

INTRA- AND INTERPERSONAL EMOTION REGULATION

by

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## Abstract

The process by which emotional experiences are managed is known as emotion regulation. Two types of emotion regulation strategies are commonly compared: rumination (focusing on one's problems and feelings) and distraction (focusing away from one's problems and feelings). Whereas rumination typically increases negative affect, distraction typically decreases negative affect. Past research has focused on emotion regulation as an *intrapersonal* endeavor (managing one's own emotions), whereas *interpersonal* emotion regulation (IER; receiving support from another person to regulate one's emotions) lacks the same degree of investigation. This study sought to compare the effects of *intrapersonal* emotion regulation (rumination, distraction) and IER (co-rumination, co-distraction) on affect and relationship quality and closeness. Participants completed the Fast Friends paradigm; following, participants privately recalled a stressful event. Finally, participants were randomized into one of four emotion regulation conditions: rumination, distraction, co-rumination, or co-distraction. Affect and relationship quality and closeness measures were completed throughout the study session. I predicted that rumination and co-rumination would increase negative affect compared to distraction and co-distraction. I also predicted that co-distraction would decrease negative affect more than distraction. Finally, I predicted that co-rumination would provide the highest relationship quality and closeness compared to all conditions. Results showed that negative affect did not differ after the emotion regulation conditions. However, negative affect decreased significantly more for participants in the distraction condition compared to participants in the rumination and co-rumination conditions. Finally, there were no differences in relationship quality and closeness across conditions. The limitations and implications of this study are discussed.

## Lay Summary

The process by which emotional experiences are managed is known as emotion regulation. Two types of emotion regulation strategies are commonly compared: rumination (focusing on one's problems and feelings) and distraction (focusing away from one's problems and feelings). Past research has focused on emotion regulation at the *intrapersonal* level (managing one's own emotions), whereas *interpersonal* emotion regulation (IER; receiving support from another person to regulate one's emotions) is researched less. In response to stress, this study compared the effects of *intrapersonal* emotion regulation (rumination, distraction) and IER (co-rumination, co-distraction) on affect and relationship quality and closeness. Results revealed that negative affect and relationship quality and closeness did not differ after the emotion regulation conditions. However, negative affect decreased significantly more for participants in the distraction condition compared to participants in the rumination and co-rumination conditions. The results of this study may inform recommendations for emotion regulation strategy use.

## **Preface**

This thesis is the original intellectual property of the author, Ashley Mary Battaglini. The study was approved by the University of British Columbia (UBC) Behavioural Research Ethics Board, certificate number: H19-02326. All study data was collected at UBC and analyzed by the author. Dr. Joelle LeMoult was the supervisor of this study and was involved, collaboratively, with Ashley Mary Battaglini in the planning, design, and implementation of the study. Moreover, the author wrote the manuscript and Dr. Joelle LeMoult was involved in the editing process.

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## **Dedication**

To my family, for all of their unconditional love and support. You mean the world to me.

## **Introduction**

It is common to experience stress on a day-to-day basis. Consequently, emotional responses to stress need to be controlled and managed in order to adaptively respond to one's environment. The process by which emotional experiences are controlled and managed is known as emotion regulation (Gross, 1998). One of the central emotion regulation theories, the Response Styles Theory, suggests that *how* one copes with negative affect can determine the intensity of that emotional experience (Nolen-Hoeksema, 1991; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). For instance, in response to a stressful event such as failing an exam, one might feel sad. The person might respond to this sadness in a way that either increases or decreases the intensity of their sadness, and in that way, certain emotion regulation strategies have adaptive or maladaptive affective consequences. Adaptive strategies are associated with reductions in negative affect and improved well-being, whereas maladaptive strategies are associated with increased negative affect and deleterious well-being (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Although several emotion regulation strategies have been identified in the literature (e.g., cognitive reappraisal, expressive suppression; Gross & Levenson, 1993), the Response Styles Theory focuses on two strategies in particular: rumination and distraction.

### **Rumination Versus Distraction**

Rumination is an emotion regulation strategy defined as passively focusing on (by repeatedly thinking about) one's distressing thoughts and negative affect (Nolen-Hoeksema, 1991). It is employed in order to extract the causes, meaning, and consequences of one's problems and feelings (Nolen-Hoeksema, 1991; Nolen-Hoeksema et al., 2008). Individuals engage in rumination in attempts to solve problems (Watkins & Baracaia, 2001); however rumination actually impedes this ability because of its persistent and rigid thought process

(constantly dwelling on problems and feelings; Lyubomirsky, Tucker, Caldwell, & Berg, 1999). In fact, there is strong empirical support that rumination is a maladaptive emotion regulation strategy that is related to increases in negative affect in the short-term and the onset of affective disorders (e.g., depression, anxiety) in the long-term (see Nolen-Hoeksema et al., 2008, for a review). In contrast to rumination, distraction is characterized by actively directing thoughts away from one's problems and negative feelings and instead thinking about neutral information (Nolen-Hoeksema, 1991). Although consistent use of distraction over time may produce maladaptive outcomes such as chronic avoidance, in the short-term distraction can facilitate alternative ways of thinking and reduce negative affect (Nolen-Hoeksema et al., 2008). The Response Styles Theory suggests that distraction is, in many ways, the opposite cognitive process to rumination (Nolen-Hoeksema, 1991), and because of its cognitive contrast to rumination, distraction is typically studied in comparison to rumination to test its affective outcomes.

In order to examine how rumination versus distraction predicts short-term changes in negative affect, researchers have increasingly used experimental designs. Experimental methodology lends itself to specific strengths such as controlling for extraneous variables and the ability to make causal inferences (Fisher, 2012). Experimental findings have shown that rumination increases levels of negative affect and distraction, in comparison, decreases levels of negative affect. For example, a study conducted by Kuehner, Huffziger, & Liebsch (2009) asked a sample of undergraduate students to recall negative events in their lives and were then assigned to a rumination or distraction condition, where their cognitive focus was guided by prompts (e.g., 'think about the physical sensations in your body' for rumination versus 'think about a boat slowly crossing the Atlantic' for distraction). The authors found that in comparison to

rumination, distraction decreased negative affect. This finding has also been documented in other experimental studies in samples of adolescents, those with current and past depression, and eating disorders (Lemoult & Joormann, 2014; Naumann, Tuschen-Caffier, Voderholzer, Caffier, & Svaldi, 2015; Park, Goodyer, & Teasdale, 2004).

### **Interpersonal Emotion Regulation**

A significant limitation of emotion regulation research to date is the focus on emotion regulation as an *intrapersonal* endeavor, where an individual is their own provider and receiver of an emotion regulation strategy. However, it is likely that after experiencing a stressful event, individuals may seek the help of others to regulate their affect (Zaki & Williams, 2013).

*Interpersonal* emotion regulation (IER) is described as actions taken to help another person regulate their emotions (i.e., *extrinsic* IER) or to receive help in regulating one's own emotions (i.e., *intrinsic* IER; Zaki & Williams, 2013). Albeit limited, most IER research has focused on the dyadic nature of IER. For example, questionnaires asking about IER tendencies assess extrinsic and intrinsic IER together without examining them separately (Rose, 2002). Isolating the experience of intrinsic IER is especially important because researchers have documented that only the *receiver's* perception of received support (not the *provider's* perception that they provided support), predicts the receiver's emotional wellbeing (Lakey, Orehek, Hain, & VanVleet, 2010). In other words, when one seeks someone else to help regulate their emotions, the receiver's perception of support is the most important predictor of emotional change. Yet despite the importance of understanding intrinsic IER, little is known.

Even at basic levels of support, the mere presence of others can attenuate negative affect (Cohen & Wills, 1985; Zaki & Williams, 2013). However, engaging in dyadic conversation is more efficacious at changing affective experience (Zaki & Craig Williams, 2013). Just as

*intrapersonal* emotion regulation strategies can involve focusing on problems and feelings (rumination) or focusing away from this experience (distraction), dyadic conversations can involve different content and processes. Two researched strategies used to regulate emotions at the interpersonal level are: co-rumination and co-distraction.

Akin to rumination but within a dyad, co-rumination is characterized by repeatedly discussing one's problems and feelings with another person (Rose, 2002). Comparable to the rumination literature, co-rumination has been found to increase negative affect and can be harmful for long term mental-health (e.g., Spendelow, Simonds, & Avery, 2017; Waller, Silk, Stone, & Dahl, 2014; White & Shih, 2012). For example, both cross-sectional (Rose, 2002; Spendelow, Simonds, & Avery, 2017) and longitudinal (Stone, Hankin, Gibb, & Abela, 2011; Stone et al., 2018) studies show that, in adolescence, engaging in co-rumination after a stressful event is associated with increased negative affect in the form of depressed mood.

However, in contrast to rumination, co-rumination has been found to contain beneficial attributes. Although co-rumination is associated with negative consequences for emotional experience, the self-disclosure component of co-rumination (talking to someone else about one's problems and feelings) has been related to increases in relationship quality (i.e., such as understanding, intimacy, affection) and interpersonal closeness (emotional connection; Byrd-Craven, Granger, & Auer, 2011; Rose, 2002; Starr & Davila, 2009). An observational study conducted by Rose, Schwartz-Mette, Glick, Smith & Luebbe (2014) sought to identify individual components of co-rumination that are related to positive interpersonal consequences. The authors instructed two same-sex friends to talk about their problems, while the researchers observed the conversation. Rose and colleagues found that talking and speculating about problems, longer conversations, and encouragement to talk about problems were related to higher friendship

quality and closeness. Unsurprisingly, dwelling on negative affect was unrelated to any positive relationship outcomes (Rose et al., 2014). Hence, the interpersonal components of co-rumination may improve relationship quality and interpersonal closeness even when the content of the conversation is negative. Taken together, Rose (2002) describes co-rumination as the convergence of rumination and self-disclosure. Thus, this construct shares the affective consequences of rumination as well as the interpersonal advantages of self-disclosure.

Although limited, research has examined the process and effects of co-rumination in comparison to other IER strategies such as co-distraction. Co-distraction occurs when an individual is distracted by engaging in a conversation with another person about neutral or tangential information in order to direct one's focus away from their problems and negative affect (Zelic, Ciesla, Dickson, Hruska, & Ciesla, 2016). In contrast to the amount of empirical comparisons made between the *intrapersonal* emotion regulation strategies of rumination and distraction, research comparing co-rumination and co-distraction is sparse. This is surprising considering they are frequently used in response to negative events (Stone et al., 2018).

To our knowledge, only two studies to date have compared co-rumination and co-distraction. Using ecological momentary assessment (EMA) methodology in a sample of adolescents, Stone et al., (2018) investigated the effectiveness of *intrapersonal* and IER strategies' on reducing negative affect after experiencing a negative event. Specifically, when participants experienced a negative event in the preceding hour, they reported whether they engaged in distraction, rumination, co-distraction, or co-rumination in response to the event. Findings indicated that co-rumination was less effective than co-distraction at regulating negative affect, and that rumination and co-rumination did not differ in their effects on negative affect.



The only other study to examine co-rumination and co-distraction was an experimental study conducted by Zelic et al., (2016). The authors asked participants to recall a recent stressor and to discuss it with an unacquainted experimenter. The experimenter led the conversation in line with co-rumination (talking about the participant's problems and feelings over and over) or co-distraction (changing the direction of the conversation to talk about neutral and tangential information). Zelic et al., (2016) found that co-rumination increased negative affect and co-distraction decreased negative affect. They also found that co-distraction was related to higher experimenter liking than co-rumination, contradicting previous findings regarding the positive association between co-rumination and relationship quality and closeness. One reason for this finding may be that Zelic and colleagues asked participants to engage in co-rumination and co-distraction with an unfamiliar experimenter as opposed to in a friendship context where co-rumination and co-distraction typically occur (Rose, 2002; Zaki & Craig Williams, 2013; Zelic et al., 2016). Indeed, engaging in co-rumination with an unfamiliar person may seem intrusive (i.e., discussing problems and feelings), whereas co-distraction may be similar to small-talk, thus increasing liking of the experimenter during the co-distraction relative to co-rumination conditions.

In sum, only two studies have examined both co-rumination and co-distraction, and only one of them used an experimental design that would allow researchers to determine a cause-and-effect relationship between IER strategies and affective changes. Both studies have found that co-rumination increases negative affect compared to co-distraction which parallels the rumination and distraction literature (e.g., Denson et al., 2012; Kuehner et al., 2009).

## Limitations of Interpersonal Emotion Regulation Research

In contrast to the abundance of research studying *intrapersonal* emotion regulation strategies (rumination and distraction), there is an insufficient amount of research examining IER strategies (co-rumination and co-distraction). Moreover, the extant literature is limited in several ways.

First, IER research to date tends to focus on the period of adolescence because this developmental period is characterized by gaining independence from parents while growing and expanding peer relationships (Choukas-Bradley & Prinstein, 2014). Originally co-rumination was offered as way to explain the paradoxical findings that, in adolescence peer relationships (and presumably social support) increase while well-being declines (Kessler, Avenevoli, & Merikangas, 2001; Rose, 2002). Rose (2002) posits that adolescents tend to talk to their peers about their problems and feelings in a repetitive way that prolongs their negative affect. Although salient in adolescence, peer relationships are even more important during emerging adulthood (ages 18-25; Choukas-Bradley & Prinstein, 2014), during which well-being also declines (Dykas & Siskind, 2018). However, in comparison to research on IER in adolescence, IER research in emerging adulthood is limited. Thus, IER research in emerging adulthood should be further examined in order to determine whether IER is more potent in adolescence or just as salient in other age domains.

The second limitation to IER research is the lack of experimental methodology. It is necessary to conduct experimental research in which IER strategies are intentionally induced and directly compared in order to avoid reliance on self-reported experiences (which may be subject to bias) and instead examine the consequences of IER in a controlled environment. Only Zelic et al., (2016) has manipulated and compared co-rumination and co-distraction. A limitation of this

study is the unfamiliarity of the experimenter which threatens its external validity because IER typically occurs within pre-existing relationships where intimacy and closeness have already been established to a certain degree (Rose, 2002).

Finally, a dearth of research has compared the effects of intrapersonal emotion regulation and IER on affect. To date, no other study has compared intrapersonal emotion regulation and IER strategies experimentally. This research is needed in order to examine the cause-and-effect relation of rumination, distraction, co-rumination, and co-distraction on negative affect and relationship quality and closeness in response to a negative event (i.e., stress).

### **The Current Study**

The aim of the current study was to compare *intrapersonal* emotion regulation strategies with IER strategies on regulating negative emotions and on relationship quality and closeness. The current study addressed the limitations in IER research discussed previously. First, emerging adulthood is a period associated with a rise in reliance on peer relationships and in risk to well-being. Within emerging adulthood, the transition to university is a particularly stressful time (Morrison & O'Connor, 2005), increasing the need for emotion regulation. To date, only one study (Zelic et al., 2016) has compared co-rumination and co-distraction in an emerging adult sample. Hence, the rise of stress and increased reliance on friends during this developmental period demands the further investigation of IER in a sample of undergraduate university students.

Second, this current study will add to the limited IER experimental research by manipulating co-rumination and co-distraction in the lab. We will overcome potential internal validity concerns caused by recruiting friend dyads and we will reduce threats to external validity caused by the use of an unacquainted experimenter (Zelic et al., 2016). Friendships made prior to

participation in the study may be influenced by the IER strategies they typically use. This may result in threats to internal validity such that instructing a dyad to engage in co-distraction may seem artificial (if for instance, they usually co-ruminate). Therefore, in order to find a middle ground, balancing between internal and external validity threats, we will create a “friendship” in the lab that mimics one that would exist outside of the lab. We will utilize the frequently used Fast Friends paradigm (Aron, Melinat, Aron, Vallone, & Bator, 1997; Page-Gould, Mendoza-Denton, & Tropp, 2008) in order to translate the intimacy and closeness found in friendships to the relationship between the experimenter and participant. This paradigm, typically used in relationship research (Aron et al., 1997; Slatcher, 2010; Sprecher, Treger, Wondra, Hilaire, & Wallpe, 2013), involves the experimenter and participant asking each other questions that gradually increases levels of self-disclosure. The Fast Friends paradigm has been found to reduce anxiety and negative attitudes towards outgroups (e.g., such as a different race; Goodman et al., 2014; Page-Gould et al., 2008), grow intimacy even in those with social anxiety (Kashdan & Roberts, 2004), test how social support effects stress hormone levels (cortisol; Smith, Loving, Crockett, & Campbell, 2009) and increase friendship intimacy between two strangers (Hampton, Fisher Boyd, & Sprecher, 2019; Slatcher, 2010; Sprecher, Treger, & Wondra, 2013; Sprecher, Treger, Wondra, et al., 2013). With regards to increasing intimacy between strangers, studies have implemented this paradigm in unacquainted pairs of undergraduate students (Hampton et al., 2019; Smith et al., 2009; Sprecher, Treger, & Wondra, 2013) and in experimenter-participant dyads (e.g., Kashdan & Roberts, 2004). Thus, this current study will add to experimental IER research and will address the limitation of Zelic et al., (2016) by implementing the Fast Friends paradigm in order to simulate a friend dyad where interpersonal emotion regulation customarily takes place.

Third, to our knowledge no other study has *experimentally* compared intrapersonal and IER strategies. This study is needed to elucidate which type of strategy (rumination or distraction) at which level (intrapersonal or interpersonal) is the most and least effective at reducing negative affect in response to negative mood states. Filling this gap in the literature will allow conclusions to be drawn about the usefulness and potential harmfulness of particular strategies. Interestingly, it will also highlight the adaptive qualities (relationship quality and closeness) of certain strategies such as co-rumination and co-distraction.

Thus, the aim of the current study was to compare the intrapersonal emotion regulation strategies of rumination and distraction with the IER strategies of co-rumination and co-distraction on modulating negative emotions and on relationship quality and closeness. Toward that goal, we recruited a sample of emerging adults. After engaging in the Fast Friends paradigm with an experimenter, participants watched a nature video to modulate their affect to baseline levels and after recalled a stressful event they had experienced (i.e., stress induction). Although some past research has used movie clips, sad music, or laboratory stress tasks to induce negative affect (LeMoult, Arditte, D'Avanzato, & Joormann, 2013; Siemer, 2005; Yoon & Joormann, 2012b), recall of a personal experience is more personally relevant, is more applicable to the participant's life, and is more ecologically valid because emotion regulation tends to occur in this context outside of the lab (Gross & Mcgraw, 2010). After the stress induction, participants were randomly assigned to one of the four conditions – rumination, distraction, co-rumination, or co-distraction. Levels of affect were assessed throughout the study session, and levels of relationship quality and closeness with the experimenter were assessed before and after the emotion regulation conditions.

## Hypotheses

Based on previous research, I have outlined the following hypotheses. First, based on the maladaptive affective consequences of rumination and co-rumination, I predicted that both rumination and co-rumination would be associated with significantly higher levels of negative affect compared to distraction and co-distraction (*Hypothesis 1a*). Considering the beneficial effects of social presence for reducing negative affect (i.e., the mere presence of others) coupled with an adaptive interpersonal emotion regulation strategy, I predicted that co-distraction would be associated with significantly lower levels of negative affect compared to distraction (*Hypothesis 1b*). In addition, I hypothesized that co-rumination would result in higher relationship quality and closeness with the experimenter compared to co-distraction, distraction, and rumination (*Hypothesis 2*).

## Method

### Participants

An a-priori power analysis conducted using G\*Power (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that at least 84 participants (21 participants in each condition) will be needed to achieve 80% power. This was calculated to achieve a small to medium Cohen's  $d$  effect size of 0.32 (see Cohen, 1988). The effect size was determined based on previous research with a similar design (Zelic et al., 2016), although a smaller effect size was chosen for a more conservative power analysis. However, due to research curtailment at UBC caused by the COVID-19 pandemic, I obtained a sample of 72 (36 male, 34 female; 1 non-binary; 1 unreported;  $M_{\text{age}} = 20.61$  years,  $SD = 3.48$ )<sup>1</sup> undergraduate students recruited from the University of British Columbia (UBC) Human Subject Pool (HSP).

### Measures

**Affect ratings.** The Positive and Negative Affect Schedule (PANAS) was used to assess positive and negative affect throughout the laboratory session (see Appendix A; Watson, Clark, & Tellegen, 1988). It contains 10 negative emotion items and 10 positive emotion items from the 20-item version. At each time point, participants rated the amount they felt each emotion in the current moment on a 5-point Likert scale from 1 (*Very slightly or Not at all*) to 5 (*Extremely*). The negative affect scale from the PANAS was calculated by summing the scores of all negative emotions (scared, afraid, upset, distressed, jittery, nervous, ashamed, guilty, irritable, and hostile) and the positive affect scale was calculated by summing the scores of all positive emotions (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active)

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<sup>1</sup>Two participants did not report their age. Thus, the descriptive statistics reflect the age of 70 participants in the sample.

consistent with what is recommended by the authors of the measure (Watson et al., 1988). The PANAS produced good to excellent internal consistency in our sample (Cronbach's  $\alpha = .84-.92$  for positive affect;  $\alpha = .79-.90$  for negative affect).

**Relationship quality.** Although the majority of research on co-rumination has administered the Friendship Quality Questionnaire (FQQ; Parker & Asher, 1993), this questionnaire is geared towards adolescents (e.g., “always play together at recess”) and assesses aspects of a friendship that exist outside of a lab context (e.g., “sticks up for me if others talk behind my back”). In order to examine relationship quality in emerging adults, we used the Peer subscale of the Inventory of Parents and Peer Attachment (IPPA; Armsden & Greenberg, 1987), consisting of 25-items. An example item is: “when we discuss things, my friends consider my point of view”. We modified the measure for this study by replacing “my friends” with “the experimenter”. This measure uses a 5-point scale from 1 (*Almost never or Never*) to 5 (*Almost always or Always*). Scores were computed by calculating the sum. Internal consistency in this sample was high ( $\alpha = .74-.84$ ).

In addition, to investigate whether positive relationship qualities such as feeling listened to by the experimenter (assessed by Zelic et al., 2016) showed different results given the inclusion of the Fast Friends paradigm in our study, participants completed this self-report question: “how much did you feel you were listened to by the experimenter?”. This item was rated on a Likert scale from 1 (*Not at all*) to 7 (*Extremely*).

**Closeness.** In research on co-rumination in adolescence (Rose, 2002; Rose et al., 2014), past studies have used the Friendship Qualities Scale (Bukowski, Hoza, & Boivin, 1994) and the Emotional Closeness Scale (Camarena, Sarigiani, & Petersen, 1990). These scales, however, do not apply to this experimental study as they were created for adolescents and assess aspects of



friendships outside of the lab. Hence, to assess relationship closeness, we used the Inclusion of Other in the Self scale (IOS; Aron, Aron, & Smollan, 1992), typically used to assess interpersonal closeness in relationship research (Slatcher, 2010; Sprecher, Treger, Wondra, et al., 2013). This is a 1-item self-report measure which contains seven pairs of circles that range from barely touching to fully overlapping. One circle is called the “self” while the other is labelled “other”. The question reads “which picture best describes your relationship with the experimenter?”. Participants were asked to choose one of the seven pairs of circles that best represents how close they felt to the experimenter. The circle pairs are numbered from 1 to 7 which range from no overlap to the greatest amount of overlap. The IOS scale has high test-retest reliability, convergent validity (Gächter, Starmer, & Tufano, 2015), predictive validity (e.g., predicts relationship longevity) and discriminant validity (Aron et al., 1992). It has been shown to be a valid measure of closeness in established relationships and among strangers after engaging in the Fast Friends paradigm in the lab (Aron et al., 1992).

Closeness was also assessed using the Subjective Closeness Index (SCI; Berscheid, Snyder, & Omoto, 1989) comprised of two items, adapted for this study: “compared to all your other relationships, how close would you describe your relationship with the experimenter to be?” and “compared to relationships other people have, how close would you describe your relationship with the experimenter to be?”. In addition, we derived items from research investigating closeness after the Fast Friends paradigm (Berger, Heinrichs, Dawans, Way, & Chen, 2016), using the following questions: “how close do you feel to the experimenter?”, “how similar are you to the experimenter?”, “how much do you like the experimenter?” and “to what degree could you imagine becoming friends with the experimenter in the future?” which was rated on a Likert scale of 1 (*Not at all*) to 7 (*Extremely*). These six closeness items and the IOS

were highly related, thus we averaged the items together to create a composite measure of closeness ( $\alpha = .79-.89$ ).

**Fast Friends paradigm.** The Fast Friends paradigm (Goodman et al., 2014; Slatcher, 2010; Aron, Melinat, Aron, Vallone, & Bator, 1997) is a self-disclosure task that involves asking and answering questions that gradually increase self-disclosure depth. It has been found to increase interpersonal closeness and intimacy in laboratory settings. The participant and experimenter were each given one set of index cards containing questions to ask the other person (Berger et al., 2016). The instructions and cards were provided by the study runner. Once the study runner left the room, the Fast Friends procedure commenced. Examples of questions from this procedure are: “would you like to be famous? In what way?” and “for what in your life do you feel most grateful?”. The 15-minute version of the Fast Friends procedure was administered, which was adapted from the original 45-minute version (Aron et al., 1997) by using only the first set of cards (instead of all three sets), in accordance with Berger et al. (2016).

Experimenters were undergraduate research assistants, extensively trained on the Fast Friends paradigm. The training for the Fast Friends paradigm was in accordance with the creators of the task and prior research (Aron et al., 1997; Kashdan & Roberts, 2004). Experimenters responded to each question verbatim, following the same script (Kashdan & Roberts, 2004). During training, pilot testing was conducted that allowed experimenters to practice and receive feedback regarding their adherence to the Fast Friends paradigm (Kashdan & Roberts, 2004). This involved recorded practice sessions and minute-by-minute review of this material with feedback. This was done to ensure that all experimenters (two male, two female) were similar in their presentation (in terms of friendliness, attentiveness, enthusiasm in voice and posture, adherence to script, and believability; derived from Kashdan & Roberts, 2004). Additionally,

experimenters practiced how to bring a conversation back in line with the topic for the Fast Friends paradigm if a participant attempted to change its direction. Experimenters were blind to participants' experimental condition until right before they administered the IER condition and were kept blind to the study hypotheses throughout the duration of the study.

Experimenters were matched with the participant based on gender, as previous research has found that higher amounts of self-disclosure and interpersonal closeness are experienced in within-gender interactions during this procedure (Aron et al., 1997; Page-Gould et al., 2008) and co-rumination research has been established by its investigation in same-sex dyads (e.g., the Co-Rumination Questionnaire was created for same-sex dyads; Rose, 2002).

**Stress induction.** Participants were instructed to recall the most stressful event that has occurred in their life. Participants were notified that this should be an event that is still stressful if thought about now (see Appendix B). Participants were instructed to verbally record the details of the event for 5 minutes in accordance with previous autobiographical recall procedures (e.g., Watkins & Brown, 2002; Denson et al., 2012). Verbal recall was used to ensure that participants spent the time recalling the event, as this may not be the case during a purely cognitive recall. After recall, participants reported the severity of the stressor on a scale from 1 (*Not at all severe*) to 5 (*Extremely severe*).

**Intrapersonal emotion regulation conditions.** The most commonly used method of inducing rumination and distraction in the laboratory is the induction task created by Nolen-Hoeksema and Morrow (1993). This task has been implemented in studies testing the differential effects of rumination and distraction on outcomes such as participants' biological stress response, cognitive distortions, and affect (Kuehner et al., 2009; Christine Kuehner, Holzhauer, & Huffziger, 2007; Naumann et al., 2015; Rimes & Watkins, 2005) as well as in non-clinical

undergraduate student samples, dysphoric samples, and those with current or past depression (e.g., Broderick, 2005; Huffziger, Reinhard, & Kuehner, 2009; Yoon & Joormann, 2012). Consistent with previous administrations of the task (e.g., Yoon & Joormann, 2012), participants were given 45 cards containing statements that provide prompts specific to their assigned condition (i.e., rumination or distraction). In the rumination condition, participants were asked to focus on thoughts that are symptom-focused, self-focused, and emotion-focused (e.g., think about... “your current level of energy”, “the physical sensations in your body” and “what your feelings might mean”). In contrast, in the distraction condition, participants were asked to focus away from their feelings and symptoms (e.g., think about... “a boat slowly crossing the Atlantic”). Participants spent 8 minutes thinking about the statements presented in the cards, but they were free to spend any amount of time they chose on each individual statement.

**IER conditions.** In the co-rumination and co-distraction conditions, experimenters used the prompts (created into questions) from the rumination and distraction task (Nolen-hoeksema & Morrow, 1993) which were used as structured guidance for each condition. The same undergraduate research assistants that were trained on the Fast Friends paradigm were also trained to conduct the two IER strategy conditions: co-rumination and co-distraction. Experimenters were trained to ask the prompts as questions from Nolen-Hoeksema and Morrow’s (1993) task. Experimenters received feedback for their presentation of each IER condition (consistent with Zelic et al., 2016). This involved review of recorded practice trials with feedback. This was done to ensure that all experimenters were similar in delivering the prompts across the co-rumination and co-distraction conditions.

## Potential Covariates

To assess the effectiveness of our random assignment, we examined whether intrapersonal and IER conditions differed on variables that may influence the effect of these conditions on affect, relationship quality, and closeness. More specifically, we assessed levels of trait rumination, distraction, co-rumination, and co-distraction. In addition, given evidence that rumination and co-rumination are related to symptoms of depression and anxiety (see Nolen-Hoeksema et al., 2008, for a review; Nolen-Hoeksema, 2000; Rose, 2002), we assessed baseline levels of depression and anxiety. Provided there is a significant difference across conditions, we planned to treat these variables as covariates in our main analyses.

**Rumination.** The Ruminative Responses Scale (RRS) of the Response Styles Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991) was used to assess individual differences in trait rumination. The shortened version of this scale (Treyner, W., Gonzalez, R., & Nolen-Hoeksema, 2003) consists of 10 items that assess participants' tendency to ruminate in response to negative affect, answered on a Likert scale from 1 (*Almost never*) to 4 (*Almost always*). The RRS has been shown to have high internal consistency in nonclinical samples ( $\alpha = .85$ ; Treyner, Gonzalez, & Nolen-Hoeksema, 2003) and produced good internal consistency in our sample ( $\alpha = .81$ ). The total RRS score was calculated by summing participants' ratings of the 10 items, with a higher total indicating higher levels of trait rumination.

**Distraction.** The Distraction Response Scale (DRS) of the Response Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991) was used to assess distraction. The scale consists of 11-items. An example item is: "go to a favorite place to get my mind off my feelings", answered on a Likert scale from 1 (*Almost never*) to 4 (*Almost always*). The Distraction Scale of the RSQ presented good internal consistency ( $\alpha = .80$ ). Levels of distraction were determined by

summing participant's ratings of the 11 items, with higher scores indicating higher levels of trait distraction.

**Co-rumination.** The Co-Rumination Questionnaire Short Form (CRQ-SF; Rose, 2002) is a 9-item questionnaire that was used to measure co-rumination tendencies with participants' closest friend. An example item is: "when I have a problem, my friend always tries to get me to tell every detail about what happened." The degree to which each item applies to them is rated from 1 (*Not at all true*) to 5 (*Really true*). This measure had good internal reliability ( $\alpha = .86$ ). The CRQ scores were determined by averaging the 9-item ratings.

**Co-distraction.** The Co-Distraction Questionnaire (CDQ; Gelb, 2013) was modified from its original 22-item questionnaire to 18-items (removal of 4 items) because of the omitted items' conceptual divergence from co-distraction. This measure was used to assess the participants' co-distraction tendencies with their closest friend. This scale was adapted from and based on the RSQ and the CRQ (Gelb, 2013). Items such as "if I have a problem, my friend and I will talk about something else or do something else rather than talking about the problem" was rated on a scale from 1 (*Not at all true*) to 5 (*Really true*). This 18-item measure showed excellent internal consistency ( $\alpha = .93$ ). The CDQ scores were obtained by averaging the item ratings.

**Symptoms of depression.** The Centre for Epidemiologic Studies Depression Scale (CES-D) is a 20-item measure that was developed in order to assess depressive symptoms in non-clinical populations (Radloff, 1977). This scale measures depressed mood and somatic symptoms. Participants responded using a 4-point scale to rate their experiences over the past week. For example, scores ranged from 0 ("*Rarely or none of the time; less than 1 day*") to 3 ("*Most or all of the time; 5-7 days*") with the total sum of scores ranging from 0-60. Scores of 16

or greater indicates significant depression. This measure has excellent concurrent and convergent validity (e.g., correlations of .81 with the Beck Depression Inventory; Weissman, Prusoff & Newberry, 1975). In the present sample, the internal reliability was excellent ( $\alpha = .90$ ).

**Symptoms of anxiety.** The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown & Steer, 1988) was used to assess symptoms of anxiety. The BAI is a 21-item measure rated on a Likert scale from 0 (*Not at all*) to 3 (*Severely, I could barely stand it*). This measure has high internal consistency in undergraduate, non-clinical samples ( $\alpha = .92$ ; Calmes & Roberts, 2008). Indeed, in our sample internal reliability was high ( $\alpha = .90$ ). The scores were summed with higher scores indicating more severe anxiety. The range of scores for the BAI were 0-63.

### **Manipulation Checks.**

**Fast Friends paradigm.** To assess the adherence to the Fast Friends paradigm, participants were asked several questions after the procedure was completed: “To what degree do you feel like the experimenter disclosed personal information about themselves?” and “To what degree did you feel like you disclosed personal information about yourself?”. Participants rated these items on a scale from 1 (*Not at all*) to 7 (*Extremely*). Participants also completed closeness measures before and after the paradigm, which tested whether the paradigm increased interpersonal closeness. These manipulation checks were adapted from prior research (Kashdan & Savostyanova, 2011; Smith et al., 2009).

**Nature video.** Levels of affect (positive and negative) were measured before and after the nature video to test whether affect from before and after the Fast Friends paradigm would reduce to baseline, before the stress induction.

**Stress induction.** Positive and negative affect were measured before and after the stress induction. This was administered to test whether the induction increased levels of negative affect

as expected. Additionally, self-reported stressor severity was measured to ensure that the severity of the recalled stressor did not significantly differ by condition.

**Intrapersonal emotion regulation conditions.** After the intrapersonal emotion regulation condition, participants were asked if they had concentrated on the presented prompts during the 8-minute task. Participants responded on a scale from 1 (*Not at all*) to 7 (*Very much*) (adapted from Naumann et al., 2015).

**IER conditions.** In order to maximize standardization across experimenters, we provided experimenters structured training which involved experimenters staying faithful to reading the prompts from Nolen-Hoeksema and Morrow's (1993) task (asked as questions).

**Demand Characteristics.** To reduce demand characteristics, participants were given filler questions throughout the study. Given that participants' awareness of the purpose of the study could influence their behaviours, we assessed participants' knowledge of the study aim. Participants were asked an open-ended question at the end of the session: "what was the purpose of this study?" (Singer & Dobson, 2007).

## **Procedure**

Participants completed demographic information (e.g., gender, sex, age) during the screening questionnaire given to all students taking the introductory to psychology course at the University of British Columbia. The students were given the option to sign up for the study.

A visual depiction of the lab procedure can be found in Figure 1 and the measures administered by time point is found in Table 1. When arriving at the lab, participants were greeted by the study runner and briefly met the experimenter. The study runner provided written consent to participants prior to beginning the study. Participants were then joined by the experimenter and they privately engaged in the Fast Friends paradigm for 15 minutes. Following



this, participants watched a nature video for 15 minutes in order to ensure emotions were brought to baseline before the stress induction. This was done in case the Fast Friends procedure changed positive or negative affect (it has been shown that self-disclosure can increase positive affect and/or decrease negative affect; Vittengl & Holt, 2000). Next, participants completed the stress induction, which involved them privately audio recording details about the most stressful event in their life for 5 minutes. Then, participants were randomly assigned to one of the four 8-minute emotion regulation conditions: rumination, distraction, co-rumination, or co-distraction.

Participants in the rumination or distraction conditions spent 30 seconds privately audio recording a summary of the stressful event that they just recalled. They were then prompted to engage in either rumination or distraction using prompts displayed on cards from the induction task created by Nolen-Hoeksema and Morrow (1993). Participants in the co-rumination and co-distraction conditions were joined by the same experimenter from the Fast Friends Paradigm, who were extensively trained in administering the IER conditions. In both IER conditions, the participant spoke for the first 30 seconds about the stressful event that they just recalled. The experimenter then implemented the assigned strategy (either co-rumination or co-distraction in accordance with Zelic et al., 2016), using Nolen-Hoeksema and Morrow's (1993) prompts. These original Nolen-Hoeksema and Morrow statements were adapted to questions in order to make it applicable to an interpersonal context. Shortly after the emotion regulation conditions, participants were debriefed by the study runner.

Participants completed measures of trait rumination, distraction, co-rumination, and co-distraction (RRS, DRS, CRQ, DRQ) as well as depression and anxiety (CES-D and BAI) when they first entered the lab. Positive and negative affect were assessed throughout the study session (before and after the Fast Friends paradigm, after the nature video, after the stress induction, and

after the emotion regulation condition). Relationship quality and closeness (IPPA, experimenter listening, closeness composite measures) were reported after the Fast Friends paradigm and after the emotion regulation condition. To assess disclosure of the experimenter and participant, participants completed disclosure measures after the Fast Friends paradigm. Stress severity was reported after the stress induction. The amount of time spent concentrating on the task was a manipulation check for the intrapersonal conditions, and thus were asked of participants in the rumination and distraction conditions.

## Results

### Preliminary Analyses

Analyses were conducted using SPSS and R. The data was first examined for missing values. Due to technical difficulties or research assistant error, some data were missing: Of the original 72 participants in the sample, three participants did not complete some portion of the study questionnaires (e.g., the group of questionnaires administered before the Fast Friends paradigm or after the stress induction). Missing data were random and not systematic as suggested by the non-significant Little's missing completely at random (MCAR) test,  $\chi^2(53) = 64.35, p = .137$ . Participants who did not complete an entire questionnaire were removed given that their removal would not result in a biased sample due to the data being MCAR (Kang, 2013; Little, Jorgensen, Lang, Moore, & Whitney, 2014). Also, one participant from the rumination condition discontinued the study after the stress induction and they were provided the appropriate well-being resources. This participant was excluded from all study analyses because they did not participate in the emotion regulation condition. During the rare instances when participants did not complete a single questionnaire item, the values were imputed based on the mean of that scale, allowing approximately 10% of missing data for each measure for each time point. Thus, we had a final sample of 68 participants for our analyses. Frequency distributions revealed that 17 participants were assigned to the rumination condition, 18 to the distraction condition, 16 participants to the co-rumination, and 17 participants to the co-distraction conditions.

For all  $F$ -test and  $t$ -test analyses, effect sizes are reported. The partial eta-squared ( $\eta_p^2$ ) is reported for the  $F$ -tests (effect sizes are determined as small = 0.01, medium = 0.09, and large =

0.25; Cohen 1988) and the Cohen's  $d$  is reported for the  $t$ -tests (effect sizes are determined as small = 0.20, medium 0.50, and large 0.80; Cohen, 1988).

**Parametric Assumptions.** Normality and homogeneity of variance were examined. The variable distributions and descriptive statistics are displayed in Table 2 for the potential covariates and Table 3 for the main study variables. The skewness and kurtosis of the majority of variables were in an acceptable range (i.e., near or between -1 and 1, with 0 indicating a perfectly normal distribution). A small number of potential covariate and dependent variables were well beyond the skew and kurtosis levels necessary to qualify as a normal distribution (i.e., below -3 and above 3; Glass, Peckham, & Sanders, 1972; Tables 1 and 2). Although these variables showed deviations from a normal distribution, the current study used analytic methods shown to be robust to violations of normality (i.e., Analysis of Variance (ANOVA) and  $t$ -tests; Boneau, 1960; Levy, 1980; Schmider, Ziegler, Danay, Beyer, & Bühner, 2010; Srivastava, 1958). The use of ANOVAs with non-normal variables do not necessarily inflate the Type I or Type II error rates (Schmider et al., 2010). Similarly,  $t$ -tests are also robust to violations of normality (Boneau, 1960; Srivastava, 1958). Other options are available when violations of normality are present, such the use of nonparametric tests (e.g., the Kruskal-Wallis H Test). However, there are disadvantages to replacing parametric tests (i.e., ANOVA) with nonparametric tests, such as a reduction in accuracy and reduced power to detect effects (Edgington, 1995; Tanizaki, 1997). Hence, given the robustness of ANOVAs and disadvantages of other alternatives, we continued with our original proposed parametric analyses.

To test homogeneity of variance, the Levene statistic was computed for each variable. The variability of our study measures were homogeneous, evidenced by non-significant Levene statistics, with the exception of trait co-rumination measured by the CRQ,  $F(3, 64) = 3.60, p$

= .018. This violation is accounted for in our examination of trait co-rumination as a covariate, below.

**Demographics.** We examined the descriptive statistics of the demographic variables and conducted a series of statistical tests to determine whether participants' biological sex, gender, age, and culture differed across the emotion regulation conditions. Demographic data are presented by condition in Table 4. Chi-square tests or a one-way ANOVA (for nominal and continuous variables, respectively) were conducted to investigate whether these demographics significantly differed by condition. The sample was equal with regards to biological sex (34 male, 34 female) and relatively equal with regards to gender (34 male, 33 female, 1 non-binary). Consistent with random assignment, results revealed that there were no significant differences of sex by condition,  $X^2(3, N = 68) = 1.73, p = .631$ , indicating that biological males and females were equally likely to participate in each of the four conditions. Similarly, there were no significant differences of gender by condition,  $X^2(6, N = 68) = 5.36, p = .449$ . Unsurprisingly our final sample of undergraduate students produced an average age that is characteristic of emerging adulthood ( $M_{\text{age}} = 20.67$  years,  $SD = 3.54$ ), which did not differ significantly by condition,  $F(3, 63) = 0.46, p = .714, \eta^2_p = 0.02$ . Finally, participants' reported culture did not differ by condition,  $X^2(21, N = 68) = 26.50, p = .188$ . Together, these findings support the effectiveness of our random assignment. While these results do not completely rule out that demographic variables could influence the study findings, given that these variables did not significantly differ by condition, they were not required as covariates in our main analyses.

**Potential covariates.** Descriptive statistics for the potential covariates are presented by condition in Table 2. We conducted a series of one-way ANOVAs to test whether trait levels of rumination, distraction, co-rumination, co-distraction, or symptoms of depression and anxiety

significantly differed across the emotion regulation conditions. Across each of the four conditions, there were no significant differences in trait level of depression,  $F(3, 64) = 0.65, p = .584, \eta^2_p = 0.03$ , anxiety,  $F(3, 64) = 0.84, p = .48, \eta^2_p = 0.04$ , rumination,  $F(3, 64) = 0.86, p = .466, \eta^2_p = 0.04$ , distraction,  $F(3, 64) = 0.09, p = .968, \eta^2_p = 0.04$ , or co-distraction,  $F(3, 64) = 1.94, p = .131, \eta^2_p = 0.08$ . Given that the Levene test for trait co-rumination showed a violation of homogeneity of variance,  $F(3, 64) = 3.60, p = .018$ , adjustments were made to the analysis for this trait. While ANOVAs are robust to violations of heterogeneity, minimally affecting Type I error with samples of relatively equal size (Glass, et al., 1972), we instead conducted a Welch's one-way ANOVA which can be used in response to homogeneity of variance violations (Mendes & Akkartal, 2010), simply as a precaution. The Welch's ANOVA indicated a significant difference in levels of trait co-rumination by condition,  $F(3, 34.98) = 4.95, p = .006, \eta^2_p = 0.13$ . The Games-Howell post-hoc analysis was conducted because it does not require groups to have equal variances. This post-hoc test revealed that participants in the co-rumination condition reported significantly lower levels of co-rumination ( $M = 2.83, SD = 0.50$ ), compared to participants in the rumination ( $M = 3.57, SD = 0.75$ ),  $p = .012$ , and co-distraction ( $M = 3.49, SD = 0.75$ ),  $p = .029$ , conditions, although not significantly different from the distraction condition ( $M = 3.09, SD = 1.03$ ),  $p = .776$ . No other conditions differed from one another, such that distraction did not differ from the rumination,  $p = .401$ , or co-distraction conditions,  $p = .565$ , and rumination did not differ from the co-distraction condition,  $p = .998$ . Given that trait co-rumination varied across conditions, co-rumination was used as a covariate in our main analyses.

### **Manipulation Checks**

**Fast Friends paradigm.** We conducted one-way ANOVAs with condition (rumination, distraction, co-rumination, co-distraction) as the independent variable, to test for any differences

in the amount of participant-reported experimenter and participant disclosure by condition. As expected, the results of the one-way ANOVAs indicated no significant main effect of condition for experimenter disclosure,  $F(3, 64) = 0.07, p = .974, \eta^2_p = 0.03$ , or participant disclosure,  $F(3, 64) = 0.56, p = .640, \eta^2_p = 0.03$ , suggesting that the disclosure levels during the Fast Friends paradigm did not differ by condition. To test whether participant-reported closeness with the experimenter varied by time and across conditions, a repeated-measures ANOVA with time (pre- and post-Fast Friends) as the within-subject factor and condition (rumination, distraction, co-rumination, co-distraction) as the between-subject factor on closeness was conducted. As expected, the main effect of time was significant,  $F(1, 64) = 205.50, p < .001, \eta^2_p = 0.76$ , the main effect of condition was not significant,  $F(3, 64) = 1.23, p = .307, \eta^2_p = 0.05$ , and the condition by time interaction was also not significant,  $F(3, 64) = 2.72, p = .052, \eta^2_p = 0.11$ . The significant main effect of time suggests that closeness increased from before to after the Fast Friends paradigm. The non-significant main effect of condition and condition by time interaction suggest that the increase in closeness across time did not differ significantly by condition. Thus, the results suggest that the Fast Friends paradigm produced its intended outcome by increasing closeness over time. Also, it suggests the effectiveness of the random assignment, given that closeness levels did not significantly differ by condition.

**Nature video.** Positive and negative affect were assessed for potential changes at three time points: when they began the study (pre-Fast Friends), after the Fast Friends paradigm (just before the nature video; post-Fast Friends), and after the nature video (post-Nature video). These time points were used to test (1) if the nature video attenuated changes in affect resulting from the Fast Friends paradigm and (2) if affect levels after the nature video (post-Nature video) were different from participants' affect levels when they entered the lab (pre-Fast Friends). A repeated-

measures Multivariate Analysis of Variance (MANOVA) with time (pre-Fast Friends, post-Fast Friends, and post-Nature video) as the within-subjects factor and condition (rumination, distraction, co-rumination, co-distraction) as the between-subjects factor was conducted on positive and negative affect. There was a significant main effect of time for both positive,  $F(1, 64) = 69.26, p < .001, \eta^2_p = 0.52$ , and negative affect,  $F(1, 64) = 24.57, p < .001, \eta^2_p = 0.28$ . There was no significant main effect of condition for positive,  $F(3, 64) = 2.15, p = .103, \eta^2_p = 0.09$ , or negative affect,  $F(3, 64) = 0.22, p = .880, \eta^2_p = 0.01$ . The condition by time interaction was also not significant, for positive,  $F(3, 64) = 1.57, p = .206, \eta^2_p = 0.07$ , or negative affect,  $F(3, 64) = 0.54, p = .654, \eta^2_p = 0.03$ . The significant main effect of time for positive affect showed that levels of positive affect increased from pre- to post-Fast Friends,  $t_{paired}(67) = -4.20, p < .001, d = 0.51$ , and then decreased significantly from post-Fast Friends to post-Nature video,  $t_{paired}(67) = 9.61, p < .001, d = 1.17$ . Interestingly, positive affect was reduced after the nature video compared to the pre-Fast Friends levels,  $t_{paired}(67) = 7.43, p < .001, d = 0.90$ .

The significant main effect of time for negative affect showed that levels of negative affect decreased from pre- to post-Fast Friends,  $t_{paired}(67) = 7.02, p < .001, d = 0.85$ , and did not significantly change from post-Fast Friends to post-Nature video,  $t_{paired}(67) = -0.23, p = .822, d = 0.03$ . Given that the nature video was intended to display neutral content, we would not expect the nature video to increase negative affect in this context. In comparison to pre-Fast Friend negative affect levels, negative affect was significantly reduced after the nature video,  $t_{paired}(67) = 6.09, p < .001, d = 0.74$ .

Together this evidence indicates that both positive and negative affect were lower after the nature video compared to when participants first entered the lab (pre-Fast Friends). Participants' levels of affect when entering the lab may not represent their true baseline levels of



affect. Hence, it appears the nature video strongly attenuated both positive and negative affect, and placed individuals in a more neutral mood state before beginning the stress induction (see Figures 2A and 2B).

**Stress induction.** To assess whether the stress induction was effective at increasing negative affect from baseline, we conducted a repeated-measures MANOVA with time (pre- and post-stress induction) as the within-subject factor and condition (rumination, distraction, co-rumination, co-distraction) as the between-subject factor on positive and negative affect. There was a significant main effect of time for positive affect,  $F(1, 64) = 5.74, p = .020, \eta^2_p = 0.08$ , and negative affect,  $F(1, 64) = 48.36, p < .001, \eta^2_p = 0.43$ . Positive affect significantly decreased and negative affect increased from pre- to post-stress induction. The main effect of condition was not significant for positive,  $F(3, 64) = 2.22, p = .094, \eta^2_p = 0.09$ , or negative affect,  $F(3, 64) = 1.22, p = .310, \eta^2_p = 0.05$ , and the condition by time interaction was not significant for positive,  $F(3, 64) = 1.01, p = .394, \eta^2_p = 0.05$ , or negative affect  $F(3, 64) = 1.36, p = .264, \eta^2_p = 0.06$ . Thus, findings support the effectiveness of the stress induction by producing its intended effect of reducing positive and increasing negative affect.

Also, we assessed whether there was a significant difference across conditions (rumination, distraction, co-rumination, co-distraction) regarding the severity of the stressor participants recalled. We conducted a one-way ANOVA on participants' reported stressor severity. As expected, stressor severity did not differ by condition,  $F(3, 64) = 1.57, p = .206, \eta^2_p = 0.07$ .

**Intrapersonal emotion regulation conditions.** In order to test whether there were differences in participants' self-reported concentration during the rumination ( $M = 5.94, SD =$

0.97) versus distraction ( $M = 5.67$ ,  $SD = 0.82$ ) inductions<sup>2</sup>, an independent samples  $t$ -test was conducted on participants' self-reported concentration ratings. Results indicated no significant difference in concentration between conditions,  $t(33) = 0.94$ ,  $p = .192$ ,  $d = 0.30$ .

**Demand characteristics.** None ( $n = 0$ ) of the 68 participants in the final study sample accurately reported the purpose of the study, suggesting that demand characteristics were not present.

### Main Data Analysis

**Hypothesis 1.** We predicted that rumination and co-rumination would be associated with significantly higher levels of negative affect at post-emotion regulation condition (post-ER) compared to distraction and co-distraction (*Hypothesis 1a*) and that co-distraction would be associated with significantly lower levels of negative affect than distraction (*Hypothesis 1b*). No *a-priori* predictions were made about positive affect. Given differences in levels of trait co-rumination across conditions (as reported above), levels of trait co-rumination were included as a covariate. Thus, to test Hypothesis 1, we conducted a repeated-measures Multivariate Analysis of Covariance (MANCOVA) with trait co-rumination as the covariate, time (pre- and post-ER) as the within-subject factor, condition (rumination, distraction, co-rumination, co-distraction) as the between-subject factor, on positive and negative affect. The main effect of time was not significant for positive,  $F(1, 63) = 0.20$ ,  $p = .653$ ,  $\eta^2_p < 0.00$ , or negative affect,  $F(1, 63) = 1.08$ ,  $p = .302$ ,  $\eta^2_p = 0.02$ . The main effect of condition was not significant for positive,  $F(3, 63) = 1.12$ ,  $p = .322$ ,  $\eta^2_p = 0.05$ , or negative affect,  $F(3, 63) = 0.35$ ,  $p = .789$ ,  $\eta^2_p = 0.02$ . The condition

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<sup>2</sup>Due to research assistant error, 3 participants in the distraction condition did not complete the concentration item. These items were imputed by replacing the missing values with the average of the distraction condition.

by time interaction for positive affect was not significant,  $F(3, 63) = 1.73, p = .170, \eta^2_p = 0.08$  (Figure 3A). However, the expected condition by time interaction for negative affect was significant,  $F(3, 63) = 5.54, p = .002, \eta^2_p = 0.21$ , suggesting that the pre- to post-ER change in negative affect differed by condition (Figure 3B).

The significant condition by time interaction for negative affect was followed-up by conducting between-group and within-group tests to elucidate the nature of the interaction. Two one-way Analyses of Covariance (ANCOVAs) with trait co-rumination as the covariate, were conducted separately for pre- and post-ER time points, on negative affect. Results showed that negative affect did not differ significantly by condition at the pre-ER time point,  $F(4, 63) = 1.26, p = .294, \eta^2_p = 0.07$ , or the post-ER time point,  $F(4, 63) = 0.71, p = .586, \eta^2_p = 0.04$ . In addition, paired samples *t*-tests were conducted to identify significant differences by condition, across time. Results indicated that negative affect for distraction,  $t_{paired}(17) = 4.86, p < .001, d = 1.27$ , and co-distraction,  $t_{paired}(16) = 3.03, p = .008, d = 0.73$ , showed a significant decrease, whereas negative affect for rumination,  $t_{paired}(16) = 2.07, p = .055, d = 0.30$ , and co-rumination did not significantly change over time,  $t_{paired}(15) = 0.37, p = .716, d = 0.08$ . In order to directly compare the conditions and clarify the findings, difference scores (subtracting post-ER negative affect scores from pre-ER negative affect scores) were calculated to investigate the degree of negative affect decrease across conditions. A one-way ANCOVA with trait co-rumination as the covariate, was conducted using the difference scores. Results revealed that decreases in negative affect significantly differed by condition,  $F(3, 63) = 5.54, p = .002, \eta^2_p = 0.21$ . The Tukey HSD post-hoc test showed that, the distraction condition ( $M = -7.17, SD = 6.25$ ) produced a significantly greater decline in negative affect, compared to the rumination ( $M = -1.88, SD = 3.76$ ),  $p = .016$ , and co-rumination conditions ( $M = -0.44, SD = 4.72$ ),  $p = .002$ , and no significant difference

compared to the co-distraction condition ( $M = -3.82$ ,  $SD = 5.21$ ),  $p = .221$ . No other conditions differed from one another. The rumination condition did not differ from the co-rumination,  $p = .847$ , or co-distraction,  $p = .684$ , conditions. Finally, the co-rumination condition did not differ from the co-distraction condition,  $p = .234$ .

Hence, results revealed that rumination and co-rumination did not show significantly higher levels of negative affect at post-ER, relative to distraction and co-distraction (*Hypothesis 1a*). Moreover, co-distraction did not show lower levels of negative affect at post-ER, relative to distraction (*Hypothesis 1b*). Instead, negative affect for participants in the distraction and co-distraction conditions significantly declined across time from pre- to post-ER, however participants in the rumination and co-rumination conditions did not report a significant decline. Results that compared across conditions showed that negative affect declined significantly more for participants in the distraction condition compared to participants in the rumination and co-rumination conditions. Finally, results showed that positive affect differences did not significantly change by time or condition.

**Hypothesis 2.** We predicted that co-rumination would result in higher relationship quality and closeness with the experimenter at post-ER compared to all other conditions. Three repeated-measures ANCOVAs with trait co-rumination as the covariate, time (pre- and post-ER) as the within-subject factor, and condition (rumination, distraction, co-rumination, co-distraction) as the between-subject factor were conducted on relationship quality (as measured via the IPPA and participants' report of feeling listened to by the experimenter) and closeness, respectively.

For relationship quality measured by the IPPA, there were no significant main effects of time,  $F(1, 63) = 0.02$ ,  $p = .894$ ,  $\eta^2_p < 0.00$ , or condition,  $F(3, 63) = 0.11$ ,  $p = .952$ ,  $\eta^2_p < 0.00$ . The condition by time interaction also was not significant,  $F(3, 63) = 0.83$ ,  $p = .484$ ,  $\eta^2_p = 0.04$ .

For relationship quality measured based on participants' report of feeling listened to by the experimenter, there were no significant main effects of time,  $F(1, 63) = 0.46, p = .502, \eta^2_p < 0.00$ , or condition,  $F(3, 63) = 0.40, p = .752, \eta^2_p = 0.02$ . The condition by time interaction was also non-significant,  $F(3, 63) = 1.12, p = .347, \eta^2_p = 0.05$ . These results are presented in Figures 4A and 4B.

Second, for closeness, there were non-significant main effects of time,  $F(1, 63) = 0.09, p = .762, \eta^2_p < 0.00$ , and condition,  $F(3, 63) = 1.02, p = .391, \eta^2_p = 0.05$ , as well as a non-significant condition by time interaction,  $F(3, 63) = 1.19, p = .322, \eta^2_p = 0.05$ . These results are presented in Figure 4C.

## Discussion

When encountering stress, people can choose to manage their emotions in a variety of ways. Although research has focused on emotion regulation at the intrapersonal level, it typically does not end there, given that many people reach out to others for support (Zaki & Williams, 2013). Thus, this current study was the first to experimentally examine how rumination and distraction, compared to the IER strategies of co-rumination and co-distraction, may alter affect and relationship quality and closeness, in response to stress.

The results for the first hypothesis were more nuanced than expected. I initially predicted that rumination and co-rumination would show significantly higher levels of negative affect after the emotion regulation conditions compared to distraction and co-distraction. I also predicted that co-distraction would show significantly lower levels of negative affect after the condition compared to distraction. However, I found that participants in the rumination and co-rumination conditions did not report significantly higher negative affect compared to participants in the distraction and co-distraction conditions. Additionally, participants in the co-distraction condition did not report significantly lower levels of negative affect, relative to participants in the distraction condition. Instead, follow-up analyses indicated that negative affect declined from before to after the emotion regulation conditions for participants in the distraction and co-distraction conditions, whereas there was no significant change for participants in the rumination or co-rumination conditions. Moreover, when comparisons were made across conditions, findings indicated that negative affect declined significantly more for participants in the distraction condition compared to those in the rumination or co-rumination conditions. In terms of the second hypothesis, I expected that co-rumination would result in higher relationship quality and closeness with the experimenter compared to all other conditions. However,

relationship quality and closeness showed no significant difference across any of the emotion regulation conditions.

The results of the first hypothesis were more complex than expected. Independently, participants in the distraction and co-distraction conditions reported significantly decreased negative affect, whereas those in the rumination and co-rumination conditions reported no significant change in negative affect. When directly compared, the results indicated that distraction decreased negative affect, compared to rumination and co-rumination. While researchers typically find that rumination increases negative affect, some studies also suggest that rumination can maintain negative affect, indicating mixed results (e.g., Broderick, 2005; Denson, Moulds, & Grisham, 2012; Lawrence & Schwartz-Mette, 2018). This may be influenced by the sample of participants. For instance, participants with Major Depressive Disorder (MDD) commonly show increases in negative affect after ruminating and reduced negative affect after distracting (LeMoult & Joormann, 2014; LeMoult, Yoon, & Joormann, 2016; Watkins & Brown, 2002). On the other hand, studies with samples of healthy undergraduate students have shown that rumination maintains negative affect and distraction decreases it (Broderick, 2005; Denson, et al., 2012; Lawrence & Schwartz-Mette, 2018). There may be an explanation for these distinct ruminative effects. Individuals with MDD tend to have greater cognitive accessibility to a variety of negative thoughts and memories, activated by their clinically low mood (Beck, 1967; Nolen-Hoeksema et al., 2008). When asked to ruminate, individuals with MDD may have more negative cognitions to focus on, compared those without this cognitive vulnerability (Nolen-Hoeksema et al., 2008). Thus, in healthy undergraduate students without the same degree of accessibility to negative cognitions, rumination may not produce the same impact on negative

affect (Ciesla & Roberts, 2007). Therefore, the current study's findings are consistent with past research using a healthy undergraduate sample.

The direct comparison of intrapersonal and IER strategies is far less common in the literature. First, the unique comparison of co-rumination and distraction, showed that distraction was more effective at reducing negative affect than co-rumination, which is in line with separate bodies of research highlighting these effects (Singer & Dobson, 2007; Spindel et al., 2017). Although no other experimental study has compared these two strategies to date, one study has compared co-rumination and distraction using EMA methodology (Stone et al., 2019). Even though Stone and colleagues did not statistically compare co-rumination with distraction, general findings posit that distraction was more effective at reducing negative affect for females than males, and co-rumination was the least effective at reducing negative affect for both genders. Although the current study was not sufficiently powered to assess gender as a moderator, the findings are similar to Stone et al., (2019)'s findings, whereby distraction was more helpful than co-rumination at reducing negative affect.

Second, findings of the current study suggest that rumination and co-rumination produce similar patterns of maintaining negative affect. While not identical constructs, rumination and co-rumination are derived from overlapping theoretical backgrounds (Response Styles Theory, Coping Literature; Nolen-Hoeksema, 1991; Rose, 2002), and empirically produce parallel maladaptive emotional consequences (e.g., depressed mood, Olatunji, Naragon-Gainey, & Wolitzky-Taylor, 2013; Spindel, Simonds, & Avery, 2017). To my knowledge, only two studies to date have directly compared rumination and co-rumination's effects on emotion. In a daily diary study, Nicolai, Laney, and Mezulis (2013) found that the use of rumination and co-rumination in response to stress similarly predicted an increase in depressive symptoms over



time. Additionally, Stone et al., (2019) found that adolescents' day-to-day use of rumination and co-rumination did not differ in their effects on negative affect. Thus, as suggested by the current study and past research, rumination and co-rumination produce similar affective consequences. Moreover, the current study adds to the dearth of literature comparing these intrapersonal and IER strategies.

The study findings may inform emotion regulation recommendations for real-world use and have important health implications. When encountering stress, choosing to ruminate or co-ruminate may present similar affective consequences compared to distracting oneself, which may be more effective at relieving negative feelings. Research shows that relieving negative affect, via distraction, can facilitate effective problem-solving, whereas ruminating on feelings and problems hinders effective adaptation to the problem at hand (Nolen-Hoeksema et al., 2008; Yoon, & Joormann, 2012). Rumination tends to produce cognitions around problems, such as hopelessness regarding the situation and believing that the problem is unsolvable (Nolen-Hoeksema et al., 2008; Lyubomirsky et al., 1999). Empirical studies show that participants assigned to distract immediately after a negative mood induction, tend to be more effective at solving an interpersonal problem than those who ruminate (Yoon, & Joormann, 2012). Hence, distraction may reduce negative affect and facilitate the adaptive response to problems/stressors, compared to rumination which may produce a stagnant response in negative patterns of feeling and thinking, making it difficult to discover solutions to the cause of distress. Furthermore, there are health implications regarding the use of rumination and co-rumination compared to distraction. The prolonged maintenance of negative affect is associated with risk for mental illness (e.g., depression), and other vital health concerns such as coronary heart disease and cardiovascular disorders (Kubzansky & Kawachi, 2000; Nolen-Hoeksema et al., 2008; Pandey,

& Choubey, 2010). Difficulties managing negative affect does not prepare individuals well for future setbacks and stressors. For instance, the inability to reduce negative affect to manageable levels can heighten cardiovascular response in preparation for upcoming stressors, hindering adaptive responding (Feldman, Cohen, Hamrick, & Lepore, 2004). Taken together, emotion regulation strategies can influence the ability to problem-solve in daily life and may impact mental and physical health in the long-term.

Unexpectedly, the prediction that co-distraction would significantly reduce negative affect compared to distraction, was not supported. This prediction was made based on research suggesting that distraction reduces negative affect and being in the presence of others (e.g., during co-distraction) further reduces negative affect when compared to being alone (Cohen & Wills, 1985; Zaki & Williams, 2013). There may be a methodological reason that the co-distraction condition did not produce its predicted affective outcome. Despite its ability to increase internal validity and reduce the risk of confounds, it is possible that the prompts used from Nolen-Hoeksema and Morrow (1993)'s induction task are not applicable to co-distraction dialogue in the real-world. For example, for one of the prompts in the co-distraction condition, participants were asked to describe the shadow of a stop sign. In friend-dyads, this type of question is quite uncommon. Being asked to describe arbitrary objects and places may fail to decrease negative affect due to perhaps feeling perplexed or awkward. However, no participant in the study explicitly reported feeling confused or uncomfortable during the co-distraction condition. Notably, co-distraction in real-life dyads is likely to take the form of topics related to the individual but diverge from the specific negative feelings and problems related to the stressor (Gelb, 2013). This was implemented in Zelic et al., (2016)'s co-distraction condition, and findings revealed that happiness was the highest in the co-distraction condition relative to the co-

rumination condition. On the other hand, theoretically, distraction can take the form of any neutral entity to focus on (Gross, 1998), including the topics (e.g., shadow of a stop sign) presented in the induction task. While the induction task tends to produce the hypothesized outcome (reduced negative affect) in a myriad of studies (e.g., Lemoult & Joormann, 2014; Naumann, et al., 2015; Park, et al., 2004; Singer & Dobson, 2007), co-distraction may require a more nuanced manipulation in the lab, geared towards mirroring a realistic conversation between friends.

The second hypothesis was not supported, given that there were no significant increases in relationship quality and closeness from the emotion regulation conditions. However, these results should be interpreted with caution given the small sample size. Nonetheless, this was contrary to what we expected for the co-rumination condition, considering the literature shows that co-rumination can be beneficial for relationships (Calmes & Roberts, 2008; Guassi Moreira, Miernicki, & Telzer, 2016; Rose, 2002). There are several important notes regarding the methodology that may serve as explanations for the results. The Fast Friends paradigm (which significantly increased closeness) involved the experimenter speaking naturally without prompts, whereas the co-rumination condition involved the experimenter reading prompts from cue-cards. Due to this procedural difference, the experimenter during the Fast Friends paradigm may have been perceived as an ‘equal’ to the participant, while they both engaged in the “get to know you” task and the participant was presented with information that the experimenter, too, had never completed this task before. In the co-rumination condition, the experimenter read prompts and directed that portion of the study which may have changed the relationship dynamic, perhaps the experimenter was perceived as embodying more of an ‘experimenter’ role. Research regarding interpersonal closeness shows that individuals like others they feel similar to (Montoya, Horton,

& Kirchner, 2008). Therefore, this potential change in the perceived role of the experimenter (and thus reduced similarity) may be one explanation for the absence of increased closeness reported by participants in the co-rumination condition.

In addition, the Fast Friends paradigm may have also improved relationship closeness simply because it involved the experimenter sharing in the discussion with the participant. Participants shared their thoughts and feelings during the co-rumination condition, but experimenters did not. The lack of reciprocal disclosure may have precluded relationship quality and closeness from improving. As a matter of fact, research shows that closeness substantially increases during reciprocal disclosure compared to when it is one-sided (Sprecher, Treger, & Wondra, 2013). Rose et al., (2014) found that mutual encouragement of discussing problems between friends, as a component of co-rumination, was one factor associated with positive friendship quality. When disclosure is one-sided, one partner seems to benefit more than the other. Sprecher and colleagues found that in a modified version of the Fast Friends paradigm with unacquainted strangers, the individual who listened to disclosures from their partner (but did not personally disclose), felt closer to their partner than the individual who disclosed. Thus, it is possible that experimenters during the co-rumination condition felt closer to the participant than the participant felt to them. Only one study to date has experientially manipulated co-rumination in the lab (Zelic et al., 2016). Zelic and colleagues used a similar method, whereby participants exclusively disclosed information. They found that co-rumination did not show higher liking of the experimenter compared to other conditions (Zelic et al., 2016). Given the similar results of the current study and Zelic et al., (2016), future research should directly investigate whether co-rumination is more likely to increase friendship quality and closeness

through a one-sided or mutual discussion of feelings and problems. This may inform the methodology for future studies that choose to manipulate co-rumination in the lab.

### **Limitations and Future Directions**

There are four notable limitations to this study. First, the COVID-19 pandemic precluded my ability to obtain the full intended study sample. This limited the statistical power below 80% (i.e., underpowered sample) and is likely to have impacted the results by reducing the ability to detect true effects (Button et al., 2013). Thus, we plan to continue to collect data to complete the study. We are expected to continue recruitment as soon as the pandemic restrictions are lifted with regards to in-person research at UBC. While this is an unpredictable time, we are considering ways to translate this study to an online format in the interim. This is not only a way to continue the study during the pandemic but may also allow for the expansion of the literature regarding emotion regulation through online modalities. This investigation is important considering the reliance on modern technology for communication. Indeed, people are likely to not only regulate their emotions interpersonally, in-person, but also through online means (Murdock, Gorman, & Robbins, 2015). The examination of IER through online modalities is currently limited in the co-rumination field (Frison, Bastin, Bijttebier, & Eggermont, 2019; Keshishian, Watkins, & Otto, 2016; Murdock, Carlucci, & Balsamo, 2019; Murdock, et al., 2015; Swearingen, Byrd-Craven, & Kennison, 2016) and has not yet been examined with co-distraction. Interestingly, an online and in-person study will also allow comparisons to be made, regarding any differential effects of emotion regulation through these different domains of communication.

Second, it is possible that latent assessments, such as physiological and biological measures, may have provided additional evidence to complement the self-report data. Research

shows that self-report results do not always align with physiological and biological findings in response to stress (Campbell & Ehlert, 2012). Although the emotion regulation conditions produced non-significant differences regarding self-reported negative affect after the conditions, it is possible that the conditions may have produced differences in physiological or biological responding. For instance, after an anger induction, Ottaviani, Shapiro and Fitzgerald (2011) found that participants in the rumination condition experienced increases in heart rate and blood pressure compared to those in the distraction condition. Also, research suggests that stress-related biological markers, such as the stress hormone cortisol and inflammation, produce differential effects after rumination versus distraction. Zoccola & Dickerson, (2012) found that cortisol after a stress induction was higher for participants in the rumination compared to distraction conditions. In terms of inflammation, results showed that rumination maintained heightened levels of inflammation which failed to return back to baseline at the end of the study session, whereas those who distracted had inflammation levels decline back to baseline levels. Heightened and prolonged levels of heart rate, blood pressure, cortisol and inflammation can have detrimental mental and physical health consequences (e.g., metabolic syndrome; Almadi, Cathers, & Chow, 2013; atrophies of the hippocampus; Campbell & MacQueen, 2004; heart disease; Palatini & Julius, 1997). Thus, future research should include these measures in addition to self-report when directly comparing potential differences between the intrapersonal and IER strategies. This would provide additional information regarding the harms and benefits of these strategies.

Third, this current study did not assess emotion regulation strategies beyond the four described, thus it lacks the comparison of other strategies identified by the field. Future research should compare and contrast the various intrapersonal emotion regulations strategies (e.g.,

cognitive reappraisal) and their interpersonal counterparts on affect and relationship quality and closeness. For instance, only one study has investigated cognitive reappraisal in its interpersonal form. Findings of the cross-sectional study by Horn and Maercker (2013), indicated that the use of co-brooding (a subtype of rumination) and co-reappraisal for female and male romantic partners, was associated with more symptoms of adjustment disorder and depression for the female partner. This is contrary to previous research that cognitive reappraisal at the intrapersonal level reduces negative affect and depression symptoms (Gross, 2002; Gross & John, 2003). Perhaps there are differences in affective outcomes for cognitive reappraisal (intrapersonal) versus co-reappraisal (IER). However, more research is needed to fully assess this possibility. Importantly, the investigation of other emotion regulation strategies not included in this current study would facilitate further expansion of the literature comparing intrapersonal and IER strategies.

Fourth, there are inherent strengths and weaknesses of experimental research. Although every effort was made to form a close relationship in the lab, the experimenter-participant relationship may not truly reflect the nuances of a real friendship. For instance, as mentioned previously, while the experimenter may use prompts to direct the discussion (IER conditions), friends do not use prompts to guide conversations. While prompts increased the internal validity of the study, this structured procedure can reduce external validity. Despite this disadvantage, this experimental design allowed the cause-and-effect comparison to be made regarding affect and relationship quality and closeness before and after each of the emotion regulation strategies. More studies using other methodologies are needed to test the extension of these findings. For instance, EMA and larger-scale longitudinal studies may complement the findings of this

experimental study, providing additional evidence, through testing short- and long-term affective and relational consequences of these strategies, in a naturalistic context.

## **Conclusion**

The current study was the first to experimentally compare the intrapersonal emotion regulation strategies of rumination, distraction, and the IER strategies of co-rumination and co-distraction, on affect and relationship quality and closeness. Although the pattern of findings were more complicated than hypothesized, findings suggest a trend towards elucidating the difference between rumination, co-rumination, and distraction on negative affect, whereby rumination and co-rumination maintained negative affect and distraction mitigated it. This study has important theoretical, methodological, and clinical implications. Although intrapersonal and IER research arise from similar theoretical foundations, rooted in emotion regulation literature (e.g., Response Styles Theory, Coping Literature), empirically, these domains are largely studied separately. This current study is the first to bridge this gap. As described previously, this study provides methodological contributions for IER literature which involve furthering the (limited) investigation of IER, experimentally in an emerging adult sample. This study adds to the examination of emotion regulation strategies within various age groups (adolescents, adults) and across methodologies (cross-sectional, experimental) which is fruitful for the empirical expansion of this field. Finally, conclusions may be drawn about the benefits and harmfulness of certain strategies that may shape day-to-day behaviours when encountering negative or stressful events. Hence, the consequences of emotion regulation strategies were highlighted in this study, spanning theoretical, methodological and real-world implications. The continuation of this study as well as future research is also expected to further inform these implications, expanding the parameters of emotion regulation research beyond what is known to date.



## Tables

**Table 1**

*Study measures administered at each time point*

Construct	Pre-Fast Friends	Post-Fast Friends	Post-Nature video	Post-Stress induction	Post-ER
Affect	X	X	X	X	X
Rel. Quality		X			X
Closeness	X	X			X
Potential	X				
Covariates					
Disclosure <sup>a</sup>		X			
Stressor severity				X	
Task concentration					X <sup>b</sup>

*Note.* The study measures are outlined by time point.

<sup>a</sup> Participant-reported experimenter and participant disclosure level during the Fast Friends paradigm.

<sup>b</sup> Amount of time concentrating on the task was only asked of participants in the rumination and distraction condition

**Table 2***Descriptive statistics for the potential covariates*

Variable	Rumination		Distraction		Co-Rumination		Co-Distraction		Range	Possible Range	Skew	Kurtosis
	M	SD	M	SD	M	SD	M	SD				
RRS	23.53	5.84	23.39	6.28	24.94	5.29	21.53	6.95	11-38	10-40	0.43	-0.28
DRS	26.94	6.90	27.44	4.67	26.56	5.23	27.47	7.24	14-43	11-44	0.27	0.20
CRQ	3.57	0.75	3.09	1.03	2.83	0.50	3.49	0.75	1.67-4.89	1-5	0.06	-0.73
CDQ	2.87	0.75	3.04	0.71	2.49	0.76	3.01	0.74	1.39-4.44	1-5	-0.17	-0.69
CES-D	16.41	10.58	19.17	12.81	17.38	7.49	14.41	8.95	1-52	0-60	1.22	2.06
BAI	10.35	8.97	13.11	10.64	11.69	7.83	3.01	0.74	0-42	0-63	1.05	1.16

*Note.* RRS = Ruminative Response Scale; DRS = Distraction Response Scale; CRQ = Co-Rumination Questionnaire; CDQ = Co-Distraction Questionnaire; CES-D = Centre for Epidemiologic Studies Depression Scale; BAI = Beck Anxiety Inventory.

**Table 3***Descriptive statistics for the main study variables*

Variable	Rumination		Distraction		Co-Rumination		Co-Distraction		Range	Possible Range	Skew	Kurtosis
	M	SD	M	SD	M	SD	M	SD				
PANAS												
Positive												
Pre-FF	29.00	7.34	25.56	9.16	21.19	5.79	27.29	6.87	11-47	10-50	0.23	-0.44
Post-FF	28.94	8.07	28.50	9.29	25.13	7.20	30.24	7.12	15-48	10-50	0.28	-0.68
Post-Nature	23.88	7.75	18.83	7.92	19.19	6.29	20.71	5.67	12-45	10-50	1.03	1.19
Post-Stress	23.47	7.96	17.31	20.33	19.25	6.72	18.00	5.00	10-38	10-50	0.68	-0.06
Post-ER	22.94	7.09	18.61	7.65	20.50	8.21	21.35	6.39	10-44	10-50	0.47	0.05
PANAS												
Negative												
Pre-FF	15.71	5.89	16.50	7.14	17.50	6.39	16.12	6.08	10-36	10-50	1.36	1.37
Post-FF	12.47	4.53	13.17	4.02	12.31	2.41	12.18	2.90	10-26	10-50	1.83	3.29
Post-Nature	11.88	3.48	13.50	5.94	12.69	5.75	12.47	2.48	10-33	10-50	2.87	9.27
Post-Stress	16.00	7.42	20.33	7.00	16.06	5.86	16.59	6.47	10-40	10-50	0.97	0.02
Post-ER	14.11	6.70	13.17	5.24	15.63	6.71	12.76	2.86	10-36	10-50	2.14	5.14
Rel. Quality (IPPA)												
Post-FF	92.52	12.15	89.72	11.37	90.38	8.79	92.53	10.49	64-112	25-125	-0.17	-0.61
Post-ER	90.71	11.54	88.67	11.98	90.25	7.93	88.06	10.08	68-112	25-125	-0.02	-0.64

*Descriptive statistics for the main study variables*

Variable	Rumination		Distraction		Co-Rumination		Co-Distraction		Range	Possible Range	Skew	Kurtosis
	M	SD	M	SD	M	SD	M	SD				
Rel. Quality (Exp. Listened)												
Post-FF	6.24	0.90	5.89	1.08	5.50	1.10	6.18	0.95	3-7	1-7	-0.59	-0.47
Post-ER	5.53	1.55	5.33	1.46	5.56	1.36	5.24	1.44	1-7	1-7	-0.70	0.21
Closeness												
Pre-FF	2.45	0.67	2.23	0.57	2.42	0.71	2.71	0.95	1.29-5.71	1-7	1.43	4.33
Post-FF	3.53	0.67	3.83	0.74	3.40	0.73	3.97	1.04	2-6.86	1-7	0.70	2.09
Post-ER	3.30	0.91	3.42	0.93	3.35	0.99	3.64	0.92	1.43-6	1-7	0.05	0.30
Stressor Severity	3.47	1.23	4.11	0.96	3.50	0.97	3.88	0.93	1-5	1-7	-0.45	-0.59

*Note.* Pre-FF= before the Fast Friends paradigm; Post-FF = after the Fast Friends paradigm; Post-Nature = after the nature video; Post-Stress = after the stress induction; Post-ER = after the emotion regulation conditions.

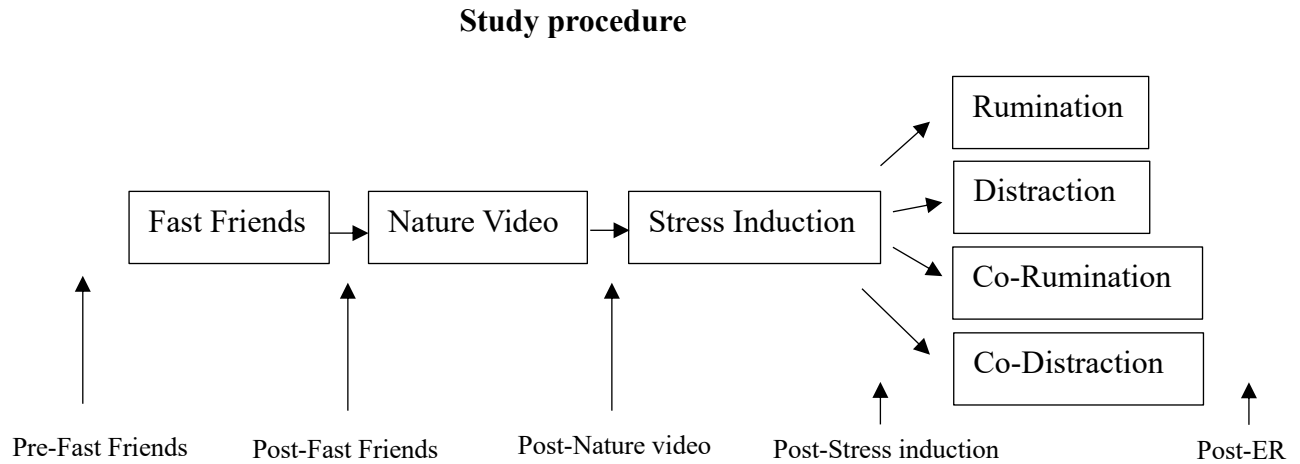
**Table 4***Demographic variables*

Variable	Rumination		Distraction		Co-Rumination		Co-Distraction		Full sample	
	n	%	n	%	n	%	n	%	n	%
Sex										
Male	10	58.8	7	38.9	9	56.3	8	47.1	34	50
Female	7	41.2	11	61.1	7	43.8	9	52.9	34	50
Gender										
Male	10	58.8	7	38.9	9	56.3	8	47.1	34	50
Female	7	41.2	11	61.1	6	37.5	9	52.9	33	48.5
Non-binary	0	0	0	0	1	6.3	0	0	1	1.5
Age (yrs.) <sup>a</sup>										
18	4	23.5	3	16.7	3	18.8	5	29.4	15	22.1
19	2	11.8	4	22.2	5	31.3	3	17.6	14	20.6
20	4	23.5	2	11.1	0	0	1	5.9	7	10.3
21	2	11.8	4	22.2	2	12.5	5	29.4	13	19.1
22	3	17.6	2	11.1	3	18.8	3	17.6	11	16.2
<22	1	5.9	3	16.7	3	18.9	0	0	7	10.4
Culture										
East Asian	5	29.4	8	44.4	7	43.8	8	47.1	28	41.2
European	6	35.3	3	16.7	2	12.5	3	17.6	14	20.6
Middle	0	0	0	0	1	6.3	0	0	1	1.5
Eastern										
Hispanic	1	5.9	0	0	0	0	0	0	1	1.5
South Asian	1	5.9	3	16.7	1	6.3	3	17.6	8	11.8
Other <sup>b</sup>	4	23.5	4	22.2	5	31.3	2	11.8	16	23.6

*Note.* Participants in the rumination ( $n = 17$ ), distraction ( $n = 18$ ), co-rumination ( $n = 16$ ), and co-distraction ( $n = 17$ ) conditions make up the total sample ( $N = 68$ ). <sup>a</sup> One participant in the rumination condition did not report their age. <sup>b</sup> One participant identified as Black, Canadian, and European, two participants identified as European and East Asian, one participant identified as European, East Asian, and Indigenous, one participant identified as Hispanic and East Asian, and finally, six participants identified as Asian

## Figures

**Figure 1**

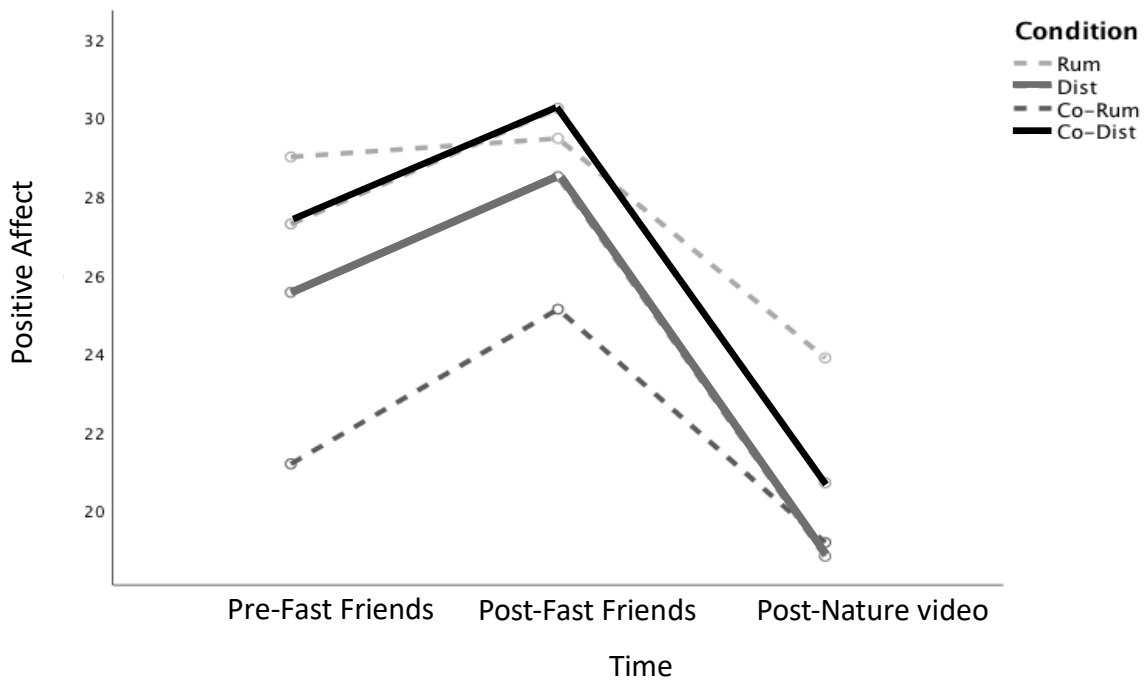


*Figure 1.* The study procedure from beginning to end of the study session. Pre-Fast Friends = affect, closeness, and potential covariates assessment. Post-Fast Friends = affect, relationship quality, disclosure of experimenter and participant, and closeness assessment. Post-Nature video = affect assessment. Post-Stress induction = affect and stressor severity assessment. Post-ER = affect, relationship quality, and closeness assessment. The amount of time spent concentrating on the task was asked of the participants in the rumination and distraction conditions.

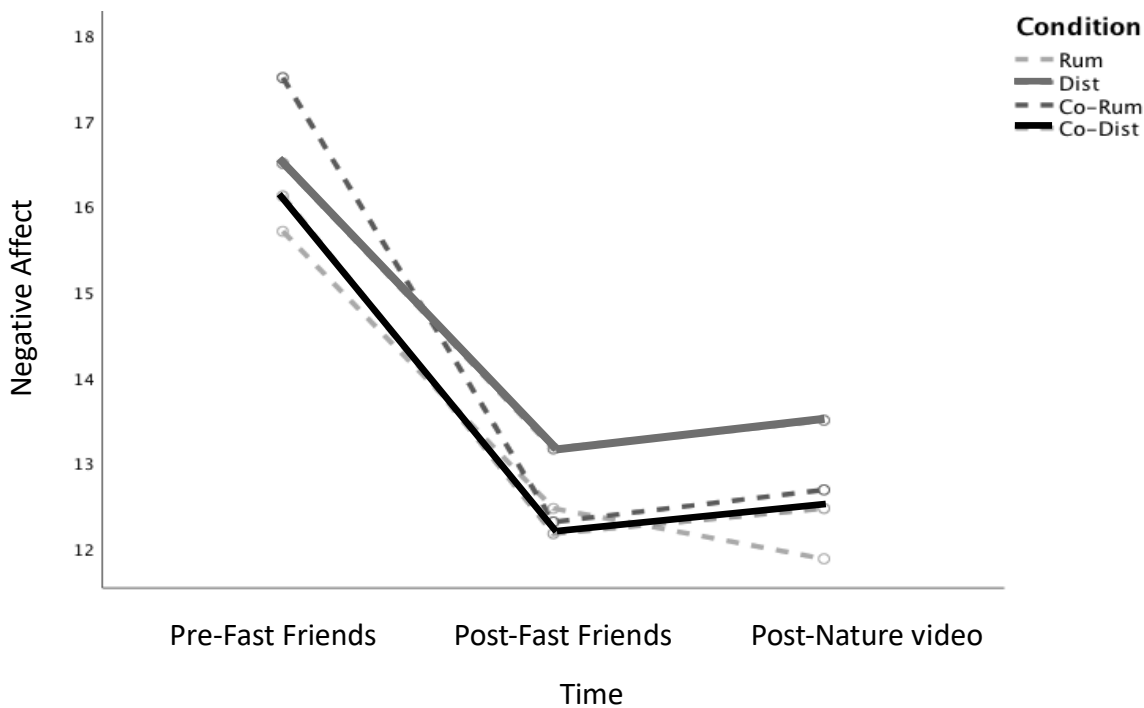
**Figure 2**

**Nature Video Manipulation Check**

**A.**



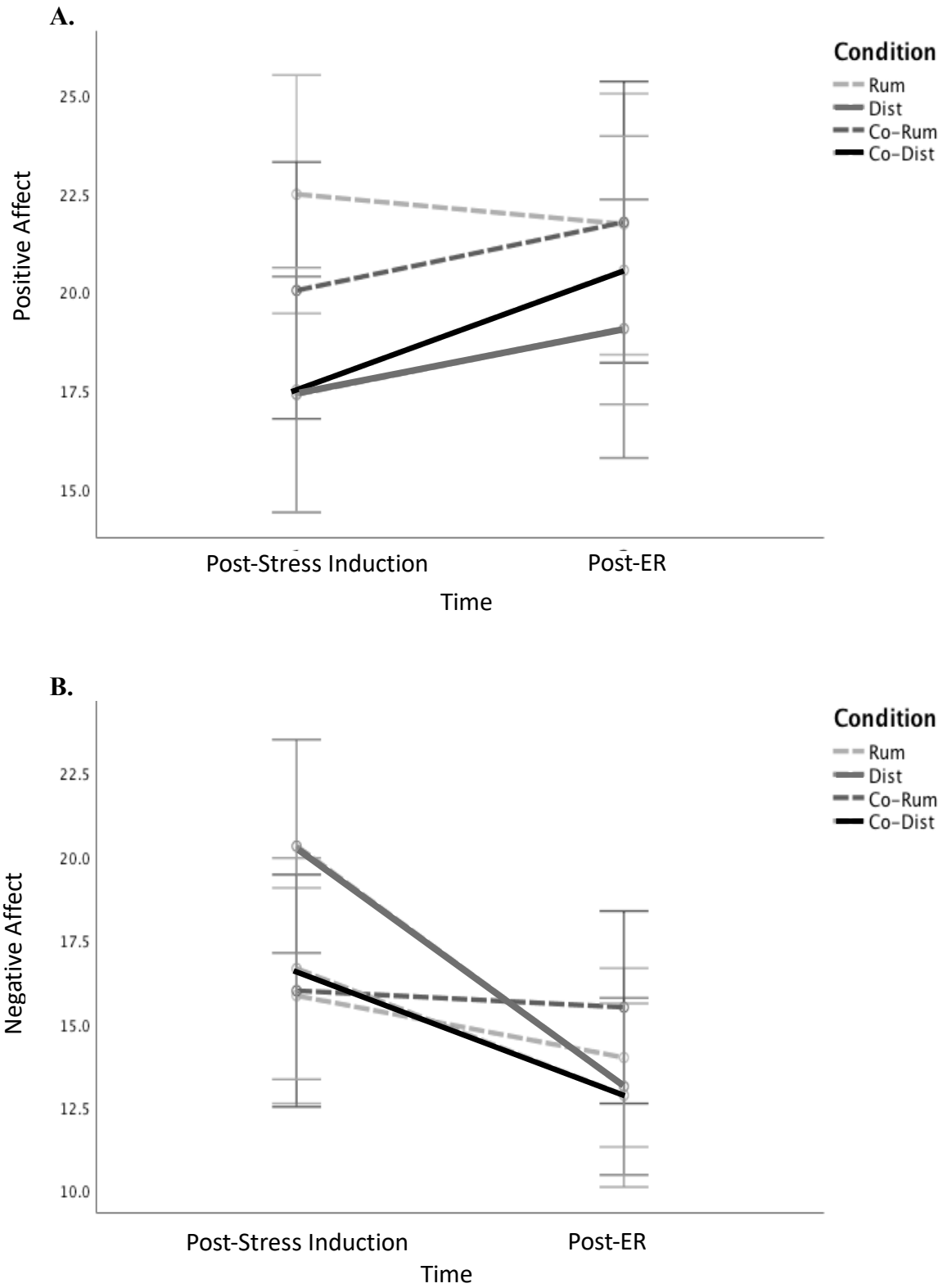
**B.**



*Figure 2.* (A) Positive affect from pre-Fast Friends to post-Fast Friends to post-Nature video, (B) Negative affect from pre-Fast Friends to post-Fast Friends to post-Nature video

**Figure 3**

**Hypothesis 1**

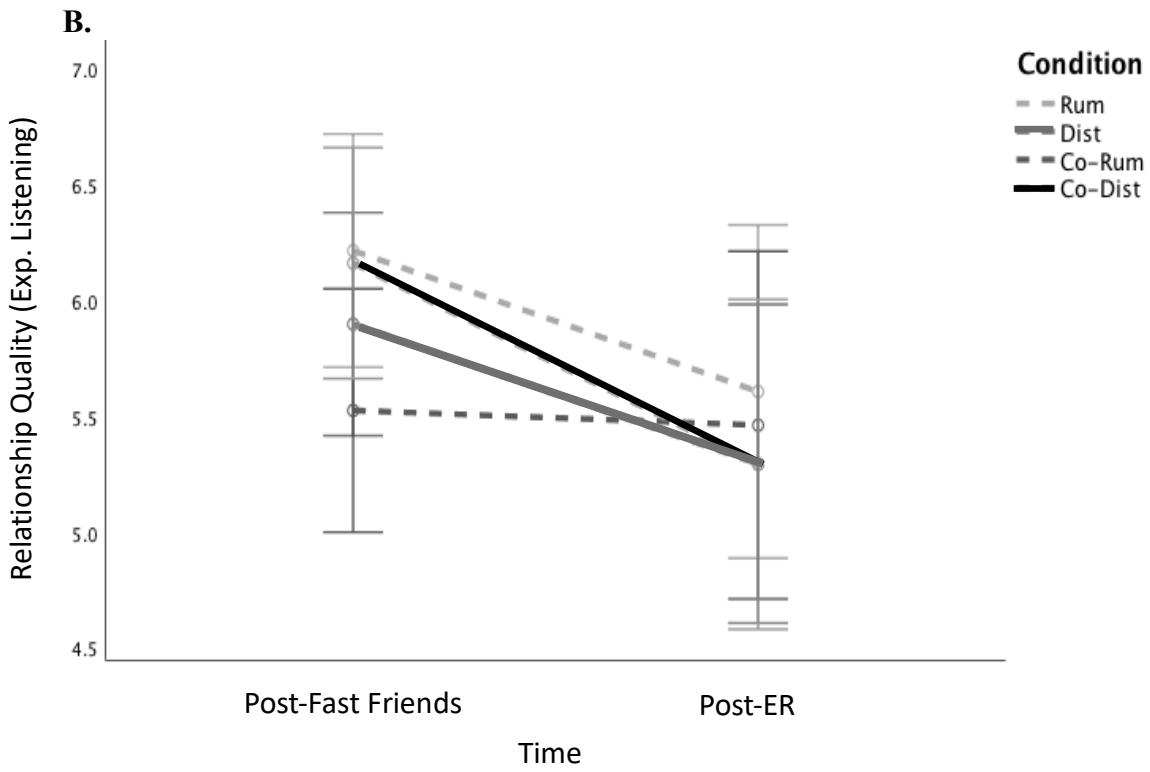
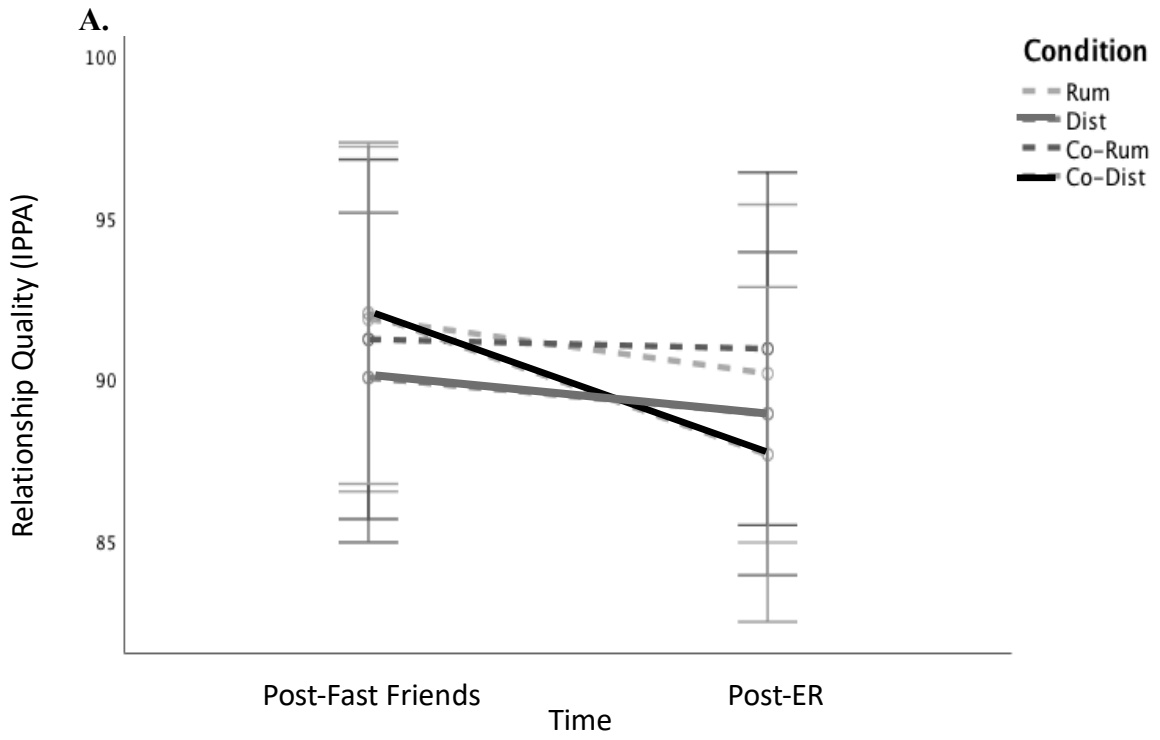


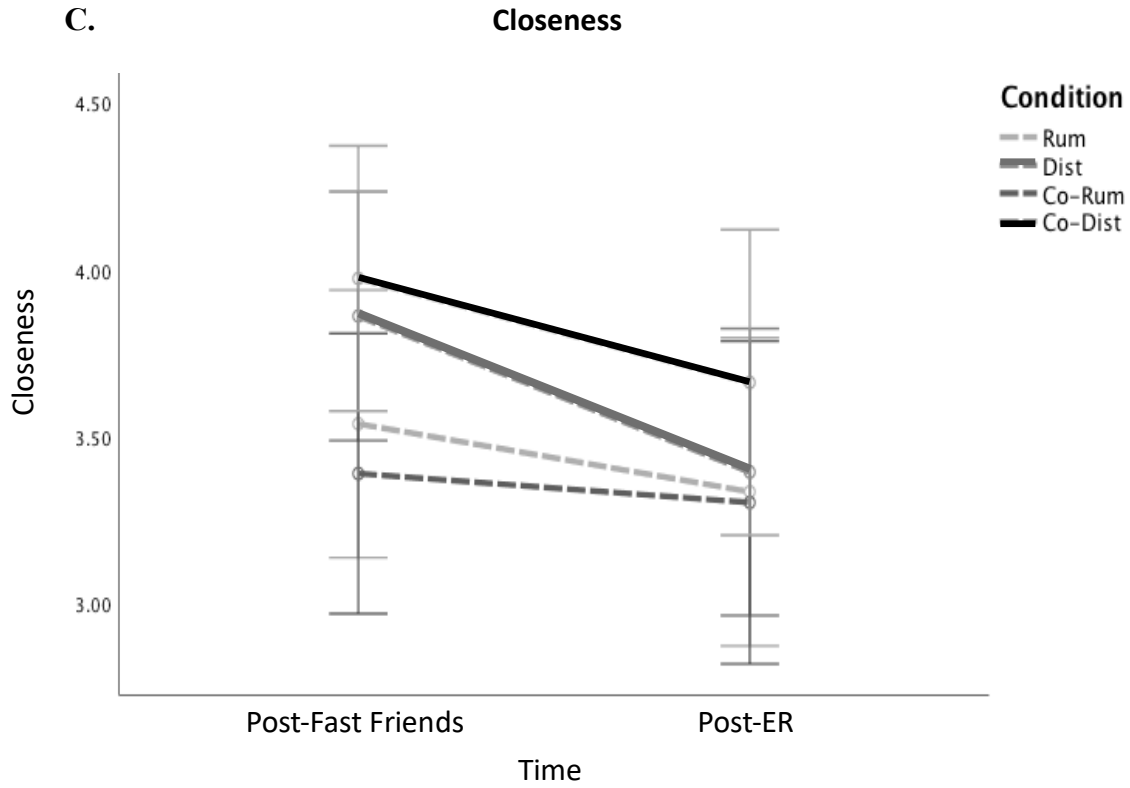
*Figure 3.* (A) Positive affect from pre- to post-ER and (B) Negative affect from pre- to post-ER.



Figure 4

Hypothesis 2





*Figure 4.* (A) Relationship quality measured by the IPPA pre- to post-ER, (B) Relationship quality measured by experimenter listening from pre- to post-ER, and (C) Closeness from pre- to post-ER

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## Appendix A – Self-Report Measures

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### Demographics Questionnaire

Please fill in the following questionnaire. If you are uncomfortable answering any of the questions you may leave it blank.

**Please indicate your biological sex:**

- Male
- Female
- Other

**What is your gender?**

- Male
- Female
- Other

**What is your age?**

\_\_\_\_\_

**What year of study are you currently in?**

- 1<sup>st</sup>
- 2<sup>nd</sup>
- 3<sup>rd</sup>
- 4<sup>th</sup>
- Other

**How Fluence is your English?**

- 1 (Not fluent)
- 2
- 3
- 4
- 5
- 6
- 7 (Completely fluent)



**What is your cultural background? (check all that apply).**

- Aboriginal: First Nation, Inuit, Métis
- East Asian
- South Asian
- Black/African Canadian
- Hispanic
- Middle Eastern
- European
- Other

Positive and Negative Affect Schedule (PANAS)

This scale consists of a number of words that describe different feelings and emotions. Please read each item and then mark the appropriate answer in the space next to that word to indicate how you feel **right now**, that is, at the present moment. Use the following scale to record your answers.

1	2	3	4	5
very slightly	a little	moderately	quite a bit	extremely
or not at allbit				

interested	_____	irritable	_____
distressed	_____	alert	_____
excited	_____	ashamed	_____
upset	_____	inspired	_____
strong	_____	nervous	_____
guilty	_____	determined	_____
scared	_____	attentive	_____
hostile	_____	jittery	_____
enthusiastic	_____	active	_____
proud	_____	afraid	_____

Inventory of Parent and Peer Attachment (IPPA) – Peer Attachment Subscale

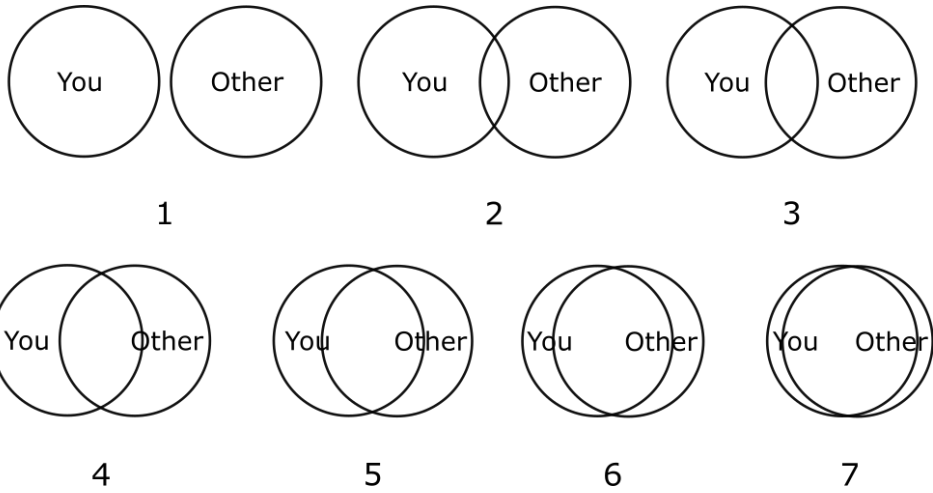
Please indicate whether the following items are (5) almost always or always true, (4) often true, (3) sometimes true, (2) seldom true, or (1) almost never or never true

1. I like to get the experimenter's point of view on things I'm concerned about.
2. The experimenter senses when I'm upset about something.
3. When we discuss things, the experimenter considers my point of view.
4. Talking over my problems with the experimenter makes me feel ashamed or foolish.
5. I wish I had a different experimenter.
6. The experimenter understands me.
7. The experimenter encourages me to talk about my difficulties.
8. The experimenter accepts me as I am.
9. I feel the need to be in touch with the experimenter more often.
10. The experimenter doesn't understand what I'm going through these days.
11. I feel alone or apart when I am with the experimenter.
12. The experimenter listens to what I have to say.
13. I feel the experimenter is a good friend.
14. The experimenter is fairly easy to talk to.
15. When I am angry about something, the experimenter tries to be understanding.
16. The experimenter helps me to understand myself better.
17. The experimenter is concerned about my well-being.
18. I feel angry with the experimenter.
19. I can count on the experimenter when I need to get something off my chest.
20. I trust the experimenter.
21. The experimenter respects my feelings.

22. I get upset a lot more than the experimenter know about.
23. It seems as if the experimenter is irritated with me for no reason.
24. I tell the experimenter about my problems and troubles.
25. If the experimenter knows something is bothering me, they ask me about it.

### Inclusion of Other in the Self Scale (IOS)

Which picture best describes your relationship with the experimenter?



Centre for Epidemiologic Studies Depression Scale (CES-D)

Below is a list of ways people sometimes feel or behave. For each item, please think and indicate how often or how consistently you have felt or behaved this way during the past week by indicating the appropriate response number.

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During the past two months:

- 0 = Rarely or none of the time (less than 1 day)
  - 1 = Some of a little of the time (1-2 days)
  - 2 = Occasionally or a moderate amount of time (3-4 days)
  - 3 = Most or all of the time (5-7 days)
- 

1. I was bothered by things that usually don't bother me.	0	1	2	3
2. I did not feel like eating; my appetite was poor.	0	1	2	3
3. I felt that I could not shake off the blues even with help from my family or friends.	0	1	2	3
4. I felt that I was just as good as other people.	0	1	2	3
5. I had trouble keeping my mind on what I was doing.	0	1	2	3
6. I felt depressed.	0	1	2	3
7. I felt that everything I did was an effort.	0	1	2	3
8. I felt hopeful about the future.	0	1	2	3
9. I thought my life had been a failure.	0	1	2	3
10. I felt fearful.	0	1	2	3
11. My sleep was restless.	0	1	2	3
12. I was happy.	0	1	2	3
13. I talked less than usual.	0	1	2	3
14. I felt lonely.	0	1	2	3
15. People were unfriendly.	0	1	2	3
16. I enjoyed life.	0	1	2	3
17. I had crying spells.	0	1	2	3
18. I felt sad.	0	1	2	3
19. I felt that people dislike me.	0	1	2	3
20. I could not get "going".	0	1	2	3

### Beck Anxiety Inventory (BAI)

Below is a list of common symptoms of anxiety. Please read each item in the list carefully.

Indicate how much you have been bothered by each symptom during the past week including today.

	<b>Not at all</b>	<b>Mildly</b> It did not bother me much.	<b>Moderately</b> It was very unpleasant, but I could stand it.	<b>Severely</b> I could barely stand it.
Numbness or tingling.				
Feeling hot.				
Wobbliness in legs.				
Unable to relax.				
Fear of the worst happening.				
Dizzy or lightheaded.				
Heart pounding or racing.				
Unsteady.				
Terrified.				
Nervous.				
Feelings of choking.				
Hands trembling.				
Shaky.				
Fear of losing				
Difficulty breathing.				
Fear of dying.				
Scared.				
Indigestion or discomfort in abdomen.				
Faint.				

Face flushed.				
Sweating (not due to heat).				



I am going to ask you to think about the *most stressful event in your life*—an event that causes a significant amount of stress for you when remember it now. The event you choose can be something that happened at any time in your life, either recently or something a long time ago.

The event must be one you were personally involved in, and you must have a recollection of being personally involved. Do not pick an event that you heard about from others.

Once you think of an event, I will ask you to audio record a detailed description of the event. You will record your description of the event while sitting alone in this room. The recording will be kept completely confidential. Your tape will be assigned a subject number and stored in a secure place.

Our interest is not about which event you choose, but rather how you describe it. I want you to try really hard to give as much detail as possible by recounting anything you can remember about the event. For instance, you can describe when and where it happened, what happened, and who was involved... just to name some examples. *Be sure to only choose an event that you would feel comfortable discussing.*

I will leave the room to give you some time to select and think about an event and will be back soon.

*[RUNNER leave room. Set timer for 30 seconds. Re-enter room]*

**Were you able to think of a stressful event? [YES/NO]**

**IF YES: Great! On a scale from 1-10, how much stress does this event cause you, when remembering it now, with 1 meaning you do not feel any stress evoked by the memory to 10 being that you feel extreme stress evoked by the memory?**

**IF NO: No problem. Some examples might be...**

- Family conflict
- Financial difficulties
- Friend conflict

**I can give you some more time.** *[Give participant another 30 seconds, then ask them to rate the event they come up with]*

**IF RATED BELOW A 7 (i.e., 1-6): Okay, so it sounds like the event causes you a moderate amount of stress. Is there another event that you would consider**

**to be even more stressful?** IF you haven't already provided them examples, you can offer these:

- Family conflict
- Financial difficulties
- Friend conflict

*[IF YES: Ask them to rate this event from 1-10. If they need more time give them another 30 seconds and re-enter the room asking again how they would rate the event]*

**IF NO: No problem! Let's stick with the event you already came up with. I'll will let you record this now for 5 minutes; I will be back when 5 minutes is up. When you describe the event, please provide as much detail as you can. For example, you can describe when and where it happened, what happened, and who was involved. Try to relive it in your mind's eye exactly as you remember it, including any thoughts or emotions you felt at the time. As a reminder, your recording will be kept completely confidential. Do you have any questions before you begin?"**

**IF RATED 7+ (i.e., 7-10): Okay! I'll will let you record this now for 5 minutes; I will be back when 5 minutes is up. When you describe the event, please provide as much detail as you can. For example, you can describe when and where it happened, what happened, and who was involved. Try to relive it in your mind's eye exactly as you remember it including any thoughts or emotions you felt at the time. As a reminder, your recording will be kept completely confidential. Do you have any questions before you begin?"**