

THE EFFECT OF BETRAYAL ON TASK CO-REPRESENTATION

By

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A thesis submitted to the

Graduate School-Camden

Rutgers, The State University of New Jersey

In partial fulfillment of the requirements

For the degree of Master of Arts

Graduate Program in Psychology

Written under the direction of

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January 2017

## THESIS ABSTRACT

### The Effect of Betrayal on Task Co-Representation

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An act of betrayal, defined as an intentional undermining of one's trust or expectations, is believed to have potential to affect one's level of co-representation, a construct that posits that those in a dyad share mental representations with one another. The construct results in one's actions being represented and having impact on the other's actions, which is important for interdependent tasks that require cooperation or competition. Although there has been extensive research into co-representation, very few studies have investigated the influence of social effects on the cognitive construct, and even fewer have explored standardized betrayal manipulations. The current study examined whether betrayal would facilitate or diminish one's level of co-representation, using an asymmetrical multiplayer game to elicit feelings of betrayal and negative moods. We tested the level of co-representation with an established go/no-go task. Although our findings were not statistically significant, the observed trends corresponded to previous claims that negative moods have a reducing effect on one's level of co-representation.

Trust is essential for relationships based on romantic, platonic, or business-centric goals. (Balliet & Lange, 2013). These types of relationships typically carry some degree of risk in the form of opportunistic behavior and vulnerability, therefore individuals may evaluate the other's integrity or benevolence before establishing trust within the relationship (Koehler & Gershoff, 2003; Turel & Gefen, 2013). Once trust has been established, relationships become much more beneficial for the individuals involved, ranging from accomplishing goals that are either impossible or significantly harder to accomplish alone to an increased sense of subjective well-being and increased quality of life (Sutcliffe, Dunbar, Binder, & Arrow, 2012). Social, political, and economic sciences have also pushed for a greater emphasis to determine factors that influence trust and cooperation within and between societies, suggesting that both trust and cooperation are fundamental components of relationships (Acedo-Carmona & Gomila, 2014; Elangovan & Shapiro, 1998; Emsley & Kidon, 2007).

If trust is one of the major foundations of social relationships, then betrayal stands as a major relationship antagonist. Individuals who have been betrayed by having their trust or expectations violated may be consequentially less willing to trust others (Aimone & Houser, 2013). Other consequences include the possible dissolution of the relationship, or lasting damage if the relationship continues to persist (Balliet & Lange, 2013). It is further evident that trust is an essential aspect of any relationship, therefore violating one's trust will tend to result in negative, long lasting consequences (Hannon, Rusbult, Finkel, & Kamashiro, 2010).

A major consequential outcome of betrayal stems from Betrayal Trauma Theory, which predicts that traumas stemming from large betrayals tend to diminish the

individual's ability to be aware of being in an abusive relationship (BTT; DePrince, 2005; Freyd, 1994). DePrince (2005) noted that the act of dissociation due to the trauma serves as a defensive mechanism, especially concerning caretaker relationships (e.g. parent-child). Unfortunately, the dissociation caused by high betrayal trauma tends to be generalized towards the individual's other relationships, and not solely on the current abusive relationship. For example, an abusive parent-child relationship may result in the child being unable to detect cheating in abusive romantic relationships in the future, a process known as revictimization (DePrince, 2005). While this is an example of how betrayal may affect one's social cognition in terms of long-term effects, we have yet to come across studies that focused on the immediate effects of betrayal on one's social cognition.

To properly assess the immediate effects of betrayal on an individual's social cognition, we believe co-representation is a notable cognitive construct to study. Co-representation is an important aspect of social cognition and relationships, providing a cognitive explanation behind joint action, dyadic relationships, and cooperation (Constantini & Ferri, 2013; Sebanz, Knoblich, & Prinz, 2003, 2005). The construct posits that actors within a dyad tend to take their co-actor's feelings, beliefs, actions, and/or intentions into account and act accordingly (Müller, Kühn, van Baaren, Dotsch, Brass, & Dijksterhuis, 2011). This process is more likely to occur when both actors are interdependent on each other, as recent studies have demonstrated that co-representation is not limited primarily to friendly, cooperative relationships (e.g. verbal communication, synchronized dancing, etc.), but can also include hostile, competitive relationships (e.g. competitive sports, chess, etc.; Ruys & Aarts, 2010).

By examining the effects of betrayal on one's level of co-representation, the current study aims to partially explain the transition from initial betrayal reactions to the various consequences detailed by past studies on BTT (DePrince, 2005; Freyd, 1994; Gobin & Freyd, 2014), which includes concepts such as betrayal aversion (Aimone & Houser, 2011/2013) and betrayal blindness (Zurbriggen, 2005). Although co-representation has been researched to a high degree, research into immediate consequences of betrayal and the effects of betrayal on co-representation have been sparse. The primary purpose of this study, then, is to examine any effects that betrayal may have on an individual's level of co-representation.

### **Betrayal**

Betrayal is the sense of having one's own sense of trust or expectations violated by a trusted individual or party, which could range from a close friend to an institutional organization (Rachman, 2010). Acts of betrayal can occur on both macro levels (e.g. fraud from corporations or educational institutions; Elangovan & Shapiro, 1998) and micro levels (e.g. infidelity within an intimate relationship or breach of confidentiality in therapist-client relationships; Thomas, 2011; Whisman & Wagers, 2005). An important aspect of betrayal is intentionality—the conscious, purposeful intent that the betraying party has against the victim(s). Under this premise, although accidental betrayals (e.g. misunderstanding or deviating from the “trustor's” personal expectations; Elangovan & Shapiro, 1998) and object betrayals (e.g. an air bag that kills rather than save a car crash victim) have been covered in past research, they are not “true” betrayals as they both lack the component of intentionality (Aimone & Houser, 2013). Additionally, although harm caused by an enemy is comparable to the harm caused by betrayal, it is important to note

that betrayal is often exclusively referred to as harm caused by a trusted individual or party (Hannon et al., 2010; Rachman, 2010).

The consequences of betrayal have been shown to be long lasting, potentially leaving a permanent damage on the relationship and being well-remembered by those involved (Hannon et al. 2010). Additionally, the seriousness of the betrayal appears to depend on multiple interactive factors, such as the significance of the relationship (e.g. intimate vs. platonic), the amount of trust established or assumed before the betrayal, the amount of perceived harm caused by the betrayal, and the type of harm inflicted (e.g. disclosure of private information, dishonest, infidelity, etc.; Rachman, 2010). To reach betrayal resolution, or to forgive an act of betrayal, is usually not without effort, complication, or autonomy. Past literature suggests, however, that if the betrayer seeks amendment with the victim, the relationship bonds have a higher likelihood of being mended as the victim's motivation to forgive the perpetrator increases (Hannon et al., 2010).

An act of betrayal could also lead to betrayal aversion (Aimone & Houser, 2013) or betrayal blindness (Zurbriggen, 2005). Betrayal aversion is defined by the tendency for the victim to lower their willingness to trust others due to being betrayed. Individuals under a state of betrayal aversion may also have a diminished willingness to engage in economic exchange, leading them to punish betrayers more severely, or choose less effective safety products (Aimone & Houser, 2013; Koehler & Gershoff, 2011). Betrayal blindness, however, is the act of ignoring, dissociating or purposely forgetting the act of betrayal, an idea proposed by BTT (Gobin & Freyd, 2014). Cases of betrayal blindness can often be traced to relationships where the victim has a dependent relationship with the betrayer (e.g. parent-child relationship), therefore a response to betrayal with revenge or relationship

dissolution would be maladaptive for the victim (Gobin & Freyd, 2014). Although individuals in a state of betrayal blindness may be close to their betrayer, the concept of betrayal blindness serves to exemplify the notion that not all close relationships are good relationships. In essence, the concept of betrayal blindness can be considered as an evolutionary defense mechanism to reduce the cognitive dissonance attributed to betrayal; it is an attempt by the victim of betrayal to maintain the relationship out of necessity rather than want (Fang, Chang, & Peng, 2011; Zurbriggen, 2005).

### **Co-Representation**

Co-representation is a cognitive construct that posits that members of a dyadic relationship share mental representations with one another, which can include feelings, beliefs, actions, and intentions (Sebanz, Knoblich, & Prinz, 2005). This ability has been shown to be present by an infant's first birthday (Atkinson, Simpson, Skarratt, & Cole, 2014; Costantini & Ferri, 2013), and is an essential component to accomplish a joint action. Such actions can range from communication (e.g. alternating between talking and listening), partner-centered dancing (e.g. following your partner's movements during a waltz), sports (e.g. coordinating player positions), or any other joint activity that requires individuals to coordinate and synchronize with each other (Aruti, Perach-Barzilay, Tsoory, Berger, Getter, & Shamay-Tsoory, 2013; Doneva & Cole, 2014; Milward, Kita, & Apperly, 2014). Additionally, co-representation can be used to help individuals predict their partner's actions so that a reactive action can be performed (Atmaca, Sebanz, Prinz, & Knoblich, 2008).

Levels of co-representation seem to be stronger when individuals are interdependent upon one another, no matter if the situation is cooperative or competitive

in nature. By increasing interdependency, and subsequently reducing independence, people tend to mimic another's goals and perform actions that are constructive towards those goals. Additionally, those who have trouble perceiving another's goals in a cooperative situation seem to be limited to perceiving the other's goals in a competitive situation (Ruys & Aarts, 2010).

Past literature also suggests that co-representation is biologically tuned, that is, the construct occurs more strongly for biological/animate agents (e.g. humans, pets, etc.; Tsai, Kuo, Hung, & Tzeng, 2008), but this claim has been challenged. A study by Müller et al. (2011) found that co-representation could still occur between a human and human-esque figure (e.g. a digital humanoid character), and not exclusively between biological agents as previously thought. This finding then led to the conclusion that co-representation is tuned more on biological-based actions (e.g. hand movements) rather than a biological agent. Additionally, this notion was further supported by Dolk, Hommel, Prinz, and Liepelt (2013), as they demonstrated the joint Simon effect—a prominent method to evaluate co-representation levels that uses go-no go spatial responses—with objects such as a mechanical Japanese waving cat, clock movements, and auditory rhythms of a stationary metronome.

Despite the conflicting studies surrounding co-representation, perhaps the most important facet of the construct is that the biological context suggests that the ability to co-represent with others may be an automatic process, a claim that can also be supported neurologically by mirror neuron activity (Blakemore & Frith, 2005; Rizzolatti & Sinigaglia, 2010). Although the process of co-representation may not necessarily be a continuous one, there seems to be at least two common events that may trigger the construct: 1) If a task



contains events in which it requires the actor and co-actor of a dyad to act parallel to one another (Eskenazi, Doerrfeld, Logan, Knoblich, & Sebanz, 2012), and 2) The presence of others in a group performing the same action (Böckler, Knoblich, & Sebanz, 2012; Sebanz, Knoblich, & Prinz, 2003). Furthermore, co-representation seems to occur regardless of mood; although positive moods serve as a facilitator while negative moods serves as a restrictor, the presence of co-representation still persists (Kuhbandner, Pekrun, & Maier, 2010).

### **Study Overview**

The goal of the present research is to understand the effect of betrayal on co-representation. Co-representation has had a well-developed research foundation, however, the effects of social interactions on the cognitive construct, especially related to acts of betrayal, is lacking (Kuhbandner et al., 2010).

Our curiosity about the effects of feelings of betrayal and co-representation stems from the latter construct's seemingly automatic nature in the presence of a dyadic relationship, no matter if the dyadic relationship consists of two biological agents or one biological agent and a quasi-biological agent (Tsai et al., 2008; Müller et al., 2011). By investigating the consequences of betrayal in terms of its effect on the victim's level of co-representation, we hope to understand whether or not an act of betrayal could reduce, eliminate, or perhaps increase the betrayal victim's co-representation with the betrayer.

Although the effects of betrayal on co-representation have not been studied in depth, an assumption could be made that an act of betrayal can negatively affect co-representation. This notion is supported as betrayal has been shown to negatively affect various actions that co-representation plays a key role in, such as empathy and social support (Müller et

al., 2011). Under this premise, we believe that an act of betrayal can distort our ability to co-represent with another individual. However, to be in line with Kuhbandner et al.'s (2010) findings on the effects of mood on co-representation, the act of betrayal should not completely negate the betrayal victim's level of co-representation, but should lower it significantly. To distinguish our study from Kuhbandner et al.'s (2010) study, which examined how mood may influence co-representation, we will be placing a greater emphasis on the social contexts of the emotions elicited.

An alternate assumption can also be made in which feelings of betrayal may elevate one's co-representation. This notion is loosely supported by the literature regarding betrayal aversion; while an individual is in a state of betrayal aversion, they become more guarded and less willing to trust individuals around them, thus preventing any dyadic relationship to be established that would be necessary for co-representation (Aimone & Houser, 2013). If an individual becomes more guarded towards other people, especially the betrayer, the individual may be more attentive towards others' beliefs and intentions in order to avoid subsequent betrayals. Under both this and the aforementioned premises, our main hypothesis posits that an act of betrayal will have some immediate effect on the victim's level of co-representation with the betrayer.

## **Methodology**

### **Participants**

A group of 43 undergraduate and high school students (19 female) enrolled in an introductory psychology course at either Rutgers University – Camden or The Leap Academy participated in the experiment. Participant age ranged from 15 to 30-years-old, and were a diverse mix of Caucasians, African Americans, Hispanic, Asian, and mixed ethnicities. In addition to recruitment from the introductory psychology course subject pool, students from the Rutgers University – Camden Honors College were recruited and given service credit as compensation for their participation. Three minors had participated through the recommendation of a Leap Academy instructor; however, parental consent was obtained prior to the experimental session.

Participants would be randomly assigned to one of three groups: Betrayal, Negative Mood, and Control. The primary goal for the Betrayal condition was to gain the participant's trust, and violate that trust through the experimental manipulation, while the goal for the Negative Mood condition was to induce a consistent state of negative affect. 1 participant from the Control condition was exempted from data analysis due to complications during the experiment.

### **Instruments/Apparatus**

The game *Keep Talking and Nobody Explodes*, developed by Steel Crate Games, is an asymmetrical multiplayer video game that both the experimenter and participant will play together. The main goal of the game is to defuse modules (i.e. mini-games) on a three dimensional bomb within an eight-minute time limit. Participants carried the responsibility of defusing the bomb, yet although they could see and manipulate the bomb with a standard

computer mouse, they would have no knowledge as to how to defuse the bomb. Meanwhile, the experimenter carried the responsibility of instructing the participant on how to disarm each of the bomb's three modules to successfully defuse the bomb, yet was unable to see the bomb's features. Under this premise, communication between the experimenter and participant was a key factor for successful bomb diffusion; participants needed to accurately describe the bomb's distinct and unique components, while the experimenter needed to give clear, precise directions based on the information given by the participant. Those in the Betrayal and Control groups will play one practice round and three main rounds, while those in the Negative Mood group will only play three main rounds.

This game would be primarily used as the catalyst for the Betrayal and Negative Mood experimental manipulations. For those in the Betrayal condition, after the initial practice round is completed, participants will be presented with the ability to earn money for successfully completing each round. During the final round, however, Betrayal participants will undergo a double-or-nothing round, in which the experimenter will purposefully give false instructions and force the participant to lose their earnings. Those in the Negative Mood condition will be given false information throughout all three rounds of the game, but were not told of any opportunity to earn money. Control condition participants played both the practice round and three main rounds normally, with no opportunity to earn money.

A pre-game and post-game questionnaire (See Appendix A and B, respectively) served as a manipulation check for both the Betrayal and Negative Mood conditions. The first three items regarding the participant's perceived levels of trust towards the experimenter in terms of "Small," "Normal," and "Large" items were the primary focus

for this study, which allows us to examine how the manipulations would affect these different levels of trust. These sizes were left to the participant's perception, as we believed participants' trust levels were subjective. For example, a participant may believe that it would only take a small amount of trust to ask the experimenter to fetch a pen from across the room, however, another participant may believe it would take a greater amount of trust for the same task. A six-point Likert scale was used for these questions, with "1" representing a low level of trust and "6" representing a high level of trust. These questions were identical on both the pre-game and post-game questionnaire, therefore to examine the changes in the participant's perceived level of trust in the experimenter, we evaluated the changes in the score between the pre-game and post-game questionnaire. We expect that those in the Betrayal group will have lower levels of trust after going through the game, while those in the Control group should remain constant or increase. Both questionnaires also contained a standard Positive and Negative Affective Schedule (PANAS; Watson, Clark, & Tellegen, 1988) section to determine any changes of mood prior and following the game. The PANAS would be primarily used to gauge any mood changes across all three groups, however, it will serve as the manipulation check as we would expect those in the Negative Mood group to score less in terms of positive affect and more in terms of negative affect compared to those in the Control group. Scoring followed the outline given by Watson, Clark, & Tellegen (1988). As the experiment was initially framed as a study on the effects of stress on video game play, a few questions within both sets of questionnaires were included but not analyzed.

To measure co-representation, an interactive Simon task was used. Like the game, this task required both the participant and experimenter to complete together. A

combination of colored rings (red or green) worn by a hand pointing in one of three directions (towards the participant, experimenter, or in between both the participant and experimenter) were randomized across 90 trials, therefore the goal was for both the participant and experimenter to press a key whenever his or her assigned color appeared on the screen. Each trial had a maximum length of 2 seconds (although most responses were under 50 milliseconds), and were separated by a fixation cross that had a 1 second duration. A Simon Effect score would then be acquired by obtaining the mean difference for the compatibility factor, which is calculated by subtracting the mean of the Incompatible trials with the mean of the Compatible trials. Larger mean differences indicate a greater co-representation level, measured in units of seconds.

### **Procedure**

Participants completed an informed consent prior to a short conversation with the experimenter that lasted an average of 5 minutes. Topics for the conversation varied depending on the experimental condition the participant was randomly assigned to: those in the Betrayal and Control condition were prompted to talk about their interests in terms of either their major, hobby, or fascination, while those in the Negative Mood condition were prompted to talk about an event that they would view as terrible if it were to occur in the future. The primary focus of the topic for the Betrayal and Control condition was to build rapport between the participant and experimenter, while the topic for the Negative Mood condition was intended to prime participants towards a negative feeling. After the conversation was concluded, participants were given a few minutes to complete the pre-game questionnaire, followed by the game *Keep Talking and Nobody Explodes*.

Participants in the Betrayal condition played 4 rounds of the game, with the first round being a practice round. During the practice round, the experimenter would stand behind the participant and walk him or her through each module while pointing out and suggesting tips throughout the round. After the initial round was completed, participants had the opportunity to ask any questions that they may have had while playing the first round. Once all questions had been answered, the experimenter would introduce a monetary incentive for successfully completing each round: for each round completed, the participant would earn \$5 USD. During the first two rounds after the practice round, the main goal was to have the participants win both games, however, during the last round, a double-or-nothing wager was introduced. During this round, the experimenter would purposefully cause the participant to lose all of their earnings by giving incorrect directions, and then inform them prior to the post-game questionnaire that the game was rigged from the beginning. Participants in the Control condition would follow a similar structure game-wise, however, the possible incentive for winning would not be introduced, and the goal of the experimenter was to help the participant win as many games as possible.

Participants in the Negative Mood condition played 3 rounds of the game, therefore they did not have an initial practice round. Although no incentive for winning was introduced for winning each round, the goal of the experimenter was to make each round as frustrating as possible, and to give directions in a way to make the participant attribute the loss as their own inability to solve the game's puzzles. The intent was to make the game incredibly frustrating, yet not frustrating enough to lead the participant to click on random buttons to cycle through each round without trying.

After all of the game rounds were completed, participants completed the post-game questionnaire, followed by the interactive Simon task. Once the interactive Simon task was completed, participants were debriefed and given a snack consisting of a snack cake and can of soda as an extra incentive for participating.



## Results

### Experimental Manipulation

Repeated measures t-tests were used to determine participant's perception on whether he/she would trust the experimenter (i.e. game partner) depending on the degree of a perceived matter. Each experimental condition's t-test was examined independent of the other conditions, as we were primarily focused on the changes within the group rather than between the groups.

Participants in the Betrayal group had consistently lower ratings of perceptive trust across all sizes, calculated by subtracting the mean of the Post-Game scores from the mean of the Pre-Game scores: Small ( $M=-0.79$ ,  $SD=1.48$ ),  $t(13)=1.92$ ,  $p=.03$ ; Normal ( $M=-0.65$ ,  $SD=1.42$ ),  $t(13)=1.73$ ,  $p=.05$ ; and Large ( $M=-0.57$ ,  $SD=1.55$ ),  $t(13)=1.67$ ,  $p=.06$ . Those in the Negative Mood group had slightly lower perceptive trust ratings for Small ( $M=-0.14$ ,  $SD=1.33$ ),  $t(13)=0.40$ ,  $p=.35$ , but slightly higher ratings for Normal ( $M=0.21$ ,  $SD=1.36$ ),  $t(13)=-0.76$ ,  $p=.23$  and Large ( $M=0.28$ ,  $SD=1.74$ ),  $t(13)=-0.60$ ,  $p=.28$ . Lastly, participants in the Control group gave consistently higher perceptive trust ratings across all sizes; Small ( $M=0.5$ ,  $SD=1.25$ ),  $t(13)=-1.84$ ,  $p=.04$ ; Normal ( $M=0.57$ ,  $SD=1.42$ ),  $t(13)=-1.67$ ,  $p=.06$ ; and Large ( $M=0.72$ ,  $SD=1.59$ ),  $t(13)=-2.22$ ,  $p=.02$  (See Appendix C).

A one-way analysis of variance (ANOVA) was used to examine the positive and negative affect scores collected by the PANAS from the post-game version of the questionnaire. Although there were no significant differences for the positive affect,  $F(2,39)=2.05$ ,  $p=0.14$  or the negative affect,  $F(2,39)=1.20$ ,  $p=.31$ , the direction of the means for each of the experimental conditions trended to what we would have expected. The Control condition ( $M=40.07$ ,  $SD=17.68$ ) scored higher in terms of positive affect

ratings compared to both the Betrayal ( $M=32.14$ ,  $SD=8.54$ ) and Negative Mood conditions ( $M=30.64$ ,  $SD=11.84$ ). This trend was also reversed for the negative affect ratings, as those in the Control condition ( $M=16$ ,  $SD=4.33$ ) had slightly lower scores compared to the Betrayal ( $M=16.5$ ,  $SD=5.91$ ) and Negative Mood conditions ( $M=19.14$ ,  $SD=6.81$ ; See Appendix D).

Another 3x2 ANOVA was also conducted to examine the mean differences for condition and affect type. For the mean differences in terms of positive affect for Betrayal ( $M=0.36$ ,  $SD=6.08$ ), Negative Mood ( $M=-1.86$ ,  $SD=6.76$ ), and Control ( $M=6.43$ ,  $SD=14.60$ ), there was a near significant effect,  $F(2,39)=2.612$ ,  $p=.09$  (See Appendix E). As for the mean differences in terms of negative affect for Betrayal ( $M=-0.07$ ,  $SD=4.36$ ), Negative Mood ( $M=0.43$ ,  $SD=9.76$ ), and Control ( $M=-1.36$ ,  $SD=5.30$ ), there was no significant effect,  $F(2,39)=0.251$ ,  $p=.78$  (See Appendix F).

### **Main Results**

A 3x2 ANOVA was conducted to evaluate any significant differences between the conditions Betrayal ( $M=0.019$ ,  $SD=0.038$ ), Negative Mood ( $M=0.024$ ,  $SD=0.059$ ), and Control ( $M=0.003$ ,  $SD=0.023$ ), and the interactive Simon task compatibility factors (e.g. Compatible and Incompatible). There was a near significant effect of condition,  $F(2,39)=3.028$ ,  $p=.06$ ,  $\eta^2=0.13$  but no significant effect of compatibility,  $F(2,39)=0.864$ ,  $p=.42$ ,  $\eta^2=0.04$  (See Appendix G).

## General Discussion

The main goal of this study was to examine how the act of betrayal could affect one's level of co-representation, with a secondary goal being to establish a reliable method to induce a sense of betrayal within a controlled environment. Our findings did not reveal anything of statistical importance related to our primary objective, however, we believe that the manipulation we developed for this study shows promise as a viable betrayal manipulation. This is further exemplified by the overall trends outlined in our manipulation check, as those in the Betrayal condition were less likely to trust the experimenter after playing the game across all perceived trust sizes compared to those in the other groups.

Unfortunately, our main analysis revealed that those in the Control condition had lower levels of co-representation compared to those in the Betrayal and Negative Mood conditions. This was contrary to our expectation, as Kuhbandner et al. (2010) demonstrated that negative moods tended to lower co-representation levels in comparison to more positive moods. Although the differences were not significant, those in the Control group trended to have higher levels of positive affect compared to those in the Betrayal and Negative Mood groups, therefore the Control condition should have exhibited higher levels of co-representation compared to the other groups. Although we cannot venture a guess as to why this occurred, we can say that the only major difference between the Control group and the experimental groups is that the Control group was not forced to lose a round during the game at any time.

We do believe that our study can be improved in both the experimental manipulation and the instruments that serve as our manipulation checks. Our use of *Keep Talking and Nobody Explodes* served as a social manipulation that contained a lot of

random factors, ranging from procedurally generated bombs so that each round was unique, to the kinds of communication tactics each participant would employ throughout both the game and the initial priming conversation. Under this premise, we may have encountered a great deal of extraneous variables that may have played a part in our findings. Although we could argue that the game served as a functional catalyst to open a situation for betrayal based on the drop in perceived trust ratings from the Betrayal group, it was not strong enough to show a significant effect.

Additionally, we believe our manipulation checks could be improved by expanding the items to include topics such as how participants would typically cope with being betrayed (e.g. cutting all ties with the betrayer, developing an aversion towards others, or rationalizing the act of betrayal to be less severe in order to maintain the relationship; Aimone & Houser, 2013; Balliet & Lange, 2013; Gobin & Freyd, 2014; Zurbriggen, 2005), or whether their experimental partner holds qualities that they would deem trustworthy (e.g. facial impressions, justice perception, etc.; Holtz, 2015; Wilson & Rule, 2015). By expanding the scope of the questions beyond whether the participant's level of trust changed during the manipulation, we can better gauge the fidelity of the partner's performance as a betrayer as well as whether the manipulation was effective for an individual's coping strategy (e.g. betrayal aversion or betrayal blindness).

We also experienced limitation in terms of both time and number of participants. Our experiment spanned a total of one hour, which we don't believe is nearly enough time to establish a concrete sense of trust and rapport with participants, much less for the five minutes that was used for the initial conversation. Repeated sessions in which the

experimenter or confederate could establish a much stronger sense of trust across two or three days would be recommendable for any future revisions of this study.

Despite our limitations, we believe that our study has several important implications for both future research into betrayal and co-representation. Betrayal research have largely been centered around the long-term effects from acts of betrayal that were out of the experimenter's control, but by utilizing and refining the manipulation we established in this study, we believe more opportunities can be done to examine the immediate effects of betrayal as well as some resolution strategies that can be done to mitigate the damage caused by the betrayal. Additionally, our use of a social game to elicit negative moods is drastically different from the passive, non-interactive mediums of traditional negative mood apparatuses such as photographs (Murphy & Zajonc, 1993) and video tapes (Forgas, 2007), therefore with some additionally refinements to our manipulation, future research can potentially further differentiate any possible differences between social and basic emotions. Although our study ultimately failed to examine the effect of betrayal on co-representation, we believe that by refining the instruments and methodology from our study, we can come closer to understanding how betrayal can influence one's level of co-representation.

## Appendix A

### Pre-G Questionnaire

Participant #: \_\_\_\_\_

Please answer each question below as accurately as possible. Keep in mind that “your partner” is the person who you will be playing the game with.

1) How likely are you to trust your partner in the future on **small/unimportant** matters?

- (1) Definitely unlikely
- (2) Probably unlikely
- (3) Unsure, but unlikely
- (4) Unsure, but likely
- (5) Probably likely
- (6) Definitely likely

2) How likely are you to trust your partner in the future on **normal/slightly important** matters?

- (1) Definitely unlikely
- (2) Probably unlikely
- (3) Unsure, but unlikely
- (4) Unsure, but likely
- (5) Probably likely
- (6) Definitely likely

3) How likely are you to trust your partner in the future on **large, very important** matters?

- (1) Definitely unlikely
- (2) Probably unlikely
- (3) Unsure, but unlikely
- (4) Unsure, but likely
- (5) Probably likely
- (6) Definitely likely

4) How easy do you find it to trust new people?

- (1) Extremely hard
- (2) Very hard
- (3) Moderately hard
- (4) Moderately easy
- (5) Very easy
- (6) Extremely easy

5a) How many people do you trust on **small/unimportant** matters?

- (1) Extremely few people
- (2) Very few people
- (3) Few people
- (4) Some people

- (5) Many people
- (6) High amount of people

5b) What is the exact number of people that you trust for **small/unimportant** matters?

\_\_\_\_\_

6) How many people do you trust on **normal/slightly important** matters?

- (1) Extremely few people
- (2) Very few people
- (3) Few people
- (4) Some people
- (5) Many people
- (6) High amount of people

6b) What is the exact number of people that you trust for **normal/slightly important** matters?

\_\_\_\_\_

7a) How many people do you trust on **large/very important** matters?

- (1) Extremely few people
- (2) Very few people
- (3) Few people
- (4) Some people
- (5) Many people
- (6) High amount of people

7b) What is the exact number of people that you trust for **large/very important** matters?

\_\_\_\_\_

8) How stressed do you feel on a daily basis?

- (1) Not at all stressed
- (2) Very relaxed
- (3) Moderately relaxed
- (4) Moderately stressed
- (5) Very stressed
- (6) Extremely stressed

9) How do you think stress has affected your everyday activities?

- (1) Definitely did not affect
- (2) Somewhat did not affect
- (3) Moderately unaffected
- (4) Moderately affected
- (5) Somewhat affected

## (6) Extremely affected

10) Please rate each of the following using a scale from 1-5 with "1" indicating "Very Slightly Or Not At All," "3" indicating "Moderately," and "5" indicating "Extremely" for how you *currently* feel.

- |  |   |
|--|---|
| <input type="checkbox"/> 1) Interested   | <input type="checkbox"/> 11) Irritable  |
| <input type="checkbox"/> 2) Distressed   | <input type="checkbox"/> 12) Alert      |
| <input type="checkbox"/> 3) Excited      | <input type="checkbox"/> 13) Ashamed    |
| <input type="checkbox"/> 4) Upset        | <input type="checkbox"/> 14) Inspired   |
| <input type="checkbox"/> 5) Strong       | <input type="checkbox"/> 15) Nervous    |
| <input type="checkbox"/> 6) Guilty       | <input type="checkbox"/> 16) Determined |
| <input type="checkbox"/> 7) Scared       | <input type="checkbox"/> 17) Attentive  |
| <input type="checkbox"/> 8) Hostile      | <input type="checkbox"/> 18) Jittery    |
| <input type="checkbox"/> 9) Enthusiastic | <input type="checkbox"/> 19) Active     |
| <input type="checkbox"/> 10) Proud       | <input type="checkbox"/> 20) Afraid     |



## Appendix B

### Post-G Questionnaire

Please answer each question below as accurately as possible. Keep in mind that “your partner” is the person who you played the game with.

Participant #: \_\_\_\_\_

1) How likely are you to trust your partner in the future on **small/unimportant** matters?

- (1) Definitely unlikely
- (2) Probably unlikely
- (3) Unsure, but unlikely
- (4) Unsure, but likely
- (5) Probably likely
- (6) Definitely likely

2) How likely are you to trust your partner in the future on **normal/slightly important** matters?

- (1) Definitely unlikely
- (2) Probably unlikely
- (3) Unsure, but unlikely
- (4) Unsure, but likely
- (5) Probably likely
- (6) Definitely likely

3) How likely are you to trust your partner in the future on **large, very important** matters?

- (1) Definitely unlikely
- (2) Probably unlikely
- (3) Unsure, but unlikely
- (4) Unsure, but likely
- (5) Probably likely
- (6) Definitely likely

4) I felt like my partner was reliable during the game session (Check one):

True

False

5) I felt like I was cheated during the game session (Check one):

True

False

6) Please rate how much you trusted your partner during the game session:

- (1) Did not trust at all
- (2) Somewhat did not trust
- (3) Moderately did not trust
- (4) Moderately trusted
- (5) Somewhat trusted
- (6) Trusted completely

7) Please rate how much you enjoyed the game.

- (1) Did not enjoy at all
- (2) Somewhat did not enjoy
- (3) Moderately did not enjoy
- (4) Moderately did enjoy
- (5) Somewhat did enjoy
- (6) Enjoyed a lot

8) How likely are you to use this game or any other type of game to relieve stress?

- (1) Definitely would use
- (2) Probably would use
- (3) Might use
- (4) Might not use
- (5) Probably would not use
- (6) Definitely would not use

9) Would you trust an authority figure (e.g. professor, parent, officer, etc.) over someone you know (e.g. family member, friend, or acquaintance)?

Yes

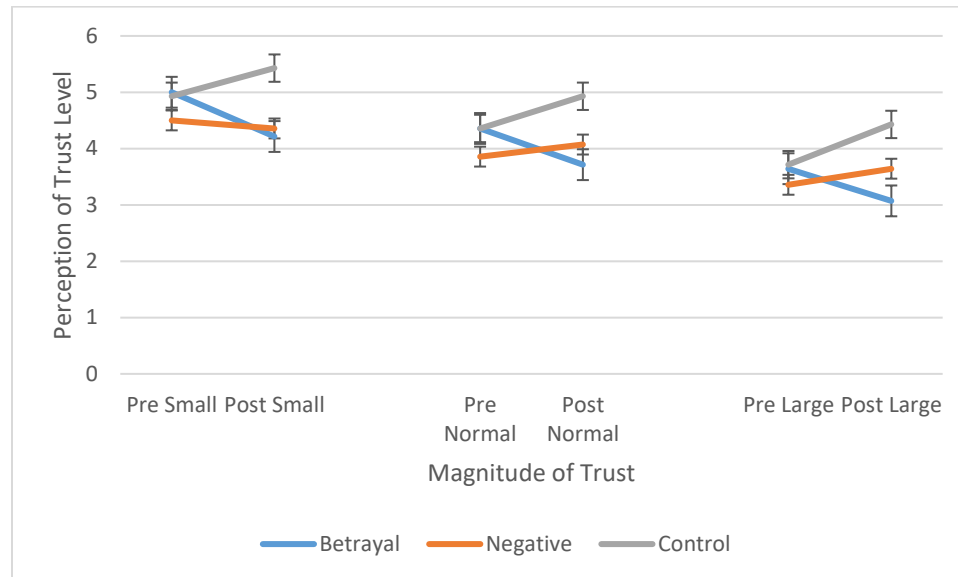
No

10) Please rate each of the following using a scale from 1-5 with "1" indicating "Very Slightly Or Not At All," "3" indicating "Moderately," and "5" indicating "Extremely."

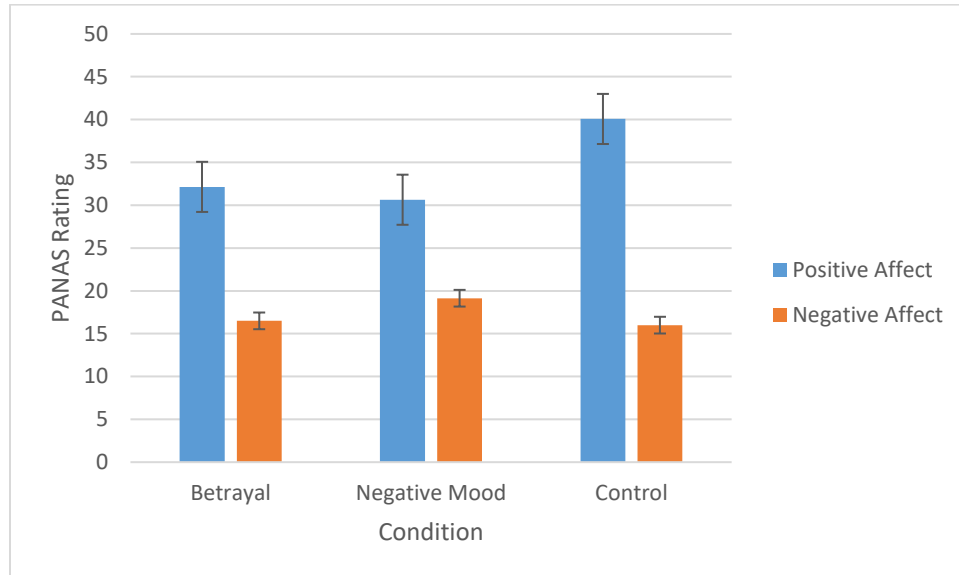
- |  |   |
|--|---|
| <input type="checkbox"/> 1) Interested | <input type="checkbox"/> 11) Irritable  |
| <input type="checkbox"/> 2) Distressed | <input type="checkbox"/> 12) Alert      |
| <input type="checkbox"/> 3) Excited    | <input type="checkbox"/> 13) Ashamed    |
| <input type="checkbox"/> 4) Upset      | <input type="checkbox"/> 14) Inspired   |
| <input type="checkbox"/> 5) Strong     | <input type="checkbox"/> 15) Nervous    |
| <input type="checkbox"/> 6) Guilty     | <input type="checkbox"/> 16) Determined |

- |                    |                  |
|--------------------|------------------|
| __ 7) Scared       | __ 17) Attentive |
| __ 8) Hostile      | __ 18) Jittery   |
| __ 9) Enthusiastic | __ 19) Active    |
| __ 10) Proud       | __ 20) Afraid    |

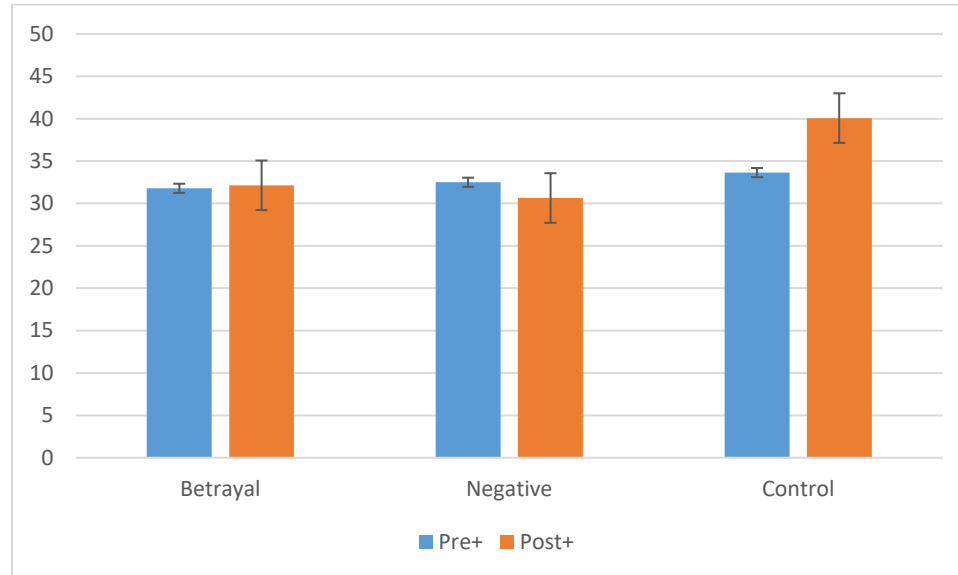
## Appendix C



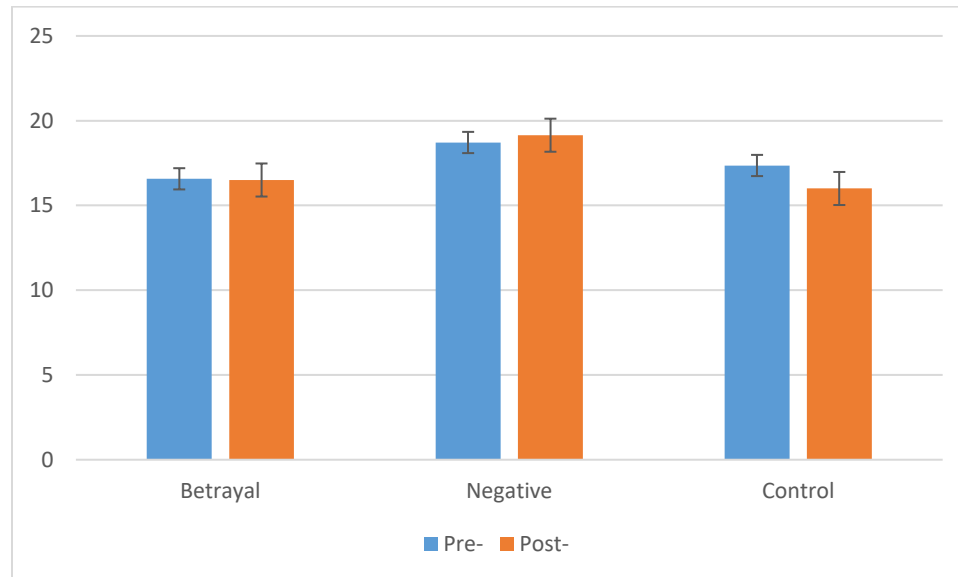
## Appendix D



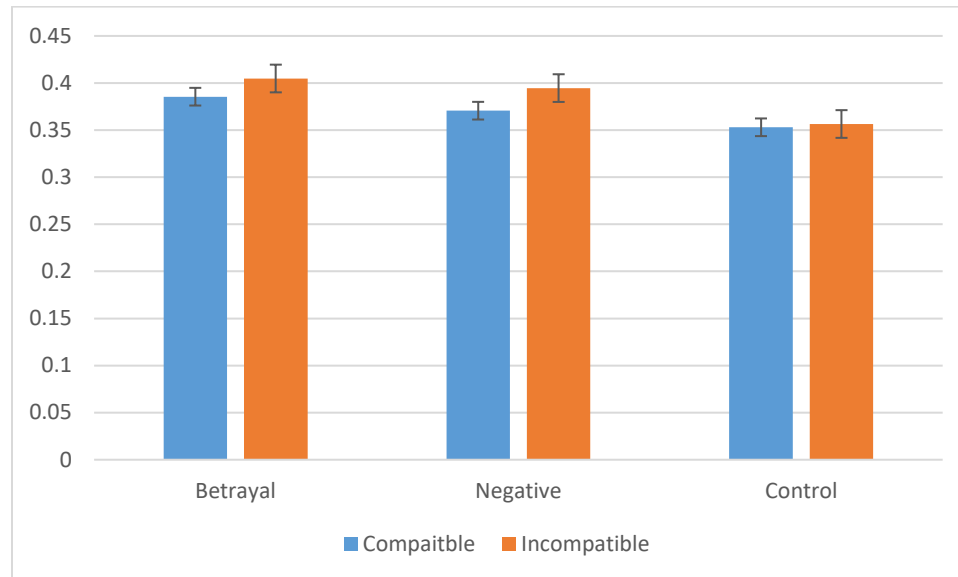
## Appendix E



## Appendix F



## Appendix G





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