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Humor use during conflict in close relationships

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HUMOR USE DURING CONFLICT IN CLOSE RELATIONSHIPS

BY

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Abstract

Research indicates that finding a way to exit maladaptive, cyclical exchanges during conflict is one of the greatest challenges for members of a dyad "stuck" in these patterns. Humor has been highlighted by positive psychology proponents as an adaptive tool in social functioning and a successful coping strategy. Humor use functions through a cognitive reappraisal mechanism, and is one such way to mitigate conflict in dyads. The current study expands upon prior findings by evaluating the relationship between relationship satisfaction, styles of humor used, and responses to interpersonal conflict (level of distress and perceived closeness) within the relationship. The present study standardized in-the-moment conflict experimentally by using Cyberball to simulate rejection in the dyad, and sought to generalize findings regarding humor use across a variety of dyads beyond just romantic partners. Analyses evaluated outcomes both related to individuals independently, and related to actor-partner interdependence. Results demonstrated a significant actor effect of affiliative humor use on change in feelings of closeness in a subsample of romantic partners only, such that as affiliative humor increased, feelings of closeness remained similar to those reported at baseline. Multiple regression demonstrated that self-enhancing and self-defeating humor were significant unique predictors of cognitive reappraisal and each accounted for a large portion of variance. Finally, an analysis of "in-the-moment" humor use, which was determined by emoji selected to be sent to a study partner following ostracism, demonstrated that self-defeating humor had a significantly more adverse impact on decreased feelings of closeness following ostracism as compared to self-enhancing humor.

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I. Introduction

Interpersonal conflict is ubiquitous and natural. However, interpersonal conflicts have been empirically demonstrated to be highly distressing events with lasting negative effects (Bolger, DeLongis, Kessler, & Schilling, 1989). For example, marital conflict specifically has been associated with myriad adverse outcomes including depression, eating disorders, physical and psychological abuse of partners, problematic drinking patterns, poorer general health, and diseases such as cancer and cardiac disease (Fincham & Beach, 1999). Of course, conflict resolution within close relationships in general is a topic of interest to researchers and clinicians alike (Martin, Puhlik-Doris, Larsen, Gray, & Weir, 2003; Nikolaisen, 2016). Research that investigates factors related to optimally navigating conflict within close relationships has implications for individual mental health and healthy interpersonal functioning within dyads with romantic partners, family members, friends, and coworkers, in a variety of social settings (Everts, 2003; Holmes & Stubbe, 2003; Tannen 2006; Winterheld, Simpson, & Oriña, 2013).

Research indicates that finding a way to exit maladaptive, cyclical exchanges during conflict is one of the greatest challenges for members of a dyad stuck in these types of patterns (Weiss & Heyman, 1997). Humor, a concept highlighted by positive psychology proponents as an adaptive tool in social functioning and a successful coping strategy, may be one such way to resolve aspects of conflict. Research has demonstrated that cognitive restructuring may play a significant role in improved happiness and communication between partners, as well as reduced irrational thinking and conflict in married couples (Okwun, 2011). Humor use, which has been demonstrated to function through a cognitive reappraisal mechanism (Kuiper et al., 1993), may be one such way to

mitigate conflict in dyads. In addition to being associated with good outcomes more generally, humor may provide a beneficial way for individuals to engage with others when faced with challenging interpersonal experiences that arouse emotional discomfort.

Humor use within conflict scenarios has been previously investigated in a variety of contexts and is the focus of the present study, which seeks to build upon prior literature by addressing methodological limitations that have remained unaddressed by former studies. For example, in several studies (Campbell, Martin, Ward, & Winterheld, 2008; Simpson & Oriña 2013), dating couples were video recorded discussing self-selected conflicts, and their conversations were coded for humor use during conflict discussion. Coders were instructed to rate each partner's humor according the categories delineated by the Humor Styles Questionnaire (HSQ). Both the use of couples' conflict discussions and the HSQ coding methods have limitations. First, conflicts discussed by couples may have been susceptible to selection bias, and participants may have been unwilling to discuss more relevant conflict related topics in front of researchers than they would have been willing to discuss privately. Further, by allowing couples to discuss a variety of self-selected topics, the type and intensity of conflict were not standardized across couples. A methodological solution to these limitations is the use of Cyberball to induce conflict between dyads, using deception to make partners believe they are excluding one another. This way, conflict is imposed rather than self-selected, and is standardized across dyads. This method provides an important contribution to both humor and ostracism literatures, as ostracism of close others using Cyberball has surprisingly seldom been assessed empirically.

To the best of this author's knowledge no studies conducted to date have examined specific humor style used by participants in a standardized experimental design and reviewed outcomes related to in-the-moment conflict within close relationships. The current study expands upon prior findings by evaluating the relationship between relationship satisfaction, styles of humor used, and responses to interpersonal conflict, including changes in level of distress and perceived closeness within the relationship. Analyses evaluated outcomes both related to individuals independently, and related to actor-partner interdependence. While prior studies have investigated these relationships in the past by asking participants to either imagine conflict scenarios (Butzer & Kupier, 2008), or allowing dyads to self-select conflict scenarios to discuss in retrospect (e.g., discussion of an argument that occurred the week prior; Campbell, Martin, & Ward, 2008; Winterheld, Simpson, & Oriña, 2013) the present study standardized in-the-moment conflict experimentally by using Cyberball to simulate rejection in the dyad, and seeks to generalize findings regarding humor use across a variety of dyads beyond just romantic partners.

II. Literature Review

A Brief History of Humor

Humor and all of its complexity has interested laypeople and philosophers alike since as early as ancient Greece. Specifically, humor's ability to impact one's well-being has been a topic of interest. Classical Greek theory postulated that the presence of the four "humors" (blood, phlegm, black bile, and yellow bile) within an individual dictated physiological and psychological functioning (Martin, 2003). The Bible echoes this sentiment noting, "a merry heart doeth good like a medicine" (Proverbs 17:22). Over time, the word "humor" has eventually become associated more broadly with mood, and its concept and definition have continued to develop and change throughout history (Martin, 2003).

The word humor has taken on various specific meanings and become associated with varying levels of social acceptability across different classes of people depending on what its definition has encompassed. For example, brash, ridiculing humor in the 17th century was revered for a time, until it was eventually viewed as vulgar during the humanistic movement. In the 18th century, humanists restricted the definition of humor and considered only benevolent, harmless styles to be part of this specific category (Martin, 2003). Similarly, Freud wrote extensively on the psychodynamic formulations that he considered to underlie humor and wit, which coincided with the humanistic view of related concepts (Freud, 1963). In Freud's opinion, what he called "humor" is a healthy defense mechanism that serves to find joy despite adversity, while he described "wit" and "sarcasm" as "means of expressing unacceptable aggressive and sexual impulses" (Martin, 2003 p. 313). Currently, society considers humor to encompass all

those concepts described by the humanists and Freud, and distinguishes between different subtypes of humor (e.g., slapstick, sarcasm, etc.).

Humor and Resilience

Humor has long been defined as an important way individuals and groups have been able to withstand difficult or even highly traumatic events. In Viktor Frankl's famous work "Man's Search for Meaning," which recounted the horrors of living in a Nazi concentration camp, he writes, "humor was another of the soul's weapons in the fight for self-preservation" (Frankl, 1984, p.63). Nardini, a medical officer within the imprisonment camps that contained American prisoners of war (POWs) of the Japanese Imperial Army, emphasized that a "well-preserved sense of humor" was among the most important factors contributing to these prisoners' likelihood of survival (Nardini, 1952, p. 247). Qualitative analysis of interviews with 62 Vietnam POW survivors revealed that humor creation and humor use were essential in these men's resilience, and likely contribute to the amazingly comparable incidences of PTSD between this group and the general population (Henman, 2001). Specifically, the content of most interviews with these men suggests that humor use facilitated both "intrapersonal coping behaviors [and] interpersonal communication of support of one another" (Henman, 2001, p. 85). Thus, this qualitative study suggests that it is (at least in part) the self-preserving and social benefits that result from humor use that promote wellbeing, even under the bleakest of circumstances. This observation is pertinent for the present study, which investigates humor use in a strained social circumstance.

It is worth briefly outlining empirical studies that investigate the role of humor as it relates to resilience, as this relationship has implications for one's ability to withstand a

variety of difficult events. Within literature, resilience has been specifically defined as "the capacity to recover or bounce back" (Davidson et al., 2005, p. 43) and "adjustment under stress" (Cheung & Yue, 2011, p. 353). In one study that aimed to determine the effects of resilience on successful treatment for patients with chronic PTSD, it was unexpectedly found that a single item related to maintaining a sense of humor in response to adversity but not the full resiliency scale it came from was associated with a significant reduction in PTSD symptomology following therapy (Davidson et al., 2005). In fact, the findings were remarkably robust. Endorsement of the item regarding maintaining a sense of humor predicted successful treatment such that per unit increase in score there was a 125% increased chance of successful treatment, and 117-162% increased chance of remission from chronic PTSD (Davidson et al., 2005). This finding gives credence to the notion that one such mechanism by which an individual acquires and/or successfully employs resilience is through humor.

A more focused study that specifically investigated the notion that resilience (including resilience to social difficulties) functions through a mechanism of humor was conducted in a sample of 215 sojourn students who traveled from Mainland China to study at a University in Hong Kong (Cheung & Yue, 2011). The Humor Style Questionnaire (HSQ; Martin et al., 2003) was used to determine the effects of specific humor styles as potentially buffering the effects of acculturative stress on outcome measures related to adjustment associated with moving (e.g., language hassles, study hassles, etc.). Among other findings, results demonstrated that affiliative humor (i.e., humor that seeks to enhance one's relationships with others) significantly positively affected life satisfaction and significantly negatively affected depressed mood. The most

robust effect that emerged from the analyses demonstrated that affiliative humor specifically protected against relational hassles. In fact, affiliative humor also overall consistently buffered against the general hassles associated with acculturation and adjustment in order to prevent depressed mood. Finally, results demonstrated that for some outcome measures, self-enhancing humor (i.e., self-oriented humor that serves to find joy despite adversity) was also associated with resilience and adjustment; however, perhaps unsurprisingly, affiliative humor was noted to be more associated with increased social well-being (i.e., fewer relational hassles) than the other styles, including the self-enhancing style. These findings are pertinent as they relate to the present study, which investigates the positive effects of affiliative humor in a relational conflict scenario.

Humor as a Coping Mechanism

As stated previously, empirical research has demonstrated that the use of humor is generally associated with positive outcomes, and that this is especially true for individuals facing difficult life events. Humor has been qualitatively identified as a coping tool employed by personnel in intense work settings such as emergency rooms (Rowe & Regehr, 2010; van Wormer & Boes, 1997) and violent crime scene investigations (Roth & Vivona, 2010). In three experiments that were published as part of the same study, it was demonstrated that in general, humor significantly moderated the relationship between negative life events and mood disturbance (Martin & Lefcourt, 1983). In the first experiment, 56 students in an introductory psychology course completed the Life Events of College Students checklist, the Profile of Mood States (regarding their mood within the past month), and two humor questionnaires; Situational Humor Response Questionnaire (SHRQ; Martin & Lefcourt, 1984), which provides a

variety of scenarios and asks participants to rate the degree to which they would have found the situation funny, and Sense of Humor Questionnaire (SHQ; Svebak, 1974), which assesses participants' noticing of humor within their environments. Results showed significant moderating effects for various subscales within the humor questionnaires on the relationship between negative life events and total mood disturbance. Specifically, higher scores on the SHRQ (indicative of a higher sense of humor overall) were associated with a weaker relationship between negative life events and depressed moods. Lower scores on the Personal Liking of Humor subscale (i.e., lower scores for the appreciation of humor) were associated with a stronger relationship between negative life events and mood disturbance. The second and third experiments within this larger study (Lefcourt, 1983) incorporated experimental procedures, rather than self-report measures alone, to investigate the effects of both humor appreciation and the ability to generate humorous content during a stressful experience. Findings from these studies were similarly in support of the moderating effect of increased general humor use and humor appreciation on a weaker relationship between negative life events and overall mood disturbance. While the results of this study are in support of the models proposed in the current study, the methods are limited. The humor measures used do not sufficiently account for the styles of humor employed by participants, and the exclusive use of self-report measures fails to adequately assess the effects of humor on in-the-moment responses to a negative life event.

Other research has specifically investigated the link between sense of humor and humor use with tendencies to employ specific coping styles. The Revised Questionnaire on Sense of Humor (revised SHQ; Svebak, 1974), the SHRQ, the Coping Humor Scale

(CHS; Martin & Lefcourt, 1983), and Plutchik's Scale for the Measurement of Coping Styles (Plutchik, 1981) were administered to 55 female and 51 male undergraduate and graduate students (Rim, 1988). Plutchik's scale measures coping styles that reflect his theory of eight primary ego defenses. The eight primary coping styles proposed and measured by the scale include minimization, suppression, seeking succorance, replacement, fault-finding or blame, substitution, mapping, and reversal. Overall, results demonstrated that for both men and women different forms of humor were associated with a tendency to employ certain coping strategies. Specifically, higher scores on the CHS were overall positively correlated with the tendency to use substitution and negatively correlated with suppression. Sensitivity to humorous messages as measured by Sveback's revised SHQ was positively correlated with minimization and negatively with replacement. Finally, the tendency to like humorous situations was positively associated with the tendency to use minimization and negatively associated with suppression and blame (Rim, 1988, p. 563). Results from this study overall demonstrate links between the appreciation and employment of humor, and the tendency to use a variety of adaptive coping strategies as opposed to maladaptive ones.

In another study, 44 female university students indicated the positive and negative events they experienced in a month, completed daily diary measures of daily negative affect using the positive and negative affects scale (PANAS; Watson, Clark, & Tellegen, 1988), and completed four separate self-report measures of humor (Martin, Kuiper, Olinger, & Dance, 1993). Increased self-reported humor use in response to stress, the ability to maintain humor in difficult scenarios, and an appreciation for humor more generally were associated with a more positive self-concept, better cognitive reappraisal

in response to stress, less negative affect in response to adverse life events, and overall more positive affect in response to positive and negative life events.

Together, the results from the above studies demonstrate the relationship between humor use and general wellbeing. Specifically, findings demonstrate the influence humor has on increased positive affect in response to adverse events. These findings have implications for the present study, which in part investigates the role of humor as it relates to wellbeing and improved affect within the self in response to a conflict scenario. However, the methods of these studies are limited as they use exclusively self-report measures rather than incorporating experimental manipulations.

Cognition of Humor

Exploring the interplay between emotional arousal and cognitive responses to stimuli is pertinent to understanding the function of humor both in relationships, as will be explored in the present study, and as a general individual coping mechanism. Further, it will be important to keep in mind the different cognitive functions underlying humor and how humor functions to regulate one's affect or emotions in order to better understand the results of the present study. There are two primary conceptualizations that are frequently cited within the literature to explain humor cognition, the underlying process that allows humor to function as a coping mechanism: 1) incongruity-based and 2) via reappraisal. The literature on these two conceptualizations is summarized briefly below.

Humor as Incongruity-Based

In the first theoretical view, humor cognition is understood as incongruity-based. Nerhardt (1977) demonstrated that the increased level of a joke's funniness related to

greater disparities between the mental representations within a joke (i.e., greater incongruence between the expectation set in the body of the joke and the punchline). To demonstrate this, he had participants attempt to lift weights in succession. The final weight was significantly discrepant from what it was expected to weigh. An increased discrepancy between the expected weight and the actual weight of this final weight was related to increased smiling and/or laughter elicited in the participant (Nerhardt, 1977).

One type of humor that involves the juxtaposition of incongruencies to an extreme is "gallows humor," an excellent example of humor used to mitigate negative emotional arousal. Gallows humor refers to a type of humor in which a seemingly hopeless situation is made more tolerable through absurd and nonsensical (and often crude or politically incorrect) joking. The term originated from jokes that were made by or about men on death row, which made light of their hopeless situations. For example, Kuhlman describes a joke made by a man who is about to be executed via hanging in the gallows: "When the executioner offers him a last cigarette before the blindfold, he responds: 'No thanks I just quit yesterday'" (Kuhlman, 1988, p. 1085). Gallows humor has been described as using the "juxtaposition of morbid and farcical elements" (i.e., incongruent elements) and as a "humorous response that appears inappropriate or illogical in the face of hopeless situations" (Rowe & Regehr, 2010, p. 449). Kuhlman (1988) discusses gallows humor through a quasi-dynamic lens: "[Gallows humor] proposes an illogical, even psychotic, response to irresolvable dilemmas and offers a way of being sane in an insane place. The psychotic qualities of gallows humor should not be underemphasized, but such an attitude is different from genuine psychosis because it is voluntarily taken on. It is controllable and therefore enjoyable. It allows one to save face in certain defeat…It

is a coping mechanism" (p. 1085). By juxtaposing incongruent elements (e.g., citing quitting smoking in an effort to prioritize health and longevity while awaiting his own inevitable sudden death by execution), the prisoner arriving at the gallows in Kuhlman's example illustrates a humorous concept, releasing tension, and thus making a highly threatening situation more tolerable. Importantly, in this example, the incongruous elements are not necessarily resolved, exemplifying how incongruency of the joke elements alone can be sufficient to describe the underlying processes involved in this type of humor.

Suls (1972, 1983) also describes a more complex cognitive process underlying other humor, as occurring within a two-stage "incongruency resolution" model. In stage one (incongruity detection) an individual perceives an element of a narrative as incongruous. In stage two (resolution), this element is resolved. In other words, in this model humor does not merely contain typically incongruent elements but also combines them in an unexpected way, which elicits a joyful reaction. He cites the following joke in which a parent calls a doctor for help regarding a baby as an example of such humor: "'Doctor, come at once! Our baby swallowed a fountain pen!' 'I'll be right over. What are you doing in the meantime?' 'Using a pencil'" (Suls, 1983, p. 45). This model, in which the incongruity is resolved in an unexpected, humorous way, is (according to Suls) observed more frequently in humor used by adults than is the model which contains incongruency alone.

Suls notes that perhaps both the incongruency model and the incongruency-resolution model are necessary to describe the underlying cognitive processes of humor, and how humor elicits a response across different scenarios. He proposes that perhaps

when incongruity between the elements of a joke are extremely divergent (i.e., expectation and outcome drastically differ as in Nerhardt's weight example and Kuhlman's gallows example) that an individual is aware that "no resolution is possible and as a result perceives no need to attempt a 'fit'" (Suls, 1983, p. 49). On the other hand, he notes that if the incongruent elements of the joke are within an expected range, a possible "resolution becomes more salient and engenders frustration if it is not found" (Suls, 1983, p. 49). In all, the incongruence and incongruence-resolution models both appear necessary to describe underlying cognitions of different styles of humor that contain incongruent elements.

There are several issues with the aforementioned incongruency and incongruency-resolution approaches to conceptualizing humor. Firstly it is difficult to determine whether these models pertain specifically to humor comprehension, appreciation, or both (McGehee & Goldstein, 1972). Further, a critique of the incongruency and incongruency-resolution theories notes that the context within which the humor is produced and other external cues (e.g., a smiling face, etc.) contribute to the overall experience of humor and humor appreciation, and are relevant in considering humor as an overarching concept (Leventhal, 1979). A dual level processing model argues there are two levels of judgements that contribute to cognitive appraisal of stimuli: 1. The objective judgment of a stimulus (i.e., the cognition of the structural properties of the incongruency and/or resolution of a joke) and 2. The subjective processing of the stimulus, such as the external cues that accompany the joke (e.g., reactions of others, social climate, etc.). This model, (Leventhal, 1979) makes the case for a more comprehensive approach to understanding and explaining the cognition of humor production and appreciation, which accounts for

the external cues accompanying humor and not merely the structure of jokes. Another critique regarding the incongruency-resolution model specifically (Rothbart & Pien, 1977), is that often the resolution of the incongruence in the beginning of a joke results in even more incongruence, which may also be deemed humorous. Lastly, a final critique of the incongruency and incongruency-resolution models is that there are of course stimuli that are considered humorous that simply do not abide by this structural model at all, and are humorous in their own right (Suls, 1983).

Humor as Cognitive Reappraisal

The second conceptualization views humor as a type of cognitive reappraisal. In this view, humor serves to lessen the intensity of a situation or stimulus, thereby "reappraising" something overwhelming or threatening as more benign and less harmful. Building upon his prior research, Martin and colleagues later investigated the cognitive process by which humor may reduce stress via reappraisal (Kuiper, Martin, & Olinger, 1993). In describing the rationale of this study, the authors note that humor may lessen stress responses to adversity due to two distinct reasons. A humor-driven appraisal process can potentially occur at two points in the cognitive processing of a stimulus or situation: either in the initial assessment of the situation (prior to its being labeled as stressful) or later on, during the reappraisal of a situation that has already been initially appraised as stressful. First, it is proposed that individuals with a disposition towards more frequent humor use (deemed "high humor" individuals) may be less inclined to initially appraise situations as stressful than are their lower humor peers. Second, it is suggested that these high humor individuals may be better positioned to effectively

reappraise situations that they do initially experience as stressful, as ultimately more benign (Kuiper, et al., 1993, p. 82).

The theoretical conceptualization of humor as an effective appraisal strategy to mitigates stress was empirically tested in a sample of 44 female university students who were scheduled to take an exam for an introductory psychology course. The students' levels of humor were measured using the Coping Humor Scale (CHS; Martin & Lefcourt, 1983). Students labeled the exam as either "threatening" or "challenging" in order to distinguished between a negative appraisal of the exam and a more positive appraisal of the exam. The students' cognitive appraisals regarding the perceived challenge and/or threat of the scheduled exam one week prior to, immediately after, and one week following the exam were measured. The students' expectation of how they would perform on the exam were also measured prior to them taking it. It was hypothesized that high humor individuals would appraise a potentially stressful situation (i.e., an upcoming exam) using more challenge-oriented language than threat-related language. The data supported this claim, and high humor individuals did indeed rate the exam in these challenge-oriented terms significantly more than did their low humored peers, both before and after the exam.

It was also hypothesized that high humored individuals would be better able to reappraise events they perceived as stressful compared to their low humor peers. This claim was also supported, as high humor was associated with a tendency to rate the exam in terms related to being "challenging" (which was considered an effective reappraisal of a stressful event) even when scores on the exam were lower than what the students expected. This pattern of ratings observed in high humor individuals was interpreted as

an effective, self-protective way of reappraising a stressful situation. Also notable, low humor individuals had significantly higher scores on the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983), even when exam scores exceeded what the students expected. Overall, these results supported theoretical assumptions that increased humor plays a role in better cognitive reappraisal, which effectively mitigates stress.

Humor as a cognitive reappraisal strategy has implications for individuals' effective management of adverse outcomes following ostracism. As summarized above, empirical data supports the link between general humor use and improved cognitive reappraisal in general and in response to stress. Surprisingly, literature that demonstrates links between various specific humor styles and individuals' tendencies to use cognitive reappraisal as a coping mechanism is lacking.

While the aforementioned studies clearly demonstrate cognitive reappraisal is a mechanism that is related to and potentially underlies humor appreciation, comprehension, and expression, to the best of this author's knowledge only one study (Poncy, 2017) has reported assessments of participants' maladaptive humor use as measured by the HSQ (as measured by scores across the various humor-style subscales) and potential links to their tendency to use cognitive reappraisal specifically as a coping strategy. For this reason, the current study poses an exploratory question regarding the potential association between the employment of each of the different humor styles and individuals' general tendencies to use reappraisal as a coping strategy.

Measuring Humor

Overview of Measurements

The aforementioned observations and studies indicate that humor may be useful in promoting resilience and coping with adverse events, particularly in difficult social circumstances. Some studies reviewed above also point to the benefits of humor as operating through a mechanism of effective cognitive reappraisal, an adaptive coping strategy. However, with the exception of one study which used the HSQ in the methods (Cheung & Yue, 2011), the measures used to assess humor in the other studies failed to differentiate among types of humor use, such as adaptive versus maladaptive or self-oriented versus other-oriented. The HSQ accounts for these aspects of humor.

Over the years, theorists and researchers have attempted to conceptualize various aspects and functions of humor and create humor questionnaires and other measures to study outcomes related to humor. For example, some theorists have focused on different aspects of humor including comprehension of humor, appreciation of humor, expression of humor, and creation of humor (Hehl & Ruch, 1985). Others (Graham, Papa, & Brooks, 1992) emphasized the functions of "why and how people use humor" (DiCioccio, 2012, p. 94). In contrast, others have outlined aspects related to an overall sense of humor (Thorson & Powell, 1993), including "recognition of oneself as humorous, recognition of others' humor, appreciation of humor, laughing, perspective, and coping humor" (Bippus, 2000, p. 397). There are three major theories of humor that have been outlined by various researchers (Meyer, 2000). The relief theory poses that experiencing humor and laughing reduce stress or tension. The incongruity theory poses that people "laugh at what surprises them" (Meyer, 2000, p. 313). The superiority theory poses that public laughter

or private amusement at others serves to elevate the self to a position of superiority. From these theories emerge four key communications functions of humor: identification (i.e., enhancement of speaker credibility by identifying a unifying position or perspective), clarification (i.e., clarifying issues, positions, or social norms, concisely), enforcement (i.e., highlighting and ridiculing deviations from social norms to enforce social norms themselves), and differentiation (i.e., contrasting the speaker with someone who holds an opposing position to make "alliances and distinctions", Meyer, 2000, p. 321). A more recent, simplified conceptualization of humor compared to these complex theories and functions, indicates that it falls along a functional continuum from prosocial to antisocial, emphasizing the unifying or divisive nature of the humor employed (Meyer, 2000).

Among the measurements that have been created related to the above concepts are the Wit and Humor Appreciation Test (WHAT; O'Connell, 1960), the Sense of Humor Questionnaire (SHQ; Svebak, 1974), the Coping Humor Scale (CHS; Martin & Lefcourt, 1983), the Sense of Humor Questionnaire (Ziv, 1984), the Situational Humor Response Questionnaire (SHRQ; Martin & Lefcourt, 1984), the Uses of Humor Index (UHI; Graham, et al., 1992), the Multidimensional Sense of Humor Scale (MSHS; Thorson & Powell, 1993), the Humorous Behavior Q-Sort Deck (Craik, Lampert, & Nelson, 1996), and the Relational Humor Inventory (RHI; De Koning & Weiss, 2002). While these instruments adequately measure aspects of humor such as its use in relation to coping with adversity (e.g., the CHS) or within relationships (e.g., the RHI), none of these measurements provides a comprehensive way to assess specific, different facets of general humor use across a variety of scenarios and contexts. The overarching concepts posed by Freud and the humanists are paralleled most accurately by Martin's more

recently developed measure, the Humor Style Questionnaire (HSQ; Martin et al., 2003), which improves upon the limitations of other humor measures. In developing this questionnaire, the authors sought to more appropriately account for and measure underlying motives associated with different types of humor use or expression than did previously developed questionnaires that assess humor. As stated previously, humor use, in the contemporary definition and understanding, encompasses the various modes of expressing the jest described by the humanists and Freud. Thus, the development of the HSQ sought to differentiate between these subtypes of what we now consider to be various forms of humor use (rather than the antiquated distinction between humor and wit) for empirical purposes. Similar to the model proposed by Meyer (2000), for the development of the HSQ Martin et al. (2003) described humor as falling along a continuum from benevolent to aggressive. However, the newer Martin et al. (2003) model improved upon the idea that humor could be used to enhance or damage relationships with others, by incorporating humor's functions as related to the self and others. This expanded conceptualization of humor has been described as a "2 x 2 psychological model" that accounts for both the positive and negative humor used, and whether the humor is directed toward the self or others (DiCioccio, 2012, p. 95). Other measures of humor that preceded this scale insufficiently assessed different components of humor, overall measured extraversion, and failed to assess the potentially maladaptive versus adaptive nature of the humor used (Martin, 2003, p. 322). For these reasons, the HSQ is considered a more innovative and comprehensive measurement of humor than the other instruments.

The Humor Styles Questionnaire and Related Findings

As a solution to limitations in prior humor research, Martin et al. (2003) conceptualized, defined, and created a measure for four humor subtypes that seeks to distinguish both between intrapersonal (self-oriented) and interpersonal (other-oriented) functioning, as well as maladaptive and adaptive humor types. The four main humor styles measured by the HSQ are: affiliative humor, aggressive humor, self-enhancing humor, and self-defeating humor. The affiliative humor style is characterized by benevolence and the enhancement of one's relationships with others. Individuals who utilize this humor may engage in self-deprecation at times; however, this humor style nonetheless maintains self-acceptance. Self-enhancing humor is more self-oriented compared to affiliative humor (which is more other-oriented), and is characterized by finding humor even in incongruent elements of life. In other words, self-enhancing humor seeks to find joy despite adversity, by capitalizing on one's ability to avoid negative affect while still acknowledging absurdities and adversities of a circumstance. This definition seems to map nicely onto Freud's concept of good-natured humor as a healthy, self-enhancing defense mechanism. Aggressive humor uses sarcasm and/or disparagement to relieve tension, and is often done at the expense of or with little regard for others. This definition seems to nicely fit with Freud's description of wit, which is related to the expression of otherwise unacceptable aggressive or sexual impulses. Lastly, an individual who uses self-defeating humor allows others to laugh at their own expense, and may even encourage others to disparage them in order to be accepted. Notably, as is evident in the studies outlined below, research using the HSQ suggests that individuals do not use solely one type of humor; therefore, it is important to account for an individual's

concurrent use of different humor styles rather than general humor use or the isolated use of one humor style. This was taken into account in the present study, and concurrent use of multiple humor styles was included in the proposed models and data analyses.

The HSQ has been used in empirical studies to assess outcomes related to the four humor styles outlined above. A meta-analysis across 47 studies that utilized the HSQ with a total of 12,734 participants found that overall self-enhancing humor had a strong positive relationship to mental health generally, and in particular optimism (Schneider, Voracek, & Tran, 2018). In contrast, affiliative humor had a smaller positive association with mental health and was most strongly related to self-esteem. Self-defeating humor had a negative association with mental health, particularly lower self-esteem. Lastly, there were no significant findings regarding aggressive humor and mental health. This meta-analysis provides support for the benefits of humor as related to self-esteem, life satisfaction, optimism, and depression, but did not specifically review studies solely related to conflict resolution. Importantly, aggressive humor was not found to have implications within the self within this meta-analysis; however, it likely has strong implications for relatedness to others, especially during conflict. For example, some studies have demonstrated that perceived aggressive humor in dyads is negatively associated with relational satisfaction or other relational outcomes both independent from (Cann, Zapata, & Davis, 2011) and related to conflict (Bippus, 2003).

Because it is important to understand the separate effects of the different humor styles on specific outcomes, it is worth highlighting some studies independently, rather than only discussing findings broadly from the aforementioned meta-analysis. In one study, the four different humor styles' relationships with various outcome measures

including stable levels of positive and negative affect, resilience, psychological distress, and well-being were closely examined (Cann & Collette, 2014). A sample of 120 undergraduate students completed baseline measures of resilience, distress, and well-being, and then completed the modified Differential Emotions Scale (mDES; Fredrickson, Tugade, Waugh, & Larkin, 2003), which captured peak levels of positive and negative affect daily for seven consecutive days. Results demonstrated that self-enhancing humor, but not the other humor styles, was reliably and significantly related to improved general functioning across all outcome measures. This finding is pertinent, as the present study poses an exploratory question related to the potentially protective nature of self-enhancing humor within the self during a conflict scenario, above and beyond that of affiliative humor.

Other research has investigated how the four styles outlined in the HSQ are associated with measures of self-regulatory abilities, quality of life, and well-being. One such study accounted for the use of multiple humor styles at once, an important way to truly conceptualize the complex use of different humor styles and their relationships with outcomes (Leist & Müller, 2013). The revised German version of the Rosenberg Self-Esteem Scale (Ferring & Filipp, 1996), Satisfaction with Life Scale (Pavot & Diener, 1993) and HSQ were administered to 342 German participants. Participants were also administered the "tenacious goal pursuit" and "flexible goal adjustment" subscales from an instrument developed by Brandstädter and Renner (1990) regarding self-regulatory strategies. Participants' responses on the HSQ were analyzed to assess whether individuals tended to demonstrate a humor "type" as defined by general scores across the various humor styles. Three groups emerged from analyses: 1. Humor endorsers, who

used an above average amount of all styles of humor compared to the sample, 2. Humor deniers, who used a below average amount of all styles of humor compared to the sample, and 3. Self-enhancers, who used a slightly above average amount of affiliative-humor, highly above average amount of self-enhancing humor, and below average amount of aggressive and self-defeating humor. Results demonstrated that humor endorsers had average levels of self-regulation strategies, self-esteem and well-being. Humor deniers had the lowest measures across these outcome measures. Finally, self-enhancers had the highest measures across all outcome measures. Taken together, these findings clearly support the notion that the increased use of affiliative and self-enhancing humor styles in conjunction with the decreased use of aggressive and self-defeating humor is most beneficial, and is generally associated with positive outcomes. The concurrent use of increased positive humor styles and decreased use of negative humor styles as yielding optimal outcomes is proposed in the hypotheses of the current study, which hypothesize that increased affiliative humor and decreased aggressive humor will yield better outcomes both within the self and between close others in a conflict scenario with a close other. Notably, this prior research (Leist & Müller, 2013) used entirely self-report measures, and did not assess the relationship between these variables within an in vivo stress inducing scenario. The present study improves upon this limitation by assessing outcome measures related to humor use in a standardized experimental manipulation that simulates conflict in dyads. Further, this research used a translated version of the HSQ due to the language constraints of their population, which was entirely German-speaking. The present study used the HSQ in its original English format.

Humor in Social Functioning

Humor use generally has implications for improved social functioning, even in the absence of conflict. This may be because humor facilitates positive interactions, self-disclosure and social probing, the conveying of social norms, discourse management, and social play, among other contributing factors (Lefcourt, 2001; Long & Graesser, 1988). The notion that humor promotes positive social interactions has been observed and empirically supported in an array of contexts such as between romantic partners, in families, and in the workplace (Everts, 2003; Holmes & Stubbe, 2003; Odell, 1996; Tannen 2006; Winterheld, Simpson, & Oriña, 2013).

The specific associations between humor styles and interpersonal abilities that contribute to positive interpersonal outcomes have been identified and investigated empirically. In one such study (Yip & Martin, 2006) several self-report measures including the HSQ, Mayer-Salovey-Caruso Emotional Intelligence Test (Mayer, Salovey, & Caruso, 2002), and the Interpersonal Competence Questionnaire (ICQ; Buhrmester et al., 1988), were administered to 111 undergraduate students. Results demonstrated that self-enhancing humor was positively correlated with emotional management, but that affiliative humor was not related to emotional management. Aggressive humor and self-defeating humor were associated with a self-reported inability to perceive emotions in the self and others. Regarding interpersonal competence specifically, increased self-enhancing humor and increased affiliative humor were positively associated with the initiation of relationships and personal disclosure. Within this study, decreased levels of the maladaptive humor styles (aggressive and self-defeating humor), were associated

with improved ability to assert one's personal rights, provide emotional support, and manage conflicts (Yip & Martin, 2006).

These results have important implications for the present study, as the concurrent increased use of adaptive humor styles and decreased use of maladaptive humor styles likely have optimal outcomes in social scenarios in general. This was accounted for within the present hypotheses and proposed models. Notably, a major limitation of the prior study is that the authors used exclusively self-report measures to assess the relationships between these variables. The current study improves upon this limitation by assessing the impact of humor use on outcome measures within a standardized experimental scenario.

Humor Use in Close Relationships

Although the scope of this study seeks to generalize findings beyond just romantic partnerships, it is worth reviewing literature related to romantic relationships as much relational research regarding close others investigates this population specifically. In one study, (Butzer & Kupier, 2008) the effects of relationship satisfaction and type of scenario (pleasant vs. conflict) on the type of humor used between romantic partners were investigated. First, the study prompted 155 undergraduate students to consider one of two scenarios. The conflict scenario prompted participants to imagine their romantic partner had eaten lunch with someone of the opposite sex, and the pleasant scenario prompted students to consider and mentally review a hypothetical, pleasant conversation with their partner. Then, students completed self-report items related to what the authors deemed to be three different styles of humor use: positive humor, negative humor, and "avoiding humor" (i.e., humor used to avoid difficult topics). Participants also completed the

Relationship Assessment Scale (RAS; Hendrick, 1988), a self-report, Likert-scale measure of relationship satisfaction for which higher mean scores indicate greater satisfaction with one's relationship.

Results demonstrated that students reported using positive humor most often with their romantic partners, using "avoiding humor" moderately, and using negative humor the least. Results also showed that individuals who reported being more satisfied in their relationships also reported using more positive humor and less negative humor, regardless of whether the experimental scenario was pleasant or related to conflict. This study has important implications for the proposed study's model, in which relationship satisfaction is a proposed independent variable that predicts the levels of affiliative (i.e., positive) and aggressive (i.e., negative) humor used during a conflict scenario. However, the methods used were limited, as they failed to administer a standardized measure assessing specific humor styles (such as the HSQ) and the authors created their own items to assess participants' humor use. Further, while the methods were experimental and not entirely based in self-report (i.e., asking participants to imagine scenarios), they failed to assess participants' reactions to conflict or other real (rather than imagined) in-the-moment scenarios. The present study accounts for these limitations, by using the HSQ to assess participants' humor, and assesses reactions to conflict in-the-moment via a Cyberball ostracism paradigm.

Aggression and Humor

An important factor related to humor production and processing that is pertinent to the present study is the context within which is it produced. Numerous theorists have suggested that in some way, anxiety and/or aggression are related to the production of

humor. Again, Freud (1960) cited "wit" (which he distinguished from humor, but which for the purposes of this study will be discussed in the contemporary sense as a subcategory related to aggressive humor) as aggressive and ridiculing. In his book "The Act of Creation," Koestler (1964) suggests that the same process of bisociation that underlies art and scientific discovery is also what is responsible for the creation of humor. In other words, these acts of creation (science, art, and humor) all result from "bisociation – the perceiving of a situation or idea in two habitually incompatible frames of reference" (Suls, 1983, p. 40). The deciding element that dictates the type of emotion elicited from the bisociation process is the "climate" in which the process occurs. For example, he notes that science and art are experienced within neutral emotional climates, and that these activities may typically elicit respect or sympathy from an individual. In contrast, Koestler notes that when the bisociation process occurs in a climate of anxiety or aggression, the result is humor due precisely to the circumstances of the climate in which the process takes place (Suls, 1983). In this conceptualization, anxiety or aggression are in fact necessary components of all humor, not just some types. Perhaps within this conceptualization, humorous art occurs when the art is either produced or perceived within a larger context of anxiety or aggression.

Theorists and researchers have suggested that in general, humor decreases aggression (Baron, 1993). However, results regarding the effects of aggressive humor on actual aggressive tendencies or behavior are mixed. Some research has shown that exposure to hostile humor is more effective than exposure to nonhostile humor at managing underlying aggression. For example, during the American civil rights era, a group of 144 Black, male civil rights activists were first exposed to arousing and control

materials (e.g., a speech by a segregationist vs. noninflammatory race relations discussion, etc.) and then were exposed to either hostile or nonhostile humor (Singer, 1968). In the hostile humor condition, a Black comedian performed a humorous (albeit hostile/aggressive) anti-segregationist bit. For example, the content of the performance included things he'd do if he was hypothetically elected president someday (e.g., raise taxes, etc.). Results demonstrated that for participants who were initially highly aroused, exposure to and appreciation of hostile humor was associated with reduction of aggression, reduced tension, and lowered residual motivations for aggression. This finding gives credence to Freud's (1960) theory that aggressive humor (again, what he called "wit") serves a cathartic function for aggressive impulses. Interestingly, results also showed that for participants who were initially moderately (rather than highly) aroused, exposure to both nonhostile and hostile humor was associated with reduced self-reported aggression on a mood adjective checklist, suggesting that exposure to both types of humor were effective in reducing aggression for these individuals.

A later study (Baron, 1978) had contradicting findings. In this experiment, 41 male undergraduate students were made to believe they were participating in an experiment regarding first impressions. The students were divided into two groups: those that received positive feedback from a male confederate, and those that received derogatory feedback. These methods were validated as effectively producing differing levels of anger in the participants in a previous study. The participants were then exposed to one of three sets of stimuli: neutral images, nonhostile humor cartoons, and hostile humor cartoons. Finally, all participants were then given 20 opportunities to aggress against the confederate via an electric shock with whatever intensity level they chose.

Results demonstrated that in comparison to the neutral condition, participants in the nonhostile humor condition aggressed against the confederate significantly less. In contrast, those participants in the hostile humor condition exerted significantly more aggression against the confederate compared to those exposed to neutral stimuli.

Overall, findings regarding aggressive humor's influence on outcomes related to the management of actual aggressive tendencies have been mixed. The concepts outlined above are important to keep in mind, as conflict between dyads (the focus of the present study) is a situation in which anxiety and aggression are likely elements that influence the interactions between close others. Additionally, it is also important to keep in mind that in contrast to the two aforementioned studies (Singer, 1968; Baron, 1978), the present study focuses on participants' humor use, rather than their exposure to aggressive or non-aggressive humor. In order to measure participants' general potential for aggressive responses to arousing scenarios, items related to potentially frustrating scenarios were administered from the Anger Response Inventory (ARI; Tangney et al., 1996). An exploratory question regarding participants' anger, humor use, and arousal following conflict is posed in the present study.

Understandably, outcomes related to aggressive humor use likely differ when measured within the self or within a dyad. As it pertains to the present study, results for aggressive humor use as measured by the HSQ specifically have been mixed within conflict discussion paradigms. For example, one study demonstrated that the effects of different humor styles used for different individuals may vary when conflict is discussed within dyads. In this study (Winterheld, Simpson, & Oriña, 2013) 96 heterosexual dating couples were video recorded discussing self-selected prior conflicts that the dyads had

experienced, and researchers coded these discussions for humor use. Behavioral coding was done by trained research assistants using ratings that corresponded to the four humor styles outlined by the HSQ. Subsequently, the authors analyzed data using an actor-partner interdependence model. One finding demonstrated that individuals tended to use more affiliative and less aggressive humor to communicate with anxious and distressed partners. There were mixed results for the use of aggressive humor, which was described as being detrimental in some scenarios but not others, depending on the intensity of the conflict and the attachment style or other aspects (i.e., vulnerability) of the partner to whom the humor is directed.

Humor Use for Conflict Resolution

Interpersonal conflict is ubiquitous and natural within relationships. Interpersonal conflicts have been empirically demonstrated to be highly distressing events with lasting negative effects (Bolger, DeLongis, Kessler, & Schilling, 1989). As one example, marital conflict specifically has been associated with myriad adverse outcomes including depression, eating disorders, physical and psychological abuse of partners, problematic drinking patterns, poorer general health, and diseases such as cancer and cardiac disease (Fincham & Beach, 1999). However, while conflict itself can evoke negative feelings and be associated with adverse outcomes, it can also have benefits such as the increased understanding of oneself and others (Deutsch, 1973; Shantz & Hobart, 1989). Deutsch (1973) describes how conflict can result in constructive negotiation and problem-solving. Naturally, conflict resolution within close relationships is a topic of interest to researchers. Understanding adaptive and maladaptive conflict resolution has implications for promoting better individual mental health as well as relatedness with romantic

partners, family members, friends, roommates, and coworkers, in various social settings. Some research has demonstrated that cognitive restructuring plays a significant role in improved happiness, reduction of irrational thinking, communication between partners, and the reduction of conflict in married couples (Okwun, 2011). Humor use, which has been demonstrated to function through a cognitive reappraisal mechanism (Kuiper et al., 1993), may be one such way to mitigate conflict in dyads. In addition to being associated with good outcomes more generally, humor may provide a beneficial way for individuals to engage with others when faced with challenging interpersonal experiences that arouse emotional discomfort. Couple and family therapists have cited humor use or "silliness" as an effective method for interrupting conflict cycles or ongoing arguments (Odell, 1996).

Regarding the specific interest of the present study, the HSQ has been used to demonstrate that certain humor styles are useful for navigating interpersonal conflict. In a sample of 98 heterosexual couples (Campbell, Martin, & Ward, 2008) behavioral ratings of humor styles outlined in the HSQ measured humor use, the Perceived Relationship Quality Components Scale (PRQC; Fletcher, Simpson, & Thomas, 2000) measured perceived relationship quality, and the Inclusion of Other in Self (IOS; Aron et al., 1992) scale measured closeness. The IOS scale is depicted in Figure 1. Participants completed the PRQC and then were asked to discuss the most serious unresolved conflict between them in the past 14 days while being video-taped. Following the discussion participants separately completed measures of satisfaction with the conflict resolution, closeness to the partner, and personal distress. Videos were coded using Likert scale ratings to assess for each partner's various styles of humor use as outlined by the HSQ during the conflict discussion. Results indicated that individuals whose partners used affiliative humor

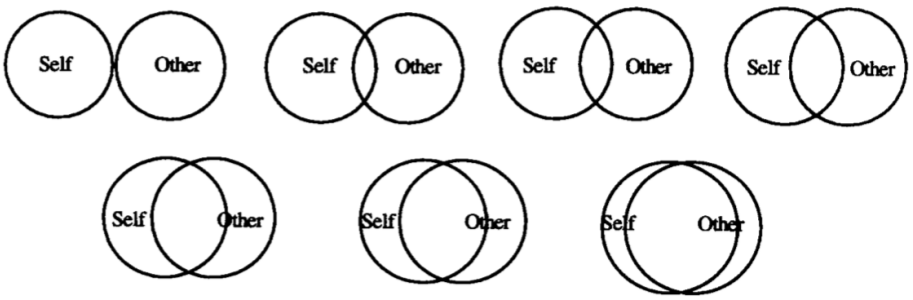

Figure 1. The Inclusion of Other in the Self Scale (from Aron, Aron, & Smollan, 1992).

during the discussion of a conflict reported feeling more relationship satisfaction (as measured by the PRQC). Both actor and partner use of affiliative humor was related to increased feelings of closeness following discussion of a conflict (as measured by changes in pre- and post-ratings on the IOS). Lastly, affiliative humor was associated with that individual feeling that the conflict was more resolved, and the partner toward whom the humor was directed feeling less distressed. In contrast, this study demonstrated generally poorer outcomes across these various measures (i.e., closeness, degree of conflict resolution, and distress) for aggressive humor use. The relationship between aggressive humor use and decreased partner feelings of closeness was marginally significant. Additionally, individuals who used aggressive humor during the conflict discussion reported greater feelings of distress.

While this study supports that some humor styles and patterns of use are more beneficial than others in conflict resolution, the conflict discussed was subject to selection bias (i.e., the couple may choose a lightly conflictual topic). Also, the coding of humor use is also susceptible to observer bias as humor is a subjective, idiosyncratic, personal experience which may be more accurately reflected by general tendencies to use a range of humor types. For example, perhaps a humorous statement a research assistant would find aggressive is understood by both members of the dyad as affiliative or an "inside joke." Finally, the findings may not be generalizable as the sample was exclusively heterosexual romantic couples.

Other research has demonstrated that the effects of different styles for different individuals may vary. Hall (2013) administered the HSQ as well as measures of humor function and relationship satisfaction to a sample of 103 heterosexual couples, and found

that men's use of self- enhancing humor and their partners' use of affiliative humor were related to men's relational satisfaction. As mentioned previously, one study (Winterheld, Simpson, & Oriña, 2013) used an actor-partner interdependence model to demonstrate that in 96 dating couples discussing conflict, individuals tended to use more affiliative and less aggressive humor to communicate with anxious and distressed partners. This study found mixed results for use of aggressive humor, which was described as being detrimental in some scenarios and not others, depending on the intensity of the conflict and the attachment styles or other aspects (i.e., vulnerability) of the partner to whom the humor is directed. The use of self- defeating humor was associated with an individual's dissatisfaction with conflict resolution. Within the same study, results indicated affiliative humor was associated with positive partner responses and greater satisfaction with conflict resolution.

The methodology of the studies reviewed here either exclusively utilized self-report measures completed by partners in the absence of conflict discussions (Hall, 2013), or used raters and behavioral coding systems to assess couples' interactions while discussing a self-selected conflict retrospectively (Campbell & Martin, 2008; Winterheld, Simpson, & Oriña, 2013). Using self-reports exclusively does not provide a full picture of in-the-moment reactions to adverse relationship events, and may be biased based on individuals' perceptions of themselves during conflicts in hindsight rather than their genuine in-the-moment reactions. Also, discussion-based methods may not standardize conflict that occurs across different relationships. Couples recruited in studies that rate videotaped discussions about conflict may impose a selection bias on the conflict material they choose to discuss. Even if a selection bias did not occur, it is difficult to standardize

the level of conflict that is discussed across couples. Despite the many studies underpinning its benefits, humor has overwhelmingly been related to outcomes in conflict scenarios that are self-selected, with less empirical focus on how humor relates to actual behaviors within relationships that lead to negative outcomes, especially in the context of momentary conflict. Another study (Butzer & Kupier, 2008) used an experimental design to investigate the effects of relationship satisfaction and type of scenario (pleasant vs. conflict) on the type of humor used between romantic partners. However, this design merely prompted participants to imagine a conflict scenario, rather than simulating actual in-the-moment conflict between close others experimentally. Future research including the current study would benefit from more stringent methods of standardizing an objective conflict scenario across dyads. Using Cyberball to simulate interpersonal conflict is one way of addressing this methodological issue.

Other studies have investigated humor use as helpful to mitigate conflict between close others more generally, as opposed to only between romantic partners. One study (Everts, 2003) used sociolinguistic discourse analysis to demonstrate how members of a family used humor within interactions in order to establish familial relational harmony. Another study qualitatively analyzed natural family discourse between partners, children, and friends and found that "reframing in a humorous key" was part of restoring harmony following conflict in three separate families (Tannen, 2006). Another (Holmes & Stubbe, 2003) analyzed natural linguistic data within workplace settings and found that humor was used to maintain harmonious relationships, challenge workplace authority, and assert authority over subordinate employees when used aggressively. While these findings set precedent for expanding recruitment beyond just romantic partners to close others more

generally, the methods used were limited. All three studies assessed natural linguistic patterns, as opposed to using experimental designs. The present study expanded recruitment to include close others more generally and used an experimental design to assess the effects of humor use during a conflict scenario.

Ostracism via Cyberball

Researchers have demonstrated that ostracism weakens abilities to self-regulate, is associated with the onset of psychological difficulties, and activates similar brain regions to those associated with physical pain (De Rubeis, Sütterlin, Lange, Pawelzik, van Randenborgh, Victor, & Vögele, 2016; Karremans et al., 2011; Yaakobi & Williams, 2016). Studies have shown that close relationships can be protective against negative outcomes during adverse events. Functional magnetic resonance imaging revealed attenuated signals within pain regions of the brain in happily married wives who received an electric shock while holding their husband's hand, compared to stronger pain-related signals while holding a stranger's hand (Coan, Schafer, & Davidson, 2006). Similarly, the negative effects of ostracism by strangers can be ameliorated when participants are prompted to think of close others (Karremans et al., 2011).

An interesting model to consider is when close others, who should presumably be safe and protective, ostracize one another. Several studies have documented outcomes of this scenario. In a longitudinal daily diary study participants' belonging, control, self-esteem, and life-meaning were more affected when ostracism was done by friends and close others than by acquaintances or strangers (Nezlek, Wesselmann, Wheeler, & Williams, 2012). Other research has used Cyberball to demonstrate that ostracism by a partner resulted in less feelings of closeness on the IOS scale (Arriaga, Capezza, Reed,

Wesselmann, & Williams, 2014). Ostracism by a partner has also been demonstrated to result in lower satisfaction, lower commitment, and the perception that better relationship alternatives existed (Arriaga, Capezza, Reed, Wesselmann, & Williams, 2014). The effects of ostracism by close others has been investigated empirically, but such research has failed to assess potentially ameliorative protective factors for negative outcomes. Future research, including the current study, will benefit from examining factors that protect individuals from negative effects of ostracism by close others. The increased use of adaptive humor styles and decreased use of maladaptive humor styles may be useful in managing this interpersonal conflict scenario both related to outcomes within the self and between members of a dyad.

III. Statement of the Problem

Interpersonal conflicts have been empirically demonstrated to be highly distressing events with lasting negative effects (Bolger, DeLongis, Kessler, & Schilling, 1989). That said, conflict resolution has been described as having positive outcomes, including the increased understanding of both oneself and others (Deutsch, 1973; Shantz & Hobart, 1989). Thus, ways of mitigating conflict between dyads is a topic of interest to clinicians and researchers. Some research has demonstrated that cognitive restructuring plays a significant role in improved happiness, reduction of irrational thinking, communication between partners, and the reduction of conflict in married couples (Okwun, 2011). Humor use, which has been demonstrated to function through a cognitive reappraisal mechanism (Kuiper et al., 1993), may be one such way to mitigate conflict in dyads.

Humor has been demonstrated to be a protective factor in a variety of contexts. For example, it was found that a single item related to maintaining a sense of humor in response to adversity was associated with a significant reduction in PTSD symptomology following therapy (Davidson et al., 2005). In a daily diary study it was demonstrated that increased humor was associated with a more positive self-concept, better cognitive reappraisal in response to stress, less negative affect in response to adverse life events, and overall more positive affect in response to positive and negative life events (Martin, Kuiper, Olinger, & Dance, 1993).

These former studies have measured humor but did not specify the type of humor that was measured. Humor is a general term for a concept that is multifaceted. To study specific humor styles that individuals tend to employ, Martin et al. (2003) conceptualized

four types of humor (affiliative, self-enhancing, aggressive, and self-defeating) and developed a scale to measure them, the Humor Styles Questionnaire (HSQ). Affiliative humor is prosocial and characterized by interpersonal benevolence. Self-enhancing humor is directed towards the self, is characterized by finding humor in incongruent elements of life, and seeks to find joy despite adversity. Aggressive humor uses sarcasm, teasing, ridicule, and disparagement to relieve tension, and is often done at the expense of others. Self-defeating humor allows others to laugh at one's own expense, and may even involve encouraging others to be disparaging in order to be accepted. In a recent meta-analysis, it was found that positive humor styles (i.e., affiliative and self-enhancing) were related to increased self-esteem, life satisfaction, and optimism. While self-defeating humor was associated with poorer outcomes, there were no significant findings regarding aggressive humor (Schneider, Voracek, & Tran, 2018).

Regarding navigating interpersonal conflict specifically, some humor styles have been demonstrated to be more useful than others. In two separate studies, dating couples' discussions of self-selected conflicts were video recorded and coded for humor use during conflict discussion (Campbell, Martin, & Ward, 2008; Winterheld, Simpson, & Oriña, 2013). Generally, in both studies actor-partner effects showed that increased affiliative humor was associated with positive outcomes while aggressive humor was associated with negative outcomes. In both studies, coders were instructed to rate each partner's humor according the categories delineated by the HSQ. Both the use of couples' conflict discussions and the HSQ coding methods have limitations. First, conflicts discussed by couples may have been susceptible to selection bias, and participants may have been unwilling to discuss more relevant conflict related topics in front of

researchers than they would have been willing to discuss privately. Further, by allowing couples to discuss a variety of self-selected topics, the type and intensity of conflict were not standardized across couples. A methodological solution to these limitations is the use of Cyberball to induce conflict between dyads, using deception to make partners believe they are excluding one another. This way, conflict is imposed rather than self-selected, and is standardized across dyads. This method provides an important contribution to both humor and ostracism literatures, as ostracism of close others using Cyberball has surprisingly seldom been assessed empirically. Also, the coding of humor use is also susceptible to observer bias as humor is a subjective, idiosyncratic, personal experience which may be more accurately reflected by general tendencies to use a range of humor types. For example, perhaps a humorous statement a research assistant would find aggressive is understood by both members of the dyad as affiliative or an "inside joke." This limitation was addressed by using self-report measures of humor styles on the HSQ rather than the behavioral coding of humor by an observer.

Studies have demonstrated that contact with and thoughts about close others ameliorate negative effects of adverse events. Functional magnetic resonance imaging revealed attenuated signals within pain regions of the brain in happily married wives who received an electric shock while holding their husbands' hands, compared to stronger pain-related signals while holding a stranger's hand (Coan, Schafer, & Davidson, 2006). Similarly, the negative effects of ostracism by strangers can be ameliorated when participants are prompted to think of close others (Karremans et al., 2011). However, the inverse may be just as true, with increased negative responses when participants are led to believe that exclusion during Cyberball comes from a close other (rather than a

stranger). A longitudinal daily diary study demonstrated that participants' belonging, control, self-esteem, and life-meaning were more affected when ostracism was done by friends and close others than by acquaintances or strangers (Nezlek, Wesselmann, Wheeler, & Williams, 2012). In another study, Cyberball was used to demonstrate that ostracism by a romantic partner resulted in less feelings of closeness on the Inclusion of Other in Self scale (IOS) (Arriaga, Capezza, Reed, Wesselmann, & Williams, 2014). Within the same study, ostracism by a partner also resulted in lower satisfaction, lower commitment, and the perception that better relationship alternatives existed. Although ostracism by a close other or romantic partner has been shown to have detrimental outcomes, research regarding potentially ameliorative protective factors during ostracism by close others is lacking. Humor is one such factor that may be useful for members of a dyad to effectively manage this scenario.

Humor use in conversation between members of dyads and in groups has been investigated in a variety of contexts. Using a sociolinguistic discourse analysis, it was demonstrated that members of a family used humor within interactions in order to establish familial relational harmony (Everts, 2003). Other research qualitatively analyzed natural family discourse between partners, children, and friends, and found that, in three separate families, "reframing in a humorous key" was part of restoring harmony after conflict (Tannen, 2006). Another study analyzed natural linguistic data within workplace settings and found that humor was used to maintain harmonious relationships, challenge workplace authority, and assert authority over subordinate employees when used aggressively (Holmes & Stubbe, 2003). These findings set precedent for the

evaluation of humor use during conflict in dyads with close others beyond just romantic partners, as in the present study.

The present study aimed to investigate humor use in close relationships when conflict occurs. This study used self-report measures to assess individuals' humor styles on the HSQ, relationship satisfaction regarding the dyad using the PRQC, feelings of closeness regarding the dyad using the IOS, and level of distress following ostracism during Cyberball using the VAS-A. Increased commitment to a relationship, which is measured within the PRQC scale, has been associated with constructive and accommodative responses to negative partner behavior (Rusbult et al., 1991; Rusbult et al., 1998). The methods of the present study sought to expand the generalizability of findings compared to prior studies by opening participant enrollment to a variety of dyads beyond just romantic partners. The methods of the present study standardized interpersonal conflict by experimentally manipulating ostracism by a close other during Cyberball. To the best of this author's knowledge, the present study is the first that examines how the humor styles outlined by Martin et al. (2003) are related to relationship satisfaction, feelings of closeness, and distress levels within dyads, in response to ostracism by close others during Cyberball.

Primary analyses investigated self-reported affiliative humor use as potentially ameliorative for negative outcomes following ostracism, and self-reported aggressive humor use as potentially further detrimental to negative outcomes following ostracism. Primary analyses assessed both individual effects and interdependent actor-partner effects. Much of the literature on humor within conflict resolution focuses on affiliative and aggressive humor styles, and does not incorporate measures of self-enhancing and

self-defeating humor. Thus, exploratory analyses investigated the effects of self-enhancing and self-defeating humor styles. Additionally, exploratory analyses regarding humor use as a variable that potentially mediates the relationship between aggression and negative affect were included in the study. Exploratory analyses regarding the potential correlation between the various humor styles and individuals' general use of cognitive reappraisal as a coping strategy were conducted. Finally, an exploratory analysis also explored humor use "in-the-moment" by assessing whether participants' choice of emoji to be sent to their partner (representative of one of the four humor styles) predicted either of the outcome variables (change in negative affect or change in closeness). These emojis are pictured in Figure 2.

Variable List

Independent Variables

1. Affiliative Humor Use – Operationalized via the Humor Styles Questionnaire Affiliative Humor subscale (Martin et al., 2003).
2. Aggressive Humor Use – Operationalized via the Humor Styles Questionnaire Aggressive Humor subscale (Martin et al., 2003).
3. Relationship Satisfaction – Operationalized by the Perceived Relationship Quality Components inventory (PRQC; Fletcher, Simpson, & Thomas, 2000).

Dependent Variables

1. Change in Negative Affect – Operationalized via repeated measures before and after the ostracism condition of Cyberball using the Visual Analog Scale for Anxiety (VAS-A; Hornblow & Kidson, 1976).

Figure 2. Emojis From Left to Right Are Representative of Affiliative, Aggressive, Self-Enhancing and Self-Defeating Humor Styles.

2. Change in Feelings of Closeness – Operationalized via repeated measures before and after the ostracism condition of Cyberball using the Inclusion of Other in the Self Scale (IOS; Aron et al., 1992).

Potential Covariates

1. Demographic variables
2. Attachment style – Measured using the Experiences in Close Relationships scale – Revised (ECR-R; Fraley, Waller, & Brennan, 2000).

Exploratory Variables

1. Self-enhancing Humor Use – Operationalized via the Humor Styles Questionnaire Self-enhancing Humor subscale (Martin et al., 2003).
2. Self-defeating Humor Use – Operationalized via the Humor Styles Questionnaire Self-defeating Humor subscale (Martin et al., 2003).
3. Anger – Operationalized via the Anger Response Inventory (ARI; Tangney et al., 1996).
4. Cognitive Reappraisal – Operationalized via the Cognitive Reappraisal subscale of the Emotion Regulation Questionnaire (ERQ-R; Gross & John, 2003).

Hypotheses

In a diverse undergraduate college sample from an urban northeastern university, it was hypothesized that:

(Hypotheses 1a and 1b are part of a parallel mediation model as seen in Figure 3).

Hypothesis 1a. For all participants, increased relationship satisfaction would be significantly correlated with reduced negative affect following ostracism in Cyberball.

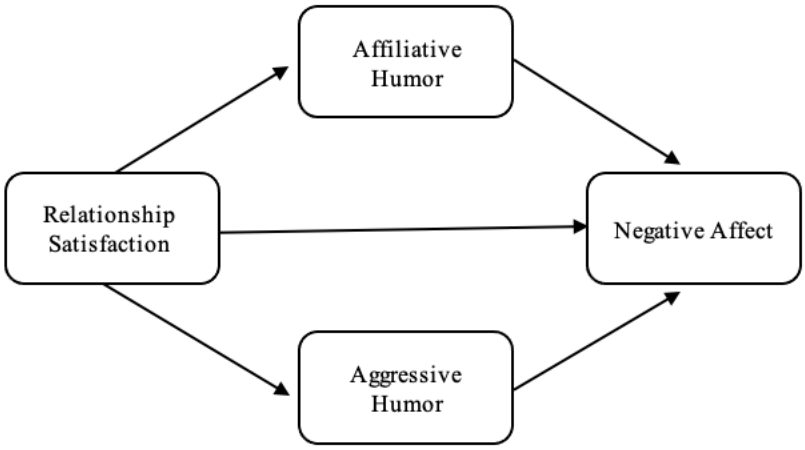

Figure 3. Parallel Mediation Model for Hypotheses 1a and 1b.

Hypothesis 1b. Affiliative humor use and aggressive humor use would each mediate the relationship between relationship satisfaction and change in negative affect following ostracism in Cyberball, such that there would be an indirect effect of increased affiliative humor use and decreased aggressive humor use in the direct effect of higher relationship satisfaction on reduced negative affect following ostracism in Cyberball.

(Hypotheses 2a, 2b, 3a, and 3b are related to an actor-partner model as proposed in Figure 4).

Hypothesis 2a. Following ostracism in Cyberball, actor use of decreased aggressive humor and increased affiliative humor would be related to decreased actor negative affect.

Hypothesis 2b. Following ostracism in Cyberball, actor use of decreased aggressive humor and increased affiliative humor would be related to decreased partner feelings of negative affect.

Hypothesis 3a. Following ostracism in Cyberball, actor use of decreased aggressive humor and increased affiliative humor would be related to increased actor feelings of closeness.

Hypothesis 3b. Following ostracism in Cyberball, actor use of decreased aggressive humor and increased affiliative humor would be related to increased partner feelings of closeness.

Exploratory research questions

1. Would self-enhancing humor measured by the HSQ protect against negative affect above and beyond affiliative in the ostracism context?

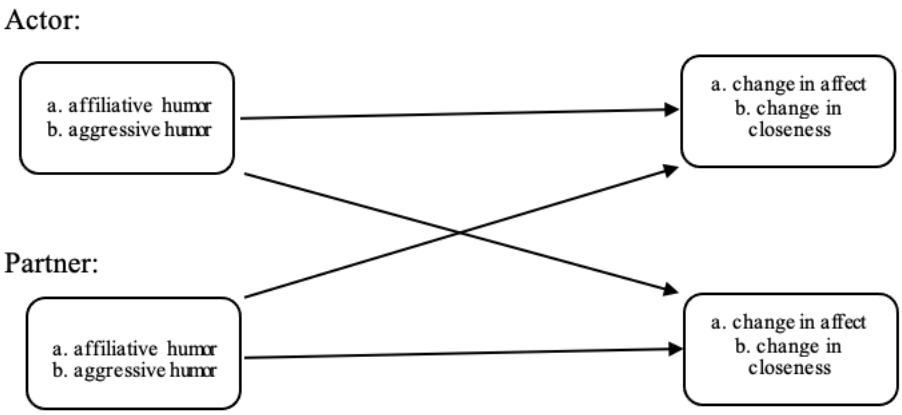

Figure 4. Actor-Partner Model for Hypotheses 2a, 2b, 3a and 3b.

2. Would self-defeating humor measured by the HSQ lead to detrimental outcomes more so than aggressive humor in the ostracism context?
3. Regarding aggression:
    a. Did aggressive humor use as measured by the HSQ mediate the relationship between anger as measured by the ARI and negative affect following conflict as measured by a VAS-A taken following ostracism during Cyberball?
    b. Did any of the humor styles mediate this relationship, if not aggressive?
4. Were any of the four humor styles measured with the HSQ more or less associated with the tendency to use cognitive reappraisal as measured by the cognitive reappraisal subscale in the ERQ?
5. Was choice of emoji (representative of each of the four humor styles) predictive of either of the outcome variables, change in negative affect or change in closeness?

IV. Method

Participants

The total number of participants recruited for this study was 180 (excluding participants from the pilot study) for a total of 90 dyads. Many dyads included undergraduate students and their partners, roommates, family members, or friends, recruited from a culturally diverse, urban northeastern university via the Sona System. Other dyads were recruited via listervs, social media, and word of mouth via other participants. Those individuals who did not participate for school credit were compensated with a $10 Amazon gift card. To be eligible to participate, both members of the dyad were required to be at least 18 years old.

Six (3.33%) participants did not have useable data due to various technical glitches with the study software and/or participant computer software as the study was conducted entirely via Qualtrics and Zoom. Two (1.11%) participants did not complete the survey, and three (1.67%) participants withdrew their consent at the end of the study during their debriefing. This left a sample of $N = 169$. Three (1.78%) participants with data that deemed them outliers were identified. A variety of transformations were attempted to eliminate outliers including square root transformation, z score transformation, log 10 transformation, and natural log transformation, but none were successful and thus these outliers were removed for final analyses. After removing outliers, this left a sample of $N = 166$. There were 77 dyads and 12 singletons. Since dyadic analyses used maximum likelihood estimation techniques, it was possible to use singletons in the analyses of dyadic hypotheses.

Descriptive statistics for the sample were calculated prior to removing outliers (*N* = 169). The sample consisted of 102 (60.4%) women, 64 (37.9%) men, and 3 (1.8%) non-binary/genderqueer/other individuals. The racial composition was quite diverse with 100 (59.2%) non-White individuals. The age of the sample ranged between 18-72 (*M* = 23.56, *SD* = 7.34). At least six sexual orientations were represented, and participants spoke at least fifteen different native languages (in addition to English). The sample was well-educated, with 34.3% (*n* = 58) having attended some college, and 34.3% (*n* = 58) having a college degree. A variety of relationships were represented among the dyads, but the most common categories were close friends (*n* = 70, 41.4%) and romantic partners (*n* = 60, 35.5%). A summary of the demographics for the sample is reported in Table 1.

Measures

Both individuals within a dyad were instructed to complete every measure.

Baseline Measures

Demographic Questionnaire. A demographic questionnaire was used to assess participants' gender, age, race/ethnicity, sexual orientation, level of education, total household income, and type of relationship with study partner.

Humor Styles. As a solution to limitations in prior humor research, Martin, Puhlik-Doris, Larsen, Gray, & Weir (2003) conceptualized, defined, and created a measure for four humor subtypes that seeks to distinguish both between adaptive humor and maladaptive types, as well as intrapersonal (self-oriented) and interpersonal (other-oriented) functioning. DiCioccio (2012) describes this as a "2 x 2 psychological model" that accounts for both the positive and negative humor used, and whether the humor is

Table 1

Demographic Characteristics of the Sample (N =169).

Variable		*n (%)*	*Range*	*M*	*SD*
Gender					
	Female	102 (60.4)			
	Male	64 (37.9)			
	Non-binary/Genderqueer	2 (1.2)			
	Other	1 (0.6)			
Age					
			18-72	23.56	7.34
Race/Ethnicity					
	White/European American	69 (40.8)			
	Hispanic/Latinx	19 (11.2)			
	East, South, Central, or Southeast Asian	37 (21.9)			
	Middle Eastern	12 (7.1)			
	Black/African-American/African-Caribbean	14 (8.3)			
	Multiracial	17 (10.1)			
Sexual Orientation					
	Heterosexual	144 (85.2)			
	Gay	3 (1.8)			
	Lesbian	3 (1.8)			
	Bisexual	10 (5.9)			
	Queer	2 (1.2)			
	Other	3 (1.8)			
Education					
	No School or Elementary/Middle School	1 (0.6)			
	High School	29 (17.2)			
	Some College	58 (34.3)			
	University/College Degree	58 (34.3)			
	Post-Graduate/Post-University Degree	22 (13.0)			
Total Household Income					
	Under $15,000	10 (5.9)			
	$15,000-24,999	10 (5.9)			
	$25,000-$34,999	13 (7.7)			
	$35,000-$49,999	15 (8.9)			
	$50,000-$74,999	24 (14.2)			
	$75,000-$99,999	26 (15.4)			
	$100,000 and above	38 (22.5)			
Type of Relationship					
	Close Friend (Non-Romantic)	70 (41.4)			
	Romantic Partner	60 (35.5)			
	Classmate	6 (3.6)			
	Roommate	2 (1.2)			
	Family Member	27 (16.0)			
	Other	4 (2.4)			

directed toward the self or others (p. 95). The Humor Styles Questionnaire (HSQ; Martin, Puhlik-Doris, Larsen, Gray, & Weir, 2003) is a 32-item scale that contains four 8-item subscales and was used to assess humor styles in the present study. The subscales measure affiliative, self-enhancing, aggressive, and self-defeating humor. Participants respond to items pertaining to the four subscales by endorsing items on a Likert-like scale ranging between "*Totally Disagree*" to "*Totally Agree*." Affiliative humor is prosocial and characterized by interpersonal benevolence. A sample item assessing participants' affiliative humor use is, "I enjoy making people laugh." Self-enhancing humor is directed towards the self, is characterized by finding humor in incongruent elements of life, and seeks to find joy despite adversity. A sample item assessing participants' self-enhancing humor use is, "If I am feeling depressed, I can usually cheer myself up with humor." Aggressive humor uses sarcasm, teasing, ridicule, and disparagement to relieve tension, and is often done at the expense of others. A sample item assessing participants' aggressive humor use is, "If someone makes a mistake, I will often tease them about it." Self-defeating humor allows others to laugh at one's own expense, and may even involve encouraging others to be disparaging in order to be accepted. A sample item assessing participants' self-defeating humor use is, "Letting others laugh at me is my way of keeping my friends and family in good spirits." Participants during the development of this scale were between ages 14-87, therefore, the scale has been used to measure humor across the lifespan. In the measure's development, the subscales demonstrated good internal reliabilities ranging between 0.77 and 0.81. In the present sample, the subscales all had adequate or better internal consistency (Affiliative Humor Subscale Cronbach's α

= .73; Aggressive Humor Subscale Cronbach's α = .70; Self-Defeating Humor Subscale Cronbach's α = .78; Self-Enhancing Humor Subscale Cronbach's α = .74).

Relationship Satisfaction. The perceived quality of the relationship was measured using the Perceived Relationship Quality Components Inventory (PRQC; Fletcher, Simpson, & Thomas, 2000). This measure contains six three-item subscales which were each demonstrated to have good reliability and validity. The subscales are: relationship satisfaction, commitment, intimacy, trust, passion, and love. An aggregate score was created across all items for all subscales. In the present sample this measure demonstrated excellent internal consistency (PRQC Cronbach's α = .90).

Outcome Measures

Cyberball. Cyberball (Williams & Jarvis, 2006) was used as an experimental manipulation to promote interpersonal conflict within dyads. Please see below for a detailed description regarding the use of Cyberball within the procedure section.

Change in Closeness (Repeated Measure). Closeness was measured using the Inclusion of Other in the Self Scale (IOS; Aron et al., 1992) both at baseline and following ostracism in Cyberball. Change in closeness was used as an outcome variable within the analyses. To evaluate closeness within relationships individuals chose one image from seven options of increasingly overlapping Venn-diagrams with two circles that each represent self and other (Figure 1). Increased overlap represents higher Inclusion of Other in Self, and greater closeness. Reliability was difficult to measure during the development of this scale, which contains only one item; however, this scale had good convergent validity with multi-item and verbal measures of closeness and the

overall test-retest correlation between initial ratings and after a two-week period was strong ($r = 0.83$).

Negative Affect (Repeated Measure). Negative affect was measured via self-report using the Visual Analog Scale for Anxiety **(**VAS-A). Participants indicated their levels of anxiety on a 100-millimeter horizontal line. The line represents a scale ranging between scores that are extremely calm to scores that are extremely anxious. Indications at or greater than 46mm are representative of clinically-meaningful anxiety. The VAS-A has been validated as a fast, meaningful representation of subjective distress that is highly correlated with the State Trait Anxiety Inventory (Hornblow & Kidson, 1976). Negative affect was measured as a continuous variable (i.e., measurement on the line) at baseline and again after ostracism.

Exploratory Measures

Cognitive Reappraisal. The tendency to use cognitive reappraisal as an emotion regulation strategy was measured using the Cognitive Reappraisal subscale from the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). In the present sample, this subscale demonstrated excellent internal consistency (Cronbach's $\alpha = .90$).

Anger. Anger in response to hypothetical conflict scenarios with close others were measured using the Anger Response Inventory (ARI; Tangney et al., 1996). In the present study only one score was created using this inventory, by calculating the mean related to the anger rating for each scenario (ARI Anger). In the present sample, this score had adequate reliability (ARI Anger Cronbach's $\alpha = 0.74$).

Covariate

Attachment Insecurity. Attachment insecurity was measured using the Experiences in Close Relationships Scale – Revised (ECR-R; Fraley, Waller, & Brennan, 2000). In the present sample, both subscales of the ECR-R demonstrated excellent internal consistency (Anxious Attachment Cronbach's α = .93; Avoidant Attachment Cronbach's α = .94).

Procedure

Pilot Study

Initially, the study procedures were piloted during a non-experimental phase of the study, using an abbreviated aggregation of the surveys. Piloting occurred over the course of one month and included three dyads. This pilot was primarily to test for feasibility, and in particular to confirm the manipulation/deception of the experimental procedure. Through this pilot portion of the study, it was assessed whether participants believed they were actually playing with the other member of their dyad during the Cyberball game (which is described in further detail below), if they felt excluded by the ostracism during Cyberball, and whether they experienced excessive negative affect or duress following the study procedures.

Feedback obtained during debriefing with each dyad following pilot study procedures revealed that for some participants the Cyberball deception was not strong enough, and participants may have been aware that they were not in fact playing with the other member of the dyad but were engaging in a computer simulated game alone. In part, participants' suspicion appeared to be related to the consistency of when each Cyberball condition would begin. In other words, the "Waiting for other players"

message appeared on the computer screen for a consistent period of time for each round, during which participants were led to believe the other member of the dyad was "still completing measures related to the study." In order to rectify this issue the Cyberball game was reprogramed with the "Waiting for other players" message to appear on the screen at inconsistent intervals, and for a longer period of time in general prior to the start of each condition. Regarding the participants' feelings regarding exclusion during the appropriate phase of the game, participants did report feeling an appropriate sense of exclusion as was expected during this phase. Finally, no participants reported excessive negative affect or duress following pilot procedures.

Full Study

For the main study procedures, some dyads were recruited using the Psychology Experience Credit (PEC) program at an urban northeastern university. Individuals completed a short survey assessing eligibility for the study. Other dyads were recruited via listervs, social media, and word of mouth via other participants. Those individuals who did not participate for school credit were compensated with a $10 Amazon gift card. Eligible participants were at least 18-years-old, fluent in English, and were in a close relationship with someone who was also willing and available to complete the study procedures. Eligible participants and their dyadic counterparts were provided informed consent to participate in the study via Zoom due to the COVID-19 pandemic, which required study procedures to occur entirely electronically/remotely. They electronically indicated informed consent at the beginning of an internet questionnaire. As part of the consent procedures, deception was used with Institutional Review Board (IRB) approval to make participants believe the pre-programmed Cyberball game was being played with

a computer generated participant and their partner. Participants believed that they were playing Cyberball with their partners and another individual, while in reality the game was played alone and was simulated to eventually exclude the participant. The partners, also participants in the study, received the same deceptive study procedures and believed they were also playing Cyberball with their partners, while they also engaged in a simulation. In reality, participants played Cyberball within a pre-programmed simulation with two dummy players, which were programmed for a fair play condition, an exclusion condition, and an overinclusion condition (as conditions related to the larger study within which the present study took place). Participants both completed baseline measures separately, and then participants played Cyberball separately. Participants were always instructed to remain far away from their partners (i.e., in a different room, home, etc.) during all study procedures.

Because partners completed measures online via Zoom, two research assistants and the dyad "met" initially to discuss the study procedures and informed consent. Then, participants were moved manually into Zoom "breakout rooms," each accompanied by one research assistant to virtually oversee the completion of study procedures. First, demographic and other measures were completed. Participants filled out surveys online which were accessed via a Qualtrics link sent to them by the research assistant. At the appropriate times during the procedure, deception was used to make participants believe that the research assistants were checking in with one another via private message to ensure that both participants were ready to complete the Cyberball game "together."

Because the procedure for this specific study was conducted within methods related to a larger study, Cyberball had three conditions: An inclusion phase, an exclusion

phase, and an overinclusion phase. Hypotheses pertaining to the current study were made regarding the exclusion phase of Cyberball only, but data collection for all phases occurred as part of a larger study. In the inclusion phase players received the ball an equal number of times as the dummy players. Ostracism was induced via Cyberball during the exclusion phase, during which the two dummy players no longer passed the participant the ball. In the overinclusion phase, participants were led to believe their partner was passing them the ball exclusively while excluding another player. Participants also completed repeated measures regarding their feelings of closeness to their partners with the IOS scale and negative affect with the VAS-A after each condition of Cyberball. The debriefing process revealed that deception had been used within the study, and outlined psychological services available to students (and off-campus services accessible to non-student participants) in the event that the experimental manipulation during Cyberball induced excessive negative affect or relationship difficulties with their partner. At the end of the study following individual debriefing, participants were brought back to the main Zoom conference call from the breakout rooms for final debriefing procedures. Lastly, participants who were part of the PEC pool at Long Island University received PEC credit upon completion of the study procedures while other participants received $10 Amazon gift cards. All data collected including informed consent at the beginning of the internet survey was deidentified and stored securely on a password protected device. The data will be destroyed within five years after study completion.

Data Analytic Plan

Prior to hypotheses testing, missing data was analyzed and all variables were assessed for normality. Demographic variables were evaluated as potential covariates.

Two sets of primary analyses were conducted: The first set of analyses investigated hypotheses related to a parallel mediation model, and the second set of hypotheses investigated hypotheses related to actor-partner effects of members of dyads' humor use on outcome variables. The first set of hypotheses for the parallel mediation model were assessed using PROCESS version 3.5 (Hayes, 2017) for SPSS with model 4.

The second and third sets of hypotheses were evaluated using the Actor-Partner Interdependence Model (APIM; Kenny, Kashy, & Cook, 2006). An empty representation of the actor-partner interdependence model is shown in Figure 5. Because the analyses used maximum likelihood estimations using the program lavaan, data from singletons were able to be used in addition to data from dyads. The tests of coefficients are z tests. Effect sizes for actor and partner effects are partial correlations. The two humor scales were mean centered.

Although not part of the initial data plan, two post hoc analyses were conducted to assess actor-partner effects of affiliative and aggressive humor within a subsample of romantic partners only. Finally, the exploratory analyses were conducted using parallel mediation models, correlations, multiple regression, and ANOVAs.

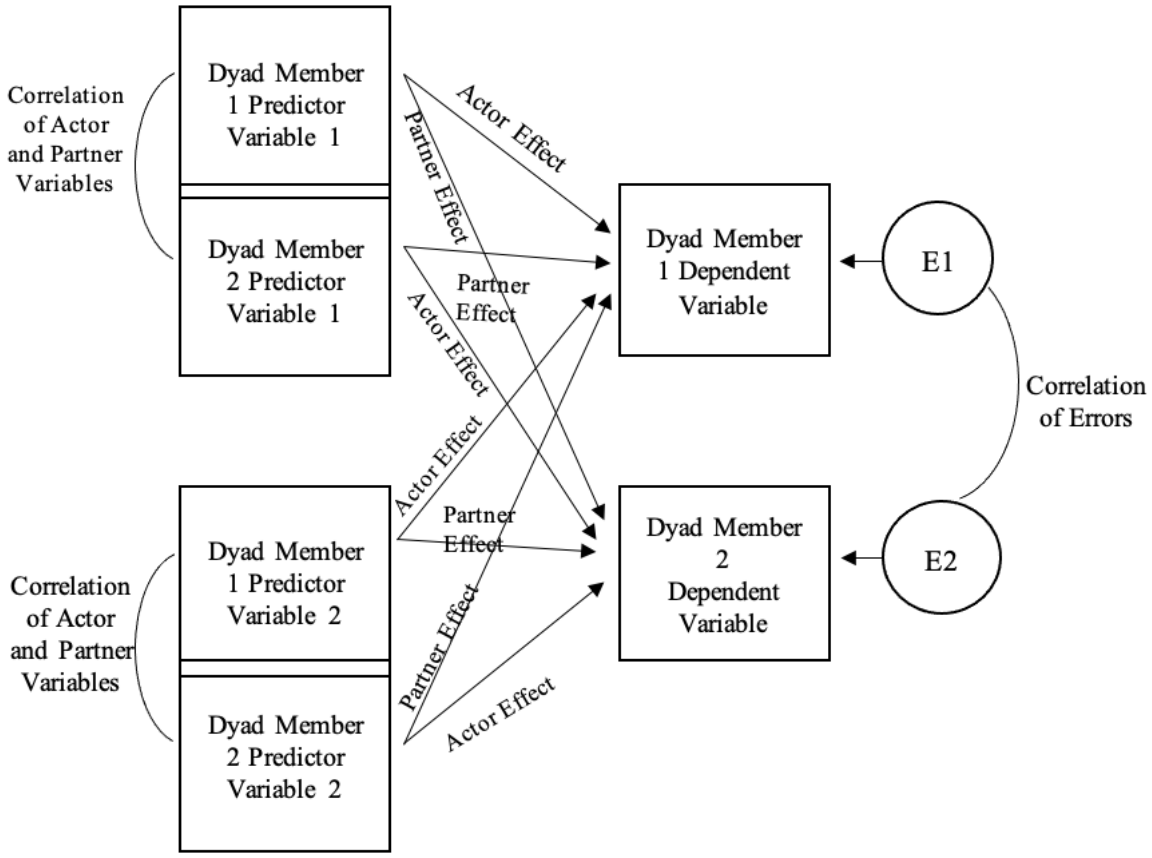

Figure 5. Empty Actor-Partner Interdependence Model.

V. Results

Preliminary Analyses and Descriptive Statistics

As noted previously, six (3.3%) participants did not have useable data due to various technical glitches with the study software and/or participant computer software as the study was conducted entirely via Qualtrics and Zoom. Two (1.1%) participants did not complete the survey, and three (1.7%) participants withdrew their consent at the end of the study during their debriefing. This left a sample of N=169.

Little's MCAR test found that the data were missing completely at random (X^2= 8.73, df = 11, p = .65). Table 2 reports scales with missing data. Scales were not scored for participants if more than 10% of items were missing (or "prefer not to answer"). In all other cases, mean substitution was used to impute missing values. Thus, sample size varied across measures.

Descriptive statistics for the main study variables are reported in Table 3. Nearly all variables' skew and kurtosis were between 2 and -2, indicating the variables were adequately normally distributed. However, change in closeness (change in IOS score) and relationship satisfaction (PRQC) were slightly kurtotic. Histograms and box plots were examined to assess for outliers. There was one extreme outlier for the PRQC measure on the low end, as this participant scored all items on the measure as "1" (the lowest response possible). There were 2 outliers on the change in closeness score (the difference between the IOS reported at baseline and IOS reported after Cyberball exclusion) indicative of an unusual effect, in which participants reported feeling closer following exclusion. A variety of transformations were used to try to normalize the data including square root transformation, z score transformation, log 10 transformation, and

Table 2

Extent of Missing Data on Study Measures.

Scale	Total Items	Required Items	Sufficient Data *n*	Missing Data *n* (%)
HSQ	32	29	169	0 (0.0)
PRQC	18	16	169	0 (0.0)
ERQ-CR	6	5	169	0 (0.0)
ARI – Anger	10	9	169	0 (0.0)
ARI – Feeling	30	27	169	0 (0.0)
ARI - Behavior	70	63	168	1 (0.6)
Change VAS-A	2	2	167	2 (1.2)
Change IOS	2	2	168	1 (0.6)

Note. HSQ = Humor Styles Questionnaire (Martin, Puhlik-Doris, Larsen, Gray, & Weir, 2003); PRQC = Perceived Relationship Quality Components Inventory (Fletcher, Simpson, & Thomas, 2000); ERQ-CR = Emotion Regulation Questionnaire – Cognitive Reappraisal subscale (Gross & John, 2003); ARI = Anger Response Inventory (Tangney et al., 1996); Change VAS-A = Visual Analog Scale – Anxiety exclusion – baseline (Hornblow & Kidson, 1976); Change IOS = Inclusion of Other in the Self Scale exclusion – baseline (Aron et al., 1992); Experiences in Close Relationships Scale-Revised (Fraley et al., 2006).

Table 3

Means, Standard Deviations, Skew, and Kurtosis Statistics for Variables for Sample Before Extreme Outliers Were Removed (N = 169).

	N	Min	Max	Mean	SD	Skew (SE)	Kurt
Affiliative Humor	168	26.00	56.00	46.36	6.87	-0.79 (.19)	-0.06 (.37)
Aggressive Humor	168	8.00	55.00	28.16	8.67	0.04 (.19)	0.07 (.37)
Self-Defeating Humor	168	8.00	52.00	27.97	9.71	0.25 (.19)	-0.38 (.37)
Self-Enhancing Humor	168	12.00	56.00	39.10	8.13	-0.54 (.19)	0.47 (.37)
Perceived Relationship Quality	168	1.00	7.00	5.63	0.97	-1.17 (.19)	2.83 (.37)
Change in Inclusion of Other in Self	167	-6.00	6.00	-0.89	1.89	-0.84 (.19)	2.26 (.37)
Change in Negative Affect	166	-91.00	91.00	-9.50	30.01	0.14 (.19)	1.18 (.37)
Cognitive Reappraisal	168	1.00	7.00	4.89	1.22	-0.63 (.19)	0.60 (.37)
Anxious Attachment	167	1.00	6.61	2.94	1.32	0.61 (.19)	-0.32 (.37)
Avoidant Attachment	167	1.00	6.39	2.89	1.29	0.57 (.19)	-0.45 (.37)
ARI Anger	169	1.70	5.30	4.02	0.67	-0.59 (.19)	0.14 (.37)

the natural log transformation. Attempts to normalize the data were unsuccessful and thus outliers were removed for the analyses. Three (1.78%) outliers were removed, leaving a final sample of $N = 166$. Descriptive statistics for the study variables for the trimmed sample are presented in Table 4. The skew and kurtosis values for variables were improved after removal of these outliers.

Covariate Analyses

The variables gender, age, education, anxious attachment, avoidant attachment, and type of relationship with study partner were tested as possible covariates using *t*-tests, correlations, and one-way ANOVAs. The independent samples *t*-tests (see Table 5) showed no significant associations with gender. Pearson correlations showed that anxious attachment was significantly correlated with the dependent variable change in closeness, therefore hypotheses involving change in closeness ratings used this covariate within the analyses. None of the Pearson correlation analyses showed significant associations with change in negative affect (Table 6). The ANOVA analyses also did not show significant relationships for dependent variables with type of relationship with study partner (Table 7).

Bivariate Correlations

Intercorrelations of main study variables were conducted (Table 8). A variety of the variables were significantly intercorrelated but only moderately so, therefore no multicollinearity was found. Several humor scales were correlated with one another. Self-enhancing humor was significantly correlated with all of the other humor styles. Consistent with prior studies, the negative humor styles aggressive and self-defeating

Table 4

Means, Standard Deviations, Skew, and Kurtosis Statistics for Variables for Trimmed Sample (N =166).

	N	Min	Max	Mean	SD	Skew (SE)	Kurt (SE)
Affiliative Humor	166	26.00	56.00	46.50	6.78	-0.82 (.19)	0.06 (.38)
Aggressive Humor	166	8.00	55.00	28.14	8.59	0.02 (.19)	0.12 (.38)
Self-Defeating Humor	166	8.00	51.00	27.77	9.54	0.21 (.19)	-0.41 (.38)
Self-Enhancing Humor	166	12.00	56.00	38.93	8.10	-0.51 (.19)	0.50 (.38)
Perceived Relationship Quality	166	2.22	7.00	5.65	0.91	-0.76 (.19)	0.69 (.38)
Change in Inclusion of Other in Self	165	-6.00	3.00	-0.96	1.78	-1.38 (.19)	1.75 (.38)
Change in Negative Affect	165	-91.00	91.00	-9.45	30.11	0.13 (.19)	1.15 (.38)
Cognitive Reappraisal	166	1.17	7.00	4.90	1.19	-0.52 (.19)	0.39 (.38)
Anxious Attachment	165	1.00	6.61	2.91	1.32	0.65 (.19)	-0.25 (.38)
Avoidant Attachment	165	1.00	6.39	2.86	1.27	0.61 (.19)	-0.32 (.38)
ARI Anger	166	1.70	5.30	4.03	0.67	-0.63 (.19)	0.20 (.38)

Table 5

Difference in Dependent Variables Based on Gender.

	Male		Female				
Dependent Variable	*M*	*(SD)*	*M*	*(SD)*	*t*	*df*	*p*
Change in IOS	-0.81	(1.81)	-1.08	(1.77)	-0.95	161	.35
Change in VAS-A	-6.71	(31.34)	-10.46	(29.11)	-0.77	161	.44

Note. Change VAS-A = Visual Analog Scale – Anxiety exclusion – baseline (Hornblow & Kidson, 1976); Change IOS = Inclusion of Other in the Self Scale exclusion – baseline (Aron et al., 1992).

Table 6

Correlations Between Potential Covariates and Dependent Variables.

Variable	*N*	Change in IOS	Change in VAS-A
Anxious Attachment	164	-.18*	-.07
Avoidant Attachment	164	.03	.03
Education	164	-.11	-.01
Age	164	-.05	.02

Note. Change VAS-A = Visual Analog Scale – Anxiety exclusion – baseline (Hornblow & Kidson, 1976); Change IOS = Inclusion of Other in the Self Scale exclusion – baseline (Aron et al., 1992).
*$p \leq .05$.

Table 7

One-Way ANOVA for Dependent Variables Based on Type of Relationship With Partner.

Variable	Type of Relationship						
	Close Friend	Romantic Partner	Classmate	Family Member	*F*	*p*	η^2
Change in IOS	-.61	-1.37	-.73	-1.04	2.07	.11	.04
	(1.44)	(2.05)	(1.62)	(1.91)			
Change in VAS-A	-12.25	-7.98	2.73	-10.50	0.85	.47	.02
	(27.06)	(36.19)	(19.34)	(25.96)			

Note. Change VAS-A = Visual Analog Scale – Anxiety exclusion – baseline (Hornblow & Kidson, 1976); Change IOS = Inclusion of Other in the Self Scale exclusion – baseline (Aron et al., 1992). Standard deviations appear in parentheses below means.

Table 8

Correlations Among Main Study Variables (N = 166).

Variable	1	2	3	4	5	6	7	8	9
1.Affiliative Humor	-	.08	.12	-.04	-.05	.27**	-.11	-.36**	-.08
2.Aggressive Humor		-	-.01	.01	.01	.17*	.34**	.06	-.00
3.PRQC			-	-.09	-.08	.16*	.06	-.29**	-.05
4.Change in IOS				-	-.12	-.04	-.00	.09	-.11
5.Change in VAS-A					-	-.02	-.01	.02	-.09
6.Self-Enhancing Humor						-	.18*	-.10	-.08
7.Self-Defeating Humor							-	.21**	.33**
8. Attachment Avoidance								-	.39**
9. Attachment Anxiety									-

Note. PRQC = Perceived Relationship Quality Components Inventory (Fletcher, Simpson, & Thomas, 2000); Change VAS-A = Visual Analog Scale – Anxiety exclusion – baseline (Hornblow & Kidson, 1976); Change IOS = Inclusion of Other in the Self Scale exclusion – baseline (Aron et al., 1992).
**$p \leq .01$ *$p \leq .05$

humor were significantly correlated with one another. Intra-dyad correlations of variables related to the first and second partners in a dyad were also conducted (see Table 9).

Tests of Hypotheses

Primary Hypotheses

For Hypothesis 1 the analyses were conducted with the individual as the unit of interest. For Hypotheses 2 and 3 the dyad was the unit of interest.

Hypothesis 1a. For all participants, increased relationship satisfaction would be significantly correlated with reduced negative affect following ostracism in Cyberball.

Initially, a Pearson correlation was conducted to test this hypothesis. Results show the correlation between relationship satisfaction and change in negative affect was not significant, r (165) = -.08, p = .29. The effect size of this correlation is very small, with only 0.6% of shared variability between these variables. The hypothesis was not supported.

A post hoc analysis used a different statistical model to further investigate this hypothesis, with relationship satisfaction predicting the negative affect reported after exclusion and controlling for the negative affect participants reported at baseline. Multiple regression was used to test the model predicting negative affect after exclusion (Table 10). The predictor variables entered were negative affect at baseline (VAS-A) and relationship satisfaction (PRQC). The model was significant and together these variables explained 20% of the variability in negative affect after exclusion (R^2 = .20, F (2, 162) = 20.23, p < .001). Individually, only the negative affect reported at baseline was a significant unique predictor of negative affect after exclusion. It was positively

Table 9

Intra-Dyad Correlations Between Study Ratings and Variables.

Variable	*r*	*n*
IOS baseline	.52**	77
IOS after exclusion	.30**	76
Change in IOS	.09	76
VAS-A baseline	.11	77
VAS-A after exclusion	.13	76
Change in VAS-A	.20	76
PRQC	.65**	77
Affiliative Humor	.28*	77
Aggressive Humor	.19	77
Cognitive Reappraisal	.27*	77
Anxious Attachment	.19	77
Avoidant Attachment	.41**	77
Self-Enhancing Humor	.23*	77
Self-Defeating Humor	.06	77

Note. PRQC = Perceived Relationship Quality Components Inventory (Fletcher, Simpson, & Thomas, 2000); Change VAS-A = Visual Analog Scale – Anxiety exclusion – baseline (Hornblow & Kidson, 1976); Change IOS = Inclusion of Other in the Self Scale exclusion – baseline (Aron et al., 1992).
**$p \leq .01$ *$p \leq .05$

Table 10

Multiple Regression Model Predicting Negative Affect after Exclusion (N =166).

Variable	B	*SE*	*β*	*t*	*p*	*Semipartial r*
Constant	33.90	12.96		2.62	.01	
PRQC	-3.77	2.19	-0.12	-1.72	.09	-.12
VAS-A Baseline	0.42	0.07	0.42	6.02	<.001	.42

associated, predicting 17.64% of the variability in negative affect after exclusion (r_{sp} = .42).

Hypothesis 1b. Affiliative humor use and aggressive humor use would each mediate the relationship between relationship satisfaction and change in negative affect following ostracism in Cyberball, such that there would be an indirect effect of increased affiliative humor use and decreased aggressive humor use in the direct effect of higher relationship satisfaction on reduced negative affect following ostracism in Cyberball.

A test of the parallel mediation model hypothesized was conducted using the PROCESS procedure macro for SPSS (v3.5, Hayes, 2017). The dependent variable was change in negative affect (change in VAS-A score), the independent variable was relationship satisfaction (PRQC score), and the affiliative humor and aggressive humor scores were entered as mediators. The model proposed is diagrammed in Figure 2. The standardized coefficient estimates for each of the paths are presented in Table 11. Neither indirect effect was statistically significant since the 95% confidence intervals included zero. The completely standardized indirect effect is the effect size for the indirect effects, and in the current analysis, the effect sizes of both the indirect effects was very small. The hypothesis was not supported.

Hypothesis 2a. Following ostracism in Cyberball, actor use of decreased aggressive humor and increased affiliative humor would be related to decreased actor feelings of negative affect.

Hypothesis 2b. Following ostracism in Cyberball, actor use of decreased aggressive humor and increased affiliative humor would be related to decreased

Table 11

Path Estimates from Parallel Mediation Model.

Effect	Model Segment	Standardized Path Estimate	*p*	95% CI Lower Bound	95% CI Upper Bound
PRQC to Aff. Humor	a_1	.07	.36		
Aff Humor to Change in VAS-A	b_1	-.03	.73		
Specific Indirect 1	a_1b_1	-.00		-.02	.02
PRQC to Agg. Humor	a_2	-.00	.96		
Agg. Humor to Change in VAS-A	b_2	.01	.89		
Specific Indirect 2	a_2b_2	.00		-.01	.02
Total Indirect	--	-.00		-.02	.02
Direct	c’	-.05	.51		
Total	c	-.05	.49		

Note. $n = 164$.

partner feelings of negative affect.

A lavaan model was conducted to test the actor and partner effects on the dependent variable change in negative affect. The model converged after 127 iterations. A summary of the results is in Table 12 and Figure 6. The R^2 was .02, indicating that 2% of the variability in change in negative affect was accounted for by the two humor styles. The partial intraclass correlation for change in negative affect controlling for the other predictors is equal to .20 and was not statistically significant (p = .09). For aggressive humor neither the actor effect nor the partner effect was statistically significant. The same was true for affiliative humor. Neither hypothesis 2a nor hypothesis 2b regarding change in negative affect was supported.

Hypothesis 3a. Following ostracism in Cyberball, actor use of decreased aggressive humor and increased affiliative humor would be related to increased actor feelings of closeness.

Hypothesis 3b. Following ostracism in Cyberball, actor use of decreased aggressive humor and increased affiliative humor would be related to increased partner feelings of closeness.

A lavaan model was conducted to test the actor and partner effects on the dependent variable change in closeness using anxious attachment as a covariate. The model converged after 113 iterations. The R^2 was .06 indicating that 6% of the variance was accounted for by the model. The partial intraclass correlation for change in feelings of closeness controlling for other predictor variables was equal to .11 and was not significant (p = .35). For aggressive humor neither the actor effect nor the partner effect was statistically significant. The same was true for affiliative humor. Neither

Table 12

Actor-Partner Interdependence Model for Hypotheses 2a and 2b.

	Effect	Estimate	Lower CI	Upper CI	*p*	Beta	*r*
Aggressive Humor	Intercept	-9.50	-14.43	-4.57	<.001		
	Actor	-0.05	-0.58	0.49	.86	-0.01	-.01
	Partner	0.25	-0.31	0.81	.38	0.07	.07
Affiliative Humor	Intercept	-9.50	-14.43	-4.57	<.001		
	Actor	-0.01	-0.70	0.68	.98	-0.00	-.00
	Partner	-0.59	-1.32	0.14	.11	-0.13	-.13

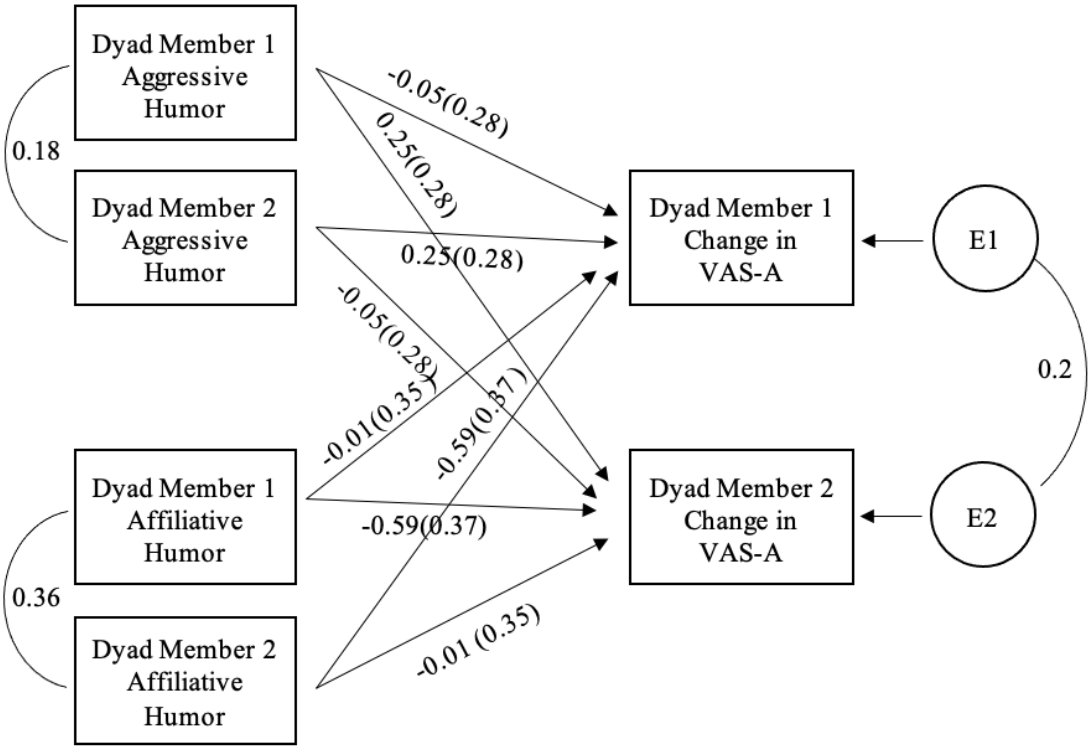

Figure 6. Lavaan Model for Hypotheses 2a and 2b Regarding Change in Negative Affect.

hypothesis 3a nor hypothesis 3b regarding change in closeness was supported. Results are displayed in Table 13 and Figure 7.

Summary of Results for Primary Hypotheses

Overall, analyses for all primary hypotheses were not significant. Results did not support the hypotheses related to the parallel mediation model with individual participants as the units of interest, nor related to the actor-partner interdependence model with dyads as the units of interest. Possible explanations for these findings are explored in the discussion section.

Post Hoc Analyses

A post hoc analysis was conducted to assess whether Hypotheses 2a and 2b were significant in a subsample of romantic partners only (n = 33 dyads). A lavaan model was conducted which converged after 125 iterations. A summary of the results is in Table 14. The R^2 was .06, indicating that 6% of the variability in change in negative affect was accounted for by the two humor styles. The partial intraclass correlation for change in negative affect (change VAS-A) controlling for the other predictors is equal to .26 and was not statistically significant (p = .16). For aggressive humor neither the actor effect nor the partner effect was statistically significant. This was also true for affiliative humor.

Another post hoc analysis was conducted to assess whether hypotheses 3a. and 3b. were significant in a subsample of romantic partners only (n = 33 dyads). The lavaan model conducted converged after 110 iterations. A summary of the results is in Table 15. The R^2 was .15, indicating that 15% of the variability in change in closeness was accounted for by the two humor styles, with anxious attachment entered as a covariate. The partial intraclass correlation for change in closeness controlling for the other

Table 13

Actor-Partner Interdependence Model for Hypotheses 3a and 3b.

	Effect	Estimate	Lower CI	Upper CI	*p*	Beta	*r*
Aggressive Humor	Intercept	-0.32	-0.98	0.35	.35		
	Actor	0.00	-0.03	0.03	.99	0.00	.00
	Partner	0.00	-0.02	0.04	.50	0.05	.06
Affiliative Humor	Intercept	-0.32	-0.98	0.35	.35		
	Actor	-0.02	-0.06	0.02	.30	-0.08	-.08
	Partner	0.02	-0.03	0.06	.43	0.07	.07

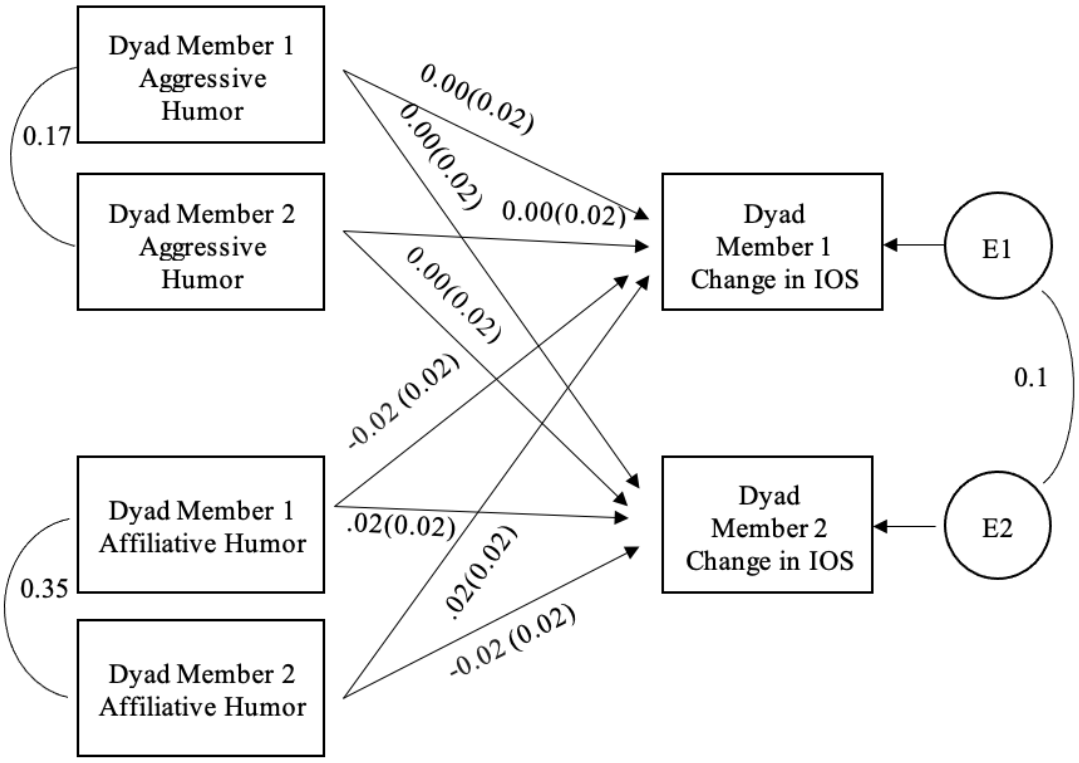

Figure 7. Lavaan Model for Hypotheses 3a and 3b Regarding Change in Closeness.

Table 14

Actor-Partner Interdependence Model for Post Hoc Analysis for Change in Negative Affect (n = 33 dyads).

	Effect	Estimate	Lower CI	Upper CI	*p*	Beta	*r*
Aggressive Humor	Intercept	-8.14	-17.68	-1.41	.10		
	Actor	-0.89	-2.06	0.28	.14	-0.20	-.20
	Partner	0.79	-0.41	1.98	.20	0.17	.17
Affiliative Humor	Intercept	-8.14	-17.68	1.41	.10		
	Actor	0.92	-0.52	2.36	.21	0.17	.16
	Partner	-1.31	-2.74	0.12	.07	-0.24	-.24

Table 15

Actor-Partner Interdependence Model for Post Hoc Analysis for Change in Closeness (n = 33 dyads).

	Effect	Estimate	Lower CI	Upper CI	*p*	Beta	*r*
Aggressive Humor	Intercept	-0.35	-1.64	0.94	.60		
	Actor	0.02	-0.05	0.08	.66	0.06	.06
	Partner	-0.02	-0.08	0.05	.67	-0.06	-.06
Affiliative Humor	Intercept	-0.35	-1.64	0.94	.60		
	Actor	-0.10	-0.18	-0.01	.03	-0.31	-.32
	Partner	0.04	-0.05	0.12	.41	0.11	.12

predictors is equal to .03 and was not statistically significant (p = .87). For affiliative humor the partner effect was not statistically significant. However, for affiliative humor a significant actor effect emerged (β = -0.31, p = .03). As affiliative humor increased the change in closeness was reduced over time. In other words, the more affiliative humor actors reported using, the more they reported feelings of closeness similar to those reported at baseline (rather than decreased feelings of closeness) following ostracism. For aggressive humor, neither the actor effect nor the partner effect was significant.

In sum, post-hoc analyses demonstrated that for hypotheses related to the actor-partner interdependence effects of affiliative and aggressive humor in a subsample of romantic partners only (as opposed to close others more generally), neither humor style significantly impacted the change in the negative affect following ostracism for actors or partners. Additionally, aggressive humor was not related to significant actor or partner effects for change in closeness following ostracism. However, a significant actor effect emerged for affiliative humor, as it impacted change in closeness. The more affiliative humor participants reported using, the less their feelings of closeness to their romantic partner were impacted by ostracism. In other words, individuals who reported using more affiliative humor had similar feelings of closeness to their romantic partner before and after ostracism. Affiliative humor appeared to serve as a relational protective factor for these individuals.

Exploratory Analyses

1. **Would self-enhancing humor as measured by the HSQ protect against negative affect above and beyond affiliative humor in the ostracism context?**

A test of the parallel mediation model hypothesized was conducted using the PROCESS procedure macro for SPSS (v3.5, Hayes, 2017). The dependent variable was change in negative affect (change in VAS-A score), the independent variable was relationship satisfaction (PRQC score), and the affiliative humor and self-enhancing humor scores were entered as mediators. The standardized coefficient estimates for each of the paths are presented in Table 16. Neither indirect effect was statistically significant, since the 95% confidence intervals included zero. The completely standardized indirect effect is the effect size for the indirect effects, and in the current analysis, the effect sizes of both the indirect effects are very small. The hypothesis was not supported.

2. **Would self-defeating humor measured by the HSQ lead to detrimental outcomes more so than aggressive humor in the ostracism context?**

A test of the parallel mediation model hypothesized was conducted using the PROCESS procedure macro for SPSS (v3.5, Hayes, 2017). The dependent variable was change in negative affect (change in VAS-A score), the independent variable was the PRQC score, and the aggressive humor and self-defeating humor scores were entered as mediators. The standardized coefficient estimates for each of the paths are presented in Table 17. Neither indirect effect was statistically significant, since the 95% confidence intervals included zero. The completely standardized indirect effect is the effect size for the indirect effects, and in the current analysis, the effect sizes of both the indirect effects are very small. The hypothesis was not supported.

3. **Regarding aggression:**

Table 16

Path Estimates from Parallel Mediation Model for Exploratory Hypothesis 1.

Effect	Model Segment	Standardized Path Estimate	*p*	95% CI Lower Bound	95% CI Upper Bound
PRQC to Aff. Humor	a_1	.07	.36		
Aff Humor to Change in VAS-A	b_1	-.04	.62		
Specific Indirect 1	a_1b_1	-.00		-.02	.02
PRQC to SE. Humor	a_2	.15	.06		
SE. Humor to Change in VAS-A	b_2	.05	.52		
Specific Indirect 2	a_2b_2	.01		-.02	.04
Total Indirect	--	.01		-.02	.04
Direct	c’	-.06	.49		
Total	c	-.05	.49		

Note. $N = 164$.

Table 17

Path Estimates from Parallel Mediation Model for Exploratory Hypothesis 2.

Effect	Model Segment	Standardized Path Estimate	*p*	95% CI Lower Bound	95% CI Upper Bound
PRQC to Agg. Humor	a_1	-.00	.96		
Agg Humor to Change in VAS-A	b_1	.01	.90		
Specific Indirect 1	a_1b_1	.00		-.01	.02
PRQC to SD. Humor	a_2	.05	.49		
SD. Humor to Change in VAS-A	b_2	-.01	.93		
Specific Indirect 2	a_2b_2	-.00		-.02	.02
Total Indirect	--	-.00		-.02	.02
Direct	c’	-.05	.50		
Total	c	-.05	.50		

Note. $N = 164$.

a. **Did aggressive humor use as measured by the HSQ mediate the relationship between Anger as measured by the ARI and negative affect following conflict as measured by a VAS-A taken following ostracism during Cyberball?**

A mediation model was conducted using the PROCESS procedure macro for SPSS (v3.5, Hayes, 2017). The predictor variable was the Anger measure yielded by the ARI, the mediator variable was aggressive humor, and the dependent variable was change in negative affect (change in VAS-A). This mediation did not yield significant results. The indirect effect and confidence intervals are represented in Table 18.

b. **Do any of the humor styles mediate this relationship, if not aggressive?**

The ARI produced a score related to the level of anger a person reports (ARI Anger). A series of mediation models were created using the PROCESS procedure macro for SPSS (v3.5, Hayes, 2017) with ARI Anger entered as the predictor, the various humor styles entered as mediators, and the change in negative affect entered as the outcome variable. No models yielded significant findings. The indirect effects of all mediation models are reported in Table 18.

4. **Were any of the humor styles more or less associated with the tendency to use cognitive reappraisal as measured by the ERQ?**

Four Pearson correlations were conducted to assess the relationship between cognitive reappraisal and the four humor styles (Table 19). Self-enhancing ($r = .41$, $p < .001$) and self-defeating humor ($r = -.16$, $p < .05$) were significantly correlated with cognitive reappraisal. Multiple regression was used to test the model predicting

Table 18

Indirect Effects of Mediation Models from Exploratory Question 3, Predicting Change in Negative Affect With ARI Anger as the Predictor Variable.

ARI Subscale (X)	Humor Style (Mediator)	Completely Standardized Indirect Effect	LLCI	ULCI
Anger	Aggressive	-0.00	-0.01	0.01
	Affiliative	-0.01	-0.05	0.02
	Self-Enhancing	-0.00	-0.02	0.01
	Self-Defeating	-0.00	-0.01	0.02

Table 19

Correlations Between Humor Styles and Cognitive Reappraisal (N =165).

Variable	Cognitive Reappraisal
Self-Enhancing Humor	0.41**
Aggressive Humor	-0.00
Self-Defeating Humor	-0.16*
Affiliative Humor	0.07

*$p < .05$, ** $p < .001$

cognitive reappraisal (Table 20). The variables entered were the four humor styles. Together the four humor styles explained 23.1% of the variability in cognitive reappraisal (R = .48, F (4, 160) = 12.02, p < .001). Individually, the self-enhancing and self-defeating humor styles were significant unique predictors of cognitive reappraisal. Self-enhancing humor was positively associated, predicting 19.9% of the variability in cognitive reappraisal (r_{sp}= .45). Self-defeating humor was negatively associated, predicting 5.8% of the variability in cognitive reappraisal (r_{sp} = -.24).

5. **Were any of the four emojis intended to represent the four humor styles (which participants believed were being "sent" to their study partner in a text message following ostracism in Cyberball game) predictive of the outcome variables, change in IOS or change in VAS-A?**

ANOVAs were conducted to assess whether choice of emoji (intended to represent humor style "in-the-moment") was predictive of the dependent variables, change in negative affect (change in VAS-A) or change in closeness (change in IOS). Results showed there were significant differences in change in closeness based on emoji chosen F(3, 160)=4.94, p=.003. Results from the ANOVAs are in Table 21. Post-hoc Tukey tests were conducted to determine which groups differed for change of closeness. The change in closeness for the self-enhancing humor emoji group (M = -.43, SD = 1.05) was significantly (p = .005) less negative than the change in closeness for the self-defeating humor emoji (M = -1.54, SD = 2.10). In other words, the self-defeating group showed greater decrease in feelings of closeness after ostracism than the self-enhancing group.

Table 20

Multiple Regression Model Predicting Cognitive Reappraisal (N = 165).

Variable	B	*SE*	*β*	*t*	*p*	*r*
Constant	3.74	0.69		5.41	<.001	
Self-Enhancing Humor	0.07	0.01	0.48	6.44	<.001	.45
Aggressive Humor	0.00	0.01	0.01	0.17	.87	.01
Self-Defeating Humor	-0.03	0.01	-0.26	-3.47	<.001	-.24
Affiliative Humor	-0.02	0.01	-0.09	-1.17	.25	-.08

Table 21

Between Subjects ANOVAs for Emoji Selection for IOS and VAS-A.

	Emoji						
	Affiliative	Aggressive	Self-Enhancing	Self-Defeating	F	η^2	p
Change in IOS	-.44 (1.50)	-.65 (1.64)	-.43 (1.05)	-1.54 (2.10)	4.94	.09	.003
Change in VAS-A	-16.67 (23.47)	-11.90 (31.03)	-11.20 (24.54)	-5.43 (34.48)	.87	.02	.46

Note. Change IOS = Inclusion of Other in the Self Scale exclusion – baseline (Aron et al., 1992). Standard deviations appear in parentheses below means; Change VAS-A = Visual Analog Scale – Anxiety exclusion – baseline (Hornblow & Kidson, 1976). Standard deviations appear in parentheses below means.

Summary of Results for Exploratory Analyses

In sum, several exploratory analyses yielded significant results. First, the model using humor styles to predict cognitive reappraisal was significant and humor style made up 23% of the variability in cognitive reappraisal. Self-enhancing and self-defeating humor were each unique significant predictors of cognitive reappraisal. Increased self-enhancing humor use was associated with increased cognitive reappraisal, while increased self-defeating humor use was associated with decreased cognitive reappraisal. Another significant exploratory finding was that in-the-moment humor use (as represented by choice of emoji to be "sent" to study partner following ostracism) was significantly associated with change in closeness. Specifically, the individuals who chose the emoji that was representative of self-defeating humor use had significantly greater decrease in feelings of closeness following ostracism than did individuals who chose the emoji associated with the self-enhancing humor style.

VI. Discussion

This section begins with the purpose of the study, followed by a discussion of the results of primary hypotheses, post-hoc analyses, and exploratory questions. Limitations of the study are discussed. Future directions for research related to humor use during conflict are proposed.

Purpose of the Study

The aim of the present study was to investigate the role of different styles of humor used by members of a dyad as potentially protective or further detrimental to outcomes following a standardized conflict scenario. Prior research demonstrated that increased affiliative humor use and decreased aggressive humor use are associated, respectively, with better and poorer outcomes related to relational satisfaction, feelings of closeness, and distress following a discussion of a recent conflict between romantic partners (Campbell, Martin, & Ward, 2008). This former study was limited in that the conflict discussed was subject to selection bias (i.e., the couple themselves were asked to choose a conflictual topic). Also, the coding of humor use may have been susceptible to observer bias given that humor is subjective, idiosyncratic, and personal. In other words, it is possible that style of humor use may be more accurately reflected by one's self-reported general tendencies to use a range of humor types, which would be better captured in a self-report measure, such as the Humor Styles Questionnaire (HSQ), as opposed to observer ratings. The present study aimed to improve upon these methods by 1) standardizing the conflict scenario via use of Cyberball to simulate ostracism and 2) by using self-report measures on the HSQ to standardize the assessment of general humor style use. Hypotheses were made regarding the individual participants' humor styles and

how those impact individual outcomes following ostracism. Hypotheses were also made regarding multidirectional interdependent actor-partner effects of variables related to outcomes within the dyad.

Summary of Findings

None of the primary hypotheses were supported. Aggressive and affiliative humor did not mediate the relationship between relationship satisfaction and change in negative affect for individual participants. A post hoc analysis revealed that for individuals, distress pre-ostracism predicted distress post-ostracism. The actor-partner interdependent models were also not significant, and within close-other dyads there were no actor or partner effects of general aggressive or affiliative humor use on either outcome variable, change in negative affect or change in closeness.

In post-hoc analyses using a subsample of romantic partners only, there was a significant actor effect for affiliative humor such that the more affiliative humor an individual reported using the less their rating of change in closeness was impacted by ostracism. In other words, the more affiliative humor actors reported using, the closer their reported feelings of closeness were to those they reported at baseline. Affiliative humor was relationally protective for actors in this regard.

Several exploratory analyses were significant. First, multiple regression analysis demonstrated that self-enhancing and self-defeating humor were individually significant unique predictors of cognitive reappraisal and each accounted for a large portion of variance within the model. Second, an analysis of "in-the-moment" humor use, which was measured by emoji selected to be sent to a study partner following ostracism, demonstrated that self-defeating humor had a significantly more adverse impact on

decreased feelings of closeness following ostracism as compared to self-enhancing humor. In other words, those individuals who chose to send the emoji representative of self-defeating humor following ostracism reported feelings of closeness significantly lower than their baseline feelings of closeness, as compared to individuals who chose to send an emoji representative of self-enhancing humor.

Explanation of Findings

The primary hypotheses of the present study were surprisingly not supported. Relationship satisfaction was not significantly correlated with participants' self-reported change in negative affect following ostracism. However, a post-hoc analysis demonstrated that negative affect at baseline predicted negative affect following ostracism, explaining approximately 17% of the variance in negative affect.

These findings suggest that it is the individuals' propensity towards negative affect that predicts a further detrimental affective experience after being excluded, rather than relational satisfaction. Research has demonstrated that insecurely attached individuals in particular are impacted most negatively by ostracism. In the present study, negative affect at baseline (prior to ostracism) was significantly correlated with attachment anxiety. This suggests that anxiously attached individuals, whom research indicates are adversely impacted by ostracism via Cyberball, already experience significant latent general distress/negative affect prior to the ostracism occurring.

Additionally, research has demonstrated that avoidantly attached individuals in particular do not perceive themselves as being impacted by ostracism, while physiological measures such as elements of heart rate variability (i.e., high frequency heart rate variability or HF HRV), suggest otherwise (Maunder, Lancee, Nolan, Hunter,

& Tannenbaum, 2006). Therefore, it is possible that many participants higher in attachment avoidance would not self-report distress after being ostracized. This potentially could be remedied by the use of physiological measures, which may assess distress occurring outside of self-awareness. Attachment style did not always emerge from preliminary analyses as a covariate; that said, physiological measures may have indicated that not all participants who were distressed following ostracism provided accurate self-report measures on the VAS-A (whether consciously or not). It's possible that self-report measures provided by avoidantly attached individuals were not actually representative of their distressing experience following ostracism, whether it is because these individuals denied their affective experience or were unaware of the impact of this distressing event on their need to emotionally regulate and on their nervous systems.

The finding that relationship satisfaction was not a predictor of negative affect following ostracism was surprising. It was hypothesized that ostracism by a close other would result in even worse detrimental outcomes related to ostracism than when ostracism is done by a stranger. In a longitudinal daily diary study participants' belonging, control, self-esteem, and life-meaning were more affected when ostracism was done by friends and close others than by acquaintances or strangers (Nezlek, Wesselmann, Wheeler, & Williams, 2012). That said, other research has shown that close relationships can be protective against negative outcomes during adverse events (Coan, Schafer, & Davidson, 2006; De Rubeis, Sütterlin, Lange, Pawelzik, van Randenborgh, Victor, & Vögele, 2016; Karremans et al., 2011; Yaakobi & Williams, 2016). For example, the negative effects of ostracism by strangers were ameliorated when participants were prompted to think of close others (Karremans et al., 2011). Perhaps the

premise of the study, that it was the participants' close others who were presumed (via deception) to be responsible for the ostracism, caused the negative effects of this adverse relational event to be dampened somewhat, and thus only those who were already feeling distressed prior to exclusion reported feeling more distressed following it. Finally, while some research has used Cyberball to demonstrate that ostracism by a partner resulted in less feelings of closeness on the IOS scale (Arriaga, Capezza, Reed, Wesselmann, & Williams, 2014), this previous research did not assess feelings of distress at all following ostracism, a variable that was investigated in the present study via the VAS-A. An alternative explanation to subjective distress not accurately capturing a negative reaction to ostracism (as physiological measures may have) is that the experience was in fact not as distressing as may have been expected given the ameliorating effect the close-other had on participants who were being ostracized. That said, it's possible that while affective distress was not adversely impacted within this mediation model, feelings of closeness may have been and that the two can be mutually exclusive.

Regarding primary hypotheses 1a and 1b (Figure 3), self-reported affiliative humor and aggressive humor use did not mediate the relationship between relationship satisfaction and change in negative affect. Although this was surprising there are several possibilities (in addition to those mentioned above) why this analysis did not emerge as significant. It is possible that while general humor styles used were indeed captured by the HSQ self-report measure, outcomes related to ostracism are more dependent on "in-the-moment" use of humor by members of a dyad rather than their generally used humor styles. That said, it may be that negative affect is not impacted by these variables while other outcome variables, such as change in closeness (which was measured in the present

study) are impacted. Notably, the present study demonstrated significant findings regarding the impact of "in-the-moment humor use" on change in closeness. However, outcomes for "in-the-moment" humor use related to change in negative affect were not significant. Participants were asked to select one of four emojis (Figure 2) to send to their study partner following ostracism. There was a significant difference in the effect of the selection of the emoji representative of the self-enhancing style as compared to the selection of the emoji representative of the self-defeating humor style. The change in closeness for the self-enhancing humor emoji group was significantly less negative than the change in closeness for the self-defeating humor emoji. In other words, the self-defeating group showed greater decrease in feelings of closeness than the self-enhancing group. It is possible that the lack of findings of in-the-moment humor use related to self-reported distress were again related to potential discrepancies between the self-reported distress levels participants perceived/provided and the actual affective experience of distress that may have been more accurately captured by other more objective (physiological) measures of distress as compared to the VAS-A.

Hypotheses related to interdependent actor-partner effects of humor following ostracism within a dyad were not supported. There were no actor or partner effects of affiliative or aggressive humor use related to outcome measures of change in negative affect or change in closeness. That said, the partner effect of affiliative humor trended towards significant (p = .07) for change in negative affect, such that increased affiliative humor nearly significantly protected against partner increased negative affect. Prior research (Campbell, Martin, & Ward, 2008) demonstrated a partner effect for affiliative humor following the discussion of a recent conflict, such that increased affiliative humor

use was associated with less partner distress. Again, the significance of these prior findings may be due to the "in-the-moment" impact of humor use on study partners during discussion of a conflict being more impactful than a tendency for a close other to use humor more generally. That said, the present study trending towards significance for the relationship between these variables is consistent with this prior research. Additionally, it is possible that the present study was under-powered.

Post-hoc analyses were conducted to test the actor-partner-interdependence hypotheses in a subsample of romantic partners. Results demonstrated a significant actor effect of affiliative humor, such that the more affiliative humor an individual within a dyad used, the more similar the feelings of closeness remained to those at baseline following ostracism. In other words, in the romantic-partner-only subsample affiliative humor was a protective factor relationally for those who employed it. Prior research demonstrated both actor and partner use of affiliative humor as related to increased feelings of closeness following discussion of a conflict (as measured by changes in pre- and post-ratings on the IOS) (Campbell, Martin, & Ward, 2008). Compared to these, the present study had mixed findings: while the actor effect was significant the partner effect was not. Perhaps the lack of actual communication between partners during the standardized ostracism task can account for this discrepancy. The methods utilized in prior research had participants discussing conflict scenarios face-to-face, while the present study separated individuals and measured reactions to an online simulated ostracism event during Cyberball. Perhaps the in-the-moment impact of partners being the recipients of affiliative humor accounts for prior findings. In the present study, the procedure did not include partners' receiving of humorous messages either by allowing

for direct, face-to-face conflict discussion (via Zoom or in person) or by simulating the receipt of a text message (such as by using the emojis as messages "sent" by the study partner).

The exploratory analyses (in addition to that of the emoji task) also yielded interesting results related to cognitive reappraisal. A multiple regression analysis demonstrated that together the four humor styles explained about 23.1% of the variability in cognitive reappraisal. Individually, the self-enhancing and self-defeating humor styles were significant unique predictors of cognitive reappraisal. Self-enhancing humor was positively associated, predicting 19.9% of the variability in cognitive reappraisal. Self-defeating humor was negatively associated, predicting 5.8% of the variability in cognitive reappraisal. Also worth noting is that the present study demonstrated a significant negative correlation between attachment avoidance and affiliative humor, and significant positive correlations between self-defeating humor and both attachment anxiety and attachment avoidance (Table 8). Prior research demonstrated that the maladaptive humor styles (aggressive and self-defeating) significantly mediated both the relationship between attachment avoidance and expressive suppression (a less adaptive way to manage affective experiences than reappraisal), and attachment avoidance and cognitive reappraisal (Poncy, 2017). The findings of the present study, both the correlations between attachment styles and humor styles as well as the model predicting cognitive reappraisal, are consistent with these findings, lending support that humor styles play an important role in whether insecurely attached individuals are capable of employing effective, adaptive emotion regulation strategies as opposed to maladaptive ones.

Limitations

The present methods were limited by several factors. First, while the sample was quite diverse in some ways (e.g., race/ethnicity, native language, etc.) it consisted overwhelmingly of young women. The study may have benefited from recruiting participants of a more evenly distributed age range and by recruiting more males. Additionally, recruitment was geared towards dyads of "close others" a broad category that wound up yielding dyads of many different types (e.g., friendships, romantic relationships, etc.). While relationship type did not emerge from the preliminary analyses as a significant covariate, it is worth mentioning that the diversity of close others within the study may have been a limitation of the sample. Perhaps targeting a more specific subset of close others (such as romantic partners) would yield more uniform, significant results.

Additionally, regarding measurement of the study variables, the VAS-A may have only provided a measure of distress that was either perceived inaccurately or consciously distorted by participants. The study could be improved upon by including a more objective, physiological measure of distress or affective processing, such as galvanic skin response (GSR; which measures perspiration presumably caused by arousal) or heart rate variability (HRV). Measuring affective distress with both self-report and physiological measures may more accurately capture participants' potentially discrepant perceptions/reports of and experience of affective arousal.

Another limitation of the present study's measurements was the lack of the interactive nature of humor use. While measuring humor use more generally via self-report measure on the HSQ was an important method that improved upon prior studies in

capturing general concurrent humor styes used, perhaps the lack of discussion between study partners (as was done by prior investigators) did not allow for the effects of "in-the-moment" humor to take place. Similarly, the standardized ostracism measure (Cyberball) was imperative in creating a more experimentally sound conflict design than has been done previously. Perhaps also including a standardized in-the-moment exchange of humor between members of a dyad (as opposed to solely collecting information about humor styles that individuals reported using more generally as measured by the HSQ self-report) would yield different results regarding the impact of humor on partners within the context of ostracism. For example, the choice of emoji to be "sent" to study partner yielded significant findings related to feelings of closeness of the sender. Perhaps an addition to the experimentally manipulated design in which participants are made to believe they are on the receiving end of a humorous message (such as an emoji) would effectively induce and capture partner effects of the impact of each humor style. That said, it may be that the self-report of one's humor style more generally does not have the same impact on partners during conflict as in-the-moment humor use, an important implication of the present study's findings. Future research may benefit from measuring both general humor use and in-the-moment humor use (via emojis both sent and received by partners of a dyad) to compare the effects of each, while maintaining standardization across and within dyads as in the present study.

Regarding the procedure, the study took place entirely over Zoom. The inability to control for the environment while participants completed study procedures allowed for occasional deviations from protocol, as several participants completed other activities (e.g., phone calls, etc.) while participating in the study. Although there was always a

research assistant present to virtually oversee study procedures and to attempt to redirect participants who deviated from the protocol, only so much was possible in controlling participant environments and behaviors via online interactions while research assistants were not physically present in the same space as participants. Although these factors likely did not adversely impact all participants and data collection, it is worth noting as a potential limitation in data collection.

As mentioned previously, another limitation of the study procedures is the exclusion of opportunities to use in-the-moment humor use to simulate the sending and receiving of humorous messages between members of a dyad in a standardized way. By including more opportunities for participants to send a humorous emoji and by creating moments during a distressing task at which participants also receive humorous emojis, this would allow for further analysis of in-the-moment humor use in a standardized way (more so than the coding of discussions about conflict, a method that has been used by researchers in the past).

Directions for Future Research

Restructuring the methods of the present study would improve the design. A combination of methods from prior research and the present study would be beneficial. Including a measure of affective processing will be essential in accurately capturing affective distress following ostracism, particularly for those individuals who perhaps perceive themselves as being less impacted by this relational event than others and for those who deny the impact of this adverse event. Additionally, including standardized measurements of both general humor use and humor use “in-the-moment” (such as via

the exploratory emoji task) will perhaps illuminate the differences in outcomes related to these two specific measurements of different aspects of the different humor styles.

Also, the effects of ostracism may not have been strong enough within the sample of close others as compared to in other research that deceives participants to believe ostracism is being done by a stranger. Perhaps a different standardized task more specifically targeted to the sample and more distressing than Cyberball would yield different results. For example, if participants are shown a photo or video of their romantic partner interacting with another individual, they may have a more strongly charged affective experience and may provide more significantly changed self-reported distress level after this event. Certainly an event like this may evoke more strong feelings between partners than a computer simulated game of catch. It would be interesting to assess outcomes related to general humor use as captured by self-report on the HSQ when using a more intense, emotionally charged (albeit still standardized) manipulation other than Cyberball.

Finally, future research should address some questions left unanswered by the present study. Perhaps the effects of ostracism when done by a partner, whether using Cyberball or another standardized experimental manipulation, are dampened by variables related to the relationship itself. Perhaps the protective effects demonstrated in other research, that romantic partners (either present or imagined) dampen the effects of ostracism by a stranger, are also protective when ostracism is done by the partner themselves. Future research would benefit from assessing this possibility by measuring variables related to relationship satisfaction, trust, or other pertinent variables in dyads, and assessing outcomes related to Cyberball.

Conclusion

In general, while primary hypotheses were unsupported, significant findings emerged from post-hoc and exploratory analyses. Overall, the findings suggest several concepts. Firstly, the current study found that actor effects related to affiliative humor use following ostracism may be circumscribed to romantic partners only rather than close others more generally. Additionally, feelings of closeness may be more greatly impacted by humor and variables related to the relationship than are self-reported feelings of distress. Also, general use of the self-enhancing and self-defeating humor styles accounted for a significant portion of variance in cognitive reappraisal. Additionally, general use of self-defeating humor as measured by the HSQ was generally positively associated with attachment insecurity. Finally, in-the-moment use of self-enhancing and self-defeating humor (determined via emoji) was significantly related to change in closeness following ostracism.

The current study has implications for future research on the use of humor in conflict. Specifically, future research may seek to assess the impact of the various humor styles on outcomes following ostracism in close others using standardized measures of in-the-moment humor styles. The current study's innovative use of emojis can be expanded to other in-the-moment techniques, such as deceiving participants to believe they are receiving a certain emoji or standardized message from their study partners. Likewise, the limitations of the current study suggest that physiological measures may provide additional information that may be precluded by the use of self-report measures. Future research may seek to explore the relationships between attachment style, expressive suppression and cognitive reappraisal in context of both ecological and self-reported

assessment of humor use. A final director for future research is exploring differences in attachment, emotion regulation, and humor style in conflicts between groups of close-other dyads versus stranger dyads.

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Appendix A

Emoji questionnaire to assess humor use in-the-moment following ostracism. Emojis from top to bottom are representative of affiliative, aggressive, self-enhancing and self-defeating humor use.

Thinking about how this game went, please select the emoji you'd like to send to your partner right now: