

Social Psychology

Proof of Concept and Moderators of Transference Processes in an Online Setting

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Previous research examining transference – which posits people draw on past experiences with close others to inform novel interactions – has found that people attribute qualities to and express preferences for novel targets based on their similarity to significant others. However, classic tasks for testing transference required multiple sessions over many weeks, limiting the test of this process to relatively small, college student samples. The purpose of the current study ($N = 532$, $M_{\text{age}} = 34.81$, $SD = 9.83$, 61.47% Men, 63.35% White) was to create an online version of a transference task administered in one session and replicate the effect of transference with a larger sample of participants across the lifespan, and test whether targets resembling parents and ex-partners were preferable to control targets. The effects of transference and preference were replicated in the online version of the transference task. We also found preliminary evidence that the effects of transference and preference were slightly stronger in older individuals and secure individuals, albeit the effects were small. Results are discussed in the context of how individuals use previous and existing relationships to guide their behavior in new relationships.

When people meet someone who reminds them of someone they know, they prefer interacting with them compared to those who do not remind them of someone they know (Brumbaugh & Fraley, 2007). This imposition of traits from a past significant other onto a new person is known as *transference* (Andersen & Cole, 1990; Brumbaugh & Fraley, 2006). Transference is a means of examining how similarities in our past romantic partners and parents manifest in our choices of new partners. However, the extent to which transference processes are consistent across age and attachment orientation is currently unknown, in part, because previous work on transference has relied on college student samples. Further, past paradigms of transference traditionally required two in-person lab sessions spaced weeks apart. Such paradigms could not be easily adapted and administered to people from different age groups and can be very labor-intensive. The current study addressed these limitations by testing the transference hypothesis and examining age and attachment-related differences in transference in a modified, online paradigm that can be completed in one sitting.

Transference

At its core, transference provides a means to navigate new social interactions and make inferences about new

people. The preponderance of theorizing about transference suggests that people draw on past experiences with significant others because they are most relevant for interacting in new relationships. Transference occurs in our everyday social interactions (Sullivan, 1953), and the experiences and time that is shared with significant others (e.g., parents, romantic partners) are stored as mental representations (Andersen & Cole, 1990; Fraley & Shaver, 1998; Hazan & Shaver, 1987, 1994). These mental representations are used to inform the impressions individuals make about new people and are chronically accessible (Andersen et al., 1995).

Mental representations exist as idiosyncratic social categories that can be drawn upon when people encounter new, sometimes ambiguous, social situations that require our prior knowledge to help us make sense of the new situation (Higgins, 1996). When people have little information about a new person, they draw on their mental representations about close relationships. This process can occasionally lead an individual to think that a novel encounter might resemble something or someone from their previous experiences, more so than might be appropriate (Andersen et al., 1995). In other words, the inferences people make about a new person are derived from information from our past and do not reflect new information (because we have never interacted with this new person; Glassman & Ander-

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sen, 1999).

To the extent that a representation is chronically accessible and applicable to a new person, an inference about them will be made that may or may not appropriately reflect the features of a new person. That is, when the resemblance of a new person and a significant other representation is high, we treat this individual as we would that significant other, filling in gaps with the knowledge we already have (Brumbaugh & Fraley, 2006, 2007). We also fill in gaps for how we responded to the significant other's behavior in the past – we act similarly towards the target because they partially serve as a proxy on which we project the representation's characteristics (Berenson & Andersen, 2006). Ultimately, transference allows us to “go beyond the information given” in a new situation, make inferences about people we do not know well and adapt our behavior on the basis that they resemble someone we do know well (Bruner, 1957).

Experimental Evidence of Transference

Transference-like processes have been demonstrated in a number of studies. The basic paradigm requires participants to first write descriptive statements about a significant other. This is meant to bring to mind the representations of significant others. Participants are also asked to categorize a series of adjectives that are (a) good, (b) poor, and (c) irrelevant for describing that significant other. Next, under the guise that a second study is unrelated, participants are brought back into the lab (often a few weeks after the aforementioned descriptive session) to read descriptions of novel targets that are generated using information from the aforementioned task (i.e., using the descriptions and adjectives they provided) a few weeks ago. Lab personnel constructs target descriptions for each participant in the interim. These target descriptions are designed to resemble either the participant's significant other or a control target, who does not resemble the significant other. To measure transference, participants are presented with sentences that may or may not have appeared in the target descriptions. They are then asked to rate their degree of certainty that a particular sentence appears in the target description. Participants who are highly certain that sentences appeared in these new target descriptions (that were nevertheless not present) demonstrate transference.

Much of the empirical work on transference has focused on understanding how inferences and affective responses to novel targets are influenced by significant other representations. Early work demonstrates a “classic” transference effect: a greater degree of certainty that details that were not included in a novel description but that were present in descriptions of their significant others (e.g., Andersen et al., 1995; Andersen & Baum, 1994). In other words, people erroneously recall the presence of details that were not present in the description (but nevertheless describe their significant other, as they go beyond the information provided). Previous work has also found that the evaluations of a target that resembles a significant other were consistent in the emotions and behavior that they evoked. When a target resembled a positively valenced significant other, participants liked this target more than a control target; when a target resembled a negatively valenced significant other,

they disliked this target more than a control target (Andersen et al., 1996). This effect is even found in the type of facial expressions made by participants when reading a description; facial affect is positive when the significant other target is positive, negative when the significant other target is negative, and no effect is found with neutral, control targets (Andersen et al., 1996). When engaged in conversations with a target that resembled a significant other, participants were judged as displaying more positive behavior toward the positively valenced target and more negative behavior toward the negatively valenced target (as assessed via tone of voice and emotional expressions; Berk & Andersen, 2000).

Transference and its Association with Different Significant Others, Attachment Orientation, and Age

Differences in transference across significant others.

Past research has examined if transference occurs more so when novel targets resemble parents or ex-partners (i.e., two different kinds of significant others). When examined separately (i.e., when a study included only one kind of significant other), parents and ex-partners have been found to elicit the effect of transference. In a study of women with a history of child abuse victimization, Berenson & Andersen (2006) found, regardless of abuse history, participants erroneously remembered more details about a target resembling a parent compared to a control target. Likewise, Brumbaugh & Fraley (2006) found participants erroneously remembered more details about a target resembling an ex-partner compared to a control target. Brumbaugh & Fraley (2007) extended this work by examining if mental representations of parents and ex-romantic partners transferred to a different context—the tendency to select friends. In other words, do people use their representations of parents and ex-partners to guide how they evaluate new friends? Or do they rely on previous romantic partners? In general, results differed between ex-partners and parents, suggesting that, ex-partners guide transference processes more than parents. People erroneously remembered more details about a target resembling an ex-partner than a control target (classic transference effect) but did not remember more about a target resembling a parent versus a control target.

Why do targets who resemble parents or ex-partners differ in their ability to bring about transference? In Brumbaugh & Fraley (2007), targets were described differently: targets based on ex-partners were portrayed as fellow students, while targets based on parents were members of the local community. Because the transference targets differed on other characteristics, this distinction could have created differences in how participants conceived of friendship and wanting to affiliate with those targets. The ambiguity of the effect of a parent-type target might also partially arise from the fact that previous research has relied exclusively on college-aged participants (Berenson & Andersen, 2006; Brumbaugh & Fraley, 2006, 2007). In the transition to college, people naturally distance from parental figures and focus on other relationships, both romantic relationships and friendships (Arnett, 2000; Fraley & Davis, 1997) — this might explain why previous romantic relationships are more influ-

ential in guiding the formation of new relationships. Or it might reflect another design characteristic altogether. In the current study, we provided targets who had attributes of either an ex-partner or a parent as potential dating partners with all other details equated.

Individual differences in attachment orientation. Attachment theory posits that a close bond with a caregiver is crucial and continues to affect how people navigate social relationships across the lifespan. Individual differences in the propensity to form and maintain bonds and relationships are operationalized as an individual's attachment-related anxiety and avoidance (Bowlby, 1969/1982; Chopik et al., 2013; Mikulincer & Shaver, 2007). People higher in anxiety are concerned with abandonment and maintaining proximity to close others (Mikulincer & Florian, 1998). People higher in avoidance dismiss intimacy with close others and are less likely to seek support during stressful periods (Brennan et al., 1998). Individuals who fixate on details of past relationships (i.e., anxious individuals; Mikulincer & Florian, 1998) might apply more details about their significant others to novel targets—because this information is more accessible. Avoidant individuals who make chronic attempts to disengage the attachment system (Brennan et al., 1998) may be less likely to apply details from past significant others as they try to lower the accessibility of this information (Fraley & Shaver, 1998). In other words, the tendency to fixate on or suppress information about a significant other might affect the accessibility of that information.

Past work has examined how transference processes are influenced by attachment. Brumbaugh & Fraley (2006) examined how individuals' global attachment orientation (i.e., broadly how people experience attachment in close relationships) and relationship-specific attachment orientation (i.e., attachment orientation to one person, their most significant ex-partner) were related to transference of an ex-partner's qualities and the relationship-specific attachment toward a novel target (i.e., novel targets that resembled the ex-partner and a control target). They found evidence for the classic transference effect: people erroneously recalled more details about the ex-partner target than the control target (i.e., people "filled in the blanks" by ascribing characteristics to new targets as though they were past significant others). Worth noting, attachment orientation did not moderate this classic transference effect in this particular study and was not formally tested in subsequent studies (Brumbaugh & Fraley, 2007). However, previous work has found people tended to transfer their feelings of anxiety and avoidance toward past significant others toward these new targets (Brumbaugh & Fraley, 2006, 2007). In other words, participants exhibited more anxiety or avoidance toward a target that resembled a significant other whom they also felt anxious or avoidant toward, respectively (i.e., a participant who felt anxious toward their relationship an ex, Sally, also felt anxious about a target who resembled Sally). In the current study, we revisit the question of attachment orientation moderation by examining attachment-related differences in transference and dating preferences in an online setting. Because attachment orientation has largely been conceptualized as one's working model that may transfer to new people, rather than an individual difference character-

istic that might disrupt or enhance the effect of transference (with one exception mentioned above, Brumbaugh & Fraley, 2006), our tests of moderation were exploratory. Recalling too much (which anxious individuals might do) or too little (which avoidant individuals might do) from past relationship experiences could enlarge or attenuate the effects of transference. Further, we were unsure whether attenuation of any effects would result in either reducing the association or rendering it non-significant. Thus, altogether, we did not make any formal hypotheses regarding moderation by attachment orientation.

Transference across age. Some of the ambiguity about which significant others are most likely to facilitate transference (and whether people prefer targets who resemble significant others) can be solved by taking a broader lifespan approach. This would allow us to examine if people rely on their mental representations of ex-partners or parents to select new relationship partners beyond the college years – as all the studies on transference to date have been conducted on college students.

Memories of parents and ex-partners are influential across the lifespan, for better or worse, and can be influential in the selection of new partners (Collins & Read, 1994). Even in late adulthood, recalling experiences with one's parents from childhood is associated with health and well-being (Chopik & Edelstein, 2019). When people experience positive relationships, these experiences can help people cultivate healthy relationships in the future (An & Cooney, 2006), while negative childhood experiences can negatively affect people later in life (Reuben et al., 2016). By examining transference across the lifespan, researchers can better understand how people use information about past relationships to inform impressions about new potential relationships differently across age.

Because we know that mate preferences and relationships with significant others change over time, it is important that we look at the transference process across the lifespan (Alterovitz & Mendelsohn, 2011; Arnett, 2000; Chopik, 2017; Fung et al., 1999; Luong et al., 2011). One reason for these changes might be that our priorities regarding social relationships and well-being change across the lifespan. Our goals and priorities change with age—often becoming more focused on the maintenance of emotional balance, positivity, and close, interpersonal relationships at the expense of more knowledge/status-related goals (Carstensen et al., 1999). As people age, they have smaller, tighter social circles and seek higher-quality relationships with others. Our preferences for certain traits and features in our relationship partners also change across the lifespan (Carstensen & Fredrickson, 1998; Fredrickson & Carstensen, 1990; Schwarz & Hasselbrauck, 2012). This has important implications for transference processes. As people gain more life and relationship experiences, do they rely less on their experiences with their parents as they gain more experience with romantic partners? If so, transference might only be present when new potential partners resemble ex-partners (but not parents). Or do transference processes remain relatively constant, such that people seek out partners based on familiar qualities, regardless of how much new partners resemble ex-partners or parents?

The Current Study

There were three primary goals of this research. The first goal was to develop and test an online transference paradigm – one that would allow for automating the participant-generated and participant-selected portions of the task within one experimental setting. One of the challenges of testing transference in traditional settings is that previous experimental paradigms required two sessions spaced out over several weeks. In this gap between sessions, researchers would manually create custom materials (i.e., descriptions of potential dating partners) for each participant. Further, to date, transference has only been examined in this way with college-aged samples. This restriction limits the understanding of transference as a process that informs new social interactions, which extends beyond just the college years. These younger samples might show an effect of transference simply because their significant others are more salient – that is, college students' social circles are larger and more superficial networking goals are seen as more important (Carstensen et al., 1999). More broadly, having an automated transference task would broaden participation from many different groups beyond college students, who are often homogenous in terms of demographic characteristics and life experiences. This broader ability to collect participants in a faster and more convenient way should make future research on transference much easier and diverse. Automatically creating the materials within one experimental setting allowed us to collect more participants from a wider age range and thus provided a better test of the transference hypothesis: that people, across the lifespan and with a wide variety of relationship experiences, falsely recall and prefer new people who resemble past significant others more than people who do not resemble significant others. To date, this is the largest study of transference and is first study to test transference in a non-college student sample.

With this online paradigm, the second goal was to establish the basic transference effects on misattribution of traits and preference for targets who resemble significant others. Related to this goal, we tested whether transference effects differ when a novel target resembled a past romantic partner versus a parent. Finally, the third goal was to test for the moderation of transference by age and attachment orientation.

Method

Participants

Participants were 733 individuals recruited from Amazon's Mechanical Turk. They received \$5.00 compensation for their participation in this study. The study received IRB

approval before data collection (Study ID: STUDY00002783), and data were collected February 2020. This study was not pre-registered. Data and syntax can be accessed via our OSF site (https://osf.io/qdr74/?view_only=None). Those who indicated English was not their first language, had incomplete data, marked "other" for their gender, indicated they were not close with a parent and yet were placed in the parent condition, and those with an invalid age (99) were excluded ($n = 201$). Individuals who indicated English was not their first language were excluded because all of the materials were presented in English. Unfortunately, we did not have a formal measure of English literacy, so we chose to exclude participants based on this selection. Individuals who identified as transgender men and women were recoded as men and women, respectively, while those who marked "other" for their gender were excluded due to insufficient sample sizes ($n=1$).

These exclusions left us with a final sample of 532 participants. Worth noting, in this sample, some participants ($n = 49$) indicated they were suspicious of the manipulation. These participants are included in the aforementioned final sample. Supplementary analyses excluding these participants do not change the main conclusions and can be found in Table S1 and Table S2. Participants were 61.47% men and ranged in age from 19-77 ($M_{age} = 34.81$, $Mdn_{age} = 32$, $SD = 9.83$). The majority of participants were White (63.35%), 23.87% were Black or African American, 6.39% were Hispanic or Latino, 3.57% were Asian, and 2.82% identified as other. The majority of participants identified as straight (76.69%), 3.20% identified as gay/lesbian, 19.92% identified as bisexual, and .19% identified as queer. At the time of the survey, 63.91% of participants were currently married or in a long-term relationship, 12.78% were currently dating someone, and 23.31% were single. There were slightly more participants in the parent condition (58.46%) than in the ex-partner condition. This is possible because, although participants were initially randomly assigned to conditions, individuals who indicated they did not have an ex-partner could not be placed in that condition (i.e., asking them questions about an ex-partner they never had would be problematic). Instead, these individuals were automatically placed into the parent condition and completed the open-ended description and adjective selection task for this new condition (see below). Of those in the ex-partner condition, 59.72% of the exes were women.¹ Of those in the parent condition, 67.42% were closest to their mothers.²

Procedure

A transference study task was designed and administered online. The goal was to create an online measure as methodologically and conceptually in-line with previous in-

1 Five participants did not provide the gender of their ex-partner, and thus this percentage does not include these participants. These participants are included in all other analyses performed.

2 One participant in the parent condition did not provide the gender of the parent they were closest to, and thus this percentage does not include this participant. This participant is included in all other analyses performed. Additionally, an examination of whether the substantive effects differed by parent's gender (e.g., mothers versus fathers) revealed few differences; the effect was slightly stronger for mother targets compared to father targets, but both mother and father targets had higher certainty and preference scores compared to control targets.

person studies of transference. To create the task, the authors first consulted with the original author team of Brumbaugh & Fraley (2006, 2007) for their study materials to help create the online version of the transference study task. This helped ensure that this online transference task was as comparable as possible to their original study. As in previous studies, people began by providing open-ended descriptions about either the parent they felt the closest to or their most significant ex-partner to aid in thinking of significant others for a subsequent adjective selection task. In other words, this exercise was meant to make the working models of these relationships accessible so that they could be further described. Participants then chose, out of a bank of 50 words, 15 adjectives that described their significant other well, 10 adjectives that described their significant other poorly, and 15 adjectives that were irrelevant descriptors of their significant other. The 15 good descriptor adjectives were then rank-ordered to convey which ones were most or least descriptive (this ranking later informed the automatic seeding of words into dating profiles). The adjective selection task was also present in previous studies of transference. The adjectives provided to participants to describe their significant others and words used in the control profiles came from Chandler (2018) – a study providing ratings of over 1,000 descriptive words. Words for this study were selected because they were rated as highly meaningful (higher than 3.5 on a 4-point scale from 0(*I have no idea the meaning of this word*) to 4(*I have a very clear and definite understanding of this word*)). Some of these highly meaningful words appeared in adjective selection tasks of previous studies provided by the original author team. After a series of filler tasks that served as a distraction, participants rated five target descriptions that were members of a new online dating website. Four of these targets were generated by the study team to serve as control targets. A fifth target description was created using 5 randomly selected adjectives that the participant had previously provided to describe their target well interspersed into a shell description to give the semblance of complete sentences. These were the adjectives ranked as moderately descriptive in the list (the adjectives ranked in the #6-10 spots to reduce suspicion (see Andersen et al., 1995)). The remainder of the description was filled in with 4 additional randomly selected adjectives from the adjectives identified by participants as irrelevant descriptors of their significant other. This was also done to reduce suspicion by making the piping of adjectives that they chose seem less obvious. The names of the targets were gender-neutral (i.e., Sam, Alex, Morgan, Jordan, and Taylor) and the order of targets was randomized. Taylor was always the significant other target; Sam, Alex, Morgan, and Jordan were always the control targets. Participants rated their preferences for interacting with each target (presented immediately after each description) as though they were members of the dating site. Participants then completed the memory task to assess transference. Suspicion was assessed with two open-ended questions at the end of the study (Did you notice anything unusual about the study? and Did you notice anything unusual about the descriptions you read about Taylor, Morgan, Alex, Sam, or Jordan?).

Measures

Certainty (i.e., memory task assessing transference).

Participants were provided with 15 statements about each target. Each statement was either present or absent in the description they read during the online dating part of the study. In line with past research (Brumbaugh & Fraley, 2006, 2007), participants were asked how certain they were that a particular sentence appeared in the target description on a scale from 1(*Not at all certain*) to 4(*Very certain*). For the significant other target (i.e., the Taylor description), 8 of the 15 items presented contained adjectives that the participant listed as good descriptors of their significant other (i.e., their parent or ex) but that did not appear in the description of Taylor. When participants reported that they were more (erroneously) certain that these 8 statements had appeared, we assume that they generated false memories about the description that resembled a significant other. Thus, higher certainty ratings on the 8 statements indicate more transference (Andersen & Cole, 1990). A mean score of participant certainty that these 8 items appeared was calculated for the significant other target ($M = 2.56$, $SD = .68$, $\alpha = .85$). For control targets (to test if certainty differed between targets), a mean score of items that did not appear in the descriptions was also taken for the other targets ($M = 2.37$, $SD = .71$, $\alpha = .97$). Of the other seven items, three were present in the description, four included irrelevant words and were not of interest.

Preference. In line with past research (Brumbaugh & Fraley, 2006) participants were asked questions about how much they prefer each target. They were asked: “Based on what you just read, how much do you like (Taylor)?”, “How attractive do you find (Taylor)?”, and “How much would you like to date (Taylor)?” on a scale from 1(*Not at all*) to 5(*A great deal*). These three items were averaged to create the preference measure. Higher values indicated greater preference for a target. These questions were asked with regards to the significant other target ($M = 3.40$, $SD = .98$, $\alpha = .87$) as well as each of the control targets ($M = 2.75$, $SD = .98$, $\alpha = .94$).

Attachment orientation. Attachment orientation was measured using the 9-item version of Experiences in Close Relationships (Fraley et al., 2011). Participants were asked to rate the extent to which they agreed with a number of statements on a scale from 1(*Strongly Disagree*) to 7(*Strongly Agree*). Example items assessing avoidance include “It helps to turn to people in times of need,” (reverse coded) and “I don’t feel comfortable opening up to others.” Example items assessing anxiety include “I often worry that other people do not really care for me” and “I’m afraid people may abandon me.” Six items were averaged to yield a score for attachment avoidance ($M = 3.27$, $SD = 1.15$; $\alpha = .80$), and three items were averaged to yield a score for attachment anxiety ($M = 3.85$, $SD = 1.98$, $\alpha = .95$).

Likeableness (as assessed in Chandler (2018)). After data collection, we wondered whether the words participants selected and the words in the control profiles varied in likeableness (Chandler, 2018). Specifically, it is possible that participants might use particularly positive words to describe their ex-partners or parents compared to the con-

control profiles we generated. In that scenario, we might observe an effect of transference (higher certainty scores for significant others) simply because they were described more positively or using similarly positive words. In other words, were participants describing significant others in particularly positive ways? To explore this possibility, we formally examined the extent to which the likeableness of descriptive words varied across profiles. Likeableness refers to the degree to which an individual would like someone who was described by that word (e.g., aggressive) on a scale from 0 (*least favorable or desirable*) to 6 (*most favorable or desirable*). The mean likeableness of words varied across profiles such that participants used somewhat more positive adjectives to describe their parent or ex-partner than the adjectives used to describe the control targets ($M_{\text{Significant Other Target}} = 4.17$, $M_{\text{Control Targets}} = 3.56$ with a range over the four targets from 3.25 to 4.32, $p < .001$). Because the likeableness of the descriptive words varied across all of the profiles, the variable was included as a covariate in the analyses below.

Analytic Strategy

Multilevel models treating the five targets as lower-level units nested within participants were used to analyze the study data. Specifically, we tested whether transference (i.e., the certainty of characteristics ascribed to a novel target based on their resemblance to the significant other previously described) and preference differed by target profile (significant other v. control), condition (parent v. ex-partner), and a target by condition interaction controlling for gender, relationships status, and likeableness ratings. Target profile was effects coded such that the significant other target was coded as 1, and the four control targets were coded as -1. Condition was also effects coded (ex-partner = 1; parent = -1). In addition, because men tend to express greater preferences for dating women than vice versa (Wood & Brumbaugh, 2009), we included participant gender as a control variable (effects coded as men = 1, women = -1). Relationship status was also included as a control variable (in a relationship including dating, married, or in a long-term relationship = 1, single = -1) because our sample includes both single and partnered individuals, and partnered people might differ in their perceptions of new relationship partners (even in the context of hypothetical dating scenarios). Finally, to control for the possibility that transference and preference processes might emerge based solely on the choice of words in the profiles, the mean likeableness of words used in the profiles of the significant other target and the control targets was included as a control variable.

In addition to the basic transference models, we also tested moderator models to examine whether the target effects for certainty and preference differed as a function of age and attachment orientation (anxiety, avoidance). Age, attachment anxiety and avoidance, and likeableness ratings were grand mean centered in all analyses. Significant two-way and three-way interactions were followed up with simple slopes analyses with dummy codes for condition and examining the effects of the continuous moderator at ± 1 standard deviation around the mean.

Results

Replicating the Effect of Transference and Preferences

Our first model examined whether the basic effect of transference (i.e., false memory for details about a target resembling a significant other) replicated using an online transference task. This model included target (significant other target v. control targets), condition (ex-partner v. parent), and their interaction, along with gender, relationship status, and likeableness ratings as covariates. [Table 1](#) displays mean certainty and preference scores by our variables of interest (bivariate correlations between study variables can be found in supplementary materials, Table S3). In the context of a mixed ANOVA, we found a significant effect of target on certainty rating, $F(1,734) = 134.643$, $p < .001$, such that ratings were higher for the significant other target ($M = 2.46$) versus control targets ($M = 2.23$). There were no differences in certainty ratings as a function of condition, $F(1,528) = 1.066$, $p = .302$, and the target by condition interaction was not significant, $F(1,530) = 1.762$, $p = .185$. Certainty ratings were higher on average for men, partnered individuals, and targets with profiles that included words lower in likeableness (t -tests for these covariates are included in [Table 2](#)). Note that [Table 2](#) replicates these results from a multi-level regression point-of-view. A separate analysis was conducted to test for interactions between the key study variables and the covariates (i.e., gender, relationship status, and likeableness), and no such interactions emerged ($ps > .06$). In sum, we found that participants were more certain of details about the significant other targets (even though these details only applied to the parent or partner they previously described) than the details about control targets, replicating previous findings.

We specified the same model predicting preference, as seen in [Table 1](#). This model examined whether the basic effect of preference (i.e., greater preference for significant other targets compared to control targets) replicated using an online task. We found a significant effect of target on preference ratings, $F(1,785) = 80.102$, $p < .001$, such that ratings were higher for the significant other target ($M = 3.07$) versus the control targets ($M = 2.64$). There were no differences as a function of condition, $F(1,529) = 1.071$, $p = .301$, and the target by condition interaction was not significant, $F(1,531) = .142$, $p = .706$. As with certainty, men and partnered individuals showed greater preference for significant other targets (t -tests for these covariates are included in [Table 3](#)). There was also a strong effect of likeableness such that targets that were described with adjectives that were more positive were preferred more by participants. [Table 3](#) replicates these results using multi-level regression. As with certainty, no interactions with covariates emerged ($ps > .06$). In sum, we found that participants preferred significant other targets over control targets, replicating previous findings.

Exploratory Tests of Moderation by Age and Attachment Orientation

Next, we examined the extent to which age moderated the effects of target and condition on certainty scores. In

Table 1. Certainty scores (transference) and preference scores by target, condition, gender, and relationship status

	Certainty scores		Preference scores	
	M	SE	M	SE
Target				
Significant Other	2.459	0.035	3.068	0.051
Control Targets	2.230	0.035	2.636	0.048
Condition				
Ex-Partner	2.315	0.047	2.815	0.059
Parent	2.373	0.041	2.889	0.053
Target*Condition				
Parent Condition				
Sig. Other Target	2.476	0.043	3.096	0.062
Control Target	2.271	0.043	2.681	0.059
Ex-Partner Target				
Sig. Other Target	2.442	0.048	3.039	0.069
Control Target	2.189	0.049	2.591	0.068
Gender				
Women	2.273	0.049	2.660	0.062
Men	2.416	0.039	3.044	0.050
Relationship Status				
In a Relationship	2.549	0.033	3.046	0.042
Single	2.139	0.058	2.658	0.074

Table 2. Results predicting certainty scores controlling for gender, relationship status, and likeableness scores.

	Base Model - Certainty scores				95% Confidence Interval		
	<i>b</i>	<i>se</i>	β	<i>df</i>	<i>t</i>	Lower Bound	Upper Bound
Intercept	2.344***	0.034		533	69.063	2.278	2.411
Target	0.115***	0.010	0.155	734	11.604	0.095	0.134
Condition	-0.029	0.028	-0.039	528	-1.033	-0.084	0.026
Target × Condition	0.012	0.009	0.016	530	1.328	-0.006	0.030
Gender	0.071*	0.028	0.097	528	2.512	0.016	0.127
Relationship Status	0.205***	0.033	0.278	528	6.259	0.141	0.270
Likeableness Scores	-0.050***	0.013	-0.032	1741	-3.720	-0.076	-0.024

Note. Target is coded significant other=1, control targets=-1.

Condition is coded ex-partner=1, parent=-1.

Gender is coded men=1, women=-1.

Relationship status is coded in a relationship=1, single=-1.

*** $p < .001$, ** $p < .01$, * $p < .05$.

this model, age, target, condition, and all two- and three-way interactions were included along with the three covariates (see Table 4). In addition to the expected target effect in which certainty was higher for the target that resembled the significant other, older individuals had lower certainty scores in general. There was also an age by target interaction. As seen in Figure 1, older individuals showed slightly stronger certainty effects when comparing control targets and significant other targets, suggesting that transference effects may be somewhat stronger for older individuals, though the confidence interval approached zero.

We specified the same model for preference (see Table 5). Older individuals had lower preference scores on average, but there were also significant two-way age by target and three-way age by target by condition interactions. As shown in Figure 2, in the ex-partner condition, the magnitude of the transference effect was similar in size for younger and older individuals (i.e., the age by target interaction was not significant in the ex-partner condition). However, in the parent condition, the size of the transference effect was larger for older individuals. Specifically, older individuals more strongly preferred the significant other target relative

Table 3. Results predicting preference scores controlling for gender, relationship status, and likeableness scores.

	Base Model - Preference scores				95% Confidence Interval		
	<i>b</i>	<i>se</i>	β	<i>df</i>	<i>t</i>	Lower Bound	Upper Bound
Intercept	2.852***	0.043		547	65.680	2.767	2.937
Target	0.216***	0.024	0.183	785	8.945	0.168	0.263
Condition	-0.037	0.036	-0.031	529	-1.035	-0.107	0.033
Target × Condition	0.008	0.022	0.007	531	0.377	-0.034	0.051
Gender	0.192***	0.036	0.163	528	5.317	0.121	0.263
Relationship Status	0.194***	0.042	0.165	527	4.657	0.112	0.276
Likeableness Scores	0.369***	0.036	0.150	1812	10.293	0.299	0.440

Note. Target is coded significant other=1, control targets=-1.
 Condition is coded ex-partner=1, parent=-1.
 Gender is coded men=1, women=-1.
 Relationship status is coded in a relationship=1, single=-1.
 *** $p < .001$, ** $p < .01$, * $p < .05$.

Table 4. Results predicting certainty scores moderated by age controlling for gender, relationship status, and likeableness scores.

	Age Moderation				95% Confidence Interval		
	<i>b</i>	<i>se</i>	β	<i>df</i>	<i>t</i>	Lower Bound	Upper Bound
Intercept	2.351***	0.033		530	70.767	2.285	2.416
Target	0.112***	0.010	0.152	730	11.270	0.092	0.132
Condition	0.001	0.027	0.001	526	0.019	-0.053	0.054
Target × Condition	0.009	0.009	0.012	528	0.960	-0.009	0.027
Age	-0.019***	0.003	-0.260	525	-6.901	-0.025	-0.014
Age × Target	0.002*	0.001	0.025	525	2.062	<0.001	0.004
Age × Condition	0.004	0.003	0.049	525	1.315	-0.002	0.009
Age × Target × Condition	0.001	0.001	0.017	525	1.417	-0.001	0.003
Gender	0.031	0.028	0.042	526	1.119	-0.024	0.086
Relationship Status	0.210***	0.032	0.284	526	6.621	0.147	0.272
Likeableness Scores	-0.050***	0.013	-0.032	1741	-3.704	-0.076	-0.023

Note. Target is coded significant other=1, control targets=-1.
 Condition is coded ex-partner=1, parent=-1.
 Gender is coded men=1, women=-1.
 Relationship status is coded in a relationship=1, single=-1.
 *** $p < .001$, ** $p < .01$, * $p < .05$.

to the control, compared to younger individuals, though this magnitude should be interpreted cautiously as this is the first ever demonstration of the effect, and the p -value is close to .05—providing only suggestive evidence for moderation.

Finally, we examined the extent to which attachment orientations moderated the effects of target and condition on certainty and preferences. In this model, anxiety, avoidance, target, condition, and all two- and three-way interactions were included, with the exception that we did not include interactions involving both anxiety and avoidance. As seen in Table 6, individuals higher in anxiety had higher certainty scores, but there were also significant two-way target by anxiety and three-way anxiety by target by condition interactions. As seen in Figure 3, people low in anxi-

ety showed a larger transference effect than people high in anxiety. However, this was particularly true for people low in anxiety viewing targets who resembled their ex-partners. In sum, transference (certainty) effects were largest among those low in anxiety, particularly when viewing targets that resembled ex-partners. However, the robustness of this effect remains to be seen: the confidence interval was close to zero, and the transference effect was also present among those high in anxiety and those in the parent condition.

There were also differences in certainty as a function of attachment avoidance. Individuals lower in avoidance had higher certainty scores on average. There were also significant two-way avoidance by condition and three-way avoidance by target by condition interactions. As seen in Figure 4, both high and low avoidant individuals reported greater

Table 5. Results predicting preference scores moderated by age controlling for gender, relationship status, and likeableness scores.

	Age Moderation					95% Confidence Interval	
	<i>b</i>	<i>se</i>	β	<i>df</i>	<i>t</i>	Lower Bound	Upper Bound
Intercept	2.872***	0.042		547	67.888	2.789	2.955
Target	0.222***	0.024	0.189	781	9.200	0.175	0.270
Condition	0.003	0.035	0.003	527	0.087	-0.065	0.071
Target × Condition	<0.001	0.022	<0.001	529	0.002	-0.043	0.043
Age	-0.026***	0.004	-0.214	525	-7.174	-0.033	-0.019
Age × Target	0.006**	0.002	0.050	525	2.756	0.002	0.010
Age × Condition	-0.001	0.004	-0.004	525	-0.144	-0.007	0.006
Age × Target × Condition	-0.005*	0.002	-0.043	525	-2.357	-0.009	-0.001
Gender	0.136***	0.035	0.116	525	3.860	0.067	0.206
Relationship Status	0.195***	0.040	0.165	525	4.862	0.116	0.273
Likeableness Scores	0.368***	0.036	0.149	1812	10.252	0.297	0.438

Note. Target is coded significant other=1, control targets=-1.
 Condition is coded ex-partner=1, parent=-1.
 Gender is coded men=1, women=-1.
 Relationship status is coded in a relationship=1, single=-1.
 *** $p < .001$, ** $p < .01$, * $p < .05$.

certainty scores for significant other targets compared to control targets, but the avoidance by target interaction was only significant in the parent condition where people low in avoidance showed a larger transference effect than people high in avoidance. However, the effect of avoidance within the parent condition was relatively small.

Finally, we specified the same model for preference (see Table 7). Highly anxious people had a greater degree of preference, but this was moderated by target. As seen in Figure 5, greater preferences for significant other targets were only seen for individuals low in anxiety. The avoidance main effect was also significant and indicated that individuals lower in avoidance had higher preference scores.

Discussion

The purpose of this study was to establish the basic transference effect and test whether transference and preference effects differ when the target resembles a past romantic partner versus a parent using an online, automated transference paradigm. We were also interested in the extent to which age and attachment orientation might moderate target and condition effects of transference and preference.

The Basic Transference Effect was Found in an Online, Automated Setting across the Lifespan

Consistent with previous research, we found an effect of transference, such that people reported more certainty for erroneously remembering information related to a target resembling a significant other, when in fact, this information was generated by them earlier in the study to describe their significant other. Moreover, an effect of transference was observed for both those in the ex-partner condition

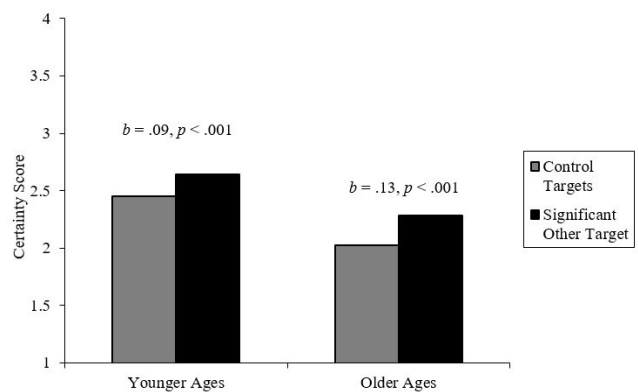


Figure 1. Predicted certainty scores by target (Significant Other Target v. Control Target) at younger and older ages (-/+1 standard deviation) where $M_{age} = 34.81$ and $SD = 9.83$.

and those in the parent condition suggesting that mental representations of both ex-partners and parents are drawn on in transference contexts. This effect is consistent with previous findings that use just targets resembling ex-partners (Brumbaugh & Fraley, 2006) or just targets resembling parents (Berenson & Andersen, 2006), but not consistent with findings that have used targets resembling ex-partners and parents (Brumbaugh & Fraley, 2007). This implies people falsely attribute characteristics of their significant others more broadly to novel people who resemble them. Surprisingly, we also found that partnered individuals engaged in transference processes and preferred targets more than single individuals. With respect to preferences, a general proclivity toward affiliation and liking people might make

Table 6. Results predicting certainty scores moderated by attachment orientation controlling for gender, relationship status, and likeableness scores.

	Attachment Moderation					95% Confidence Interval	
	<i>b</i>	<i>se</i>	β	<i>df</i>	<i>t</i>	Lower Bound	Upper Bound
Intercept	2.357***	0.028		533	83.002	2.302	2.413
Target	0.113***	0.010	0.152	748	11.816	0.094	0.131
Condition	-0.018	0.023	-0.024	524	-0.763	-0.064	0.028
Target × Condition	0.011	0.009	0.015	527	1.255	-0.006	0.028
Anxiety	0.188***	0.012	0.505	524	15.245	0.164	0.212
Avoidance	-0.067**	0.021	-0.104	524	-3.163	-0.109	-0.025
Anxiety × Target	-0.028***	0.005	-0.076	524	-6.233	-0.037	-0.019
Avoidance × Target	-0.006	0.008	-0.009	524	-0.731	-0.021	0.010
Anxiety × Condition	-0.002	0.012	-0.004	524	-0.123	-0.026	0.023
Avoidance × Condition	0.047*	0.021	0.073	524	2.239	0.006	0.089
Anxiety × Target × Condition	-0.010*	0.005	-0.027	524	-2.183	-0.019	-0.001
Avoidance × Target × Condition	0.021**	0.008	0.032	524	2.645	0.005	0.036
Gender	0.065**	0.024	0.088	524	2.749	0.019	0.112
Relationship Status	0.181***	0.027	0.245	524	6.605	0.127	0.234
Likeableness Scores	-0.050***	0.013	-0.032	1741	-3.726	-0.076	-0.024

Note. Target is coded significant other=1, control targets=-1.
Condition is coded ex-partner=1, parent=-1.
Gender is coded men=1, women=-1.
Relationship status is coded in a relationship=1, single=-1.
*** $p < .001$, ** $p < .01$, * $p < .05$.

finding romantic partners easier. The fact that partnered individuals engaged in more transference processes also might underscore the functions of transference. In other words, transference processes might make interpersonal interactions more familiar and ultimately facilitate romantic relationship formation. What about other significant relationships? For single individuals, siblings and friends are more influential in transference processes (Brumbaugh, 2017), and may be relied upon as prototypes more so than other significant others (e.g., ex-partners or parents). Of course, our experimental approach did not test these ideas or settings in particular, so we hesitate to make claims that are too strong given that we do not know whether transference facilitates relationship formation or applies equally well with other relational partners (or is moderated by attachment or age to the same extent). Rather, future research should test some of these possibilities and focus more on the consequences and functions of transference with a wider variety of significant others and examine how it affects people's relationships moving forward.

Why did consistent effects of transference emerge for both ex-partner and parent targets? This study included a larger sample than past work (Brumbaugh & Fraley, 2007), and perhaps examining this effect across age revealed more variation in the accessibility of significant others in one's working model (Fraley, 2007). This further supports that mental representations of significant others remain relevant when meeting new people; significant others are accessible to the extent they share a resemblance with the

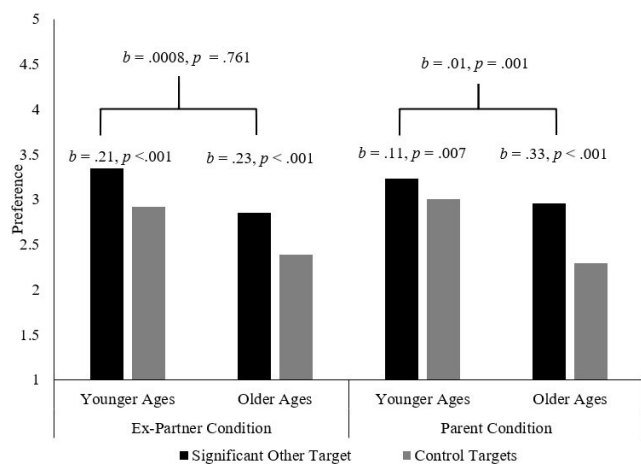


Figure 2. Predicted preference scores by target (Significant Other Target v. Control Target) and condition (Ex-Partner Condition v. Parent Condition) at younger and older ages (-/+1 standard deviation) where $M_{age} = 34.81$ and $SD = 9.83$. The age by target interaction was significant in the Parent Condition, but not in the Ex-Partner Condition.

novel person, and this is true whether it relates to parents or ex-partners.

Significant Other Targets were Preferred over Control Targets

We found that significant other targets were preferred over the control targets. This effect did not differ by condition; people found targets resembling ex-partners and parents similarly preferable. Because preference ratings did not differ by condition, perhaps the presence of familiar qualities make a familiar target preferable over another that is not familiar. This is consistent with Brumbaugh and Fraley's (2006) findings that targets resembling ex-partners were more dateable than control targets. Although preference in a dating context has not been directly studied for targets that resemble parents, there is some evidence to suggest that familiar traits—like those we may have seen in our interactions with parents—may influence someone's attraction and preference for targets who match on those traits (see Andersen & Chen, 2002; Heffernan et al., 2018). Further, when it comes to actual similarities between people whom someone has dated, individuals' actual past and current partners are similar to each other, suggesting that we tend to seek out relationships with similar people over time and, based on the current study, potential partners resemble significant others from our past (Park & MacDonald, 2019).

Preliminary Evidence of Moderation by Age and Attachment

Both younger and older individuals engaged in transference in the hypothesized direction – certainty scores for the significant other target were higher than those for control targets. However, an age by target interaction revealed some differences in the transference process across age. Specifically, compared to younger individuals, older individuals had lower certainty scores overall (across conditions), but demonstrated a greater transference effect—reporting a greater degree of certainty that details of their significant other applied to the significant other target (when in fact they did not appear in the target description). Worth noting, this effect was not moderated by condition. A similar pattern emerged for preference – both younger and older individuals preferred the significant other target compared to the control targets. Older people had lower preference for targets overall but demonstrated a slightly greater degree of preference for the significant other target compared to control targets. However, the effects did differ by condition: the preference effects seen for older individuals were only significant in the parent condition, though the size of this difference was very small. Taken together, these interactions suggest there are small differences in the relative strength of transference processes across age, rather than a presence or absence of the process across age. Why might we see this stronger effect in older individuals? Significant other representations are chronically accessible to the extent that they are high in richness and distinctiveness (Andersen et al., 1995). Indeed, higher quality relationships are memorable and translate across generations; people who recall better quality relationships with their parents also report more positive relationships with their own children (An & Cooney, 2006). By virtue of their

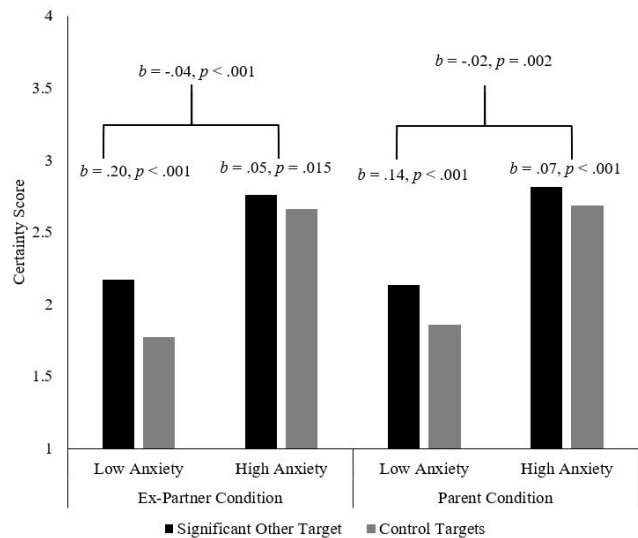


Figure 3. Predicted certainty scores by target (Significant Other Target v. Control Target) and condition (Ex-Partner Condition v. Parent Condition) at low and high levels of anxiety (-/+ 1 standard deviation). The anxiety by target interaction was significant in both conditions.

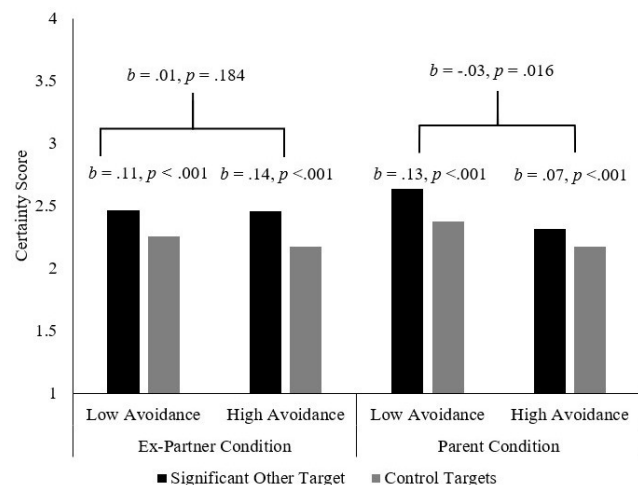


Figure 4. Predicted certainty scores by target (Significant Other Target v. Control Target) and condition (Ex-Partner Condition v. Parent Condition) at low and high levels of avoidance (-/+1 standard deviation). The avoidance by target interaction was significant in the Parent Condition, but not in the Ex-Partner Condition.

age, older individuals have likely had more opportunities to interact with significant others in memorable ways which might make them more chronically accessible, or even interpret their many interactions across life as being consistent with their internal representations about relationships. However, because this was the first study to test age-related differences in transference, we hesitate to make strong claims about this finding and recognize examining age dif-

Table 7. Results predicting preference scores moderated by attachment orientation controlling for gender, relationship status, and likeableness scores.

	Attachment Moderation		95% Confidence Interval				
	<i>b</i>	<i>se</i>	β	<i>df</i>	<i>t</i>	Lower Bound	Upper Bound
Intercept	2.872***	0.038		562	76.001	2.798	2.947
Target	0.216***	0.023	0.183	824	9.559	0.172	0.260
Condition	-0.020	0.031	-0.017	525	-0.649	-0.081	0.041
Target × Condition	0.006	0.020	0.005	528	0.320	-0.033	0.046
Anxiety	0.216***	0.016	0.364	524	13.221	0.184	0.248
Avoidance	-0.130***	0.028	-0.127	524	-4.632	-0.186	-0.075
Anxiety × Target	-0.092***	0.010	-0.155	525	-8.829	-0.113	-0.072
Avoidance × Target	-0.033	0.018	-0.032	524	-1.841	-0.068	0.002
Anxiety × Condition	0.017	0.016	0.029	524	1.059	-0.015	0.049
Avoidance × Condition	0.029	0.028	0.028	523	1.043	-0.026	0.084
Anxiety × Target × Condition	-0.001	0.010	-0.002	525	-0.129	-0.022	0.019
Avoidance × Target × Condition	0.006	0.018	0.006	524	0.327	-0.029	0.041
Gender	0.181***	0.031	0.154	524	5.882	0.121	0.242
Relationship Status	0.164***	0.036	0.139	524	4.619	0.094	0.234
Likeableness Scores	0.365***	0.036	0.148	1813	10.184	0.295	0.436

Note. Target is coded significant other=1, control targets=-1.
Condition is coded ex-partner=1, parent=-1.
Gender is coded men=1, women=-1.
Relationship status is coded in a relationship=1, single=-1.
*** $p < .001$, ** $p < .01$, * $p < .05$.

ferences in transference with wider age ranges as an important future direction.

Individuals lower in attachment anxiety erroneously applied more significant other-relevant information and preferred targets who resembled their significant others. However, these processes were diminished among those high in anxiety. Specifically, individuals high in anxiety engaged in this process with a heightened fixation to details (they had higher certainty ratings overall) and were less discriminant among target descriptions (they similarly preferred the significant other and control targets).

Why might transference processes be diminished in those who are higher in anxiety? This process of going beyond the information given allows people to further speculate about what they have learned about a novel person and generate inferences that are relevant to stored information (Bruner, 1957; Mikulincer et al., 2009). Indeed, past research suggests securely attached individuals are more cognitively flexible and open to new information, and thus they may have an easier ability to draw on past experiences related to significant others (Baldwin et al., 1996; Mikulincer, 1998). However, this cognitive flexibility could also reflect suppression of transference processes for securely attached individuals, a potential direction for future research. Anxiously attached individuals have a strong desire to maintain close relationships, and as a result, chronically seek out information to assess the state and quality of their relationship (Cassidy & Berlin, 1994; Chopik et al., 2013). Perhaps

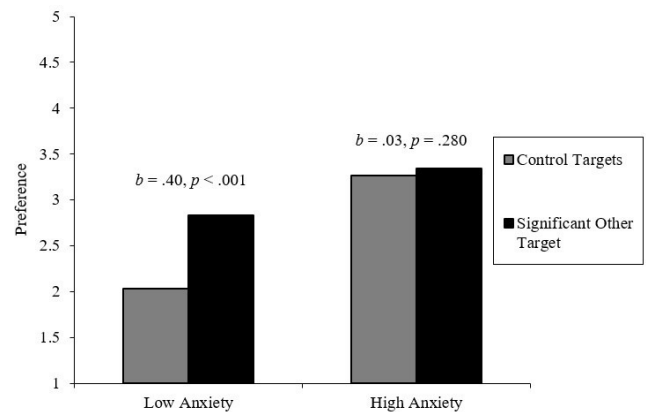


Figure 5. Predicted preference scores by target (Significant Other Target v. Control Target) at low and high levels of anxiety (-/+ 1 standard deviation).

because anxiously attached people already are on “high alert” to look for cues on the status of their relationships, they draw more connections to incoming information and are less distinguishing about whether characteristics resemble someone they already know.

Individuals high in avoidance showed the same pattern of certainty scores as those low in avoidance (i.e., they had higher certainty scores for parent targets versus control targets), and they also engaged in transference processes to

a lesser extent (reporting lower certainty scores overall). However, this interaction was only present for those in the parent condition. The discrepancies in the strength of the effect at low and high levels of avoidance might be attributable to characteristics of people high in avoidance. Avoidant individuals suppress the attachment system and instead prioritize autonomy and self-reliance over getting close to significant others (Brennan et al., 1998). This may lead avoidant individuals to gather less information or reflect less on information about significant others, and thus this information is less accessible when new people resemble them. In sum, we hesitate to make strong claims about these findings. Although there was some indication that anxiety moderated transference processes, future research should continue to examine attachment orientation as a moderator of transference.

In general, we found that transference effects replicated using an online, automated transference task. Compared to control targets, people were more erroneously certain of details that described targets resembling significant others (i.e., parents and ex-partners), and people preferred these targets. However, the magnitudes of the age and attachment moderation effects were smaller and less consistent. Worth noting, this study was not pre-registered, and thus, we interpreted the findings from our moderation analyses considering their exploratory nature.

Strengths, Limitations, and Future Directions

The current study had a number of strengths. We created a modified version of the transference task, which allowed transference to be tested in a straightforward way that saved time and energy on both the part of the experimenter and participant. Moving forward, this could galvanize researchers to study transference, and answer further questions about transference processes and the robustness of the theory. Further, using the modified transference task, we were able to examine preference and transference processes with two different significant others across age and recruit a relatively large sample size easily, which might have been more difficult and labor-intensive using previous paradigms examining college-aged participants and only one significant other. Although previous work on transference and ways of testing it are invaluable (and served as the basis for this study), we hope that the approach outlined here will make testing transference-related questions easier in the future.

There are also a number of limitations that should be acknowledged. One limitation of this study is the number of significant others we examined. We only examined two significant others: the most significant ex-partner and the parent to whom participants felt the closest. A better test of transference would examine whether transference occurs when people draw on their working models across multiple significant others. In general, the process of examining multiple significant others of the same type (i.e., ex-partners or friends; parents or mentors) would allow researchers to examine if people broadly select new close others who are similar to ones in their working models across the totality of their relationships. For example, future researchers could examine transference processes across se-

quential ex-partners. This would allow researchers to examine the accessibility of ex-partners and determine if more recent partners are more accessible than those farther in the past or whether the most significant, exemplary ex-partners hold the most sway. Moreover, examining multiple friends in a person's working model would allow future researchers to examine if people select new friends based on their similarity with existing (or past) friends and which friendships are the most accessible to individuals.

A second limitation of this study is the construction of target descriptions. Participants read dating profiles that only included a short paragraph of information. Certainly, when evaluating similarities between someone who resembles a significant other, there are other more relevant factors to take into account, like facial expressions, tone of voice, behavior, and physical appearance (e.g., Kraus & Chen, 2010).

A third limitation of this study is the reliance on self-reports when describing a significant other. Because the effect of transference is based on characteristics generated by the participant, we might observe transference simply because it is easier for people to remember descriptions they generated about people they know than descriptions generated by someone else about people they know. Specifically, because these descriptions are self-reports of others, they might reflect information inside a participant's working model, but they might not accurately reflect the descriptions that the ex-partner or parent might generate of themselves. In other words, it is possible that the information provided by the participants is inaccurate or a distortion of what their significant other is like. Future researchers might examine whether the observed effect of transference is based only on memory of self-reported descriptions of significant others or is also observed when the details about the significant other are more "accurate" and factual. Accuracy in significant other descriptions and their effect on transference might be addressed with an informant design in which pairs of exes describe themselves and each other. Intriguingly, working models involve the subjective organization of imperfect information solely from the perspective of the individual themselves (Collins & Read, 1994; Fraley, 2007). Thus, it could be that an individual's perception of a significant other, regardless of whether this perception is rooted in reality, may be all that is necessary to facilitate transference. Relatedly, we did not measure other variables related to these significant others (e.g., their relationship quality with each person). Examining how one's perception or appraisal of past relationships might influence transference processes is an interesting direction for future work.

Finally, with this new online transference paradigm, collecting larger and diverse samples is now possible. The current study partially served as a proof of concept and recruited a convenience sample that was predominantly White and relatively young, with few older adults. Future research should collect samples that are more diverse with respect to age, gender/sexual orientation, race/ethnicity, and relationship experiences.

Conclusions

This study is the first to test transference with a stream-

lined, automated task, beyond a college-aged sample, with parents and ex-partners. Even with modifications to the original task, the classic transference effect was found: people reported more certainty for erroneously remembering information related to a target resembling a significant other. People also preferred the significant other target to the control targets. These effects were seen regardless of whether people were drawing on their ex-partners or parents as the basis of transference. These transference and preference processes were slightly stronger for older individuals and secure individuals; however, more pre-registered research is needed to understand age and attachment orientation as moderators of transference. The current study provides further evidence that people apply their mental representations of significant others broadly during the process of learning about novel people. Future research should continue to examine transference with more diverse samples, multiple or sequential partners, and informant reports to examine how transference processes differ with more attachment figures and multiple sources of information.

Contributions

Contributed to conception and design: KEL, WJC
 Contributed to acquisition of data: KEL, WJC
 Conducted analysis and interpretation of data and drafted the article: KEL
 Revised the article: KEL, WJC
 Approved the submitted version for publication: KEL, WJC

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Competing interests

We have no known conflicts of interest to disclose. William J. Chopik is an editor at *Collabra: Psychology*. He was not involved in the peer review process of the article.

Supplemental materials

Table S1. Regression results predicting certainty scores controlling for gender, relationship status, and likeableness scores including models moderated by age and attachment excluding suspicious participants

Table S2. Regression results predicting preference scores controlling for gender, relationship status, and likeableness scores including models moderated by age and attachment excluding suspicious participants

Table S3. Correlations between study variables Peer Review History and Communication

Data accessibility statement

Data and syntax are available at: https://osf.io/qdr74/?view_only=None

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REFERENCES

- Alterovitz, S. S.-R., & Mendelsohn, G. A. (2011). *Partner preferences across the life span: Online dating by older adults*.
- An, J. S., & Cooney, T. M. (2006). Psychological well-being in mid to late life: The role of generativity development and parent-child relationships across the lifespan. *International Journal of Behavioral Development, 30*(5), 410–421. <https://doi.org/10.1177/0165025406071489>
- Andersen, S. M., & Baum, A. (1994). Transference in interpersonal relations: Inferences and affect based on significant - other representations. *Journal of Personality, 62*(4), 459–497.
- Andersen, S. M., & Chen, S. (2002). The relational self: an interpersonal social-cognitive theory. *Psychological Review, 109*(4), 619.
- Andersen, S. M., & Cole, S. W. (1990). “Do I know you?”: The role of significant others in general social perception. *Journal of Personality and Social Psychology, 59*(3), 384.
- Andersen, S. M., Glassman, N. S., Chen, S., & Cole, S. W. (1995). Transference in social perception: The role of chronic accessibility in significant-other representations. *Journal of Personality and Social Psychology, 69*(1), 41.
- Andersen, S. M., Reznik, I., & Manzella, L. M. (1996). Eliciting facial affect, motivation, and expectancies in transference: Significant-other representations in social relations. *Journal of Personality and Social Psychology, 71*(6), 1108.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*(5), 469–480. <http://doi.org/10.1037/0003-066x.55.5.469>
- Baldwin, M. W., Keelan, J. P. R., Fehr, B., Enns, V., & Koh-Rangarajoo, E. (1996). Social-cognitive conceptualization of attachment working models: Availability and accessibility effects. *Journal of Personality and Social Psychology, 71*(1), 94.
- Berenson, K. R., & Andersen, S. M. (2006). Childhood physical and emotional abuse by a parent: Transference effects in adult interpersonal relations. *Personality and Social Psychology Bulletin, 32*(11), 1509–1522.
- Berk, M. S., & Andersen, S. M. (2000). The impact of past relationships on interpersonal behavior: Behavioral confirmation in the social-cognitive process of transference. *Journal of Personality and Social Psychology, 79*(4), 546.
- Bowlby, J. (1982). *Attachment and loss: Vol. 1. Attachment*. Basic Books. (Original work published 1969)
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships*. (pp. 46–76). Guilford Press.
- Brumbaugh, C. C. (2017). Transferring connections: Friend and sibling attachments’ importance in the lives of singles. *Personal Relationships, 24*(3), 534–549.
- Brumbaugh, C. C., & Fraley, R. C. (2006). Transference and attachment: How do attachment patterns get carried forward from one relationship to the next? *Personality and Social Psychology Bulletin, 32*(4), 552–560.
- Brumbaugh, C. C., & Fraley, R. C. (2007). Transference of attachment patterns: How important relationships influence feelings toward novel people. *Personal Relationships, 14*(4), 513–530. <https://doi.org/10.1111/j.1475-6811.2007.00169.x>
- Bruner, J. S. (1957). Going beyond the information given. *Contemporary Approaches to Cognition, 1*(1), 119–160.
- Carstensen, L. L., & Fredrickson, B. L. (1998). Influence of HIV status and age on cognitive representations of others. *Health Psychology, 17*(6), 494.
- Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist, 54*(3), 165–181. <https://doi.org/10.1037/0003-066x.54.3.165>
- Cassidy, J., & Berlin, L. J. (1994). The insecure/ambivalent pattern of attachment: Theory and research. *Child Development, 65*(4), 971–991.
- Chandler, J. (2018). Likeableness and meaningfulness ratings of 555 (+ 487) person-descriptive words. *Journal of Research in Personality, 72*, 50–57.

- Chopik, W. J. (2017). Associations among relational values, support, health, and well-being across the adult lifespan. *Personal Relationships*, 24(2), 408–422. <https://doi.org/10.1111/per.12187>
- Chopik, W. J., & Edelstein, R. S. (2019). Retrospective memories of parental care and health from mid-to late life. *Health Psychology*, 38(1), 84.
- Chopik, W. J., Edelstein, R. S., & Fraley, R. C. (2013). From the cradle to the grave: Age differences in attachment from early adulthood to old age. *Journal of Personality*, 81, 171–183. <https://doi.org/10.1111/j.1467-6494.2012.00793.x>
- Collins, N. L., & Read, S. (1994). Cognitive representations of attachment: the structure and function of attachment models. In *Attachment processes in adulthood: Advances in personal relationships*. Kingsley.
- Fraley, R. C. (2007). A connectionist approach to the organization and continuity of working models of attachment. *Journal of Personality*, 75(6), 1157–1180. <https://doi.org/10.1111/j.1467-6494.2007.00471.x>
- Fraley, R. C., & Davis, K. E. (1997). Attachment formation and transfer in young adults' close friendships and romantic relationships. *Personal Relationships*, 4(2), 131–144. <https://doi.org/10.1111/j.1475-6811.1997.tb00135.x>
- Fraley, R. C., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The Experiences in Close Relationships—Relationship Structures Questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment*, 23(3), 615.
- Fraley, R. C., & Shaver, P. R. (1998). Airport separations: A naturalistic study of adult attachment dynamics in separating couples. *Journal of Personality and Social Psychology*, 75(5), 1198–1212. <https://doi.org/10.1037/0022-3514.75.5.1198>
- Fredrickson, B. L., & Carstensen, L. L. (1990). Choosing social partners: how old age and anticipated endings make people more selective. *Psychology and Aging*, 5(3), 335.
- Fung, H. H., Carstensen, L. L., & Lutz, A. M. (1999). Influence of time on social preferences: implications for life-span development. *Psychology and Aging*, 14(4), 595–604. <https://doi.org/10.1037/0882-7974.14.4.595>
- Glassman, N. S., & Andersen, S. M. (1999). Activating transference without consciousness: using significant-other representations to go beyond what is subliminally given. *Journal of Personality and Social Psychology*, 77(6), 1146.
- Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology*, 52(3), 511–524. <https://doi.org/10.1037/0022-3514.52.3.511>
- Hazan, C., & Shaver, P. R. (1994). Attachment as an organizational framework for research on close relationships. *Psychological Inquiry*, 5(1), 1–22.
- Heffernan, M. E., Chong, J. Y., & Fraley, R. C. (2018). Are People Attracted to Others Who Resemble Their Opposite-Sex Parents? An Examination of Mate Preferences and Parental Ethnicity Among Biracial Individuals. *Social Psychological and Personality Science*, 1948550618794679.
- Higgins, E. T. (1996). Activation: Accessibility, and salience. *Social Psychology: Handbook of Basic Principles*, 133–168.
- Kraus, M. W., & Chen, S. (2010). Facial-feature resemblance elicits the transference effect. *Psychological Science*, 21(4), 518–522.
- Luong, G., Charles, S. T., & Fingerman, K. L. (2011). Better with age: Social relationships across adulthood. *Journal of Social and Personal Relationships*, 28(1), 9–23. <https://doi.org/10.1177/0265407510391362>
- Mikulincer, M. (1998). Adult attachment style and individual differences in functional versus dysfunctional experiences of anger. *Journal of Personality & Social Psychology*, 74, 513–524.
- Mikulincer, M., & Florian, V. (1998). *The relationship between adult attachment styles and emotional and cognitive reactions to stressful events*.
- Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change*. Guilford Press.
- Mikulincer, M., Shaver, P. R., Sapir-Lavid, Y., & Avihou-Kanza, N. (2009). What's inside the minds of securely and insecurely attached people? The secure-base script and its associations with attachment-style dimensions. *Journal of Personality and Social Psychology*, 97(4), 615.
- Park, Y., & MacDonald, G. (2019). Consistency between individuals' past and current romantic partners' own reports of their personalities. *Proceedings of the National Academy of Sciences*, 116(26), 12793–12797.

Reuben, A., Moffitt, T. E., Caspi, A., Belsky, D. W., Harrington, H., Schroeder, F., Hogan, S., Ramrakha, S., Poulton, R., & Danese, A. (2016). Lest we forget: comparing retrospective and prospective assessments of adverse childhood experiences in the prediction of adult health. *J Child Psychol Psychiatry*, *57*(10), 1103–1112. <https://doi.org/10.1111/jcpp.12621>

Schwarz, S., & Hassebrauck, M. (2012). Sex and Age Differences in Mate-Selection Preferences. *Human Nature*, *23*(4), 447–466. <https://doi.org/10.1007/s12110-012-9152-x>

Sullivan, H. S. (1953). *The interpersonal theory of psychology*. WW.

Wood, D., & Brumbaugh, C. C. (2009). Using revealed mate preferences to evaluate market force and differential preference explanations for mate selection. *Journal of Personality and Social Psychology*, *96*(6), 1226.

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