potentially provide an avenue for even simpler measurement approaches, which we will discuss below.

## General Discussion

Across three studies, the present paper provides evidence that categorizing targets as sexually attractive (versus not sexually attractive) from an assigned perspective that is different from one's own produces longer reaction times and (literally) less straight-forward responses in a mousetracking paradigm. Using a sample of opposite and same-gender attracted men from the UK, Study 1 established that when participants were asked to classify stimuli according to a particular perspective, their own (self-reported) sexual preference was visible in their performance. In particular, whenever perspective and subjective preference were incongruent, an attraction to the task-dependent invalid response was detectable (via smaller mouse-trajectories and faster RTs). Preference indices were also correlated in the expected direction with the use of same-gender attracted fantasies. Mouse trajectories in

Study 2 showed a similar pattern using a sample of opposite and same-gender attracted German men. However, the correlations between preference indices and sexual fantasies of same and opposite-gender targets were non-significant. Finally, the mousetracking data from Study 3 suggested that opposite-gender attracted men and women from the general community made decisions indicative of a teleiophilic profile, rather than a pedophilic one. Also, the RT preference index for men was correlated in the expected direction with sexual fantasies involving child-related characteristics, but not for women.

Based on the results of all three studies, it can be argued that mousetracking can be used as an indirect measure for assessing sexual interest in relation to a preferred gender (Study 1 and 2) and preferred level of maturation (Study 3). This has implications for forensic researchers and clinicians. In other words, if mousetracking data can provide an indication of typical sexual interests, it could be applied to *atypical* sexual interests (e.g., pedophilic interest using forensic samples). This would also allow for further corroboration of its validity by testing its convergence with other established assessments tools, such as PPG, VT, and relevant offence-related data.

However, it is important to note that our results also suggest that the uniquely predictive variance was not so much captured in actual mouse trajectories but rather in the time taken to make a decision. This may suggest that it is not necessarily the magnetic-like attraction of the respondents' hands to what would be the appropriate response for their own personal sexual interest, but potentially just a greater required cognitive effort to complete the task from an 'alien' perspective. Although this finding may take away a little bit of the magic from the mousetracking effect, it opens up an avenue for parsimonious alternative measures. Completing a task of judging target persons' sexual attractiveness from a perspective that is incoherent to one's own may just be cognitively more taxing (and thus more time-consuming) than completing the same task from a perspective coherent to one's own. It may literally take time to put oneself in another's shoes (across all studies and groups an average of roughly 117 milliseconds). To our best knowledge, this effect has not been thoroughly discussed, let alone exploited in the existing literature. Although previous research (Imhoff et al., 2012) included a side-finding showing that completing a Viewing Time task from a perspective that has opposite-gender preferences takes longer (as indicated by a significant three-way interaction of sexual orientation, assigned perspective sex, and assigned perspective sexual orientation; Table 2), this has not been discussed. Future research may explore this effect more in-depth and potentially capitalize on it in indirect measurement approaches.

In conclusion, the findings presented in this paper demonstrate that mousetracking can be applied to decisions about sexually preferred and non-preferred sexual targets based on gender and maturation. Given that mousetracking provides an insight into the real-time cognitive processes underlying decisions, the task affords researchers an approach to examining specific research questions about how people make decisions about sexual stimuli that other socio-cognitive tasks do not offer. In addition, our findings invite the possibility of using moustracking as an indirect measure for assessing sexual interest. However, in conjunction with previous work, we argue that the mousetracking task (and other response-latency tasks) may actually be assessing perspective-taking costs, rather than the construct of sexual interest per se. Given that this cost appeared to be most effectively captured by the pure reaction-time data, clinicians and researchers (who are purely interested in assessing sexual interest) may want to consider using any response-latency measure at their disposal and applying self-centric and other-centric perspectives. Future researchers are encouraged to explore this wider principle in future work.

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**Table 1.** *Mean (SD) AUC, MD, and RT across Participants' Direction of Sexual Attraction, Block Type, and Target Gender* (*Study 1*)

| | Opposite-gender attracted perspective | | | | | | | | | Same-gender attracted perspective | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stimuli of Men | | | Stimuli of Women | | | All Stimuli | | | Stimuli of Men | | | Stimuli of Women | | | All Stimuli | | |
| | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT |
| Opposite-gender attracted men (*n* = 23) | .41 (.21) | .32 (.12) | 989 (100) | .36 (.15) | .29 (.10) | 1002 (116) | .39 (.14) | .31 (.10) | 996 (103) | .38 (.20) | .29 (.13) | 1053 (123) | .43 (.30) | .31 (.16) | 1071 (154) | .40 (.21) | .30 (.12) | 1062 (134) |
| Same-gender attracted men (*n* = 24) | .42 (.21) | .29 (.14) | 1132 (153) | .46 (.26) | .30 (.14) | 1133 (148) | .44 (.21) | .29 (.13) | 1133 (144) | .31 (.23) | .23 (.14) | 1038 (123) | .39 (.26) | .28 (.16) | 1042 (97) | .35 (.21) | .26 (.13) | 1041 (104) |
| *Group differences*: Cohen's *d* (*p*) | -0.05 (.80) | 0.23 (.34) | **-1.11 (<.001)** | -0.47 (.12) | -0.08 (.92) | **-0.99 (.002)** | 0.32 (.40) | 0.17 (.62) | **-1.11 (.001)** | 0.33 (.29) | 0.32 (.14) | 0.12 (.69) | 0.14 (.67) | 0.19 (.51) | 0.23 (.45) | 0.25 (.29) | 0.32 (.23) | 0.18 (.54) |

*Note*. MD = maximum deviation; AUC = area under the curve; RT = response time in milliseconds. Statistically significant results are in **bold.**

**Table 2:** *Mean (SD) and Group Differences for Each Preference Index* (Study 1)

| | Opposite-gender attracted men ($n$ = 23) | Same-gender attracted men ($n$ = 24) | | |
|---|---|---|---|---|
| | $M$ ($SD$) | $M$ ($SD$) | $p$ | $d$ |
| RT index | 50.24 (119.69) | -95.31 (136.89) | <.001 | 1.13 |
| AUC index | .01 (.19) | -.15 (.23) | .01 | 0.76 |
| MD index | -.01 (.10) | -.07 (.12) | .059 | 0.54 |

*Note*. MD = maximum deviation; AUC = area under the curve; RT = response time in milliseconds

**Table 3**. *ANOVA results for AUC, MD, and RT as a function of Participants' Direction of Sexual Attraction, Target Gender, & Block* (Study 2)

| | Opposite-gender attracted perspective for men | | | | | | | | | Same-gender attracted perspective for men | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stimuli of Men | | | Stimuli of Women | | | All Stimuli | | | Stimuli of Men | | | Stimuli of Women | | | All Stimuli | | |
| | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT |
| Opposite-gender attracted men (*n* = 33) | .20 (.27) | .13 (.13) | 1155 (185) | 1.00 (.73) | .49 (.32) | 1577 (407) | .60 (.40) | .32 (.18) | 1381 (272) | 1.10 (.80) | .52 (.35) | 1764 (369) | .30 (.44) | .17 (.19) | 1355 (283) | .68 (.49) | .34 (.21) | 1559 (259) |
| Same-gender attracted men (*n* = 30) | .32 (.36) | .20 (.20) | 1552 (520) | 1.10 (.86) | .56 (.35) | 1929 (944) | .70 (.46) | .38 (.21) | 1741 (698) | 1.00 (.82) | .52 (.38) | 1750 (395) | .17 (.16) | .11 (.10) | 1256 (253) | .59 (.41) | .31 (.19) | 1517 (272) |
| *Group differences*: Cohen's *d* (*p*) | -0.38 (.13) | -0.42 (.11) | **-1.12 (< .001)** | -0.12 (.65) | -0.21 (.60) | -0.52 (.07) | -0.23 (.32) | -0.31 (.23) | **-0.74 (.01)** | 0.12 (.79) | 0.00 (.97) | 0.04 (.95) | 0.43 (.18) | 0.41 (.15) | 0.37 (.23) | 0.20 (.41) | 0.15 (.54) | 0.16 (.52) |

*Note*. MD = maximum deviation from a direct line; AUC = area under the curve; RT = response time in milliseconds.

**Table 4:** *Mean (SD) and Group Differences for Each Preference Index* (Study 2)

| | Opposite-gender attracted men (*n* = 33) | Same-gender attracted men (*n* = 30) | | |
|---|---|---|---|---|
| | *M* (*SD*) | *M* (*SD*) | *p* | *d* |
| RT index | 186.80 (303.98) | -179.58 (805.28) | .02 | 0.66 |
| AUC index | .11 (.71) | -.08 (.52) | .23 | 0.30 |
| MD index | .03 (.32) | -.04 (.24) | .38 | 0.23 |

*Note*. MD = maximum deviation; AUC = area under the curve; RT = response time in milliseconds

**Table 5.** *Mean (SD) AUC, MD, and RT across Participant Gender, Block Type, and Target Age* (Study 3)

| | Teleiophilic perspective | | | | | | | | | Pedophilic perspective | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Adult Stimuli | | | Child Stimuli | | | All Stimuli | | | Adult Stimuli | | | Child Stimuli | | | All Stimuli | | |
| | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT | AUC | MD | RT |
| Full sample | .41 | .29 | 1130 | .28 | .21 | 1080 | .34 | .25 | 1105 | .42 | .29 | 1189 | .41 | .29 | 1185 | .42 | .29 | 1187 |
| (*N* = 99) | (.29) | (.16) | (204) | (.27) | (.15) | (183) | (.23) | (.13) | (185) | (.29) | (.15) | (253) | (.29) | (.15) | (246) | (.25) | (.13) | (241) |
| Men | .36 | .27 | 1100 | .24 | .19 | 1053 | .29 | .23 | 1076 | .43 | .30 | 1196 | .42 | .29 | 1194 | .43 | .29 | 1196 |
| (*n* = 51) | (.23) | (.14) | (205) | (.27) | (.16) | (197) | (.20) | (.12) | (195) | (.32) | (.17) | (290) | (.29) | (.14) | (285) | (.26) | (.14) | (279) |
| Women | .45 | .31 | 1160 | .33 | .23 | 1108 | .39 | .27 | 1134 | .40 | .28 | 1181 | .41 | .28 | 1174 | .41 | .28 | 1178 |
| (*n* = 48) | (.35) | (.17) | (200) | (.25) | (.15) | (162) | (.24) | (.13) | (171) | (.25) | (.14) | (207) | (.29) | (.16) | (197) | (.23) | (.13) | (195) |

*Note.* MD = maximum deviation from a direct line; AUC = area under the curve; RT = response time in milliseconds.

**Table 6:** *Mean (SD) and Gender Differences for Each Preference Index* (Study 3)

| | Full sample (*N* = 99) | Men (*n* = 51) | Women (*n* = 48) | Gender comparison | |
|---|---|---|---|---|---|
| | *M* (*SD*) | *M* (*SD*) | *M* (*SD*) | *p* | *d* |
| RT index | -55.28 (193.59) | -94.15 (219.30) | -13.97 (153.61) | .039 | 0.42 |
| AUC index | -.01 (.31) | -.06 (.26) | .05 (.34) | .09 | 0.36 |
| MD index | .002 (.15) | -.02 (.14) | .03 (.16) | .15 | 0.33 |

*Note.* MD = maximum deviation; AUC = area under the curve; RT = response time in milliseconds

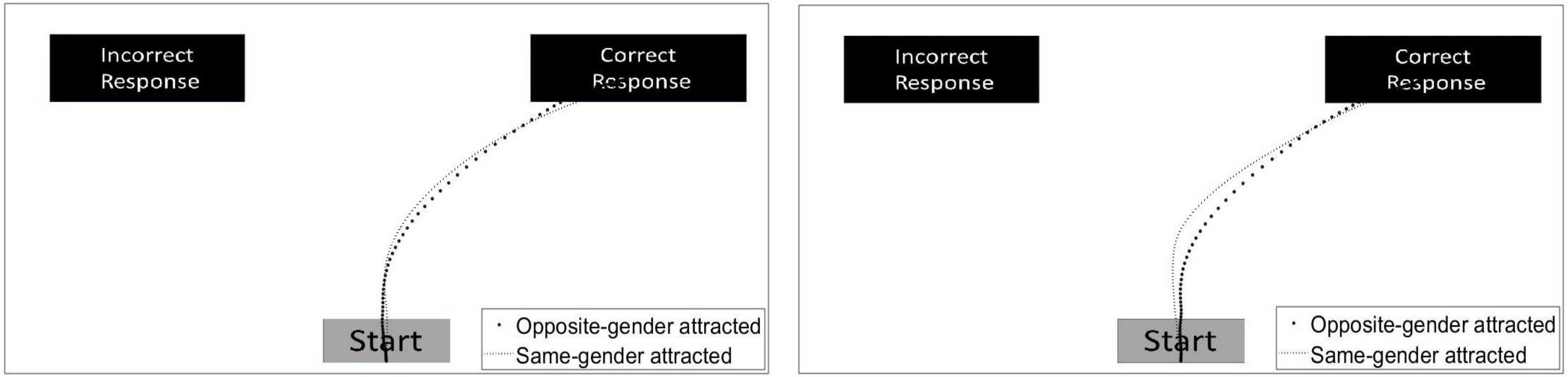


**Figure 1:** Average mouse trajectories from an opposite-gender attracted perspective. ‘Women-Arousing’ (left); ‘Men-Non arousing’ (right) (Study 1)


**Figure 2:** Average mouse trajectories from a same-gender attracted perspective. ‘Women-Non arousing’ (left); ‘Men-Arousing’ (right) (Study 1)

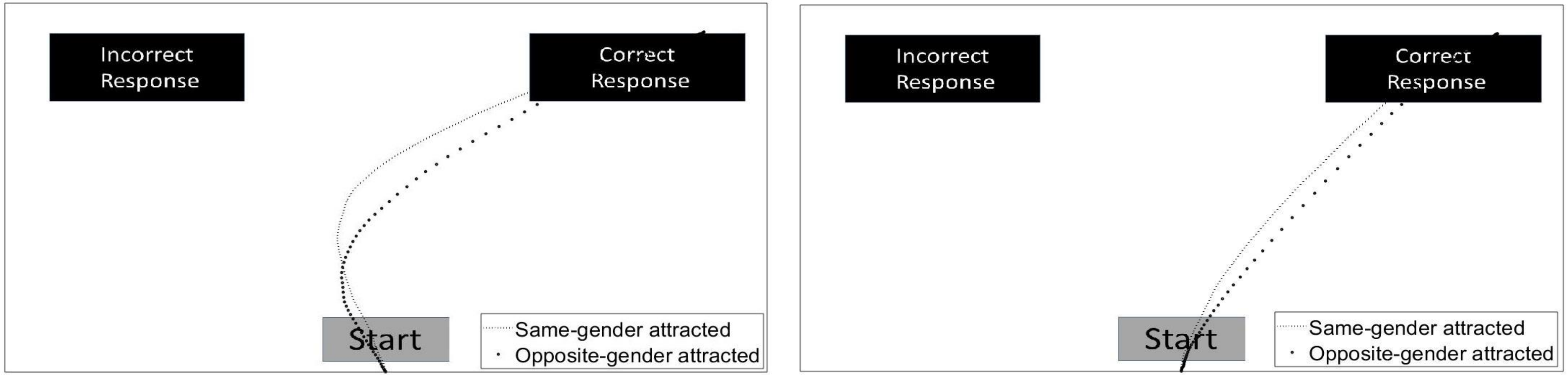


**Figure 3:** Average mouse trajectories from an opposite-gender attracted perspective. 'Women-Sexually Attractive' (left); 'Men-Not Sexually Attractive' (right) (Study 2)

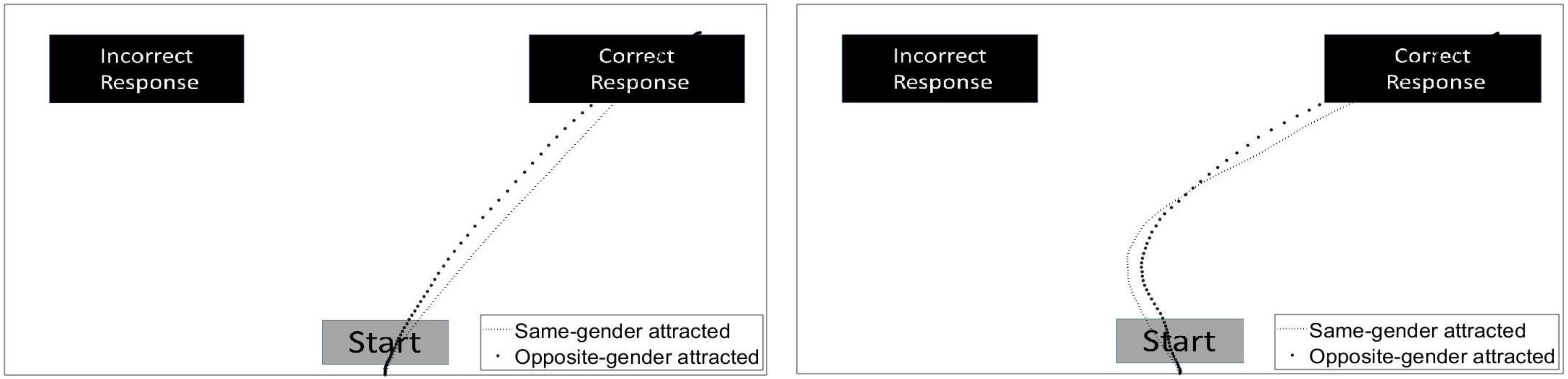


**Figure 4:** Average mouse trajectories from a same-gender attracted perspective. 'Women-Not Sexually Attractive' (left); 'Men-Sexually Attractive'' (right) (Study 2)

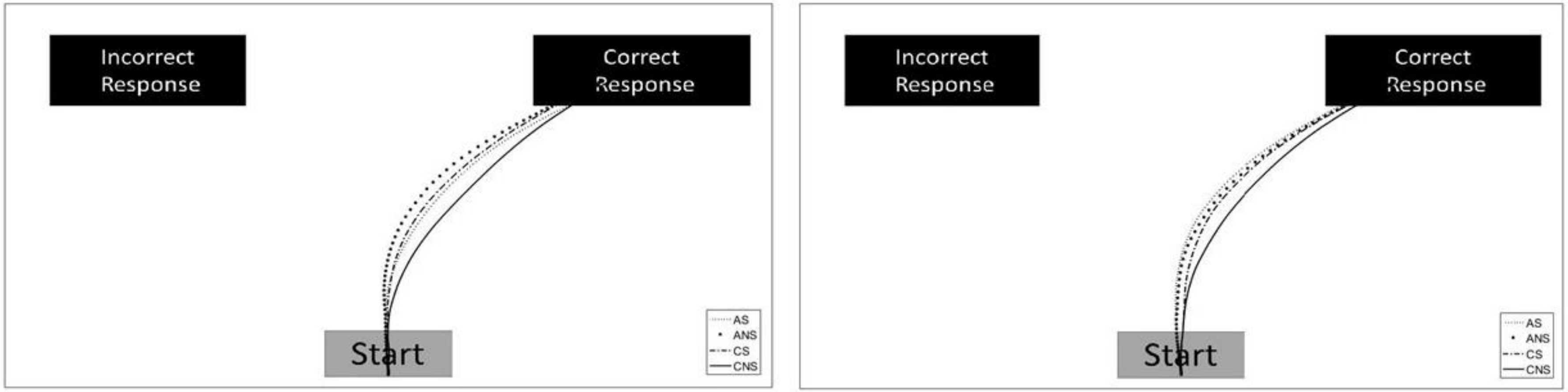


**Figure 5:** Average mouse trajectories for men (left) and women (right) (Study 3).
*Note:* AS = Adults Sexually Exciting; ANS = Adults Not Sexually Exciting; CS = Children Sexually Exciting; CNS = Children Not Sexually Exciting