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The weighting of positive vs. negative valence and its impact on the formation of social relationships

Matthew D. Rocklage[1], Evava S. Pietri[2], and Russell H. Fazio[3]

[1]Kellogg School of Management, Northwestern University, 2001 Sheridan Road, Evanston, IL 60208, USA

[2]Department of Psychology, Indiana University-Purdue University Indianapolis, 402 N Blackford Street, Indianapolis, IN 46202, USA

[3]Department of Psychology, Ohio State University, 1835 Neil Avenue, Columbus, OH 43210, USA

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Correspondence concerning this article should be addressed to Russell H. Fazio, Department of Psychology, Ohio State University, 1835 Neil Avenue, Columbus, Ohio 43210. Contact: fazio.11@osu.edu

Abstract

Forming social relationships is an integral aspect of our lives and a topic fundamental to social psychology. Using a performance-based measure of individual differences in valence weighting, we demonstrate that the extent to which first-year college students weight positive versus negative valence when engaged in attitude generalization predicts how many peer relationships they develop during the subsequent two months (Study 1). Furthermore, we show that individuals strategically recruited for their high sensitivity to interpersonal rejection benefit from an intervention that recalibrates their valence-weighting tendencies from an overweighting of negative valence to a more balanced weighting of positive and negative valence (Study 2). Recalibration led to extended decreases in participants' rejection sensitivity and, most importantly, led them to develop more social relationships over a subsequent two-week period. These findings demonstrate that the weighting of positive versus negative valence is a fundamental process that influences complex social outcomes and that such valence weighting tendencies can be recalibrated so as to benefit individuals.

Keywords: attitude generalization, valence bias, cognitive modification, social relationships, rejection sensitivity

The weighting of positive vs. negative valence and its impact on the formation of social relationships

Take a moment and remember back to your very first day as a student at college. You have just moved away from your home, perhaps for the first time ever, and are now faced with the prospect of making new social connections in a brand new environment. As you walk down your dormitory corridor, you see two other students chatting at the end of the hallway. Should you join them and introduce yourself? On the one hand this situation resembles one where you met a few of your friends in high school. You approached them, had a free-flowing conversation, and became fast friends. On the other hand, this situation also resembles one where you had attempted a conversation with another student while seated at a lunch table, were largely ignored, and came away feeling distressed. That situation turned out significantly worse. These types of decisions present themselves frequently when first entering a new environment. One of the ways we can decide on our course of action is to weigh the current situation's resemblance to past positive versus negative experiences. Whichever past situation seems to better resemble the current one may win the day and foster the selection of that course of action.

Such a decision process may seem relatively straightforward, but is made much more difficult to the extent that this novel situation closely resembles both a previous positive and negative experience. In essence, one is then faced with the dilemma of how much weight to give to each valence. Although negative valence may predominate on average (Fazio, Pietri, Rocklage, & Shook, 2015; Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Rozin & Royzman, 2001), this is not the case for all individuals. Indeed, research shows that individuals vary in the extent to which they give weight to positive versus negative valence – an individual

difference that has been termed the *weighting bias* (Fazio et al., 2015; Pietri, Fazio, & Shook, 2013a).

The underpinnings of this valence weighting bias lie in a theoretical model concerning attitude generalization. Any novel situation in which individuals need to reach some judgment requires some weighting of the situation's positive versus negative aspects. The central theoretical premise is that any such weighting is essentially an exercise in attitude generalization. Individuals must weigh how much the entity resembles past occurrences that proved to be positive versus those that proved to be negative. These differential resemblances may be sufficiently extreme so as to make the assessment straightforward. However, when the novel stimulus resembles both a known positive and known negative to some extent, either the positive or the negative attitude must come to dominate the generalization process. For this reason, valence weighting tendencies can be assessed by examining how individuals' pre-established attitudes generalize to similar but novel attitude objects.

A now-lengthy line of research documents that individuals do differ in the extent to which they give weight to positive versus negative valence when generalizing their attitudes, that this difference can be measured behaviorally, and that these weighting tendencies influence related judgments and behaviors. For instance, as we overview more fully below, individuals with negative weighting tendencies express more anxiety regarding novel situations, are more averse to risk taking, anticipate potentially threatening situations to grow progressively worse over time, and are more likely to interpret ambiguous social cues as signaling rejection (Fazio et al., 2015). These very processes are likely to be involved in any given situation involving the possibility of forming new relationships. The aim of the current research is to take the theoretical

and empirical foundation underlying our understanding of individuals' valence weighting tendencies and extend it to forming social relationships in the real world.

Assessing individual differences in attitude generalization

It is important to understand how valence weighting tendencies are measured and, in particular, their foundation in attitude generalization. For that reason we first present the method and then proceed on to the important outcomes to which this performance-based individual difference variable has been shown to relate.

Individuals' weighting bias has been measured behaviorally through a game referred to as "BeanFest" (Fazio, Eiser, & Shook, 2004). BeanFest exposes participants to virtual beans that vary in terms of their shape (10 levels from circular to oblong) and number of speckles (1 to 10). Subsets of the beans from this 10x10 matrix are presented during the course of the game, with some types producing positive outcomes when individuals choose to approach them (+10 points) and others producing negative outcomes (-10 points). In this way, individuals develop attitudes toward the different types of beans presented during the game.

This game/learning phase is followed by a test phase in which individuals are asked to classify each bean as to whether it is one that produces positive or negative outcomes, which provides data regarding how well they learned the game beans. During this test phase participants are also shown – without forewarning – novel beans that were not presented during the game. When categorizing these novel beans, which vary in their visual similarity to the positive and negative game beans, participants must weigh their resemblance to these previously-encountered beans.

The data invariably indicate that attitudes generalize (Shook, Fazio, & Eiser, 2007). Beans that more closely resemble known positives are more likely to be classified as positive

than are beans that more closely resemble known negatives. However, individuals' responses to a large number of these novel beans provide a means of measuring valence weighting tendencies. If individuals tend to categorize a greater proportion of the novel beans as positive (negative) than is to be expected on the basis of how well they learned the positive and negative game beans, this indicates they give relatively greater weight to positive (negative) resemblances when judging novel instances.

Self-reports of valence sensitivity

Past research indicates that individuals' self-reported beliefs about their valence biases tend not to show an association with the weighting bias (Fazio et al., 2015). We believe this occurs for at least three reasons. First, individuals are typically inaccurate when reporting how many beans they classified as positive or negative during BeanFest and, hence, appear not to have much insight into their own tendencies (see Pietri, Fazio, & Shook, 2013b). Second, negative events and information are typically unexpected, surprising, and distinctive (Jones & Davis, 1965; Kanouse & Hanson, 1972) and therefore are often more diagnostic (Skowronski & Carlston, 1989). As such, these natural confounds may make it difficult for individuals to achieve an accurate calibration of their valence weighting tendencies per se (see Fazio et al., 2015, for a more extensive discussion of this issue). Finally, when reporting their valence biases, individuals may have self-presentational concerns as they may not wish to acknowledge that they have tendencies to overweight either positives or negatives (e.g., Paulhus, 1984).

To directly test individuals' ability to self-report their valence weighting tendencies, researchers created the Weighting Bias Questionnaire (WBQ; Pietri et al., 2013a), which explicitly asks participants about their weighting tendencies (e.g., "To what extent do you tend to give more weight to positive information over negative information?"). Attesting to its validity,

the WBQ has been found to correlate significantly with other well-validated self-report measures of general sensitivity to positives and negatives such as the Approach/Avoidance Temperament Questionnaire (ATQ; Elliot & Thrash, 2010). (See the supplementary materials for details regarding many additional correlates of the WBQ, including self-reports of loneliness and life satisfaction). Individuals' self-reported weighting tendencies in the WBQ, however, did not relate to those that were measured behaviorally via BeanFest across a corpus of over 500 participants (Fazio et al., 2015). As such, individuals appear unable to report their weighting tendencies.

Furthermore, individuals' valence weighting tendencies appear not to be redundant with other commonly-used measures related to valence sensitivity. Indeed, similar null correlations have been observed with the ATQ (Elliot & Thrash, 2010), the BIS/BAS scales (Carver & White, 1994), the promotion/prevention scales (Lockwood, Jordan, & Kunda, 2002), the attachment scales of the Experiences in Close Relationships – Revised questionnaire (Fraley, Waller, & Brennan, 2000), and the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Furthermore, null correlations have been found with individuals' self-reported Big Five traits using the Big Five Aspects Scale (DeYoung, Quilty, & Peterson, 2007), the Ten-Item Personality Inventory (Gosling, Rentfrow, & Swann, 2003), and the extraversion subscale of the Eysenck Personality Questionnaire – Revised (Eysenck & Eysenck, 1991).

Research on valence weighting tendencies and their relation to developing new relationships

Research findings regarding individuals' valence weighting tendencies highlight the multiple pathways by which they may influence the formation of social relationships. For example, developing new relationships often requires that individuals enter novel situations and

interact with strangers. Past research has demonstrated that individuals with a more negative weighting bias express greater fear of novel situations (Pietri et al., 2013a). Indeed, individuals with more positive valence weighting tendencies actually sample a greater proportion of stimuli of an unknown valence, especially when required to make rapid approach-avoidance decisions (Rocklage & Fazio, 2014).

Also important to forming relationships is actively taking risks, as when making the effort to introduce oneself to a stranger or attending a social function where one may not know many people. A connection between actual risk-taking behavior and the weighting bias has been demonstrated across multiple studies. In particular, the Balloon Analogue Risk Task (BART; Lejuez et al., 2002) is a game where participants must pump a virtual balloon in order to increase its value, but balance this pumping with the knowledge that if pumped too much, the balloon will pop and the participant will earn no money on that particular trial. Those with a more positive weighting bias display more risky behavior by pumping the balloon to a greater extent (Pietri et al., 2013a; Rocklage & Fazio, 2014).

Furthermore, once in the new situation and talking with a stranger, some individuals may interpret ambiguous cues from others as signaling some form of threat and therefore may prematurely disengage from a conversation. A more negative weighting bias has been found to predict more severe reactions to potential threats (Pietri et al., 2013a, Study 2). Relatedly, individuals' valence weighting tendencies predict their scores on the Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman, 1996), which presents respondents with hypothetical scenarios in which they imagine themselves making a request of an acquaintance, friend, or family member. Given that everyone is likely to have had both experiences in which others have agreed to their requests and experiences in which they instead encountered rejection, the RSQ

scenarios require individuals to generalize from any such related experiences when considering how anxious they would be about making a specific kind of request. They must weigh the extent to which the imagined scenario resembles similar previously experienced events that yielded a positive outcome versus those that yielded a negative outcome. The more negative individuals' weighting bias, the more apprehension they expressed across various interpersonal scenarios (Pietri et al., 2013a, Study 1).

To summarize across these disparate examples, the weight individuals give to positives versus negatives in the BeanFest game represents a fundamental individual difference. A more positive weighting bias is associated with a greater willingness to approach novel stimuli, greater risk-taking behavior, more benign interpretations of ambiguous threats, and less concern about rejection – all which should increase the likelihood of forming relationships in a new life setting.

The current research

Research within the relationships domain has investigated those factors that are associated with and predict initial friendship formation such as individual differences (e.g., Asendorpf & Wilpers, 1998) and proximity (e.g., Festinger, Schachter, & Back, 1950) as well as those that predict the subsequent development of these friendships into closer relationships across time (e.g., perceived relationship benefits and initial liking; Hays, 1985). Given our concern with initial relationship formation and their relation to individual differences, we focus on the former line of inquiry. This work has primarily utilized self-reported personality traits to assess the concurrent relation of these traits with the number of friends individuals report (e.g., Stokes, 1985; Sarason, Shearin, Pierce, & Sarason, 1987) as well as the extent to which they prospectively predict who makes new friendships longitudinally (e.g., Asendorpf & Wilpers, 1998; Selfhout, Burk, Branje, Denissen, van Aken, & Meeus, 2010). To illustrate, Asendorpf and

Wilpers (1998) examined the development of social relationships over an 18-month period among first-year university students who had rated themselves on the Big Five personality traits. The researchers measured how many relationships individuals developed by having participants list, by their initials, those peers who were important to them. They found that greater self-reported extraversion predicted individuals developing more peer relationships over time.

To date, however, research has not investigated the possibility that individuals' fundamental weighting of positive versus negative valence influences the formation of new peer relationships. Our first study examines the relation between valence weighting tendencies and relationship development in a prospective manner by considering the growth in the number of relationships first-year college students form over time. The findings of this first study prompted a subsequent experiment testing the efficacy of an intervention aimed at individuals who tend to overweight negative valence. The goal was to recalibrate them toward a more balanced weighting of positive and negative valence and in that way demonstrate the causal importance of valence weighting.

Study 1

To prospectively predict growth in the number of social relationships individuals develop, we targeted a pivotal window of time in individuals' lives: their first months at college. This is a time when individuals have the rare opportunity to interact with many strangers and thus a time when the weighting of positive versus negative valence may be critical to their development of social relationships.

Method

Procedure. The current study took place across a two-month period beginning the first week of classes at a large Midwestern university. First-year college students came to the lab early in the academic year and then returned for a second session about two months later.

Participants underwent the BeanFest procedure in order to measure their weighting bias.[1] They then completed a few measures that are not related to the present research aims that assessed political attitudes as part of a larger study on voting behavior. Participants then completed a series of questionnaires regarding their current peer relationships, which constituted our main dependent variables of interest, as well as self-reported personality measures.

Participants. In session one, 94 first-semester undergraduate students (62% female and 38% male) participated in partial fulfillment of a psychology course requirement. Fifty-five (59%) of these same students returned for the second session (65% female and 35% male). Those students who returned did not differ from those who did not return in their weighting bias ($t(92) = .07$, $p = .95$), self-reported weighting bias ($t(92) = 1.26$, $p = .21$), gender ($t(92) = .88$, $p = .38$), their initial number of peer relationships ($t(92) = .27$, $p = .78$), or any Big Five personality traits ($ps > .26$).

Measures.

BeanFest. The BeanFest procedure followed past work measuring individuals' valence weighting tendencies (Pietri et al., 2013a; Rocklage & Fazio, 2014). Participants began the game with 50 points and were instructed to maximize their points by approaching those beans that were positive (+10 points) and avoiding those beans that were negative (-10 points). When participants approached a positive bean, they were told the value of the bean, earned 10 points, and were shown an increase in their total point meter. When they approached a negative bean, they were told the value of the bean, lost 10 points, and were shown a decrease in their total

[1] Participants also played a similar version of BeanFest in the second session, but this time using donuts instead of beans as the stimuli. While those results may lend insight into variables that predict changes in individuals' valence weighting tendencies, our current question focuses on the ability of these tendencies to predict relationship development. Thus, these analyses are not reported here.

point meter. Participants received feedback at all times: even if they avoided a bean, they were told what its value would have been. In this way, participants developed attitudes toward each bean based on its associated valence.

The beans themselves varied systematically in their shape (10 levels from circular to oblong) and how many speckles they had (1 to 10). Mirroring previous work, 36 beans from six regions of this 10x10 matrix were selected as game beans. Each region was assigned either a positive or negative value.

Participants were shown each bean three times across three game blocks. They then proceeded to a test phase, during which they were shown the 36 game beans and 64 novel beans that varied in resemblance to the positive and negative game beans. They were instructed to categorize each bean as helpful or harmful and received no feedback on whether they were correct. The test phase therefore was able to assess the extent to which participants learned each bean's valence as well as how they generalized their attitudes to novel beans that varied in resemblance to these game beans. The calculation of the weighting bias is based on participants' average response to these novel beans and will be detailed further in the Results section.

Peer relationships. The term "friend" has varied meanings, ranging from its usage on social media where individuals can have thousands of friends that include acquaintances of acquaintances to relationships that involve intimate self-disclosure and the provision of social support (see Fehr, 1996, for a discussion of the multiple meanings). Given our interest in the type of relationships that students were likely to develop during their first few weeks on campus, we provided participants with a definition that struck a balance between one that did not necessarily require the shared intimacy that characterizes a close friendship, but that did extend beyond casual or role-specific conversations. We used the more colloquial label of "friend" and then

defined what we meant by this term: “A friend is a person with whom you make a conscious effort to keep in touch with, and communicate with, and who is not a relative. A friend is not the same as an acquaintance, who is someone who you see on a somewhat regular basis, talk to, and know, but is not someone who you would consider a friend.” (We consider the implications of this characterization in the General Discussion). After this explanation, we asked individuals to enumerate these relationships by listing each person one-by-one by his/her initials. This listing approach and the delineation of friends versus acquaintances align with previous research (Asendorpf & Wilpers, 1998; Selfhout et al., 2010). Also following Asendorpf and Wilpers (1998), we shall typically refer to the listed friends as “peer relationships.”

In the first session, we first asked participants to list any friends they had prior to starting college who were now at the college with them. We asked for these relationships so that individuals would not include them in any subsequent listings as we were specifically interested in those relationships participants had made since arriving at college. We then asked participants to list the initials of the new friends they had made since arriving at college.

The second session proceeded much like the first. However, in this instance, after we provided them again with our operational definition of a friend, participants were asked to reproduce the list of new relationships that they had provided to us in the first session. This was done in order to allow them to separate these older relationships from the newer relationships they would list for us subsequently. In particular, we asked them to list those friends they had made since the first session they had attended in our lab.

Personality traits. Traits clearly play a role in the likelihood of individuals’ forging new relationships. For example, personality research has indicated that greater extraversion predicts the number of new relationships students develop during their first term at college (Asendorpf &

Wilpers, 1998; Selfhout et al., 2010). Wishing to identify the effect of weighting bias above-and-beyond such personality traits, we measured individuals' Big Five personality traits – openness, conscientiousness, extraversion, agreeableness, and neuroticism – using the Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003).

Self-reported valence weighting. To build on past work documenting the independence of the BeanFest performance-based measure and self-reported valence weighting tendencies, we included the Weighting Bias Questionnaire (WBQ; Pietri et al., 2013a). The WBQ was administered in the first session ($\alpha = .75$) and consisted of four direct questions regarding participants' self-beliefs of their valence weighting tendencies (e.g., "To what extent do you tend to give more weight to positive information over negative information?").[2]

Results

Calculating the weighting bias. We indexed the weighting bias using the same method as past studies (Pietri, Fazio, & Shook, 2012, 2013a; Rocklage & Fazio, 2014). The calculation is based on individuals' response to the novel beans, i.e., beans not presented during the BeanFest game phase. The greater weight they give to positive (negative) information, the more they will categorize novel beans as positive (negative). Thus, we first calculated each individual's average response to the 64 novel beans. However, this process of attitude generalization is known to be affected by how well individuals learned the positive versus negative game beans. To control for this differential learning, we used a regression equation predicting individuals' average response to the novel beans from the proportion of positive beans they correctly categorized and the

[2] Although we focus on the formation of social relationships here, participants also provided responses to other exploratory measures. A full list of these measures and analyses of particular interest are reported in the supplementary materials. We report all measures, manipulations, and exclusions in our two studies.

proportion of negative beans they correctly categorized in the test phase. We then employed the residual of this regression as the measure of individuals' weighting bias (over-and-above their idiosyncratic learning of positives versus negative). This calculation ensures that the weighting bias is not confounded with any biases in learning of positive and negative information and instead represents attitude generalization and valence weighting per se (Fazio et al., 2015). More positive scores reflect the participants classifying more of the novel beans positively than is to be expected on the basis of the pattern of learning that they exhibit.

To calculate this residual we aggregated the individuals from the current study into a larger corpus of about 1500 participants who had previously completed the BeanFest paradigm. This larger sample allowed for a more stable estimate of the weighting bias that would not be affected by the idiosyncrasies and variability of smaller samples.[3]

Predicting the development of new peer relationships. To quantify the number of new relationships individuals formed, we counted the number of initials they listed for those relationships developed since arriving at college. At session one, individuals reported, on average, 10.31 new peer relationships (*SD* = 9.50). Two months later, they listed an additional 9.31 new relationships (*SD* = 7.32).

To assess the change over time, we included participants' initial number of relationships (i.e., those they had developed at college prior to the first session) in the regression equation predicting the number of new relationships developed over the two month period. Assessing change in this way is important given that the number of peer relationships can be influenced by

[3] As in past research (Rocklage & Fazio, 2014), the correlation between the larger corpus's estimate of the weighting bias and an estimate using only the current sample was extremely high ($r(53) = .95$, $p < .001$, 95% CI [.92, .97]).

such factors as the spatial design of students' dormitory living situations, their proximity to others (Festinger, Schachter, & Back, 1950), and the size of classes in which they have enrolled. We control for this variability via the number of individuals' initial peer relationships.

In addition, given that we are interested in the effect of the weighting bias above-and-beyond personality traits, we also sought to control for the possible effects of self-reported traits when predicting new relationships.[4] As we do for all subsequent regression analyses, we first standardized each variable. We then entered all of the Big Five traits simultaneously to predict the number of new peer relationships individuals developed. Replicating past research (Asendorpf & Wilpers, 1998), only extraversion was a significant predictor of the number of new peer relationships (b = 2.32, $t(49)$ = 2.16, p = .04, 95% confidence interval (CI) [.16, 4.48]) and thus this was the only trait we included in subsequent analyses.

As expected, the more relationships individuals had initially, the more relationships they developed over the subsequent two-month period (b = 4.93, $t(51)$ = 7.16, p < .001, 95% CI [3.55, 6.31]). Turning to our primary outcome of interest, individuals' weighting bias predicted the number of new peer relationships: the more positive individuals' weighting bias, the more new relationships they developed over the two-month period (b = 1.95, $t(51)$ = 2.86, p = .006, 95% CI [.58, 3.32]; see Figure 1) above-and-beyond their trait-level extraversion (b = 1.36, $t(51)$ = 1.93, p = .059, 95% CI [-.06, 2.77]). While individuals' extraversion and their initial number of relationships accounted for 51% of the variance in predicting new peer relationships, the weighting bias accounted for an additional 7% when added to the model. The regression

[4] Replicating earlier findings (Fazio et al., 2015), the behavioral measure of valence weighting was not significantly associated with any of the Big Five trait scores: extraversion ($r(53)$ = -.22, p = .11, 95% CI [-.46, .05]), neuroticism ($r(53)$ = .01, p = .97, 95% CI [-.26, .27]), conscientiousness ($r(53)$ = -.10, p = .48, 95% CI [-.36, .17]), agreeableness ($r(53)$ = -.18, p = .20, 95% CI [-.43, .09]), or openness to experience ($r(53)$ = -.12, p = .40, 95% CI [-.37, .15]).

equation indicated that those with the most negative weighting bias in our sample (-.40) were predicted to have formed about five additional peer relationships over this two-month period while those with the most positive weighting bias in our sample (+.40) were predicted to have 14 additional relationships.[5]

Self-reported weighting bias. As in previous research, there was no association between the behaviorally measured weighting bias and individuals' self-beliefs as assessed by the WBQ ($r(53) = .05$, $p = .70$, 95% CI [-.22, .31]). When WBQ scores were entered into the previous regression equation, all the predictor variables considered earlier remained significant whereas individuals' self-reported weighting bias was unrelated to the number of new relationships they developed ($b = -.93$, $t(50) = 1.39$, $p = .17$, 95% CI [-2.27, .42]).

[5] We also conducted analyses to explore the robustness of the effects. By taking repeated samples from the existing data, bootstrapping allows for a data-driven approach to creating standard errors and *p*-values that are often more accurate than when relying on non-bootstrapped regression (e.g., Preacher & Hayes, 2004). Using the same regression equation as above along with 5000 bootstrapped samples, we found that our effects were similar. The effect of extraversion was slightly weakened ($b = 1.36$, $p = .11$, 95% CI [-.10, 3.22]), but both individuals' initial number of relationships ($b = 4.93$, $p < .001$, 95% CI [1.38, 6.32]) and their weighting bias ($b = 1.95$, $p = .01$, 95% CI [.39, 3.36]) continued to be strong predictors of peer relationships two months later.

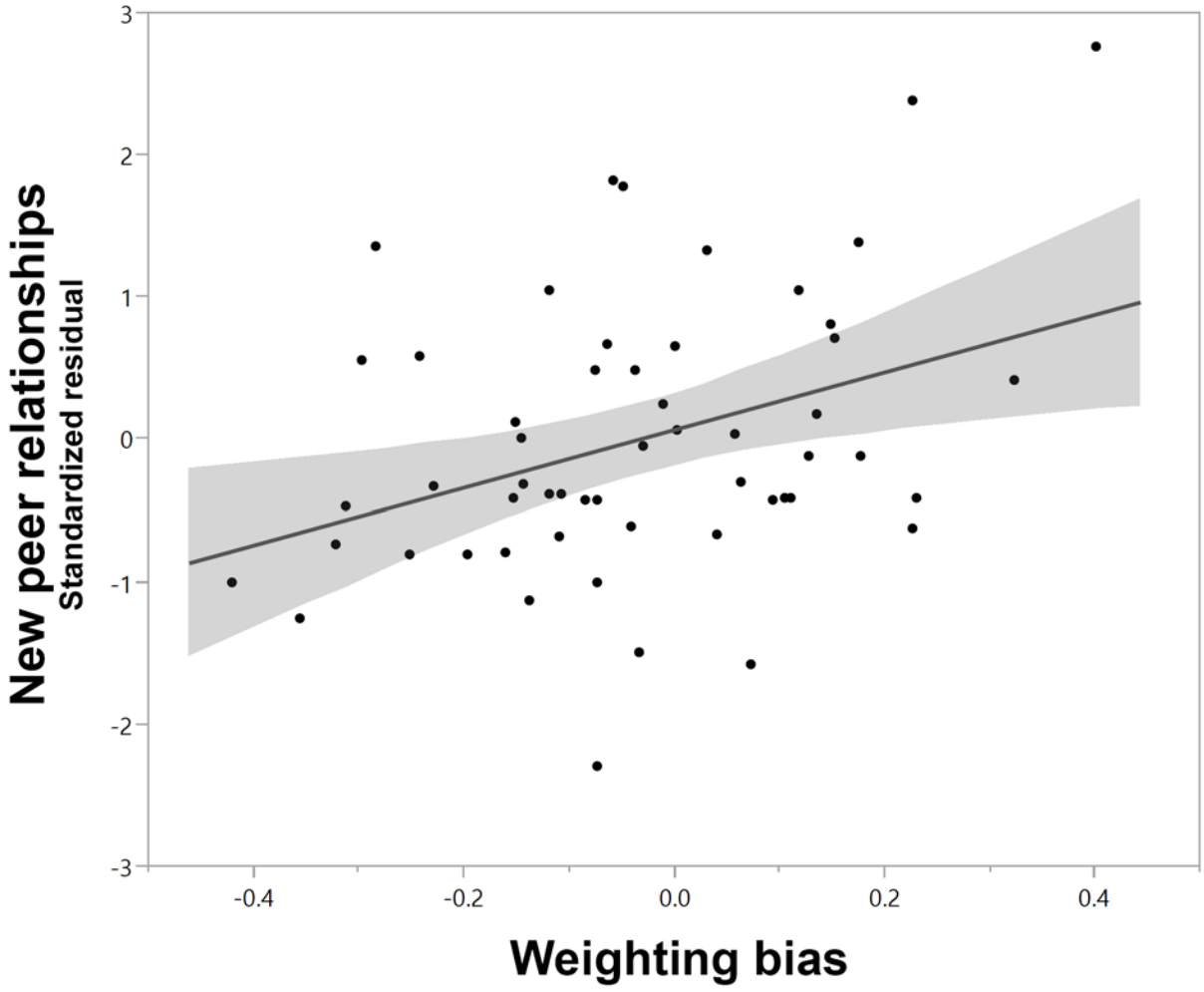

Figure 1 – Scatter plot and best fit line displaying the relationship between the weighting bias and new peer relationships developed across the two-month period. Shaded area represents the 95% confidence interval. Y-axis values are standardized residuals with z-scores representing predicted new relationships over-and-above individuals' initial number of relationships and self-reported extraversion. Values on the x-axis range from the minimum to the maximum scores within the sample.

Discussion

The results of this first longitudinal study indicate that the extent to which individuals weight positive versus negative valence as measured in BeanFest prospectively predicts the number of peer relationships they develop over the subsequent two months. The findings also highlight the predictive validity of the weighting bias measure over-and-above other conceptually important constructs. Mirroring past work, the weighting bias was not significantly correlated with individuals' personality traits nor their self-reported weighting bias (Fazio et al., 2015). Additionally, the observed relation between the weighting bias and new peer relationships existed over-and-above individuals' personality traits and self-reported weighting bias. In fact, our performance-based measure of valence weighting was a stronger predictor of the number of relationships individuals developed than was their extraversion: the weighting bias predicted an additional 7% of the variance in the number of new relationships above-and-beyond extraversion, whereas extraversion predicted 3% of the variance uniquely.

Given the ability of the weighting bias measure to prospectively predict new peer relationships, we next sought to demonstrate the causal influence of valence weighting. Past experimental research has approached this issue of causality by recalibrating individuals' valence weighting tendencies. Thus, Study 2 examines the effects of this recalibration procedure on the development of new peer relationships.

Study 2

Mirroring other successful cognitive modification procedures (e.g., those altering detrimental attentional processes; Dandeneau et al., 2007; MacLeod et al., 2002; see Hertel & Mathews, 2011 for a review), participants' weighting bias has been successfully recalibrated through repeated cognitive training within a single session. In these recalibration experiments,

participants play a variation of the BeanFest game, but, during the test phase, half of the participants are given corrective trial-by-trial feedback as to whether they are accurately categorizing the novel beans as positive or negative (Pietri et al., 2013b). Objectively, each novel bean resembles either a known positive game bean or a known negative game bean more closely, although the difference is sometimes subtle. Based on these objective resemblances, individuals are given feedback as to whether their classifications are correct. Through this procedure, participants gradually become more equivalent in their weighting of positive and negative information and, hence, more accurate in the classifications of the novel beans, compared to a control condition that receives no feedback. Though relatively brief, the recalibration procedure provides individuals with experiences that the real world rarely affords – repeated and direct feedback as to whether they are appropriately weighting positive and negative valence, unconfounded by all the natural correlates regarding distinctiveness and diagnosticity.

This recalibration procedure has resulted in downstream consequences paralleling those seen with the correlational approach. Recalibration in BeanFest led individuals to give differential weight to positives and negatives when categorizing ambiguous stimuli in a separate game called DonutFest – a game similar in its layout to BeanFest but using novel donut-like stimuli instead of beans (Pietri et al., 2013b, Experiment 1). When presented with a novel donut that resembled both a previously-encountered positive and negative donut, recalibration led individuals who began with a more negative weighting bias to give greater weight to positive resemblances and therefore categorize a greater number of these novel donuts as positive. Participants who began with a relatively more positive bias showed the opposite tendency. Thus, this experiment offers direct evidence that the recalibration procedure is successful in modifying individuals' valence weighting biases.

Individuals' recalibrated weighting tendencies also have been shown to influence subsequent judgments that do not involve visual resemblances. For example, Pietri et al. (2013b, Experiment 2) asked participants to imagine and interpret a number of ambiguously threatening scenarios, including such events as "You call up a friend and suggest going out and he says he cannot go with you. Why not?" After recalibration, individuals with initial negative weighting tendencies provided more benign explanations for such scenarios than those in the control condition.

This recalibration procedure also results in changes in actual behavior. In one such experiment, participants' weighting tendencies were recalibrated and they then played the same risk-taking game – the BART – as described earlier. Recalibration led those participants who began with a more negative weighting bias to pump the balloons more and thereby engage in riskier behavior than similar participants who had not been recalibrated. Likewise, recalibrated participants who began with a more positive weighting bias pumped the balloon *less* than their control counterparts (Pietri et al., 2013b, Experiment 4).

Important to our current aims, a recent experiment has demonstrated that individuals' sensitivity to interpersonal rejection can also be modified through the recalibration procedure (Pietri & Fazio, 2017). The researchers specifically recruited highly sensitive individuals (those with Rejection Sensitivity Questionnaire (RSQ) scores in the upper quartile of the distribution) so as to target those who are known to overweight negative valence and to avoid inadvertently increasing sensitivity to rejection among participants with positive weighting biases. Following recalibration, these initially hypersensitive individuals expressed less anxiety regarding the scenarios presented in the RSQ compared to the control condition. These results persisted a week later when participants were surveyed again.

Recalibration as an intervention to promote new peer relationships

The BeanFest recalibration procedure provides a promising avenue by which to intervene and foster individuals' development of new peer relationships. Indeed, encouraging evidence exists suggesting that interventions targeting basic psychological processes at pivotal windows in time can have far-reaching effects (e.g., Marigold, Holmes, & Ross, 2007, 2010; Zunick, Fazio, & Vasey, 2015; Finkel, Slotter, Luchies, Walton, & Gross, 2013). With the intent of enhancing the efficacy of the current recalibration intervention, we made two strategic decisions. First, because individuals' valence weighting tendencies have been shown to relate to their sensitivity to rejection (Pietri et al., 2013a; Pietri & Fazio, 2017), we targeted those individuals who were highly sensitive to rejection and therefore known to overweight negative valence. In other words, although rejection sensitivity itself may or may not relate to forming new relationships, we utilized rejection sensitivity as a proxy for the recruitment of individuals with negative weighting tendencies. This decision also ensured we would avoid deterring the development of peer relationships among participants with positive weighting biases.

Second, and equally important, just as in Study 1 we recruited these individuals at a pivotal window of time: their first weeks of college. This is a time when individuals are encountering many strangers and must repeatedly rely on the weighting of positives versus negatives to make judgments regarding possibly-emerging relationships.

Method

Participants. To begin the selection of participants known to overweight negative information, 775 college students completed the Rejection Sensitivity Questionnaire (RSQ;

Downey & Feldman, 1996) as one of many questionnaires included in a larger prescreening process in their first weeks at college. The RSQ puts forth interpersonal scenarios involving the potential for rejection and requires individuals to weigh between the possible positive and negative outcomes in order to assess the extent to which they would be concerned about possible rejection and then how likely such rejection would be (e.g., "You ask a friend to do you a big favor. How anxious or concerned would you be about whether your friend would do this big favor for you or not? How likely is it that this friend will do you this big favor?"). Following Downey and Feldman (1996), we multiplied each participant's concern and likelihood responses for each of 18 scenarios and then averaged these values for that participant's final RSQ score (M = 8.85, SD = 2.93; α = .85; see the supplementary materials for information regarding analyses that examine the concern and likelihood variables separately).

In order to reach our criterion of 40 participants per condition (a criterion based on previous research using the recalibration procedure; Pietri et al., 2013b; Pietri & Fazio, 2017), we first invited individuals in their first semester of college who scored in the top 10% of the RSQ distribution, then those in the top 20%, and finally those in the top 30%. We ended recruitment once our total of 80 participants (54% female and 46% male) was reached. The recruited sample was characterized by a mean RSQ score of 12.28 (SD = 1.62). Of the 80 participants who attended the initial experimental session, 79 (99%) completed the two-week follow-up.

The experimental session. We began by defining friends as before and asked participants to list, by their initials, those with whom they had a relationship prior to coming to college and those with whom they had developed a relationship since arriving at college. Participants also completed the TIPI (Gosling et al., 2003).

In order to experimentally recalibrate individuals' weighting bias, we followed the procedure used in previous BeanFest research. In this procedure, participants play a simplified version of the BeanFest game and undergo multiple learning phases in order to ensure they are accurate in their knowledge of the game beans (see Pietri et al., 2013b and Pietri & Fazio, 2017 for details). Attaining maximum learning is important to ensure that the recalibration procedure's effectiveness will not depend on how well individuals learned the beans.

After learning the game beans, participants proceeded to the test phase, which constituted the recalibration procedure. All participants were shown 20 game beans (10 positive and 10 negative) and 48 novel beans twice and asked to categorize each bean as harmful or helpful. Participants were specifically presented with novel beans that were close in resemblance to both the positive and negative game beans, and hence, had both positive and negative characteristics for participants to weight. Whereas half of the participants received no feedback regarding the correctness of their judgments, the other half of participants received feedback on each and every trial (e.g., "Correct! This was Positive!!"). For the novel beans, this feedback was based on whether the bean was objectively closer to a positive or negative game bean within the 10x10 matrix (see Pietri et al., 2013b Experiment 2 for additional details).

To assess whether recalibration had an immediate effect on individuals' sensitivity to rejection, participants then completed the RSQ ($\alpha = .69$). They then were administered the WBQ ($\alpha = .72$).

The two-week follow-up. Two weeks later, participants were sent an e-mail with a link to an online survey. The survey began with another administration of the RSQ ($\alpha = .66$) and was followed by the relationships measure. The definition of a friend was repeated and participants

were then asked to recall and list those relationships they had listed during the initial laboratory session. They were then asked to list those relationships they had developed since that time.

Results

Learning of the game beans. Participants learned the game beans well: the average proportion of correct responses was extremely high and well above chance (M = .94, 95% CI [.92, .96]; $t(78) = 40.97$, $p < .001$, $d = 4.56$).[6] We also conducted a 2x2 mixed ANOVA with valence as a within-participant variable and condition as the between-participant variable to assess whether this learning differed by condition or valence. There was no effect of condition ($F(1, 77) = .83$, $p = .36$, partial $\eta^2 = .01$), no difference between the proportion of positive and negative beans learned ($F(1, 77) = .60$, $p = .44$, partial $\eta^2 = .01$), and no condition by valence interaction ($F(1, 77) = .74$, $p = .39$, partial $\eta^2 = .01$). Thus, learning was high and did not differ by condition or valence.

Effects of recalibration within the BeanFest procedure itself. Given that we invited participants with high levels of rejection sensitivity, which is related to giving greater weight to negative resemblances in the BeanFest game (Pietri et al., 2013a), we expected that individuals in the control condition would show a negative weighting bias overall. Averaging across their responses to the novel beans as either positive (coded as +1) or negative (-1), we found that those in the control condition did indeed classify more novel beans as negative (M = -.15, 95% CI [-.22, -.08]; $t(39) = 4.24$, $p < .001$, $d = .67$). Participants in the recalibration condition, however, showed no difference from zero (M = .009, 95% CI [-.03, .04]; $t(38) = .55$, $p = .59$, $d = .09$),

[6] One participant's data were unable to be included in the internal analyses of the recalibration procedure due to a recording error during BeanFest.

indicating that recalibration was successful in correcting their responses to the novel beans. Participants in the recalibration condition made significantly more positive responses to the novel beans than those in the control condition ($t(77) = 4.03$, $p < .001$, $d = .92$).

Recalibration not only led individuals to respond more positively to the novel beans, but they actually became more accurate in their weighting. Following past research utilizing the recalibration paradigm (Pietri et al., 2013b, Experiment 1; Pietri & Fazio, 2017), we adopted a signal detection approach by calculating the proportion of "hits" and proportion of "false alarms" individuals had when categorizing each bean as positive (versus negative). We then calculated *d'* following Stanislaw and Todorov (1999). In order to examine participants' change in accuracy, we focused on the sets of trials at the very beginning and end of the test phase. Due to the way in which the test phase was constructed, we could guarantee that the first 16 novel beans contained an equivalent number of positive and negative beans and that the last 20 novel beans also contained an equivalent number.

We used a repeated-measures ANOVA with *d'* scores for the first and last set of trials as a within-participants variable and condition as a between-participants variable. As anticipated, there was a significant set by condition interaction ($F(1, 77) = 4.15$, $p = .045$, partial $\eta^2 = .05$): at the beginning of the test phase, those in the recalibration ($M = .63$, 95% CI [.47, .80]) and control conditions ($M = .45$, 95% CI [.29, .62]) did not differ in their general weighting accuracy ($F(1, 77) = 2.34$, $p = .13$, partial $\eta^2 = .03$). By the end of the test phase, however, those in the recalibration condition were more accurate ($M = 1.20$, 95% CI [.95, 1.46]) compared to those in the control condition ($M = .60$, 95% CI [.36, .85]; $F(1, 77) = 11.56$, $p = .001$, partial $\eta^2 = .13$). Those in the recalibration condition became significantly more accurate in their weighting over time ($F(1, 77) = 15.18$, $p < .001$, partial $\eta^2 = .17$), whereas those in the control condition did not

($F(1, 77) = 1.10$, $p = .30$, partial $\eta^2 = .01$). This outcome is important as it provides clear evidence of the effectiveness of the manipulation. It indicates that participants were not simply responding to recalibration by indiscriminately categorizing novel beans as positive, but were in fact generalizing their previously formed attitudes more accurately. Naturally, there was some variability within the recalibration condition in the extent to which participants grew more accurate. As we shall see later, this accuracy metric serves as a useful index of the extent to which individuals were recalibrated successfully and, hence, proved predictive of the outcome measures.

Rejection sensitivity and recalibration. We used a repeated-measures mixed ANOVA to assess the effect of recalibration on rejection sensitivity. There were three timepoints – baseline RSQ scores, RSQ scores immediately after recalibration, and RSQ scores two weeks later. There was a main effect of recalibration indicating that across the timepoints those in the recalibration condition were less sensitive to rejection compared to those in the control condition ($F(1, 77) = 6.02$, $p = .02$, partial $\eta^2 = .07$). Furthermore, there was an effect of time such that all participants showed decreases in rejection sensitivity as the semester proceeded ($F(2, 154) = 11.04$, $p < .001$, partial $\eta^2 = .13$). These effects were qualified by the predicted time by condition interaction ($F(2, 154) = 3.46$, $p = .03$, partial $\eta^2 = .04$). As expected, there was no difference between the recalibration ($M = 12.15$, 95% CI [11.63, 12.67]) and control conditions ($M = 12.43$, 95% CI [11.92, 12.95]) prior to recalibration ($F(1, 77) = .61$, $p = .44$, partial $\eta^2 = .01$). Immediately after recalibration, however, there was an effect of condition, such that participants in the recalibration condition reported lower sensitivity to rejection ($M = 10.77$, 95% CI [10.04, 11.51]) compared to those in the control condition ($M = 12.18$, 95% CI [11.45, 12.91]; $F(1, 77) = 7.32$, $p = .008$, partial $\eta^2 = .09$). Extending this finding further, we also observed a difference two

weeks later between the recalibration (M = 10.76, 95% CI [10.08, 11.44]) and control conditions (M = 11.89, 95% CI [11.21, 12.56]; $F(1, 77) = 5.49$, $p = .02$, partial $\eta^2 = .07$; see Figure 2). These findings, coupled with participants' response to the beans during the recalibration procedure, provide compelling evidence that our participants were successfully recalibrated to give more weight to positive information and that this effect persisted over the two weeks.

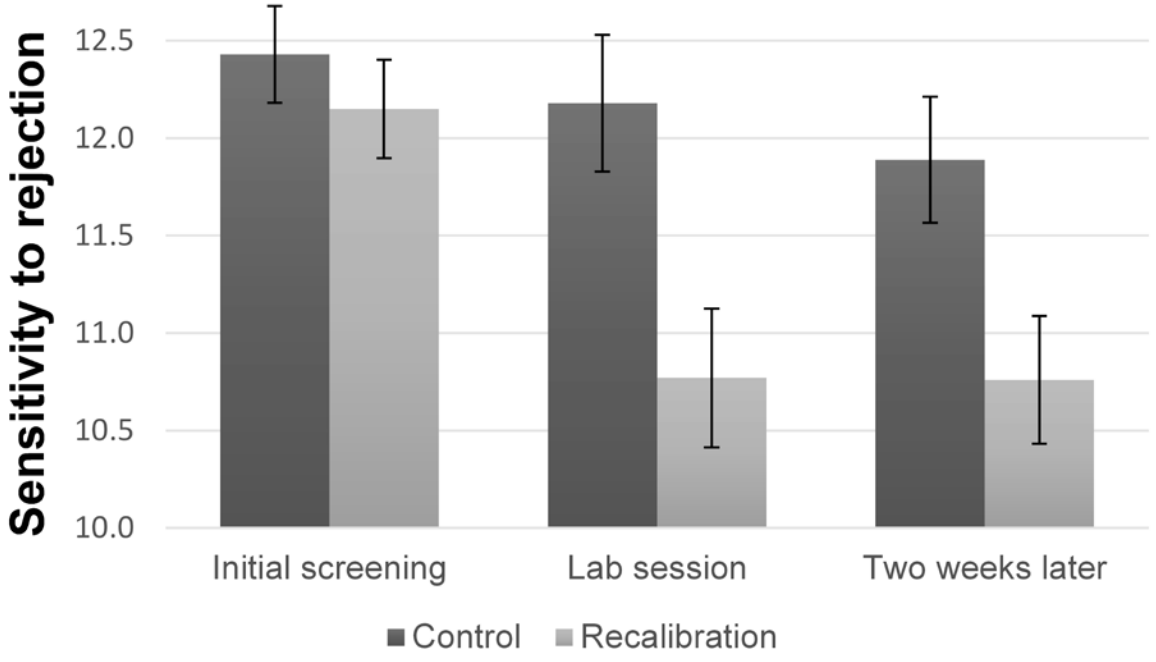

Figure 2 – Comparison of individuals' sensitivity to rejection based on condition and time. Error bars represent ± 1 standard error of the mean (SEM).

Peer relationships and recalibration. As we would expect, there was no initial difference in the number of peer relationships individuals listed in the recalibration (M = 7.83, 95% CI [7.05, 8.60]) or control condition (M = 8.55, 95% CI [7.31, 9.79]) prior to recalibration ($t(78) = .50$, $p = .62$, $d = .11$). Across the subsequent two-week period, individuals reported making 3.53 (SD = 3.14) more friends on average. This average attests to the importance of the timing of the intervention by demonstrating this to be a time when individuals have the opportunity to forge new relationships relatively quickly. Yet, the standard deviation indicates that there was substantial variability across individuals in the number of new relationships they formed during the two-week period.

A regression analysis predicted the number of new relationships individuals developed during the two weeks following the laboratory session from their initial number of relationships as well as their trait-level extraversion. As in Study 1, the more relationships individuals had initially, the more new relationships they developed subsequently (b = 1.37, $t(75) = 4.32$, $p <$ .001, 95% CI [.74, 2.00]), and greater extraversion was related to more new relationships (b = .59, $t(75) = 1.85$, $p = .069$, 95% CI [-.05, 1.22]). Most importantly, when we included a dummy variable reflecting condition (coded as '1' and '0' for the recalibration and control conditions, respectively), we observed the predicted effect: those in the recalibration condition developed more new peer relationships than those in the control condition (b = 1.23, $t(75) = 2.00$, $p = .05$, 95% CI [.002, 2.46]). Thus, participants in the recalibration condition reported, on average, 1.23 more new relationships than those in the control condition.[7]

[7] Using the same regression equation with 5000 bootstrapped samples, we found similar effects. Individuals' initial number of peer relationships (b = 1.37, $p = .007$, 95% CI [.34, 2.15]) and extraversion (b = .59, $p = .09$, 95% CI [-.04, 1.25]) were similar, and, most importantly, the effect of recalibration was significant (b = 1.23, $p = .048$, 95% CI [.07, 2.38]).

Rejection sensitivity and peer relationships. Given that recalibration relates to rejection sensitivity and peer relationships separately, we can examine whether there is any relation between these latter two variables. Although it seems reasonable to predict that rejection sensitivity might relate to the development of peer relationships, this may not necessarily be the case. First, there have been no past findings indicating that sensitivity to rejection leads to fewer peer relationships. Second, those scenarios outlined in the rejection sensitivity questionnaire are largely related to the risk associated with making requests of others (e.g., asking a friend for a big favor, asking your parents for extra money, asking your professor for extra help) while developing peer relationships is multiply determined. For example, it is not only about asking requests of others, but also is related to being receptive toward others if they extend some initial overture. Finally, many of the scenarios in the RSQ involve close others (e.g., parents, significant others), and past research has primarily focused on rejection sensitivity's influence on already-established close relationships (e.g., Downey & Feldman, 1996; Downey, Freitas, Michaelis, & Khouri, 1998). In contrast, our research is concerned with the initial development of relationships.

Reflecting these distinctions, we did not find that rejection sensitivity predicted new peer relationships. We used a regression equation to examine the number of new relationships as a function of individuals' initial number of relationships, their trait-level extraversion, and their change in sensitivity to rejection from the initial screening period to just after recalibration (RSQ directly after recalibration minus prescreened RSQ). As before, both individuals' initial number of relationships (b = 1.35, $t(75) = 4.18$, $p < .001$, 95% CI [.71, 1.99]) and extraversion (b = .55, $t(75) = 1.71$, $p = .092$, 95% CI [-.09, 1.20]) were related to the number of new relationships they made. However, the change in rejection sensitivity was not a significant predictor (b = -.25, $t(75)$

= .78, p = .44, 95% CI [-.88, .38]). We then examined a similar model, but now using the change in sensitivity to rejection from the initial screening period to two weeks following recalibration (RSQ two weeks after recalibration minus prescreened RSQ). Again, the change in rejection sensitivity was not a significant predictor of the number of new relationships (b = -.37, t(75) = 1.17, p = .25, 95% CI [-.99, .26]). These results indicate that though valence weighting influences both of these outcomes, they themselves are not directly related.

Weighting bias self-beliefs and their relation to recalibration. It is possible that the observed effects of valence weighting stem from individuals becoming aware of their weighting tendencies during recalibration and then deliberately correcting for this tendency subsequently. To examine this possibility, we directly assessed participants' beliefs at the end of the laboratory session via the Weighting Bias Questionnaire (WBQ).

Recalibration had no effect on individuals' valence weighting beliefs: those in the recalibration condition (M = 3.83, 95% CI [3.70, 3.97]) did not alter their beliefs about their weighting bias compared to the control condition (M = 4.09, 95% CI [3.95, 4.24]; t(78) = 1.31, p = .20, d = .30). Furthermore, we found that individuals' beliefs about their valence weighting tendencies did not correlate with their sensitivity to rejection (ps > .53) at any session, nor the number of new peer relationships they developed (b = .14, t(75) = .45, p = .66, 95% CI [-.50, .78]). Thus, individuals' self-reported beliefs regarding their valence weighting tendencies were unaffected by recalibration and were not predictive of either sensitivity to rejection or peer relationships.

Individuals' valence weighting accuracy. By the end of recalibration we had successfully led individuals to be more accurate in their assessment of the novel beans. It is possible that this accuracy relates to the consequences of recalibration that we observed for the

development of peer relationships. Specifically, the extent to which participants became more accurate by the end of recalibration provides an indication of how successful we were in recalibrating those participants' weighting bias. The more accurate individuals became, the more they exhibited signs of having been responsive to the feedback they received during the recalibration procedure. Participants for whom recalibration was more successful, as indicated by their accuracy, may have subsequently developed more peer relationships.

To index valence weighting accuracy, we turned to our previous calculations of *d'* for the very first and then the final beans shown to individuals in the test phase. We control for individuals' initial accuracy and then use their final accuracy to measure the extent to which they came to correctly weight positives versus negatives by the end of the recalibration procedure. We found that greater final valence weighting accuracy predicted more relationships (b = .80, $t(73)$ = 2.60, p = .01, 95% CI [.19, 1.42]). As before, their initial number of relationships (b = 1.38, $t(73)$ = 4.39, p < .001, 95% CI [.75, 2.00]) and extraversion (b = .58, $t(73)$ = 1.84, p = .07, 95% CI [-.05, 1.23]) also predicted the number of new relationships; initial weighting accuracy did not (b = -.35, $t(73)$ = 1.15, p = .25, 95% CI [-.97, .26]).

We then tested a mediation model whereby recalibration led to individuals' final accuracy in categorizing the novel beans, which in turn led more new peer relationships. The proposed mediation pathway was significant as a bootstrapping 95% confidence interval with 5000 samples did not include zero [.02, 1.33]. Those individuals who were successfully recalibrated and showed the best accuracy in their valence weighting tendencies developed more peer relationships during the subsequent two weeks.

A parallel set of analyses, detailed in the supplementary materials, also provided statistically significant evidence for the mediating role of valence weighting accuracy on rejection sensitivity, as assessed both immediately after recalibration and two weeks later.

Discussion

The results of this experiment demonstrate that we can intervene to recalibrate the valence proclivities of individuals with a more negative weighting bias and promote the formation of new relationships. This experiment also demonstrated similar outcomes for individuals' sensitivity to rejection: recalibration led to an immediate decrease in individuals' sensitivity to rejection and this improvement persisted across a two-week period. Although previous research has shown that recalibration alters individuals' sensitivity to rejection as long as one week later (Pietri & Fazio, 2017), this is the first demonstration of these changes persisting beyond that time. Importantly, the effectiveness of the recalibration procedure substantiates the *causal* role of valence weighting with respect to both friendship development and rejection sensitivity.

These results cannot be explained by participants' awareness of the recalibration procedure's purpose and outcome. It might be argued that participants became aware of the number of positive and negative beans they correctly or incorrectly categorized as the task proceeded and then consciously made an effort to be less influenced by that particular valence in subsequent categorization. However, we found that individuals' self-reported valence weighting beliefs did not change as a function of recalibration. Such a change would have been expected if participants were aware of what the recalibration feedback was revealing about their valence weighting tendencies and then consciously correcting for that bias.

The more proximal predictor of the observed effects of recalibration was individuals' final valence weighting accuracy within the BeanFest procedure itself. This finding speaks to the underlying mechanism that we have been highlighting: the relative weight individuals give to positive (versus negative) valence when encountering strangers and when assessing the risk associated with making a request of another. Those individuals whom we most successfully recalibrated – as evidenced by their superior accuracy by the end of the recalibration phase – subsequently developed all the more peer relationships and exhibited even more of a decrease in rejection sensitivity.

Although the recalibration procedure involves a relatively short intervention, its ramifications were seen two weeks later. This rather impressive outcome is likely due to the fundamental nature of individuals' valence weighting tendencies, the population we recruited, and the timing of the intervention. Regarding the first point, as has been demonstrated across sizeable number of studies, individuals' weighting tendencies relate to their willingness to approach novel objects, their interpretation of ambiguous situations, and their actual risk taking (Fazio et al., 2015), all of which would play a role in developing peer relationships in a new environment. Furthermore, we targeted a specific population that is known to consistently give greater weight to negative information – those with a negative weighting bias – at a key window in time – their initial weeks on campus. Thus the very process of weighting positives versus negatives in order to assess novel entities is more likely to occur during this pivotal time and therefore the recalibration procedure was all the more likely to have an impact. Such a result mirrors past research that has utilized similarly short psychological interventions that have also had similarly striking outcomes when executed in a strategic manner (Walton, 2014). Researchers have provided evidence that targeting fundamental processes among at-risk

populations at key times can have substantial implications through cascading effects (e.g., Cohen & Sherman, 2014; Walton, 2014; Stephens et al., 2015). By giving greater weight to positive valence, individuals may have been more receptive toward interacting with a stranger. Participants may have enjoyed the positive outcome of such an initial interaction, which may have then promoted continued behavioral change (i.e., talking with strangers) and a sustained positive weighting bias.

General Discussion

Taken together, the results of these studies provide strong evidence for the role of valence weighting in the development of new peer relationships. These results are likely driven by the pivotal nature of valence weighting. Although the present studies did not illuminate the precise mediating mechanisms beyond those provided by valence weighting accuracy within the BeanFest environment, past research is informative about the likely processes. Individuals who have a more positive weighting bias or have been experimentally recalibrated toward positivity are quicker and more likely to approach novel stimuli (Rocklage & Fazio, 2014), more likely to interpret ambiguous events as positive (Pietri et al., 2013a; Pietri & Fazio, 2017), and more likely to take risks (Pietri et al., 2013a), all of which are integral to relationship development. Moreover, such initial behavior is likely to produce further cascading effects: once individuals find that the novel situation is benign, they are likely to feel more comfortable during the interaction, which, in turn, can lead them to be more likely to foster the relationship. Although, previous findings suggested valence weighting may influence real world behaviors, the current studies represent the first investigation of such a possibility. In particular, this is the first time that the weighting bias has predicted behavior outside of the laboratory, and the first time that recalibration has influenced outcomes in the real world.

There are variety of strengths associated with utilizing BeanFest to assess and manipulate valence weighting. First, BeanFest is a performance-based paradigm that uses individuals' actual behavior to measure the extent to which they weight positive versus negative valence. Because we do not rely on individuals' introspected self-reported beliefs, our measurements are less susceptible to, for example, social desirability pressures when reporting general positivity or negativity. As demonstrated in both studies, when individuals were asked to report their beliefs about their weighting bias, these beliefs were ultimately not predictive of their new relationships or rejection sensitivity.

Second, BeanFest represents a unique and powerful paradigm in that it uses a set of novel stimuli – virtual beans – to predict seemingly unrelated outcomes. Despite these outward differences, BeanFest has been designed to capture the fundamental process of valence weighting in attitude generalization. By using the novel bean stimuli, BeanFest is able to target this fundamental weighting process, obtain a relatively pure measure of this process, and predict these diverse outcomes.

Importantly, the current research involved the measurement of individuals' peer relationships via their own perception as participants nominated those individuals whom they considered to be friends. This approach is advantageous in that it builds on previous research within this domain that has used a similar method; this previous research has shown, sensibly, that more extraverted individuals make more friends across time (Asendorpf & Wilpers, 1998). In addition, past work has documented the greater impact of perceived social support relative to received support in predicting adjustment to stressful life events (e.g., Lakey & Cohen, 2000; McDowell & Serovich, 2007; Wethington & Kessler, 1986), highlighting the importance of whether individuals themselves view someone as a friend (see Baumeister & Leary, 1995).

Moreover, having a greater number and diversity of social interactions has been shown to prospectively predict higher quality friendships and better psychological outcomes later in life (Carmichael, Reis, & Duberstein, 2015). Specifically, in a large 30-year longitudinal study, researchers found that the quantity of social interactions at age 20 predicted better relationship quality at age 50, even when controlling for the quality of individuals' relationships at age 20. As these researchers argue, it may serve individuals well to accumulate and develop social knowledge and skills earlier in life and then apply these resources throughout their lives.

Despite this importance of perceived number of friends and quantity of interactions, future research might explore the nature of individuals' peer relationships more fully. For example, it would be possible to conduct a study whereby researchers obtain the traditional list of relationships from participants themselves but then examine whether the listed individuals would also nominate the participant as a friend. In this way researchers could assess not only the extent to which participants' perceptions of friendships matter, but also those friendship relationships that are endorsed reciprocally by the partner.

Moreover, the definition of friends we offered to our participants as well as the circumstances under which they were recruited – the first weeks of a new life setting – assess valence weighting's effect on the relatively early stages of relationship development. For our purposes, participants were asked to list relationships characterized by their making "a conscious effort to keep in touch with, and communicate with" the person. It is important that future work assess the extent to which the initial relationship stages we capture grow into more intimate friendships over time given the multitude of benefits individuals accrue from perceptions of strong support from their social networks (e.g., Heinrich & Gullone, 2006; Cacioppo, Hawkley, Crawford et al., 2002).

In summary, the extent to which individuals weight positive versus negative valence predicts the number of new peer relationships they develop over the ensuing two months (Study 1). For those with a more negative weighting bias, this weighting process can be recalibrated toward positivity to foster the formation of additional peer relationships during a time when they are encountering many novel situations and strangers and, hence, making repeated valence weighting judgments (Study 2). These results demonstrate that the basic psychological process of valence weighting has real-world ramifications in even very complex social processes. They also help to illuminate those characteristics and processes that foster new relationships. As such, we hope this research spurs further interest into how individuals develop new relationships as well as the basic process of valence weighting.

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