Attachment-Related Individual Differences in the Consistency of Relationship Behavior Interpretation

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Abstract
The consistency with which people interpret relationship-based information has important implications for attachment theory and research. Our objective is to determine whether there are attachment-related individual differences in the manner and the consistency with which individuals interpret hypothetical relationship behaviors. In two studies (N = 629, 79% female, 63% American, M_age = 29; N = 820, 78% female, 65% American, M_age = 29), we assessed participants’ ability and consistency in relationship behavior interpretation across two blocks and estimated how they would have performed had they interpreted information perfectly consistently. Secure participants were generally more consistent in their interpretations relative to insecure participants. Estimates of perfectly consistent interpretation revealed that improvements to both systematic factors related to behavior interpretation (e.g., working models) and consistency would have led to a more secure interpretation style for participants of all attachment styles. Results imply that both secure and insecure individuals process relationship-based information according to secure scripts, but insecure individuals do so inconsistently. Our results imply that, due to the inconsistent behavioral responses that may occur as a result of inconsistent information processing, the consistency with which people process relationship-related information will be related to relationship satisfaction. Further directions for future research are discussed.

Attachment researchers have long been interested in how adults interpret interpersonal interactions in close relationships (e.g., Collins, 1996; Vicary & Fraley, 2007). However, the consistency with which adults interpret similar interactions across different points in time has not been examined. The question of whether there are attachment-related individual differences in this type of consistency has important implications for the future of attachment and close relationships research. If such differences exist, they can serve as a foundation for research examining the relationship between consistency and variables crucial to relationship outcomes (e.g., relationship satisfaction). On a theoretical level, predictability and familiarity are central factors in attachment security (Levitt, 1991), both of which may depend on the consistency with which partners interpret each other’s behaviors and respond to one another. As such, it is important to examine the consistency with which adults interpret interpersonal interactions.

Our two main objectives in the present research are (a) to determine whether there are attachment-related individual differences in the degree to which adults securely process relationship behaviors and in the consistency with which they do so, and (b) to determine the extent to which systematic factors (i.e., working models of attachment) and consistency jointly contribute to the interpretation of relationship behaviors. In the process of doing so, we aim to address related questions, such as what it means to be “consistent” in a close relationship, why consistency is important for romantic relationships, and whether consistency can be improved.

Review of Relevant Attachment Theory
According to attachment theory, people develop mental representations, or working models, that guide interpretations of behaviors and interactions in close relationships (Bretherton & Munholland, 2008). Working models vary in two ways. First, individuals vary with respect to positive versus negative models of the self (or what some researchers call attachment-related anxiety; Bartholomew & Horowitz, 1991). Highly anxious individuals, or those with negative models of the self, strongly desire closeness and intimacy, but view themselves as inherently unworthy of love and their romantic partners as unavailable or unresponsive. The jealous, anxious tendencies of highly anxious individuals result in relationships character-
ized by arguments (Levy & Davis, 1988), accusations of infidelity (Kingham & Gordon, 2004), and, commonly, dissolution (Kirkpatrick & Hazan, 1994).

Second, working models vary with respect to positive versus negative models of others (or what some researchers call attachment-related avoidance). Highly avoidant individuals, or those with negative models of others, prefer physical and psychological distance from others, view others as untrustworthy, and value self-reliance and autonomy (Fral ey, Davis, & Shaver, 1998). Highly avoidant individuals tend to withdraw from conflict situations (Kobak & Duemmler, 1994) and avoid affection and intimacy (Schachner & Shaver, 2004). Avoidant individuals have also been shown to exhibit a high degree of defensiveness, contempt, and domineeringness during marital conflict (Creasey, 2002).

The working models of individuals who view themselves and others positively (also referred to as secure individuals) contain expectations of partners as available, supportive, and responsive (Collins, 1996). Compared to others, secure individuals report higher marital satisfaction, less subjectively felt rejection, and a greater sense of support from spouses (Kobak & Hazan, 1991).

The working models that people hold lead them to process relationship-related information in attachment-specific ways (Collins & Feeney, 2004; Pietromonaco & Barrett, 2000). Secure individuals tend to interpret interactions with close others in a positive manner, whereas insecure individuals tend to interpret interactions with close others in a comparatively negative manner (e.g., Collins, 1996; Collins & Feeney, 2004). Working models, therefore, impact the construals that people make about their partners’ actions. Although it is assumed that working models can change over time, theoretical and empirical evidence suggests that a stable, latent factor known as a prototype underlies the variance in working models (Fral ey, 2002). This supports the assumption that working models influence relationship-related information processing in a systematic manner (Bowlby, 1980; Collins & Feeney, 2004).

There are also stochastic, or random, factors that influence the processing of close relationship interactions (see Fraley & Brumbaugh, 2004). We refer to these presumably innumerable factors as “random factors.” Thus, there are two sources of variation—systematic and random—that influence the processing of relationship behaviors. Although random factors are, by definition, random, they still have a systematic effect on the relationship between attachment style and information processing: As the influence of random factors on relationship behavior interpretation increases, the consistency of interpretation decreases. Inconsistency in relationship-relevant information processing could therefore lead to inconsistent behavioral responses, which in turn may have negative consequences for close relationships. Therefore, it is important to document and understand the relative contributions of both systematic and random factors to the interpretation of interpersonal interactions.

**Attachment and Consistency**

We define consistency as behaving in a reliable manner across identical or similar situations. Said another way, consistency is behaving in a similar or identical manner in response to repeated instances of a specific stimulus (or class of stimuli). Across repeated instances, the same behavior may be interpreted differently depending on both the working models of the perceiver and the extenuating circumstances involved in a given instance of that behavior.

To date, the role that consistency plays in attachment and close relationships has not been studied. There are at least two reasons why exploring consistency in an attachment context may prove fruitful. First, because there are individual differences in the organization of working models, there are likely predictable, attachment-related individual differences in the consistency with which people interpret relationship-based information. To elaborate, highly avoidant individuals tend to ignore, avoid, or suppress attachment-related information in an effort to prevent attachment system activation (Cassidy & Kobak, 1988). Avoidant individuals also tend to preemptively exclude attachment-related information from becoming encoded into memory (Fral ey & Brumbaugh, 2007; Fraley, Garner, & Shaver, 2000) and have difficulty recalling past attachment experiences (Fral ey et al., 1998; Mikulincer & Orbach, 1995; Simpson, Rholes, & Winterheld, 2010). As such, avoidant individuals may process attachment-related information at a shallow level, rendering their judgments susceptible to the influence of random factors. This implies that avoidant individuals will exhibit inconsistent interpretations of relationship-related behaviors relative to more secure individuals.

Highly anxious individuals, on the other hand, tend to evaluate relationships in a short-term, day-to-day manner, rather than referencing more long-term characteristics of the relationship (Campbell, Simpson, Boldry, & Kashy, 2005). Moreover, highly anxious individuals tend to misremember attachment-related events, especially when distressed (Simpson et al., 2010). This may result in rapidly changing or inaccurate perceptions of partner behaviors that fluctuate based on the current climate of the relationship. It is therefore possible that anxious individuals experience several referent shifts (i.e., instances or behaviors used as a standard against which to evaluate a current interaction) from instance to instance of a particular occurrence, resulting in greater inconsist ency relative to more secure participants.

Importantly, the question of whether increasing consistency would improve the degree to which people interpret information in a secure manner depends on the interpretation strategies they use. If insecure individuals interpret relationship behaviors with truly insecure strategies, improving consistency will lead to a greater degree of insecure interpretations. If, on the other hand, insecure individuals use secure strategies inconsistently, then improving consistency should result in more secure interpretations.
Second, the question of whether there are attachment-related individual differences in the consistency with which people interpret relationship behaviors has potential implications for future attachment and close relationships research. For instance, it may be difficult to form a secure attachment bond with a person whose behavioral responses are inconsistent, and therefore unpredictable. Beginning in infancy, humans are extremely sensitive to the consistency with which caregivers respond to their bids for proximity. Bowlby (1969, 1973, 1980) discussed the importance of working models in infants’ forecasting of caregivers’ future behaviors, a proposition supported by research revealing that the quality and consistency of caregiver responses are crucial determinants of infant attachment style (Ainsworth, Blehar, Waters, & Wall, 1978). As the attachment system continues to influence thoughts, feelings, and behavior throughout life (Fraley, 2002), it is likely that this sensitivity to consistency continues into adulthood. If this is the case, then inconsistent behavior in adult close relationships could lead to anxiety, anger, and frustration, ultimately undermining relationship satisfaction. All of these assumptions rest on the answer to the question of whether there are attachment-related individual differences in the degree to which people consistently process relationship-based information. Next, we discuss the theoretical and methodological approach used to assess consistency in the present research.

### Potential Performance Theory

Classical true score test theory is a psychometric theory used to predict outcomes of psychological testing (see Crocker & Algina, 1986). It assumes that each respondent has a true score that would be obtained in absence of measurement error. Potential performance theory (PPT; Trafimow & Rice, 2008), an extension of classical true score test theory, is used to derive potential performance scores, which are observed scores that have been corrected for inconsistency on the part of the respondent. A primary innovation of PPT over true score test theory is that PPT mathematically attributes inconsistency to the individual being measured rather than the measure itself. According to PPT, a person’s observed performance in a given activity is influenced by (a) all of the systematic factors that are relevant to that activity and (b) the consistency with which those factors are applied. PPT mathematically defines systematic factors as the combination of all nonrandom elements of performance and defines consistency as the correlation between two identical blocks of trials. Trafimow and Rice (2008) argue that any improvements to performance can be accomplished through improvements in systematic factors, improvements in the consistency with which systematic factors are applied to the task, or a combination of both. It is important to note that PPT uses the term consistency only in reference to the correlation between two blocks of identical trials, and it should not be confused with consistency as it is defined or applied in other psychological perspectives.

Consistency calculations require that participants complete a block of trials, and after a delay or an intermediate activity, complete a second block of matched trials. A correlation coefficient can then be computed across the set of matched responses for each participant. In the absence of random influences on behavior, there should be a perfect correlation between the two blocks of matched trials. However, as the influence of random factors increases, the correlation (i.e., the consistency coefficient) decreases. As long as success is achieved at a level greater than that obtainable by chance, the increased influence of random factors will result in a decrease in observed scores. Once observed scores and the consistency coefficient are obtained, PPT formulas can be used to calculate the potential score a person would achieve with perfect consistency. The power of PPT is that it can be applied in any domain in which people can engage in behaviors or pursue goals having outcomes characterized by success or failure. In the present context of interpreting relationship behaviors, “success” would be indicated by correctly interpreting secure behaviors as relationship strengthening and insecure behaviors as relationship weakening, whereas “failure” would be indicated by misinterpreting secure behaviors as weakening and insecure behaviors as strengthening.

In order to conduct PPT calculations, it is first necessary to convert observed scores into a correlation coefficient. Assuming dichotomous item responses (one of which is arbitrarily or objectively designated as “correct” and the other as “incorrect”) in a forced-choice answer paradigm, the participant can make one of four possible responses: (a) correctly choose option 1, (b) incorrectly choose option 1, (c) correctly choose option 2, or (d) incorrectly choose option 2. Thus, each person’s performance across the trials can be summarized by a 2 × 2 table where a, b, c and d refer to the cell frequencies, r₁ and r₂ refer to the row frequencies, and c₁ and c₂ refer to the column frequencies. This table can be converted into a correlation coefficient via Equation 1 below.

\[
r̴ = \frac{|ad - bc|}{\sqrt{(a+b)(c+d)(a+c)(b+d)}} = \frac{|ad - bc|}{\sqrt{n_{12}c_{1}c_{2}}}
\]

Next, this correlation coefficient must be corrected for attenuation due to inconsistency. Equation 2 below can be derived from classical true score theory as well as from several other modern theories (see Gulliksen, 1987, for a review). An adjusted correlation coefficient is calculated by dividing the correlation coefficient between the correct answers and the participants’ block 1 answers (r̴) by the square root of the consistency coefficient (r̴c₁c₂) as in Equation 2 below.

\[
R = \frac{r̴}{\sqrt{r̴c₁c₂}}
\]

Using the adjusted correlation coefficient (R), we can return to the table and calculate the cell frequencies that would be
obtained in the absence of randomness. This requires fixing the margin frequencies based on the cell frequencies obtained from the first block of trials. This process is similar to Fisher’s exact test or the chi-square procedure. Next, the potential cell frequencies are estimated based on $R$ using Equations 3–6 below (see Trafimow & Rice, 2008, 2009, for proofs of these equations and support for the validity of the assumptions made by PPT). Because we are now referring to potential rather than observed cell frequencies, we use uppercase letters to refer to the cell and margin frequencies in Equations 3–6 below.

$$
A = \frac{R \sqrt{R_1 R_2 C_1 C_2 + C_1 R_1}}{(R_1 + R_2)}
$$

$$
B = \frac{R_1 (R_1 + R_2) - R \sqrt{R_1 R_2 C_1 C_2 + C_1 R_1}}{(R_1 + R_2)}
$$

$$
C = \frac{C_1 R_2 - R \sqrt{R_1 R_2 C_1 C_2}}{(R_1 + R_2)}
$$

$$
D = \frac{C_1 (R_1 + R_2) - [R_1 (R_1 + R_2) - R \sqrt{R_1 R_2 C_1 C_2 + C_1 R_1}]}{(R_1 + R_2)}
$$

Finally, using Equation 7 below, the adjusted cell frequencies can be used to calculate potential performance scores. These are scores that would be obtained in the absence of random influences on behavior.

$$
\text{potential performance} = \frac{A + D}{(A + B + C + D)}
$$

**Using PPT to Analyze Close Relationship Behavior**

In a romantic relationship, a person could correctly or incorrectly interpret a partner’s behavior. Poor interpretation could be systematic, such that negative working models lead one to interpret a partner’s behaviors in a biased manner. On the other hand, inconsistency could simply be the product of random factors in the environment, relationship, or individual (e.g., prior interactions in the day, fluctuations in mood) that lead to inconsistent interpretation of relationship behaviors.

In the present research, the potential scores yielded by PPT are estimates of how participants would perform at interpreting relationship behaviors should they follow their systematic interpretation strategies with perfect consistency. Potential scores will reveal whether more consistent interpretation will lead to more (or, ironically, fewer) correct interpretations, as described earlier.

It is important to note that PPT uses terms such as improvement and success, which we apply somewhat arbitrarily in the present research. Traditionally, secure attachment behaviors are conceptualized in a positive manner and insecure attachment behaviors in a negative manner. Because of the adaptive nature of the attachment system, there are numerous variations on what can be considered “optimal” relationship behavior. If different conceptualizations of successful relationship behaviors are desired, PPT can be easily adapted to accommodate them. Nonetheless, in the present research, we focus on the traditional conceptualization of secure behaviors as relationship enhancing and insecure behaviors as relationship impairing.

**Overview and Hypotheses**

We presented participants with a block of 50 relationship behaviors (25 secure, 25 insecure) and asked them to decide whether each behavior would strengthen or weaken a relationship. Participants then completed a second identical block following a delay. In Study 1, we presented participants with prototypically secure and avoidant behaviors. In Study 2, we presented participants with prototypically secure and anxious behaviors. Items were designed based on the types of behaviors that secure, anxious, and avoidant individuals would likely interpret in attachment-specific ways.

Because secure individuals have knowledge of scripts about how secure base interactions work, they should implicitly understand the kinds of behaviors that fit into those scripts, and accordingly, they should have access to knowledge about the kinds of behaviors that make a relationship succeed or fail. Thus, we predict that participants low on anxiety and avoidance will, relative to insecure participants, be better able to identify behaviors as beneficial or detrimental to relationships. Moreover, secure individuals think about attachment-related experiences in a clear, coherent, and stable manner (Main & Goldwyn, 1993). Accordingly, we predict that secure participants will exhibit a fairly high degree of consistency across blocks of trials in both studies.

Anxious individuals, due to their fleeting and unstable manner of processing we discussed earlier, may have trouble maintaining a stable set of schemas against which to evaluate behavior. Accordingly, we predict that participants scoring high on anxiety will interpret relationship behaviors less consistently than more secure individuals in Study 2 (which features secure vs. anxious behaviors). Due to their hypervigilance to attachment threats, however, anxious individuals should find avoidant behaviors particularly aversive, and, in spite of their unstable processing style, should still be able to differentiate them from secure behaviors. Thus, we predict that anxious participants will exhibit a level of classification accuracy and consistency on par with secure individuals in Study 1.

Intuitively, due to avoidance of individuals’ aversion to closeness and preference for independence, one might assume avoidant participants would find it easy to differentiate between anxious and secure behaviors, and thus would be highly consistent in Study 2. However, based on the theoretical and empirical evidence of avoidant individuals’ defensive pro-
cessing style and preemptive exclusion of information related to closeness (Cassidy & Kobak, 1988; Fraley & Brumbaugh, 2007), it is conceivable that avoidant individuals’ shallow level of processing will extend to all relationship behaviors, anxious or otherwise. As such, a more plausible prediction is that highly avoidant participants will interpret relationship behaviors less consistently than more secure individuals in both studies. This effect may be especially prevalent in Study 1 (which features secure vs. avoidant behaviors) because avoidant individuals’ defensive style of thinking may result in a blurred line between secure and avoidant behaviors.

Regarding potential scores, due to secure individuals’ knowledge of secure scripts, perfect consistency should lead to increased accuracy in classifying whether certain behaviors would strengthen or undermine a relationship. Accordingly, we predict that the potential scores of secure participants will be higher than their observed scores. Regarding insecure participants, we offer two competing hypotheses: If insecure participants tend to experience difficulty classifying relationship behaviors because they use a secure interpretation strategy inconsistently (e.g., they have sufficient knowledge of secure base scripts, but have trouble consistently applying them due to shallow or shifting processing), their potential scores will be higher than their observed scores. However, if they experience difficulty because they consistently use an insecure interpretation strategy (e.g., relying on hyperactivating or deactivated strategies), their potential scores will be lower than their observed scores. Both of these predictions align with contemporary attachment theory and research; thus, we consider both hypotheses equally plausible.

STUDY 1

Method

Participants. Data were collected via the Internet, through a Web-based study labeled as a “Relationship choices” survey. Because there was not a sufficiently similar body of research on which to base a power analysis, we decided to run the survey for one month (which generally yields approximately 700 participants). The study was programmed in the Perl programming language and was hosted on the Web site yourpersonality.net, which offers a variety of personality, attachment, and relationship surveys. A primary attraction of the site is that it generates personalized, educational feedback for participants upon completion of each study. The host site can be found by various means, including Internet search engines and following shared links. Recent research has indicated that Internet studies allow for a more diverse sample than those recruited through the average subject pool, are comparable in quality to paper-and-pencil methods, allow participants greater degree of confidentiality than person-proctored surveys, and due to sophisticated screening methods, are relatively free of corrupt, repeated, or otherwise tainted data (see Farrell & Petersen, 2010; Gosling, Vazire, Srivastava, & John, 2004).

The final sample contained 629 participants, of which 79% were female. Sixty-three percent were from the United States, 8% were from Canada, 6% were from the United Kingdom, and the rest were from other countries. Forty-six percent were in a marital or dating relationship. Eighty-three percent identified as heterosexual, 4% homosexual, 6% bisexual, and 7% declined to answer. Median participant age was 27 years (M = 29.6, SD = 10, range = 18–64).

Materials and Procedure

Attachment Orientation. The Experiences in Close Relationships-Revised (ECR-R; Fraley, Waller, & Brennan, 2000) was used to assess participants’ attachment orientations. The ECR-R contains 36 items and is used to assess attachment scores on the dimensions of attachment-related anxiety (e.g., “Sometimes I worry my partner doesn’t love me”) and avoidance (e.g., “I prefer not to be too close to romantic partners”). Participants indicated their agreement with each item on a 7-point Likert-type scale. Internal consistencies for the present sample were .92 and .93 for anxiety and avoidance, respectively. The correlation between anxiety (M = 3.64, SD = 1.29) and avoidance (M = 2.96, SD = 1.21) was .37, which is typical for the ECR-R.

Relationship Behavior Choice Task. The consistency of relationship-related information processing was assessed with a 50-item dichotomous choice task. Each item presented a behavior that might typically occur in a relationship (e.g., “Seeking comfort in your partner after a personal failure”; “Not involving your partner with your problems”). Participants indicated whether they thought each behavior would strengthen a relationship. Half of the items featured prototypically secure behavior, and the other half featured prototypically avoidant behavior (see above examples, respectively). Items for both studies were chosen from a base list of 300 behaviors (100 prototypical secure, anxious, and avoidant behaviors) that was compiled by three researchers familiar with attachment theory, and corroborated by the first author. The items (with a 1 to 5 response scale stating, “This behavior is something I would typically do in a romantic relationship”) and an attachment scale (ECR-R) were issued to 163 individuals in a classroom-based pilot study. The top 50 items from each attachment category that best represented responses from respective participants scoring high (+1 SD) on avoidance, high (+1 SD) on anxiety, or low (−1 SD) on both dimensions were chosen for the study.

In the main studies, responses to secure-oriented items were scored as “correct” if the participant selected “relationship strengthening” and “incorrect” if he or she selected “relationship weakening.” Avoidant-oriented items were scored in the reverse manner. This coding system resulted in 50 responses that were used to generate the 2 × 2 table described in Equation 1.

Procedure. The title and a brief description of the study were linked on the home page of yourpersonality.net. Clicking
Table 1: Study 1: Hierarchical Linear Regression Predicting Consistency, Observed Scores, and Potential Scores

<table>
<thead>
<tr>
<th>Predictor</th>
<th>ΔR²</th>
<th>B</th>
<th>95% CI</th>
<th>Predictor</th>
<th>ΔR²</th>
<th>B</th>
<th>95% CI</th>
<th>Predictor</th>
<th>ΔR²</th>
<th>B</th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>.06</td>
<td></td>
<td></td>
<td></td>
<td>.30</td>
<td></td>
<td></td>
<td></td>
<td>.18</td>
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</tr>
<tr>
<td>Avoidance</td>
<td></td>
<td>-.03*** [-.04, -.02]</td>
<td>Avoidance</td>
<td></td>
<td>-.13*** [-.01, -.11]</td>
<td>Avoidance</td>
<td></td>
<td>-.12*** [-.14, -.10]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td></td>
<td>-.00 [-.02, .01]</td>
<td>Anxiety</td>
<td></td>
<td>.02** [0.01, 0.04]</td>
<td>Anxiety</td>
<td></td>
<td>0.01 [-.01, .03]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td>-.01* [-.02, -.00]</td>
<td>Interaction</td>
<td></td>
<td>-.00 [-.01, .01]</td>
<td>Interaction</td>
<td></td>
<td>0.00 [-.02, .02]</td>
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<tr>
<td>Total R²</td>
<td>.07</td>
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<td></td>
<td>Total R²</td>
<td>.30</td>
<td></td>
<td></td>
<td>Total R²</td>
<td>.18</td>
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</tbody>
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Note. N = 629. CI = confidence interval.
*p < .05. ***p < .01.

the link led to a consent page describing the study. On this page, participants were notified of the opportunity to stop participation at any time by closing the Web browser. Accordingly, we did not collect any data from participants who opted out. Upon granting informed consent, the survey began. Following a brief demographics section, participants completed the 50-item behavior choice task (block 1), filled out the ECR-R, and then completed the 50-item task again (block 2). Preliminary testing indicated the survey took approximately 20 minutes to complete (approximately 8 minutes per block, with the 3–5-minute ECR-R between blocks). The order of the ECR-R items was randomized, as was the order of the items and the item response options in the behavior choice task. Upon completion of the survey, participants were thanked, debriefed, and given personalized feedback based on their responses. Aside from this feedback, no compensation was given.

Results and Discussion

Prior to conducting regression analyses, attachment dimension scores were mean-centered. All PPT calculations were carried out using the series of equations described earlier. It is important to note that one of the assumptions of PPT is that chance success can occur for reasons other than chance. As such, a correction is needed for cases in which a participant obtains an observed score below 50%. The correction involves forcing the numerator in Equation 1 to be negative:

\[ \frac{ad - bc}{\sqrt{r_{cc}^2 c_2}} \]

becomes \[ -\frac{ad - bc}{\sqrt{r_{cc}^2 c_2}} \]

This adjusts the potential score downward from the observed score rather than upward. Specifically, if a participant performs at a level below 50% for reasons other than inconsistency, potential scores will be adjusted downward.

Mean consistency for the sample was .89 (median = .92). The mean proportion of observed successes was .58, and the mean proportion of potential successes was .69. This means that, in the absence of random influence, participants would have chosen the correct answer 69% of the time instead of 58%, an average improvement of 11%:\(t(628) = 17.41, p < .001\). This implies that up to a 31% additional improvement (100% - 69% = 31%) may be reached through improvements in systematic factors.

In order to illustrate the relationships between the PPT variables and attachment styles, we plotted the dependent variables for the different attachment styles using the same techniques used to illustrate interactions involving continuous variables (see Aiken & West, 1991). Specifically, we plotted the four theoretical attachment styles described by Bartholomew (1990) as derived from the two dimensions of anxiety and avoidance. Secure was derived by substituting values of +1 for both anxiety and avoidance in the estimated regression equation, dismissing by substituting values of +1 for avoidance and –1 for anxiety, preoccupied by substituting values of –1 for avoidance and +1 for anxiety, and fearful by substituting values of +1 for both anxiety and avoidance (see Bartholomew & Horowitz, 1991; Fraley et al., 1998). It is important to note that we interpret these “styles” not as categories or types, but simply 45-degree rotations of the two dimensions (see Fraley & Waller, 1998). In other words, we report dimensional analyses labeled with the four theoretical prototypes solely for illustrative purposes.

Consistency. In a hierarchical linear regression, we regressed consistency on anxiety and avoidance (Step 1), and their interaction (Step 2). The regression estimates are reported in the left panel of Table 1. In Step 1, the overall model was significant, \(F(2, 626) = 19.23, p < .001\), \(R^2 = .06\). There was a main effect of avoidance, such that high avoidance was associated with lower consistency. This main effect was qualified by an interaction between avoidance and anxiety in Step 2, \(F_{change}(1, 625) = 6.15, p = .01, \Delta R^2 = .01\). We plotted the interaction using the values of +1 and –1 for the two standardized dimensions (see left panel of Figure 1). Simple slope analyses revealed that the slopes for both high anxiety (β = –.04,
and low anxiety ($\beta = -0.02, p = 0.002$) were significant, indicating that participants scoring high on both dimensions simultaneously were the least consistent relative to others.

**Observed Scores.** In a hierarchical linear regression, we regressed observed scores on anxiety and avoidance (Step 1), and their interaction (Step 2). The regression estimates are reported in the center panel of Table 1. In Step 1, the overall model was significant, $F(2, 626) = 132.78, p < .001, R^2 = .30$. There were main effects of both avoidance and anxiety, such that highly avoidant individuals tended to choose the incorrect responses, and highly anxious participants tended to choose the correct responses. There was no interaction. See the solid lines in the right panel of Figure 1.

**Potential Scores.** In a hierarchical linear regression, we regressed potential scores on anxiety and avoidance (Step 1), and the interaction between the two dimensions (Step 2). The regression estimates are reported in the right panel of Table 1. In Step 1, the overall model was significant, $F(2, 626) = 68.46, p < .001, R^2 = .18$. There was a main effect of avoidance, such that highly avoidant individuals displayed a diminished potential for making secure choices compared to less avoidant individuals. There was no interaction. See the dashed lines in the right panel of Figure 1.

**Auxiliary Analyses.** In order to confirm that the above results were not demographical artifacts, we conducted a follow-up regression controlling for sexual orientation, age, participant sex, and relationship status. The effect size, statistical significance, and directionality of the attachment dimensions and their interaction were virtually identical to those above, suggesting that the attachment dimension scores explained unique variance in consistency, observed scores, and potential scores. We further ran a series of regressions in order to test whether the attachment dimension effects were moderated by the above four demographic variables. We found two moderation effects. Regarding potential scores, there was an Anxiety $\times$ Sex interaction ($\beta = .19, p = .035$), such that highly anxious men, relative to others, displayed a slightly diminished potential for improvement through increased consistency. Regarding observed scores, there was an Anxiety $\times$ Avoidance $\times$ Sex interaction ($\beta = -.22, p = .019$), such that highly anxious men, relative to others, displayed a smaller decline in accuracy as avoidance increased. Both of these effects were due to differences in the magnitude of the effect rather than direction or statistical significance, and thus do not appreciably alter the interpretation of the main analysis results.

In Study 1, several noteworthy findings emerged. As predicted, attachment avoidance was negatively related to consistency. Participants scoring high on both anxiety and avoidance simultaneously were particularly inconsistent. This finding corroborates the attachment literature, as the combination of high avoidance and anxiety characterizes a prototypically fearful avoidant attachment style (Bartholomew & Horowitz, 1991). These individuals tend to employ a mix of hyperactivating and deactivating strategies in a haphazard or confused manner, resulting in a pattern of incoherent behavior (Simpson & Rholes, 2002).

Regarding observed scores, the finding that anxious participants were more successful than others at behavior interpretation makes theoretical sense, given their hypervigilance to attachment threats. Regarding potential scores, all participants displayed a potential for improvement. Less anxious participants displayed a slightly greater potential for improvement compared to more anxious individuals. In other words, the gap
between high- and low-anxiety participants closed once attenuation due to inconsistency was corrected for. Collapsing across the entire sample, participants would have chosen correctly approximately 69% of the time had they interpreted behaviors with perfect consistency across blocks.

**STUDY 2**

**Method**

**Participants.** Study 2 replaced Study 1 on the hosting Web site and remained available for a comparable amount of time. The final sample contained 820 participants, of which 78% were female. Sixty-five percent were from the United States, 6% were from Canada, 5% were from the United Kingdom, and the rest were from other countries. Forty-five percent were in a marital or dating relationship. Eighty-two percent identified as heterosexual, 5% homosexual, 7% bisexual, and 6% declined to answer. Median participant age was 25 years (M = 29.31, SD = 11.46, range = 18–67).

**Materials and Procedure.** Materials and procedure exactly replicated those in Study 1, with the exception of the relationship behavior choice task. The insecure items, which featured prototypically avoidant behaviors in Study 1, were replaced with items featuring prototypically anxious behaviors (e.g., “Making sure you know exactly where your partner is at all times”). Internal consistency for the ECR-R in the present sample was .93 for both dimensions. The correlation between anxiety (M = 3.65, SD = 1.34) and avoidance (M = 2.94, SD = 1.17) was .35.

**Results and Discussion**

Analyses were carried out as described in Study 1. Mean consistency for the sample was .90 (median = .92). The mean proportion of observed successes was .68, and the mean proportion of potential successes was .78, an average improvement of 10%, t(819) = 22.62, p < .001. This implies that up to a 22% additional improvement may be reached through improvements to systematic factors.

### Table 2 Study 2: Hierarchical Linear Regression Predicting Consistency, Observed Scores, and Potential Scores

<table>
<thead>
<tr>
<th>Predictor</th>
<th>ΔR²</th>
<th>B</th>
<th>95% CI</th>
<th>Predictor</th>
<th>ΔR²</th>
<th>B</th>
<th>95% CI</th>
<th>Predictor</th>
<th>ΔR²</th>
<th>B</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidance</td>
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<td></td>
<td></td>
<td>Anxiety</td>
<td>.18</td>
<td></td>
<td></td>
<td>Avoidance</td>
<td>.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>-0.01***</td>
<td>[-0.02, -0.01]</td>
<td></td>
<td>Anxiety</td>
<td>-0.02***</td>
<td>[-0.03, -0.01]</td>
<td></td>
<td>Anxiety</td>
<td>-0.08**</td>
<td>[-0.09, -0.07]</td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td>.00</td>
<td></td>
<td></td>
<td>Interaction</td>
<td>.01</td>
<td>[-0.01, 0.01]</td>
<td></td>
<td>Interaction</td>
<td>.00</td>
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</tr>
<tr>
<td>Total R²</td>
<td>.06</td>
<td></td>
<td></td>
<td>Total R²</td>
<td>.18</td>
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<td></td>
<td>Total R²</td>
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</tr>
</tbody>
</table>

Note. N = 820. CI = confidence interval.
*p < .05. ***p < .01.

**Consistency.** We regressed consistency on anxiety, avoidance, and their interaction. The regression estimates are reported in the left panel of Table 2. In Step 1, the overall model was significant, F(2, 817) = 26.92, p < .001, R² = .06. There were main effects of anxiety and avoidance, such that both anxiety and avoidance were negatively associated with consistency. There was no interaction. See the left panel of Figure 2. Secure participants were the most consistent, and insecure participants the least, in line with predictions.

**Observed Scores.** We regressed observed scores on anxiety, avoidance, and their interaction. The regression estimates are reported in the center panel of Table 2. In Step 1, the overall model was significant, F(2, 817) = 90.12, p < .001. R² = .18. There were main effects of both avoidance and anxiety, such that highly avoidant and highly anxious participants tended to choose the incorrect responses. There was no interaction. See the solid lines in the right panel of Figure 2.

**Potential Scores.** We regressed potential scores on anxiety, avoidance, and their interaction. The regression estimates are reported in the right panel of Table 2. In Step 1, the overall model was significant, F(2, 817) = 58.20, p < .001, R² = .13. There were main effects of both avoidance and anxiety, such that both highly avoidant and highly anxious participants displayed a diminished potential for making secure choices relative to secure participants. There was no interaction. See the dashed lines in the right panel of Figure 2. Again, no single attachment style was associated with a notable advantage or disadvantage of increased consistency relative to the others; all participants were expected to experience a relatively similar magnitude of improvement in performance through perfectly consistent behavioral interpretation.

**Auxiliary Analyses.** As in Study 1, we conducted a regression analysis controlling for sexual orientation, age, participant sex, or relationship status. The effect size, statistical significance, and directionality of the attachment dimensions and their interaction were virtually identical to those above, suggesting that the attachment variables explained unique variance in consistency, observed scores, and potential scores. A further set of
regressions revealed no moderating effects of the demographic variables.

In Study 2, high anxiety and high avoidance were associated with inconsistency. Participants low on both dimensions were the most consistent, and participants high on both dimensions were the least consistent. Highly anxious participants were less consistent overall than they were in Study 1, which featured avoidant behaviors. The anxious behavior items in Study 2 appeared to be more of a challenge for highly anxious participants to interpret consistently. It is possible this effect stemmed from the difficulty anxious participants experienced when trying to parse apart truly secure behaviors from insecure behaviors that serve to keep partners close. Regarding observed scores, both anxious and avoidant participants tended to classify relationship behaviors incorrectly. Highly avoidant participants performed almost as well as prototypically secure participants, whereas highly anxious participants performed notably worse. Regarding potential scores, all participants, regardless of attachment style, displayed a relatively similar potential for improvement through increasing consistency. Collapsing across the entire sample, participants would have correctly interpreted the behaviors 78% of the time had there been no random influence on behavior.

**GENERAL DISCUSSION**

One noteworthy finding from this research was that highly avoidant participants were less consistent compared to other participants. This finding emerged even in Study 2, which required participants to differentiate anxious from secure behaviors. This result is interesting because avoidant individuals are uncomfortable with closeness and reliance on others, and thus they should be capable of consistently identifying anxious behaviors as relationship weakening. This highlights avoidant individuals’ tendency to defensively circumvent or ignore attachment-related information, especially when it is of an emotional or proximity-seeking nature (e.g., anxious behaviors). Our results suggest that this preemptively defensive style of thinking renders avoidant individuals susceptible to the influence of random factors on information processing.

Anxiety was associated with inconsistency only in Study 2, which required participants to evaluate the impact of prototypically anxious and secure behaviors on relationships. Although both highly anxious and highly avoidant participants were inconsistent in Study 2 (relative to secure participants), it is unlikely that they were inconsistent for the same reason. While avoidant participants likely processed the relationship items at a shallow level, we suggest anxious participants, by contrast, were inconsistent in Study 2 for at least two reasons: (a) They employed extremely short-term, or “in the moment” processing strategies instead of basing their judgments on longer-term, more established relationship criteria, and (b) they failed to recall (or inconsistently or incorrectly recalled) past relationship behaviors to use as a foundation on which to base their responses.

Finally, in both studies (albeit not significantly so in Study 2), inconsistency was greatest for participants high on both anxiety and avoidance. This finding corroborates research showing that prototypically fearful-avoidant individuals desire closeness, yet withdraw from their romantic partners or close others for fear of rejection (Shaver & Mikulincer, 2002). When stressed, these individuals can exhibit contradictory or incoherent behavior, perhaps due to their inability to decide on an appropriate attachment strategy (Simpson & Rholes, 2002).
We speculate the conflicting motives experienced by this type of individual could be a cause of any inconsistency (either in processing or behavior) they exhibit in true-life relationships.

Regarding observed and potential scores, highly anxious participants outperformed their less anxious counterparts in Study 1. This was anticipated, considering the unlikelihood of anxious individuals interpreting avoidant behaviors as relationship strengthening. However, this gap narrowed considerably when scores were adjusted for inconsistency. Anxious participants had an especially difficult time when faced with prototypically anxious and secure behaviors in Study 2, yet still exhibited a capacity for improvement similar to less anxious participants. Across both studies, highly anxious individuals were estimated to experience a benefit from increased consistency, albeit not to the same degree as less anxious individuals. Across both studies, the potential scores of avoidant participants were notably higher than their observed scores, suggesting that they too would benefit from increased consistency. Although avoidant participants’ potential scores were low relative to secure participants, the magnitude of the increase from observed scores was similar. In sum, the potential scores calculated in this research imply that individuals of all attachment styles would experience a more secure style of behavioral interpretation by increasing the consistency with which they make relationship-based attributions. This suggests that even anxious and avoidant individuals process relationship-relevant behavior in a manner that is more secure than insecure.

Taken together, the present results have important implications for attachment theory. One such implication concerns whether a more secure style of relationship behavior processing can best be accomplished via improvements in systematic attachment-related factors (e.g., working models) or increases in consistency. Across both samples, we estimated accuracy increases of 10–11% had participants used their attachment-specific information-processing strategies with perfect consistency. Further improvement would have needed to come from improvements to the systematic factors related to information processing, such as revising working models in such a way that results in a more secure information-processing strategy. In sum, we suggest that improvements to both systematic factors and consistency would lead to more secure processing. Next, we discuss the practicability of making such improvements.

Regarding improvements to systematic factors, the stability and lability of working models of attachment have long been a matter of theoretical and empirical debate. Some researchers report evidence of working models having moderate to high stability over time (Waters, Merrick, Treboux, Crowell, & Albersheim, 2000), whereas others report little to no stability (Lewis, Feiring, & Rosenthal, 2000). Over the last decade, research by Fraley and his colleagues (Fraley, 2002; Fraley, Vicary, Brumbaugh, & Roisman, 2011) suggests individual differences in attachment are driven by a single, latent factor referred to as a prototype. This does not, however, imply that working models are not labile. Fraley et al. (2011) reported that test-retest stability coefficients for romantic partners hovered around .60 across two longitudinal samples, which is lower than those reported for parental relationships. Fraley et al. (2011) suggest that this is due to romantic relationships being “newer” than parental relationships, in that participants were still adjusting their working models of their partners. In support of this notion, stability coefficients were higher for couples who had been together longer. In any case, long-term (as opposed to state-like) changes to a prototype-like system appear theoretically unlikely. Such changes, in theory, could be made by introducing another enduring, latent factor into the system, perhaps through a reorganization of one’s social networks or automating specific cognitive or behavioral patterns (Fraley & Brumbaugh, 2004). In summary, although changes to the systematic components of relationship information processing are theoretically possible, the prognosis of actually accomplishing such changes is less optimistic.

As for the question of whether consistency can be increased, if an individual uses an insecure strategy of interpreting behaviors, the only way to increase the likelihood of secure interpretation is to make improvements to systematic components. However, assuming improving consistency would have a positive outcome, Trafimow and Rice (2008, 2009) suggest training as an ideal way to increase consistency. In the context of attachment relationships, this could ostensibly involve an effort by both partners to make themes of trust, support, and availability more accessible. Moreover, counseling designed to help insecure individuals overcome their attachment-specific difficulties in relationships (i.e., helping avoidant individuals come to terms with their needs, helping stabilize anxious individuals; see Johnson, 2004) could also result in increased consistency.

We can also turn to the literature on communication and attachment for insight on improving both consistency and systematic factors of attachment. Throughout the life course, open communication plays a crucial role in the maintenance of secure relationships (see Kobak & Madsen, 2008). Bowlby (1988) suggested that in child-caregiver relationships, communication plays a crucial role in the maintenance of secure relationships (see Kobak & Madsen, 2008). Bowlby (1988) suggested that in child-caregiver relationships, communication allows for the revision of working models by allowing infants to access information that could potentially disconfirm their current working models. Later in life, the process becomes one more of fine-tuning than revision. The fine-tuning of working models through communication fosters realistic and positive expectations of the self and others, as well as more agreement between partners (Kobak & Hazan, 1991). Thus, communication of intents and perceptions may not only lead to more positive working models of a partner, but also lead to more consistent interpretations of each other’s behaviors. This implies that communication may be one of the most effective means of increasing the degree to which information is processed securely.

A second implication of the present results concerns the effects of inconsistency on adult close relationships. People tend to respond to partners based on their interpretations of their partner’s behaviors (Vicary & Fraley, 2007). If people’s perceptions of others’ actions are inconsistent, their behaviors
in response to such actions may also be inconsistent, which can in turn result in difficulty predicting and understanding the behavior of close others. Partner inconsistency could thus lead to anxiety, anger, and frustration, undermining relationship satisfaction. Inconsistency could also result in a vicious cycle whereby the uncertainty created by inconsistent responses continually reinforces negative working models of a partner (see Collins & Read, 1994; Feeney, 1999). This implies that consistency will be strongly related to relationship satisfaction in adult relationships, an important hypothesis for future research.

DIRECTIONS FOR FUTURE RESEARCH

In the present research, we compared participants’ responses to an absolute standard where the response options were predesignated as “correct” or “incorrect.” However PPT can also be employed with items that cannot be judged as correct or incorrect against an absolute standard, as is the case with many relationship choices that people make. In this PPT paradigm, the responses of all participants can be used to create a relative standard against which each participant is compared. Another possible application of PPT is assessing members of a couple relative to each other. Agreement between partners could be viewed as a success and disagreement as a failure. Using PPT, a researcher would be able to discern why the couple is experiencing particular outcomes (e.g., do they have poor communication strategies, or do they use good communication strategies inconsistently?) and would be able to estimate how much agreement the couple would experience at varying levels of consistency. Finally, PPT can be applied to partners’ interpretations of each other’s intents or behaviors. In this context, one partner’s behavioral intent could be correctly or incorrectly interpreted by the other. This approach has the potential to reveal if and where communication breaks down, which party member (or both) is the source of any breakdown of communication, and why.

LIMITATIONS

One limitation of the present research is the low degree of ecological validity. The scenarios featured in the study were experimenter generated and lack context that could be present in a genuine relationship. However, previous research suggests that people tend to respond to both real and hypothetical relationship events in a similar manner (Fincham & Beach, 1988). Moreover, PPT can be easily employed in contexts that involve actual human behavior and responses in real-life settings and relationships. We believe the present investigation serves as an important stepping stone to such research.

Another limitation of the present study is the short time frame between the administration of the first and second blocks. This could have allowed participants to remember how they had responded to the items in the first block, resulting in artificially high consistency. Although randomization of items and response options should have yielded no systematic carryover, primacy, or recency effects, it should be noted that the consistency figures in the present study would likely be somewhat lower given a longer delay, such as hours or even days.

We can address this limitation mathematically and empirically. Mathematically, PPT calculations are robust against violations of independence. In most PPT research to date, artifacts of independence violations have not been found. Trafimow, MacDonald, and Rice (2012) conducted investigations of the independence of blocks of trials, as well as the local independence of the trials themselves, and detected no effects of independence violations at any level. In addition, Trafimow and Rice (2011) performed mathematical analyses and computer simulations to determine the effects of independence violations on PPT calculations and found that it takes substantial independence violations to discernably influence PPT results.

Empirically, we conducted two analyses on each sample in order to determine whether the short delay between the two blocks could be responsible for the reported results. First, because consistency is independent of the temporal order of events, we reversed the order of the blocks (i.e., treated block 1 as block 2 and vice versa) in both studies and repeated the PPT calculations in order to determine whether there were any significant differences from the reported results. The original results were closely replicated. Next, in both studies, we randomly reversed the blocks for half of the participants, conducted PPT calculations, and conducted regressions with block order as a predictor. There were no effects of block, alone or in interaction with the attachment dimensions or demographic variables. In total, we conducted the latter analysis three times for each sample and found no effect of block, alone or in interaction with attachment or demographic variables. This supports the claim that the present results are not an artifact of memory, age, priming, or recall.

A related concern is whether the administration of the attachment measure in the short time span between the two blocks resulted in priming effects. Specifically, it is possible that the behavior choice task could have activated the attachment system, influencing responses to the ECR-R. In order to assure this concern, we examined data from seven other studies that were (or are currently) hosted on yourpersonality.net, as well as two paper-and-pencil-based studies, all of which used the ECR-R attachment measure. These studies were in various stages of completion (from the data collection phase to published) and ranged in sample size from 157 to 29,053. The attachment scores in the present study are consistent with those we examined. These results should assuage any concerns about the relatively short delay between measures and blocks.

CONCLUSION

The goal of the present research was to determine whether there were attachment-related individual differences in the
consistency with which people interpret relationship-related behaviors. Our results suggest that in the domain of relationship behavior interpretation, secure individuals are more accurate and more consistent in their interpretations than insecure individuals. PPT analyses revealed that a more secure style of interpretation processing could be realized via improvements to both systematic factors and consistency, even for insecure individuals. Based on the present results, we predict future research will show that secure individuals behave more consistently in actual relationships than do insecure individuals, and that consistency is positively related to relationship satisfaction. It is our hope that this research inspires others to explore the role of consistency in adult relationships and that it inspires further use of potential scores in attachment and close relationship-based contexts.

References


