Conflicted Minds: Recalibrational Emotions Following Trust-based Interaction

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Abstract

We propose a model of behavior regulation in trust-based interaction dilemmas and test the predicted experience of 20 emotional components of this model reported by 90 participants. According to this model, new information about trust-based interaction outcomes triggers specific emotions that jointly recalibrate the operation of relevant behavior regulation programs in self and/or others. With this recalibrational system in mind, we propose adaptive design features shared among six sets of 20 emotions to produce a functional taxonomy of emotions – with sets triggered according to the computed identification of adaptive problems. Unlike Valence Models that predict reports of large sets of emotions according to interdependent positive and negative affect alone, the Recalibrational Model predicts and finds evidence of mixed-affect emotional states. We discuss the implications of having conflicted minds for both scientific and well-being pursuits.

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1. Introduction

The central aim of this paper is to investigate whether emotions, reported by participants after completing a "Trust game" (based on Berg, Dickhaut, & McCabe 1995, hereafter BDM) and learning of its outcome, were experienced in a patterned way and whether results conform to predictions of our proposed "Recalibrational Model" or predictions of positive and negative affect Valence Models. We propose an emotionally calibrated model of behavior regulation in trust-based interaction dilemmas (the "Recalibrational Model") and a functional taxonomy of emotions (elaborated in subsections 1.1. through 1.3. below) that predict the experience of 20 individual emotions reported by 90 participants according to information about game outcomes.

The first part of the proposed model (1.1) describes how the relative calibration of short-sighted and long-sighted behavior regulation programs ultimately determines Investor and Trustee behavior when individuals are confronted with Trust game choice dilemmas. The second part of the model (1.2) specifies how emotions, acting jointly in sets to recalibrate the operation of relevant behavior regulation programs in both self and others, are triggered by new information about Trust game outcomes. The third part of the model (1.3) proposes how the above sets of emotions computationally identify the presence of specific adaptive problems based on Trust game decisions and outcomes. A fourth part of this model, untested with this research, specifies the kinds of targeted recalibrational effects (i.e., "positive" upregulation and/or "negative" downregulation) that we expect emotions to produce (on specific behavior regulation programs: short-sighted or long-sighted) in self and others (see Table 1 for details).

The multivariate recalibrational functions proposed for the 20 emotions studied determine the functional fit of specific emotions into six unique sets within this model. Our multivariate model predicts the experience of emotions better than more intuitive models still de riguer today[1], such as the bipolar affect Valence Model where positive emotions or negative emotions are experienced as interdependent negatively correlated opposites (e.g., see Lang et al. 1993; Ortony, Clore, & Collins 1988; Russell & Carroll 1999).

We observe reports of mixed-valence emotional states (e.g. strong simultaneous experience of triumph & guilt) consistent with competition between cognitive programs within humans' "conflicted

[1] While many researchers have long moved past the bipolar affect models, instead recognizing that positive and negative affect are at times *independent* dimensions (e.g., see Watson, Clark, & Tellegen 1988), psychophysiologists (Driscoll, Tranel, & Anderson 2009; Lang, Greenwald, Bradley, & Hamm 1993) neuroscientists (Proverbio, Zani, & Adorni 2008; Screenivas, Boehm, & Linden 2012) behavioral economists (Morretti & di Pellegrino 2010; Brandts, Riedl, & van Winden 2009; Van den Berg, Dewitte, & Warlop 2008; Morris 1995) and decision scientists (Hogarth, Portell, Cuxart, & Kolev 2011; Reid & Gonzalez-Vallejo 2009; Schlosser, Dunning, & Fetchenhauer 2011) continue to use bipolar affect scales (specifically, the Self-Assessment-Manikin valence scale developed by Lang (1980)).

minds". We provide further evidence for the patterned experience of multivariate sets of emotions, supporting the theory that sets of recalibrational emotions are triggered in patterned response to the adaptive problems produced by trust-based interactions.

1.1. Trust-Based Decision Dilemmas and Behavior Regulation by Short-Sighted and Long-Sighted Programs

When one is confronted with a dilemma, there is some sort of internal conflict over how to pursue alternative desired outcomes that cannot be simultaneously fulfilled at their maxima. We study such a dilemma modeled by the BDM Trust game where an Investor first decides how much of a $10 endowment to send a paired Trustee, en route the sent amount is tripled – becoming the "income", and then the Trustee decides how much of the income to return to the Investor. In this trust-based interaction the Investor must decide whether to pursue his short-term goal of securing immediate and certain material gains – maximally achieved by keeping his endowment, or else to pursue his long-term goal of developing a trust-based exchange relationship – maximally achieved by investing his endowment in the Trustee stranger (demonstrating trust) and then recouping his loss when the Trustee fulfills the implicit expectation of returning a value in excess of the investment. Likewise, the Trustee, having received a multiplied transfer of funds from the Investor, must decide whether to pursue her short-term goal of immediately securing material gains by keeping this income, or else she can pursue her long-term goal of developing a trust-based exchange relationship[2] by transferring back an amount greater than what the Investor originally transferred and thereby demonstrating her trustworthiness. Reciprocity theories predict that demonstrations of trust and trustworthiness, and the results of trust-based interactions affect the relative valuations of short-term and long-term goals that people pursue.

Our model proposes that the adaptive problems, modeled by the Trust game, are regulated by short-sighted and long-sighted programs[3] (e.g., see Carrillo 1998; Kurzban 2010) in conflict with one another (Livnat & Pippenger 2006). The relative calibrations of these two programs regulate

[2] While we study a single, anonymous interaction, our evolved psychology errs to caution by processing information about one-shot interactions under the premise that they may in fact be repeated in the future (e.g. see Delton et al., 2011).
We also suspect that Investors who make trust-based choices discover consequent effects on their payoffs and extend this information in constructing generalizable models about the trustworthiness of Trustees in the population (e.g., the experimental subject pool).

[3] "Programs", from computational science, refers to neural circuits in the brain/body which process input information and accordingly cause outputs either in the form of regulatory variables and feedback (reused as input by programs) or behavior.

individuals' behavior[4] in dilemmas such as trust-based interactions (see Figure 1). Outside of the artifices of a laboratory, individuals may rely on alternative behavioral strategies (e.g. threats of violence, sexual seduction) for coercing transfers from those they interact with, and while we prohibit these forms of personal interaction, we acknowledge that calibrations of individuals' behavior regulation programs during trust games might be affected, a priori, by their strategic inclinations in less restrictive contexts.

1.2. Recalibrational Functions of Emotions and Prediction of Emotional Experience

Based on the various types of emotion functions described below, we propose a functional classification system that categorizes the 20 emotions studied (see Table 1) according to constellations of their shared features. This classification system allows us to not only identify the positive and negative affect valence of emotions that recalibrate the behavior regulation programs, but also to identify which behavior regulation programs they serve, and whether the behavior regulation programs that they target are in self or other. The functional features that we conjecture emotions to have are "recalibrational", as we describe below.

Nesse (2004, p.1138) states that, while emotions have been selected for because of their ability to solve specific adaptive problems, "...there is no one to one correspondence between an emotion and a function. One emotion can serve multiple functions, and one function may be served by several different emotions." Consistent with Nesse, our functional classification of 20 emotions yields six sets containing multiple emotions that we expect to be triggered in concert for common functional purposes. We characterize these functions as *positive* or *negative* recalibrations, targeting *short*- and *long*-sighted programs, *intra* and *inter* personally.

Generally, an adaptationist and functional perspective of emotions argues that emotions facilitate behavioral regulation because they provide either positive or negative feedback (experienced as pleasant and unpleasant feelings) that is used in updating the calibration of one's internal regulatory variables (e.g., Cosmides & Tooby 2000; Buck 1999; Tooby & Cosmides 1990). Pleasant feelings (e.g., from happiness, contentment, pride, cheerfulness) are rewarding and can incentivize approach behavior and continuation of the prior behavior or interaction that triggered them (Watson et al., 1999; Carver & Scheier 1990). Unpleasant feelings (e.g., from sadness, aggravation, guilt, disgust, anger) are

[4] While we expect individual differences in *degree* (i.e., variance in relative strengths of regulatory programs or emotions), we do not expect differences in *kind* (i.e.., direction of calibrational effects), since we take the existence of these programs to be species-typical adaptations.

costly and motivate a change, whether through behavior reduction, avoidance, or aggression (Gray 1971).

Of our set of 20 emotional states, we conjecture 9 [*appreciative, happy, content, cheerful, triumphant, inspired, secure, proud, believable*] that are positive, 1 [*surprise*] that could be either positive OR negative (in a unique set by itself: set 4), and 10 [*disgusted, jealous, aggravated, frustrated, angry, depressed, sad, embarrassed, ashamed, guilty*] that are negative.

Perhaps the binary division into positive and negative affect types is the simplest of these taxonomies of emotions (Tellegen, Watson, & Clark 1999). Several theoreticians have argued that by moving beyond the more simplistic models of valence (or positive and negative affect) to models of emotions with additional features of functional design-specificity, we might gain even greater explanatory power of how emotions affect behavior (Lerner & Keltner 2000, 2001; Van Kleef, de Dreu, & Manstead 2004). In considering the nature of adaptive decision problems encountered in trust-based interactions, we recognize that the outcomes of these decisions are contingent on not only self-behavior (according to the calibration of one's own behavior regulation programs), but also the actions of others (according to the calibration of their programs). As such, it is helpful to consider a typology of these adaptive problems in terms of their solutions: specifically, solutions arrived at via intrapersonal and/or interpersonal behavior regulation (e.g., see Levenson 1999; Van Kleef et al., 2004; Butt, Choi, & Jaeger 2005). Below we discuss the distinction between intrapersonal emotions that may affect reinforcement, maintenance, or change of self-behavior, and interpersonal emotions that may ultimately affect reinforcement, maintenance, or change of another's behavior.

Of our set of 20 emotional states, we conjecture 15 [*appreciative, happy, content, cheerful, triumphant, inspired, secure, surprised, disgusted, jealous, aggravated, frustrated, angry, depressed, sad*] that serve both short-sighted and long-sighted adaptive goals, and 5 [*proud, believable, embarrassed, ashamed, guilty*] that exclusively serve long-sighted adaptive goals (split into 2 unique sets, one positive: set 3; and one negative: set 6).

Emotions are ultimately designed to deal with the adaptive problem of program orchestration (Tooby & Cosmides 1990) that arises by the simultaneous activation of competing behavior regulation programs within an individual's mind. To solve this adaptive problem, triggered emotions have been designed by natural selection to recruit the assistance of a number of psychological, physiological, and behavioral processes that are best suited for affecting a recalibration of targeted programs. When one's prior actions did not succeed in achieving an adaptive goal, negative emotions are triggered to recalibrate regulatory programs in the self. For example, guilt, an intrapersonal emotion triggered exclusively in response to a failure by the long-sighted program, recalibrates (i.e., downregulating) the dominant short-sighted program within one's self so as to effectively increase the value of delayed payoffs relative to immediate payoffs. As the incentive to pursue short-term payoffs decreases in magnitude (as a function of guilt felt), the costs of forgone long-term rewards looms larger in our minds. As a result, we increase our valuation of long-term goals and therefore our ability to "commit" to their pursuit (Frank 1988). On the other hand, when one's prior actions succeed in achieving an adaptive goal, positive emotions are triggered and recalibrate regulatory programs in the self to ensure further achievements. For example, the experience of feeling believable and proud occurs when positive emotions are triggered by the decision to engage in cooperative behavior. These positive intrapersonal emotions upregulate the long-sighted program (relative to the short-sighted program) so as to further encourage the behavior that led to successful cooperation.

Several theorists including moral philosophers (Hume 1740; Smith 1759), moral psychologists (Kohlberg 1971; Haidt 2003; Ketelaar 2006) evolutionary biologists (Darwin 1872; Trivers 1971; Nesse 1990), and economists (Hirschleifer 1987; Frank 1988) have identified a set of emotions among humans designed to commit one towards or reinforce socially appropriate behavior or recalibrate self and others towards socially desirable behavior. We conjecture that while most (19/20) emotional states of our set have intrapersonal recalibrational functions, seven of these [*triumphant, inspired, secure, proud*, *believable*, *surprised*, *guilty*] are exclusively intrapersonal (not also serving interpersonal recalibrational functions).

Another way that emotions are designed to function is by regulating another's programs in an effort to affect how that person will interact with one's self. For example, consider the gratitude emotion. Discovery that another has foregone short-term rewards in the pursuit of a long-term exchange relationship with one's self – for example by providing assistance, presents a fortunate opportunity but one that must be acknowledged, lest it appear that the goodwill relationship initiated by the other is taken for granted by self and not reciprocated in kind. If one is unprepared to reciprocate in some welcomed form directly after receiving a benefit, how can one signal or demonstrate willingness to reward the other? Evolutionary psychologists have suggested that gratitude and appreciation are emotions designed for this adaptive problem (Tooby & Cosmides 2008). Experimental evidence supports this functional account of feeling grateful and appreciative (Tesser, Gatewood, & Driver 1968; Algoe, Haidt, & Gable 2008; McCullough et al., 2001).

Of our set of 20, we conjecture 1 emotional state [*appreciative*] that is exclusively interpersonal (in a unique set by itself: set 1), positive, and serves both short-sighted and long-sighted adaptive goals. We conjecture there to be 6 more positive emotional states serving both short-sighted and long-sighted adaptive goals, but that are not exclusively interpersonal [*happy, content, cheerful, triumphant, inspired, secure*] and form another unique set by themselves: set 2.

A few emotions are designed to regulate dual targets: particular programs within one's self, and particular programs in others. Shame and embarrassment are emotions that may dually serve both self-directed and other-directed purposes. Generally speaking, the shared adaptive goal of shame and embarrassment is for one to preempt another's targeted inter-personal regulation of one's self by, instead, initiating self-imposed regulations with the functional equivalence of regulations that the other party might otherwise impose. For example, shame could preempt a disgust reaction in another if it preemptively leads to distancing one's self from the other, or alternatively, shame could preempt anger in another if it preemptively imposes costs on one's self. Likewise, the appeasement function of embarrassment may act remedially, effectively preempting the social conflict and aggression outputs from others, for example, when others experience anger as a consequence of one's rule violations (Keltner, Young, & Buswell 1997; de Jong 1999). This class of dually intrapersonal and interpersonal emotions is unique in that, when triggered, it recalibrates a targeted program within the self and in doing so preempts a recalibrational process that the interpersonal emotions (e.g., anger) of others would be motivated to affect.

We next describe the design of our natural experiment and state predictions derived from the theory that potentially competing behavior regulation programs, each evolved to pursue a specific adaptive goal, recruit superordinate emotion programs to calibrate self and/or other, so as to optimize the pursuit of adaptive goals.

Of our set of 20 emotional states, we conjecture that 12 are both intrapersonal and interpersonal, with the seven [*disgusted, jealous, aggravated, frustrated, angry, depressed, sad*] negative states considered to serve both short-sighted and long-sighted adaptive goals forming a unique set (set 5).

1.3. Computation of Adaptive Problems Triggering Recalibrational Emotions

Our recalibrational theory of emotions is built around conflicting short-sighted and long-sighted behavior regulation programs, whose relative calibrations determine an individual's choices when faced with decision dilemmas, such as in the Trust game. We propose that the emotions serving these programs computationally assess game outcomes for the purpose of identifying and reacting to successes and failures of the short-sighted and long-sighted programs (in self and other). Because these successes and failures (from the perspective of an individual's short-term and long-term goals) may be attributed to one's own behavior, to the interaction partner's behavior, or to both persons' behaviors, the problem source must be computationally identified and the appropriate emotions for recalibrating these targeted programs must be triggered. According to our model, emotions computationally identify the trust game outcomes that trigger them. We label these triggers A, B, C and D.

For illustration, we describe below how each of the A, B, C, and D triggers can be computed based on Trust game decisions and interactions, and how these triggers are hypothesized to affect emotion responses. For the complete specifications of emotions according to triggers produced by the Trust game, see Table 1 where the additive combinations of triggers (derived from the computational model illustrated in Figure 1) contributing to predicted experiences of emotion sets 1-6 are detailed for Investor and Trustee. This combined functional framework of emotional experience (represented in Table 1 and Figure 1) has been constructed based on postulated adaptive functions of the defined emotions and the nature of the adaptive problems presented by Trust game outcomes.

The "A" trigger measures the amount that the Trustee's return, R, exceeds the Investor's investment, S. When "A" is strongest the Trustee has transferred-back the greatest amount of the Investor's invested endowment possible. The "A" trigger quantifies the Trustee's reciprocal behavior by providing a measure of the amount of invested endowment that is returned in a Trust game interaction. A computational identification of "A" triggers proud and believable emotions experienced by the Trustee that upregulate her long-sighted program, while the simultaneous triggering of aggravated, frustrated, and depressed emotions experienced by the Trustee serve to downregulate her competing long-sighted program. Likewise, "A" will trigger emotion experiences in the Investor. For example, "A" triggers the Investor to feel appreciative, an emotion that targets the Trustee, upregulating her long-sighted program.

The "B" trigger measures the amount that Investor's investment, S, exceeds Trustee's return, R. When "B" is strongest the Trustee has returned nothing and opportunistically kept the greatest amount of the Investor's invested endowment possible. While the strength of "B" is limited by the amount of endowment invested, it quantifies the amount of opportunistic behavior demonstrated by the Trustee who does not return enough to restitute the loss of endowment invested in the Trust game interaction. A computational identification of "B" triggers guilty, ashamed and embarrassed emotions experienced by the Trustee that downregulate her short-sighted program. Likewise, "B" triggers the Investor to feel angry and aggravated, downregulating his long-sighted program.

The "C" trigger measures the fraction of the endowment kept by the Investor. When "C" is strongest the Investor has demonstrated no trust, invested nothing, and kept the greatest portion of his endowment possible. A computational identification of "C" – produced entirely by the Investor's decision to not invest endowment in the Trust game – triggers guilty, ashamed and embarrassed emotions experienced by the Trustee that downregulate her short-sighted program. Likewise, "C" triggers the Investor to feel disgusted and frustrated, downregulating his long-sighted program.

Last, the "D" trigger measures the fraction of the multiplied transfer (or income) kept by the Trustee. When "D" is strongest the Trustee has transferred-back nothing and opportunistically kept the greatest amount of income possible. Computationally, "D" identifies the amount of available opportunism achieved by measuring the proportion of available income that a Trustee decides to keep in a Trust game. A computational identification of "D" triggers a negative surprise reaction by the Investor who expected monetary gains from returns on his investments. From the perspective of the Trustee's short-sighted program, a strong "D" corresponds to an unexpected, but seized, "opportunity". "D" triggers happiness, appreciation, and positive surprise emotions for the Trustee, in turn, upregulating the long-sighted program in the Investor that produced the opportunity in the first place.

In summary, emotions are triggered by computational assessments of short- and long-sighted programs' successes and failures. When these problems that they are variably designed to address are present, emotions are triggered (experienced). According to their design functions, triggered emotions either contribute to the reinforcement of successes or the reduction of failures by upregulating or downregulating either short- or long-sighted programs in the self or other. We test whether constellations of specific antecedents (the A, B, C, and D triggers produced by Trust game interaction; see Figure 1) reliably predict specific emotion responses.

2. Design, Predictions and Procedures

2.1. Natural Experiment Design

We conducted a BDM Trust game in which the Investor received an endowment of $10 and could send any unkept portion of it to the Trustee, with the amount sent tripled. The Trustee then decided how much of the tripled investment, or income, to return (or else keep). Following the Trust game we administered a 20-item emotional status survey[5] in which participants reported how much

[5] To avoid experimenter demand effects that might result by soliciting reports on only a few select emotional states commonly ascribed to failed trust-based interactions (i.e. anger and guilt) and identified in the literature (e.g., Ketelaar & Au 2003), we constructed a survey of a large array of emotional experience, based on the Positive and Negative Affect Scale (PANAS), a 20-item self-report measure of positive and negative affect states developed by Watson et al. (1988) that has been demonstrated across a large non-clinical sample to be a reliable and valid measure of these states (Crawford & Henry 2004).

they felt each of 20 emotions (on a 5 point scale labeled (1) very slightly or not at all, (2) a little, (3) moderately, (4) quite a bit, (5) extremely) as a consequence of their recent game interactions and outcomes. Using this laboratory implementation of the Trust game, which engages participants in one-shot anonymous economic interactions, and a well-established emotional status survey we investigated whether emotions were triggered and reported experienced in a patterned and predicted way as a consequence of game outcomes.

2.2. Predictions

Inspired by functional theories of social emotions (Trivers 1981; Cosmides & Tooby 1989), Nesse (1990, p.275; 1999, p.458) made various predictions about how specific emotions mediating reciprocity would be triggered by the four types of interaction patterns produced by a repeated Prisoner's Dilemma game. To our knowledge Nesse's predictions have not yet been tested. This paper takes a similar natural experiment approach and examines the relationship between participants' endogenous generation of Trust game outcomes and consequential reports of emotion. Like the Prisoner's Dilemma, the Trust game is another model for reciprocity, albeit a model of asynchronous (rather than synchronous) trust-based exchange.

With the set of predictions below, generated by Valence Models and our Recalibrational Model, we test assumptions and compare how well different models of emotional experience predict the emotions reported by participants who had just completed Trust games.

Valence Models

P1: In the three versions of Valence Models (predicted in P1.1-P1.3 below, respectively) emotions show positive correlation within each of two sets: a Positive Affect (PA) set and a Negative Affect (NA) set.

P1.1: PA & NA sets are *independent:* no correlation (=0) is expected between them.

P1.2: PA & NA sets are strictly *interdependent* with negative (=-1) correlation between them. Consistent with a purely "bipolar" model of valence, reports of simultaneously experienced strong positive emotion and strong negative emotion are unexpected.

P1.3: Interdependence is *unrestricted* between emotions in the PA & the NA. While negative correlation is expected between sets, positive correlation between items in PA & NA sets can also occur.

Recalibrational Model

P2: Conflicted minds produce mixed emotions: at times involving positive correlation between (simultaneously experience) PA & NA emotions.

P3: Emotion experiences are reported in a patterned way according to a multivariate set of shared recalibrational features (i.e., *positive* and/or *negative* recalibrational effects, targeting *short*- and/or *long*-sighted programs, *intra* and/or *inter*personally).

P4: A set of four adaptive problem features (triggers), computed from Trust game interactions, predicts the experience of emotions in the 6 sets of the Recalibration model *better than* the 2 sets of the Valence models.

2.3. Experimental Procedures

The experiment, programmed using z-Tree (Fischbacher 2007), was conducted at Chapman University's Economic Science Institute. Participants were recruited from a campus-wide subject pool consisting primarily of undergraduate students.

There were four experimental sessions, each lasting approximately thirty-five minutes. The average amount earned was $10.31, plus $7 for arriving to the experiment on time and participating. No participant participated more than once. Each session had between 18 and 24 participants, seated in individual cubicles, and was conducted as follows. An experimenter read the instructions explaining experimental procedures and payoffs aloud while each participant followed along with their own copy of the instructions. After finishing the instructions, participants were given five minutes to privately write down their answers to several quiz questions. After participants completed the quiz, the experimenter distributed a printed copy of the correct quiz answers. To ensure understanding, any remaining questions were answered in private.

Participants, randomly assigned to one of two roles: "person 1" (Investor) or "person 2" (Trustee), interacted anonymously in the computerized Trust game over a local computer network, then completed the 20 item survey in which they reported the status of various emotions consequent on their decisions, game interactions, and resulting outcomes.

3. Results

In this section, we report general results of the Trust game and the emotional status survey, then in section 3.1 we investigate evidence for shared features between emotions: how the patterned experience of emotions accords with the various assumptions of the Valence Models and our

Recalibrational Model. In section 3.2 we examine the full models of emotional experiences according to four triggers (based on computation of adaptive problems consequent of economic decisions and interactions), comparing the fit of the unrestricted Valence Model and the Recalibrational Model.

We find no significant differences between the four sessions and report the joint results of all 90 participants. Figure 2 displays the scatter plot of the amount sent and the amount sent back. There is substantial variability in individual behavior. On average, Investors sent $5.31 (SD=3.68) and received $5.34 (SD=6.00) back from the Trustees, resulting in profits of $10.04 and $10.57, respectively. These results are consistent with previous findings of BDM. Likewise, there is substantial variability in individual reports of emotional experience. While the modal report for most (17/20) emotions was 1=, "very slightly or not at all", modes were also seen at 3 (for *happy* and *content*) and 5 (for *appreciative*). The average emotion was reported experienced as mean=2.2075 (median= 1.85, SD=1.303) near "a little" (=2) as a result of Trust game interactions. Ratings on every emotion ranged from 1 (very slightly or not at all) to 5 (extremely).

3.1 Shared Features of Emotions

Valence Models assume two factors, one comprised of a standard set of positive emotions that positively correlate with one another [*appreciative, happy, content, cheerful, triumphant, inspired, secure, proud, believable, and surprised*] and the other comprised of a standard set of negative emotions that positively correlate with one another [*disgusted, jealous, aggravated, frustrated, angry, depressed, sad, embarrassed, ashamed, and guilty*] [6]. Consistent with **P1**, item analysis indicates that all positive emotions positively correlate with one another (all of 45 correlations) and most, but not all, negative emotions positively correlate with one another (40/45 correlations). *Guilty* positively correlates with only 5 of 9 other negative emotions and negatively correlates with only 6 of 10 positive emotions, most notably showing a strong positive correlation with *triumphant* (0.184; p=0.041) – consistent with **P1.3** and **P2**.

In further support of **P1.3** and **P2**, cross tabulation, indicates occurrences of simultaneously experienced PA & NA emotions. We observe a total of 41 cases (0.5%) from 7 respondents reporting PA & NA emotions that are (both) felt "extremely" (=5); 123 (1.4%) cases from 16 respondents reporting PA & NA emotions that are (both) felt in the range from "quite a bit" to "extremely" (≥4); 601 (6.7%) cases from 41 (45.6%) respondents reporting PA & NA emotions that are (both) felt in the

[6] These "standard" sets are based on the PANAS (e.g., Watson et al. 1988).

range from “moderately” to “extremely” (≥3); and 1456 cases (16.2%) from 60 (90%) respondents reporting PA & NA emotions that are (both) felt in the range from “a little” to “extremely” (≥2).

We use Confirmatory Factor Analysis (CFA)[7] to measure how well our data on reported emotional experience fits the three Valence Models, each assuming positive correlation within sets of positive and negative emotions, but each with a differing assumption concerning the relationships between the experience of positive and negative emotions. In all valence models we constrain each emotion to load onto only one of the two factors but not onto the other. Thus, the valence models differ only in the constraints they impose on the factor correlations. Model 1 constrains the factors to have a zero correlation (where positive emotions bear no relationship with negative emotions), Model 2 constrains the positive and negative factors to a correlation of negative one (as would be appropriate if emotional state existed purely on a bipolar continuum), and Model 3 imposes no restrictions on the factors’ correlation.

An examination of model 1 and model 2 fit informs us whether positively and negatively valenced emotion sets are better described as experienced independently or experienced dependently. By comparing the fit of Model 3 to that of Models 1 and 2, we can further address the adequacy of describing the experience of these valenced sets with restricted versus unrestricted factor solutions.

Summaries of the three models are shown in Table 2. The lesser Bayesian Information Criteria, (BIC) and greater log-likelihood (LL) make it apparent that Model 1 has fit superior to Model 2, however Model 3 has fit superior to Model 1 ($X^2(1) = 29$, p-value < .001), consistent with **P1.3**. In model 3 the correlation between positive and negative factors is -.72 and significantly different from zero (p-value < 0.001 and 95% confidence interval of [-.833, -.616]).

We use CFA to evaluate the fit of twenty emotions into the six functional sets derived from our Recalibrational Model. We describe this derived fit as “Model R”. Model R predicts the patterned experience of emotions according to the six factors corresponding to the Recalibrational Model’s sets listed in Table 1. Consistent with **P3**, all emotions loaded positively and significantly onto Model R at a 1% level.[8] With a greater LL and lesser BIC, Model R has a superior fit to the unrestricted Valence Model 3 ($X^2(14) = 125$, p-value < 0.001).

3.2. Comparison of Structural Equation Model Fit

[7] We use Stata version 12.1 and the `confa’ procedure by Kolenikov (2009). Our results are robust to those obtained using the `sem’ procedure (Structural Equations Model) yielding the same log-likelihood fit and similar measures of fit. Either set of results produces the same ranking where Model R fits best, followed by Model 3, then Model 1 and last Model 2. Results available upon request.

[8] While not reported here, results including between factor correlations are available upon request.

We use Structural Equation modeling to compare the fit of our Recalibrational Model to the unrestricted Valence Model. The models are illustrated in Online Appendix 1 where subfigures (a) and (b) illustrate our six factor model while subfigures (c) and (d) illustrate the unrestrained valence model. To compare these models we test both with triggers A, B, C and D, as computed from game interactions. Results of both exercises are shown in Table 4. Given we did not find support for either perfect independence or interdependence in section 3.1, we do not restrict correlations and allow all latent factors to freely correlate in both models[9]. As predictions differ for Investor and Trustee, separate analysis is performed for each role. Where more factors tend to produce better fit, all-things-equal, we report the BIC, which penalizes for added variables. We report the difference between models, assessing whether the better fit is statistically significant despite the difference in factors seen in Table 4.

As with CFA, we find superior results for the Recalibrational Model, consistent with **P4**. Despite penalizing for additional fitted variables, the difference is significant (computed using $X^2(\Delta) = \beta$, where Δ is the difference in the degrees of freedom between the competing models, and β is the difference in log-likelihood).[10]

In the Recalibration Model, 15 of 18 of the triggers' coefficients are significant below the 5% level, whereas in the bipolar valence model only 4 of 16 of the trigger's coefficients are significant (see Table 4). We find all the individual emotions' coefficients significant below the 5% level in the Recalibration Model, whereas in the Valence Model we find 10 of 19 individual emotions' coefficients significant (below 5%) for the Investor and 8 of 20 individual emotions' coefficients significant for the Trustee (see Online Appendix 1).

4. Discussion

We consider our mapping of situational predictors of emotions and their orchestrated triggering of emotions (according to shared recalibrational features) a success. Using confirmatory factor analysis to assess latent sets, or structural equation models to assess triggers on latent sets we demonstrate that our Recalibrational Model predicts the experience of 20 predicted emotional states (specifically, six latent sets of these) following the Trust game better than the Valence Model. Below we discuss two

[9] Given that all between factor correlations are significant for the unrestricted Valence Model, but not for the Recalibrational Model, this choice should bias against the Recalibrational Model being superior via fit measures that penalize for additional variables.
[10] We also find superior fit when comparing our Recalibrational Model to the Valence Model as predicted by amounts sent and returned (S and R) instead of the computed triggers (A, B, C, D). For brevity we do not report results of the Valence Model as predicted by S and R here. Results are available upon request.

potential sources of our currently unexplained variance, consider future directions for further exploring the predicted effects of recalibrational emotions, and suggest some implications of having conflicted minds for both scientific and well-being pursuits.

We consider two potential classes of explanations for currently unexplained variation in how strongly emotional experiences are rated by participants: first, that participants either have imperfect access to their emotional states or the fidelity of their reports is compromised, and second, that frequency dependent selection maintains different types in the population, and some of these types (e.g. psychopaths) do not experience certain emotions (e.g. guilt) as do others.

People who are asked to rate single emotions may not be able to accurately describe their emotional states (Ellsworth & Tong 2006) if emotion experiences are more often and accurately described with multiple words (Izard 1977), or with different words among different people. While we acknowledge that the limitations of language could present problems for our research, the precedent of previous research successful at relating the experience and impact of self-reported emotions in conjunction with experimental games (Ketelaar & Au 2003) gave us encouragement in pursuing measures of self-reported emotions following an economic game.

Another obvious issue is that participants may make biased[11] or untruthful reports. Experimental economists are particularly concerned that participants "will not 'tell the truth' unless incentives make truth telling compatible with maximizing utility" (Lopes 1994, p.218). According to a metareview by Camerer & Hogarth (1999) there is no clear evidence that additional financial incentives would improve the quality of responses in a simple survey task like ours. In fact, it has been noted that for short tasks like our emotions survey that people are known to voluntarily complete without problem (because they have sufficient intrinsic motivation to do so), an attempt at increasing participation via financial incentives often "backfires" with counter-intentional effects (e.g., see Mellstrom & Johannesson 2008). Nevertheless, wary of the possibility that participants may have been incentivized to use efficiency tactics to complete the survey (such as marking all responses with the same value –an expedient technique for clicking through the survey), we reviewed our data and found not a single apparent case of such behavior.

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[11] Ekman (1999) shows evidence of culture-specific under-expression of experienced negative emotions, while Kotchemidova (2005) shows evidence of culture-specific over-expression of experienced positive emotions. To ascertain whether participants biased reporting of positive emotions relative to negative emotions, we examine the constants terms from the structural equation models. Comparing constants for reported positive vs. reported negative emotions, we observe higher values for positive emotions (using a Median Test, $p < 0.01$ for Trustee and Investor), which could result from either or both of the noted cultural biases. If homogeneous, this bias should not result in unexplained variance as the models allow fitted constants for reported emotions or emotion sets. If heterogeneous, our lack of identifying information would prevent us from controlling for the role of culture.

Frequency dependent selection can produce relatively stable mixed types in a population (e.g., see Lomborg 1996), a phenomenon that might contribute to individual variation in emotional reports (Ketelaar 2004; Mealey 1995). For example, sociopaths who do not respond to remedial social gestures and likely lack the "moral" emotions that serve the long-sighted program's goal (e.g., see King-Cases et al., 2008), comprise about 5% of the adult population (Mealey 1995). As Mealey (1995, p.124) stated, we suspect that "as long as evolutionary pressures for emotions as reliable communication and commitment devices leading to long-term cooperative strategies coexist with counter pressures for cheating, deceptions, and 'rational' short-term selfishness, a mixture of phenotypes will result, such that some sort of statistical equilibrium will be approached". We are unable to account for individual variation in types that exist in our sample.

Explanations of how our psychological and behavioral systems function can be distinguished as either proximate (how and when a mechanism does what it does) or ultimate (what the mechanism has been selected to do). While we have developed theory of emotions' ultimate function and derived our predictions of antecedents from it, this study only tests the proposed functioning (i.e. the triggering) of emotions' proximately. Future studies can take our Recalibrational Model one step further and test for ultimate functions by examining whether the future actions of those individuals who report emotions under the predicted conditions are affected as theory predicts. Three studies which we know of have taken this approach to testing ultimate functions already: Ketelaar & Au (2003) who demonstrated how the experience of guilt leads to choices of cooperation over opportunism, Fehr & Gachter (2002) who demonstrated that angry individuals are more likely to engage in costly punishment, and Dunn & Schweitzer (2005) who have shown that Investor happiness and gratitude increase trust in the Trust game.

It may be that the current literature has disproportionately focused on anger and guilt because they are among the more reliably predictable emotions to be experienced consequent of cooperative or uncooperative game interactions. According to individual regressions (detailed in Online Appendix 2) anger was the best predicted post-game emotion among our Investors ($p<0.001$, $R^2=0.61$) and guilt was one of the best-predicted post-game emotions among our Trustees ($p<0.001$, $R^2=0.55$). For Trustees, the emotional states happy, appreciative, and content were predicted as successfully as guilt. We are optimistic that, for these emotion experiences especially, the proposed recalibrational functions would be demonstrated if their effects were examined in subsequent Trust games.

Normative accounts of decision making (e.g., von Neumann & Morgenstern 1944) argue that rational agents should pursue the best alternative by comparing costs and benefits of all outcomes. If decision makers had perfect information for forecasting others' behavior and always made the best choices by accurately evaluating all possible cost-benefit tradeoffs, there would be little value to ex-post emotional feedback. It is rarely the case that we have enough information, mental resources, or time to evaluate all outcomes when presented with a decision task (Simon 1987; Todd 2001, Mellers et al., 2001). In fact, when facing a decision under uncertainty, the resulting outcome of a decision may be unknown and quite relative. We have proposed that recalibrational emotions are triggered when decision outcomes are finally realized. As such, the ex-post feedback that emotions provide, and their ability to recalibrate both self and other to improve conditions, contributes to the experience-based learning and recalibration process that is useful when taking advantage of opportunities in uncertain environments. Without the ability to update our behavior regulation programs based on this feedback, we might repeatedly set ourselves up for failure where a more appropriate (and economically viable) strategy could be substituted.

Divorced from their application, emotions do not appear to be cognitive tools, but instead may appear as flaws of human nature that interfere with rationality (Sherer 1984; Elster 1995). However, when known dilemmas are re-encountered and the effects of emotional experience that they previously triggered are integrated into a decision calculus (e.g., Ketelaar & Au 2003), we see evidence for the specially designed recalibrational functions of emotions.

While the experience of mixed emotions has been discussed by others (Cacciopo, Gardner, & Berntson 1999) and evoked with wins and losses in the laboratory (Larsen, McGraw, & Cacciopo 2001; Larsen et al., 2004), as well as by trust-based interaction in our study, it is not well appreciated as a core trait of human nature, and may appear as a flaw of human nature that interferes with rationality (Sherer 1984; Elster 1995). Many experimentalists continue to work with assumptions and methodological tools supposing that valenced emotional states can accurately be represented on a bi-polar spectrum, or that such a representation is sufficient to accurately capture behavioral effects of emotional states. Our study cautions against assuming that explanatory power of the Valence Model is sufficient and suggests that more complex multivariate models, such as the Recalibrational Model, better track the triggered experience of mixed emotions and subsequent behaviors.

In light of our model, we have identified the mechanics that would need to be engineered to produce an emotional equilibrium between partners: a condition in which the emotional impact of partners' behavior on each other and on themselves is one in which all engaged programs are kept in the same relative state (before and after action). An important implication of this stable equilibrium is that even under such conditions, the mind is expected to remain conflicted. A proscription that might be derived from such a consideration is that a steady emotional state might be more closely approached in so far as one is prepared to properly anticipate the experience of both positive and negative emotions; a “conflicted mind” is not a fluke, but a normal predictable condition.

The experience of mixed emotions may not be regarded as a reliable steady state because it challenges our intuitions of a “self’s” singular internal interests and the consonance of a non-contradictory self-representation generally attributed to a sane mind. Kurzban (2010, p.56) suggests, “if it’s true that your brain consists of many, many little modules with various functions, and if only a small number of them are conscious, then there might not be any particular reason to consider some of them to be “you” or “really you” or your “self”... And for that matter, there might be no particular reason to consider your intuitions about your choices, or your ability to know your “self” reliably.” While the implications of a modular recalibrational theory of emotions might be existentially and even epistemologically difficult to grapple with, we extend the following practical implications for mental health professionals and laypeople alike.

Psychotherapists often treat patients who complain of and suffer from emotional states – and it is not uncommon for patients that patronize these professionals to seek an escape from unwelcomed negative emotions (e.g., Nesse 1991, 2000). Treatment of these emotions, whether through behavioral intervention or psycho-pharmaceutical treatment, may benefit from the degree to which psychologists, psychiatrists, and counselors are (1) informed of the functional uniqueness and similarities distinguishing the emotions and their taxonomic classifications, and (2) informed of the choice dilemmas and post-decision situations from which emotional experiences precipitate. Our Recalibrational Model suggests that it is not optimal for wellbeing pursuits to aspire for a purely “positive” emotional state via complete transcendence or removal of “negative” emotional states – in fact, such a pursuit could be harmful. Life entails suffering and happiness because both positive and negative emotional states serve their functions, recalibrating our own inner-workings as well as the inner-workings of those that we interact with. Given the uncertain future, we need to constantly engage in recalibration of ourselves and others to make the most of opportunities given our needs.

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Table 1. Specific Classifying Features of Emotions with Predicted Emotion Triggers and Emotion Targets

Set	Emotion	Adaptive Goal		Recalibration				I's Emotion Trigger & Target				T's Emotion Trigger & Target			
		U	V	Pos	Neg	Intra	Inter	A	B	C	D	A	B	C	D
1	*Appreciative*	X	X	X			X	T^{U}Pos				I^{U}Pos			I^{U}Pos
2	*Happy*	X	X	X		X	X	I^{U}Pos T^{U}Pos		I^{V}Pos		I^{U}Pos T^{U}Pos			I^{U}Pos T^{V}Pos
2	*Content*	X	X	X		X	X	I^{U}Pos T^{U}Pos		I^{V}Pos		I^{U}Pos T^{U}Pos			I^{U}Pos T^{V}Pos
2	*Cheerful*	X	X	X		X	X	I^{U}Pos T^{U}Pos		I^{V}Pos		I^{U}Pos T^{U}Pos			I^{U}Pos T^{V}Pos
2	*Triumphant*	X	X	X		X		I^{U}Pos		I^{V}Pos		T^{U}Pos			T^{V}Pos
2	*Inspired*	X	X	X		X		I^{U}Pos		I^{V}Pos		T^{U}Pos			T^{V}Pos
2	*Secure*	X	X	X		X		I^{U}Pos		I^{V}Pos		T^{U}Pos			T^{V}Pos
3	*Proud*	X		X		X		I^{U}Pos				T^{U}Pos			
3	*Believable*	X		X		X						T^{U}Pos			
4	*Surprised*	X	X	X	X	X					$I^{U,V}$Neg	T^{U}Pos		$T^{U,V}$Neg	T^{V}Pos
5	*Disgusted*	X	X		X	X	X		I^{U}Neg T^{V}Neg			T^{U}Neg		I^{V}Neg	
5	*Jealous*	X	X		X	X	X		I^{U}Neg T^{V}Neg			T^{U}Neg		I^{V}Neg	
5	*Aggravated*	X	X		X	X	X		I^{U}Neg T^{V}Neg			T^{U}Neg		I^{V}Neg	
5	*Frustrated*	X	X		X	X	X		I^{U}Neg T^{V}Neg			T^{U}Neg		I^{V}Neg	
5	*Angry*	X	X		X	X	X		I^{U}Neg T^{V}Neg			T^{U}Neg		I^{V}Neg	
5	*Depressed*	X	X		X	X	X		I^{U}Neg T^{V}Neg			T^{U}Neg		I^{V}Neg	
5	*Sad*	X	X		X	X	X		I^{U}Neg T^{V}Neg			T^{U}Neg		I^{V}Neg	
6	*Embarrassed*	X			X	X	X			I^{V}Neg T^{U}Neg			I^{U}Neg T^{V}Neg		
6	*Ashamed*	X			X	X	X			I^{V}Neg T^{U}Neg			I^{U}Neg T^{V}Neg		
6	*Guilty*	X			X	X				I^{V}Neg			T^{V}Neg		

Note: X's indicate classifying features of emotions; cells populated under A, B, C, D triggers indicate targets of Investor's or Trustee's emotion (I= Investor's; T= Trustee's; ^{U} = long-sighted program ^{V} = short-sighted program) and Pos (=upregulation) or Neg (=downregulation) denoting the direction of targeted recalibration.

Table 2. Details of Confirmatory Factor Analyses

Model	Specification	Bayesian Information Criteria	df	Log-likelihood
1	Independent Valence Model - Zero PA/NA Correlation	5,121	170	-2,470
2	Bipolar Valence Model – Negative (-1) PA/NA Correlation	5,298	170	-2,559
3	Unrestricted Valence Model – Unrestricted PA/NA Correlation	5,067	169	-2,441
R	6 Factor Recalibrational Model	5,060	155	-2,366

Table 3: Details of Structural Equation Fit Analyses

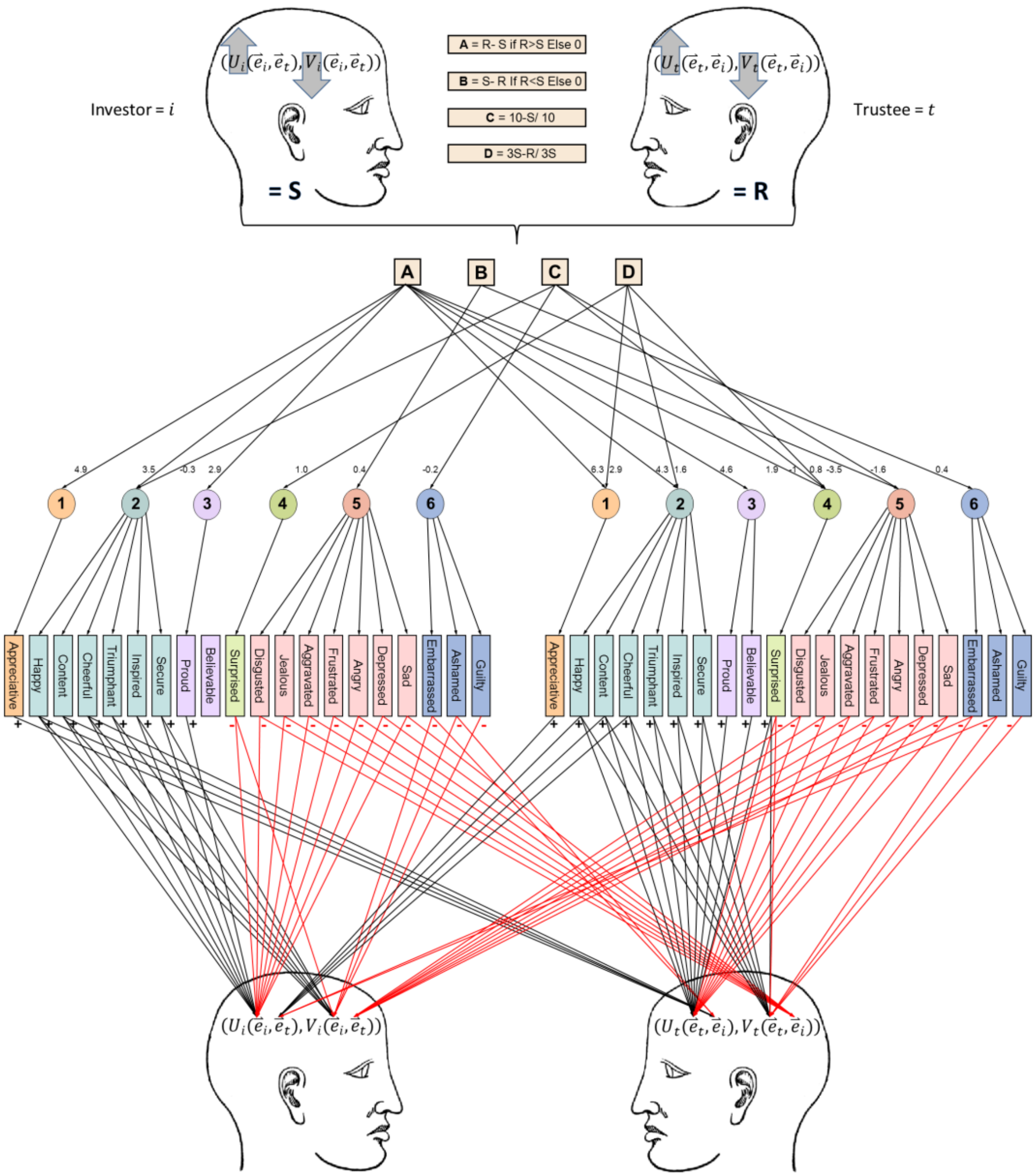
	Recalibration Model			***Valence Model***			
	Log-likelihood	df	Bayesian Information Criteria	Log-likelihood	df	Bayesian Information Criteria	Difference
Investor	-1,246,04	76	2,773.38	-1,286.39	66	2,824.03	$p < 0.001$
Trustee	-1,264.81	84	2,849.38	-1,416.53	69	3,095.71	$p < 0.001$

Table 4: Structural Loadings for Unrestricted Recalibrational and Valence Models

	Investor				**Trustee**			
	A	**B**	**C**	**D**	**A**	**B**	**C**	**D**
	Recalibrational Model							
L1	0.315***				0.527***			1.334**
	(0.101)				(0.096)			(0.669)
L2	0.522***		1.536***		0.461***			1.404**
	(0.096)		(0.421)		(0.081)			(0.566)
L3	0.265***				0.586***			
	(0.103)				(0.084)			
L4				1.292**	0.416**		1.076	-0.980
				(0.556)	(0.191)		(1.045)	(0.904)
L5		0.327***			0.094		2.257***	
		(0.050)			(0.098)		(0.631)	
L6			1.019***			0.228***		
			(0. 375)			(0.065)		
	Valence Model							
PA	0.241**	-0.104	0.242	-0.127	0.086	-0.030	-2.02***	0.806*
	(0.112)	(0.070)	(0.494)	(0.404)	(0.110)	(0.076)	(0.060)	(0.046)
NA	-0.008	0.064	0.014	-0.051	-0.371***	0.318***	-2.172***	-0.467
	(0.019)	(0.057)	(0.090)	(0.087)	(0.114)	(0. 080)	(0.574)	(0.467)

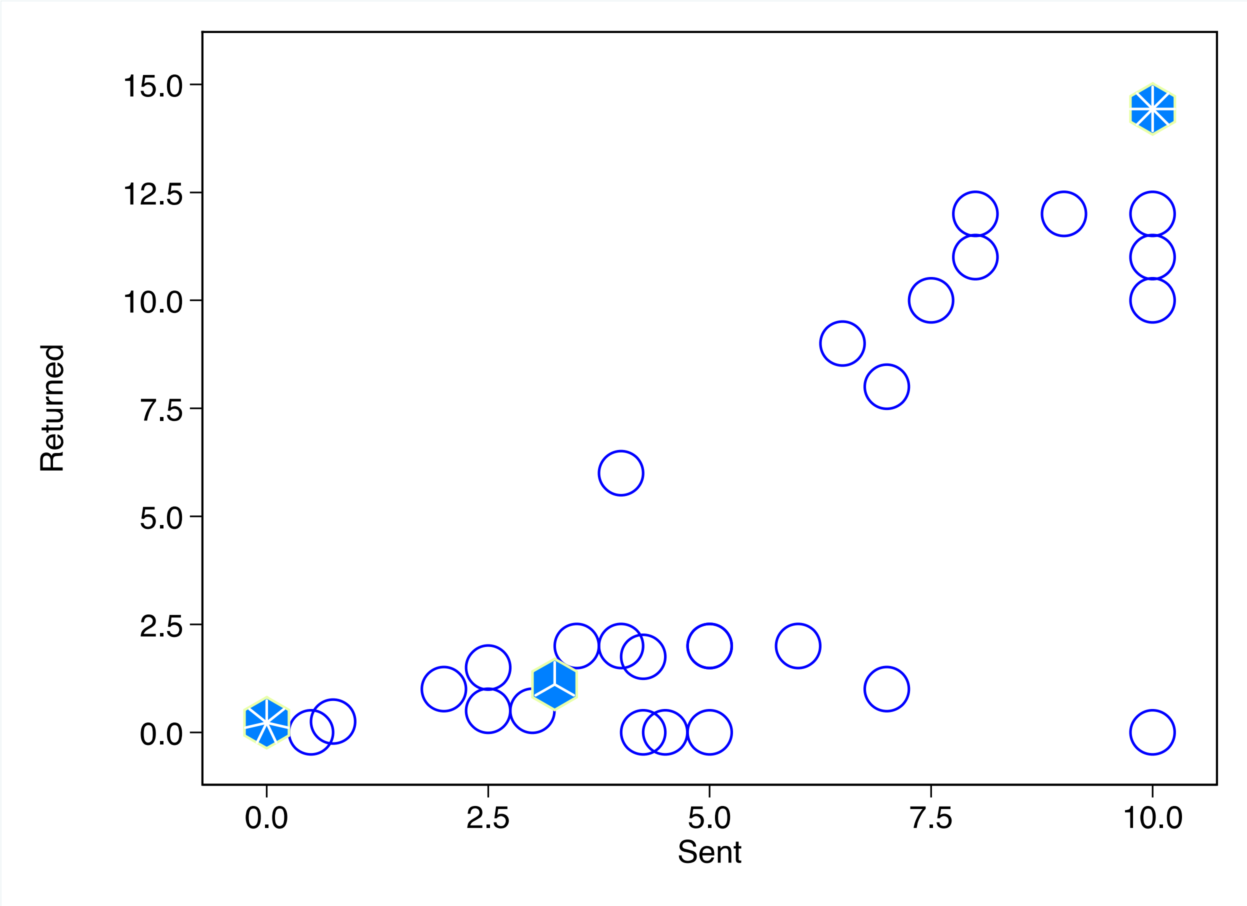
Note: * indicates statistical significance at $p<0.10$, ** significant at $p<0.05$, and *** at $p<0.01$

Figure 1. Complete Recalibrational Model



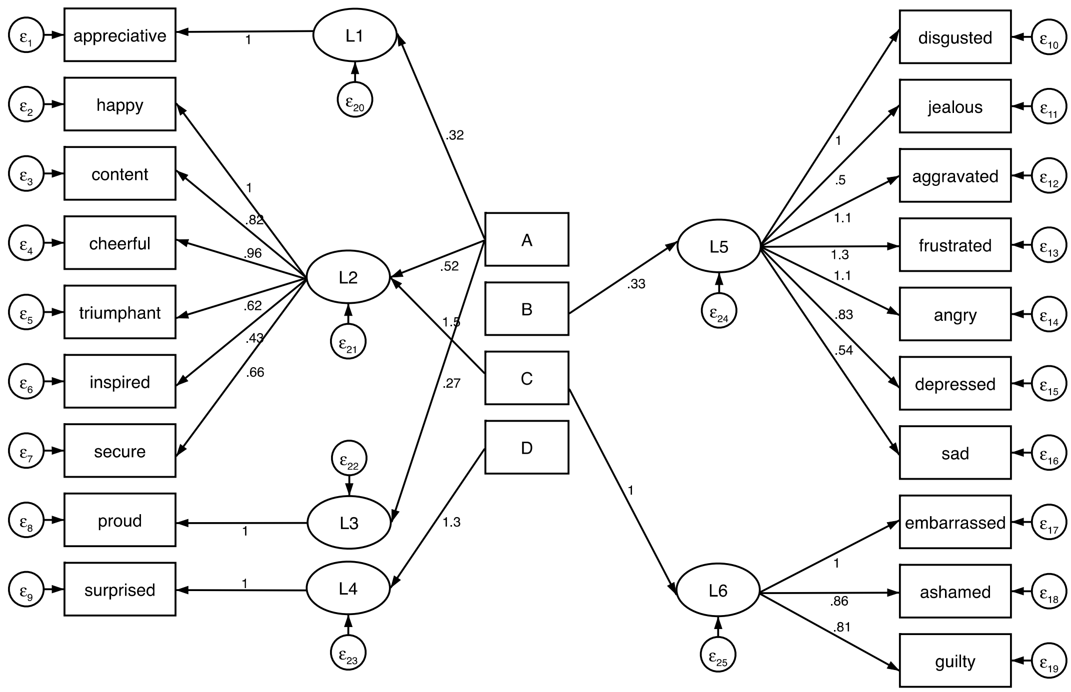
Note: Each individual has two weights that determine the relative importance of pursuing conflicting goals of long-term and short-term programs, respectively, where $U \geq 0$ and $V \geq 0$. The weights determine individuals behavior via decision function where a higher U weight weakly increases and a higher V weight weakly decreases S or R, for the Investor (i) and Trustee (t), respectively. Emotions computationally assess adaptive problems that result from game outcomes and identify goal successes or failures. The weights are up- and down-regulated by arrays of emotions (e_i, e_t) produced by self (i) and other (t) – for example, the individual's exchange partner. Thus the weights are dynamically updated after targeting by recalibrational emotions.

Figure 2. Scatter Plot of the Amount Sent and the Amount Returned.

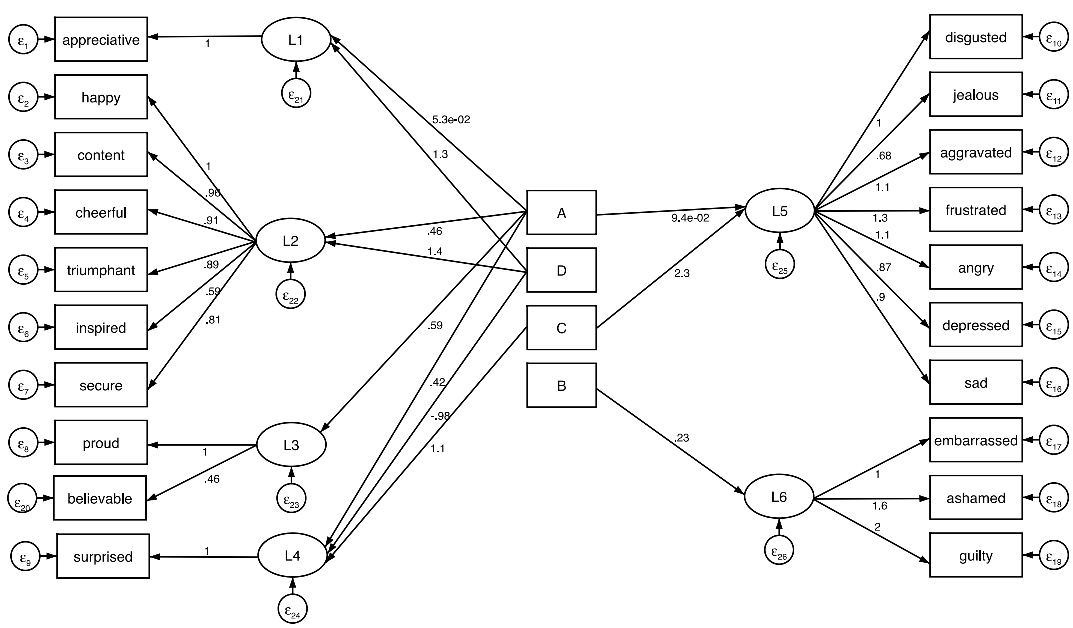


Note: One circle equals one observation. Each 'petal' of flower-like figure equals one observation.

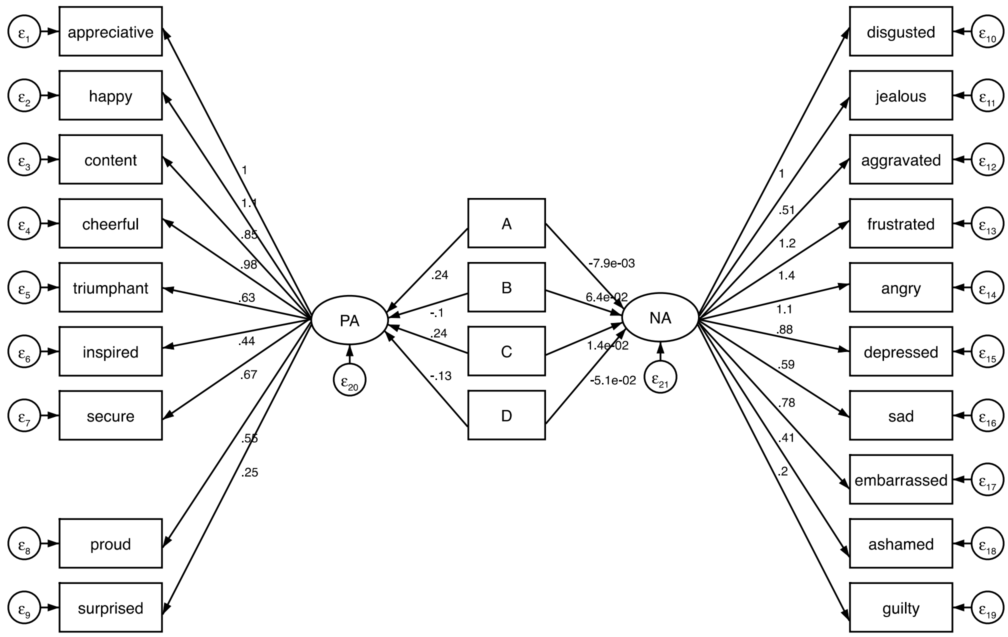
Online Appendix 1: Structural Equation Models for Recalibrational and Bipolar Valence Models



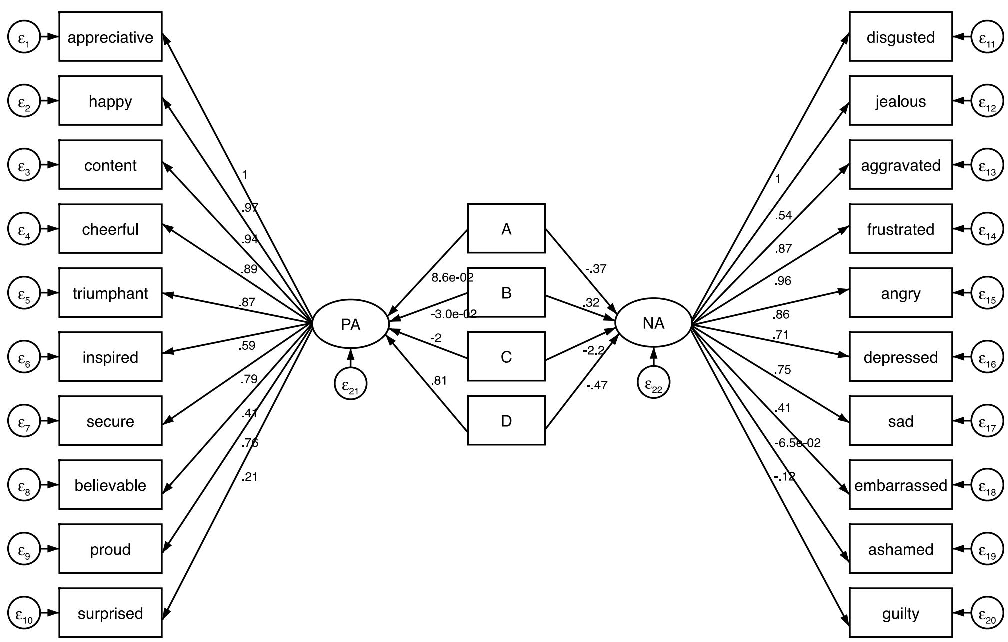
Subfigure a: Recalibrational Investor



Subfigure b: Recalibrational Trustee



Subfigure c: PANA Investor



Subfigure d: PANA Trustee

Online Appendix 2: Regression Analysis of Individual Emotions

Table 1 provides the set of predictions about how interactions based on Trustee and Investor behaviors trigger different emotions. We test these predictions applying linear regression analysis separately for each emotion. Results of this estimation are shown in Table 5. Each row in the table represents a separate emotion as a dependent variable. As independent variables we use the triggers predicted by the theory. The first five columns are estimated for Investors and the last five columns are estimated for Trustees.

All emotions of Investor are significantly affected by at least one of the triggers predicted by the theory. Specifically, 22 out of 25 triggers are significant and have correct signs. For Trustee, emotions are also significantly impacted by the triggers, with 25 out 36 being significant and having correct signs. The one emotion that is not well predicted by the theory is “surprised”. This is not entirely unexpected, since many theorists (e.g., Ortony et al. 1988; Ortony & Turner 1990) have argued that “surprise” may not even qualify as an emotion as it could be either positively or negatively valenced – a source of confusion that may also contribute to participants’ difficulty uniformly interpreting this label.

A simple linear regression analysis in Table 5 shows that the results of the experiment provide strong support for our theoretical predictions. It is important to emphasize, however, that simple regression analysis performed separately for each emotion does not account for the fact that emotions can be triggered simultaneous. As we suggest, sets of emotions can operate jointly as a unified system. Therefore, error terms in each linear regression may be correlated.

Table 5. Prediction of Individual Emotion Reports by Triggers.

	Investor					Trustee				
	Triggers					Triggers				
Emotion	A	B	C	D	R-sq	A	B	C	D	R-sq
Appreciative	4.865*** (1.045)				0.335	5.521*** (0.980)			2.095*** (0.602)	0.468
Happy	0.556*** (0.126)		1.211* (0.675)		0.367	4.523*** (0.862)			2.065*** (0.530)	0.457
Content	0.547*** (0.132)		1.750** (0.710)		0.298	5.040*** (0.792)			2.039*** (0.487)	0.536
Cheerful	0.549*** (0.136)		1.284* (0.732)		0.317	4.502*** (0.842)			1.871*** (0.518)	0.453
Triumphant	0.337** (0.134)		0.461 (0.720)		0.186	4.174*** (0.917)			1.479** (0.564)	0.358
Inspired	0.451*** (0.106)		0.0357 (0.570)		0.48	4.499*** (0.823)			0.338 (0.506)	0.418
Secure	0.607*** (0.131)		2.771*** (0.704)		0.343	3.983*** (1.036)			1.071 (0.637)	0.269
Proud	2.920*** (0.955)				0.179	5.871*** (0.855)				0.523
Believable						2.595** (1.044)				0.126
Surprised				1.004 (0.620)	0.057	0.219 (0.169)		-0.215 (0.901)	-1.507** (0.714)	0.284
Disgusted		0.362*** (0.070)			0.378	0.00767 (0.127)		2.038*** (0.681)		0.313
Jealous		0.278*** (0.065)			0.297	0.187* (0.111)		2.221*** (0.596)		0.281
Aggravated		0.398*** (0.069)			0.439	0.137 (0.107)		2.702*** (0.572)		0.44
Frustrated		0.446*** (0.074)			0.457	0.117 (0.123)		3.021*** (0.661)		0.446
Angry		0.436*** (0.053)			0.613	0.0596 (0.119)		2.563*** (0.639)		0.412
Depressed		0.278*** (0.062)			0.317	0.0836 (0.111)		1.763*** (0.597)		0.239
Sad		0.135** (0.059)			0.107	-0.00615 (0.113)		1.314** (0.607)		0.203
Embarrassed			1.064** (0.473)		0.106		0.194** (0.081)			0.118
Ashamed			0.843** (0.397)		0.095		0.331*** (0.058)			0.428
Guilty			1.679*** (0.418)		0.273		0.445*** (0.061)			0.550

Note: * indicates statistical significance at $p<0.10$, ** significant at $p<0.05$, and *** at $p<0.01$. Standard errors are in parentheses.

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