

# What Makes Us Feel the Best Also Makes Us Feel the Worst: The Emotional Impact of Independent and Interdependent Experiences

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*Four studies examined the hypothesis that intense emotional experiences are more often centered on interdependent than independent experiences. Studies 1 and 2 demonstrated that when asked to write about emotionally intense events, participants were more likely to write about interdependent than independent experiences. Study 3 provided evidence that these effects were not due to recall effects based on mere exposure. Finally, Study 4 demonstrated that when asked to write about the most positive and negative interdependent and independent experiences of their lives and then rate their impact, participants were more likely to indicate that interdependent experiences had more emotional impact than independent experiences. Study 4 also provided evidence that the extent to which an experience fostered belonging motivations predicted the emotional impact of that event. Implications of the current research in terms of the need to belong and research on motivation and appraisal theories of emotion are discussed.*

**Keywords:** Appraisal theory; Emotion; Motivation; Need to belong.

Appraisal theories of emotions posit that emotions arise when a stimulus is evaluated as fostering or hindering something that is important to the individual (Castelfranchi & Miceli, 2009; Frijda, 1986; Lazarus, 1991; Nussbaum, 2004; Roseman & Smith, 2001). Accordingly, appraisal theorists of emotion have long been interested in understanding the evaluative dimensions upon which emotional experiences are based (Scherer, Schorr, & Johnstone, 2001). Most of this work has focused on

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understanding the evaluative antecedents of particular discrete emotions such as anger or shame (e.g., Scherer, 1986; Smith & Lazarus, 1993). Although this research is invaluable and answers many important questions, it is easy to lose the forest for the trees. In other words, although we have knowledge about the antecedents of specific emotional experiences, it is less clear what types of experiences elicit emotions *in general*. Thus, the current research examined the antecedents of positive and negative affect at a broad level in order to understand the types of experiences that are evaluated as important to the individual. Since the intensity of an emotional experience closely corresponds to the importance of the eliciting stimulus for an individual (Smith, David, & Kirby, 2006), the current studies also focused exclusively on the types of experiences that elicit emotions of high intensity.

### *Emotions as an Appraisal Process*

One of the dominant perspectives employed in understanding emotions are appraisal theories of emotion (Reisenzein & Döring, 2009). These theories posit that emotions arise in response to appraisals that an event has desirable or undesirable implications for an individual's well-being. As such, it is not the event per se that produces an emotional response in any given person, it is the implications an event has for that person that produces an emotion (e.g., Frijda, 1986; Lazarus, 1991). Thus, the eliciting factors of emotional experience are necessarily and integrally tied to an individual's motivations, goals, and desires.

A number of studies conducted in the appraisal theory tradition have examined the ability of a set of evaluative dimensions to predict the experience of a particular discrete emotion (e.g., Buunk & Hupka, 1987; Frijda, Kuipers, & ter Schure, 1989; Scherer, Summerfield, & Wallbott, 1983; Smith, Haynes, Lazarus, & Pope, 1993). For instance, a cross-cultural study by Scherer (1997) demonstrated that perceptions of immorality coupled with a stimulus that is viewed as unfair and unexpected produces anger. Similarly, Smith and Ellsworth (1985) found that pleasant experiences associated with certainty, a desire to pay attention, and a low amount of effort are related to reports of pride. While these and similar studies have fostered significant advances in the understanding of the antecedents of emotions, little remains known about the eliciting factors of emotions in general. More specifically, while it seems clear that combinations of particular antecedent factors elicit a specific discrete emotion, there are also likely eliciting factors that are generally evaluated as desirable or undesirable thus producing some form of positive or negative affect. What types of experiences are likely to elicit positive or negative affect? Research on basic human motivations provides one promising answer to this question. That is, since emotions are rooted in an individual's motivations and goals, a significant inhibition or cultivation of a motivation that is fundamental to human nature should regularly produce an emotional reaction.

At an abstract level, motivations can be understood in terms of two broad categories; those that are concerned with social connection (e.g., belonging motivations) and those that are concerned with self-oriented processes (e.g., achievement motivation, self-preservation motivation). Given the great importance of the need to belong (Baumeister & Leary, 1995) and the fundamentally social nature of the human species, we hypothesized that intense emotional experiences would happen more often in the context of social belonging (from herein termed interdependent situations) than in the context of self-oriented processes (from herein termed independent situations).

### *The Importance of Belonging Motivations*

Research on the need to belong suggests that human beings have a fundamental need to feel connected to others and are thus motivated to seek and maintain longstanding and caring relationships (Baumeister & Leary, 1995). There is compelling evidence in support of the inherently social nature of human beings (e.g., Gardner, Pickett, & Brewer, 2000; Leary, 2002; Tice & Baumeister, 2001). For example, research shows that social attachments are formed fairly easily, even under adverse circumstances, and are preserved tenaciously (Elder & Clipp, 1988; Festinger, Schacter, & Back, 1950; Nahemow & Lawton, 1975; Wilder & Thompson, 1980). There is also ample evidence suggesting that mental and physical well-being depend upon satisfying belonging motivations. (DeLongis, Folkman, & Lazarus, 1988; Lynch, 1979). A lack of social connections can have serious negative outcomes such as anxiety (Baumeister & Tice, 1990; Leary, 1990), anger (Williams, Shore, & Grahe, 1998), substance abuse (Williams, Takeuchi, & Adair, 1992), and even premature death and suicide (Durkheim, 1897/1951; House, Landis, & Umberson, 1993; Lynch, 1979). Conversely, social connections are associated with many positive outcomes such as happiness (Baumeister, 1991) subjective well-being (McAdams, 1986) and health (Reis, Wheeler, Kernis, Spiegel, & Nezlek, 1985).

The social nature of humans is not surprising when considered from an evolutionary perspective. Humans evolved in an environment in which forming social ties was critical to survival (Brewer, 2004; Buunk & Nauta, 2000; Stevens & Fiske, 1995). As a relatively fragile and weak animal without claws or fangs, human beings presumably had to live in close collectives and rely on relationship partners for assistance with hunting, child rearing, and safety. Groups provided individuals with the safety and resources needed to survive (Hogan, Jones, & Cheek, 1985). Humans not drawn to group life would have had a difficult time surviving, whereas those drawn to others, especially in difficult times, would have likely thrived. Consistent with an evolutionary account, cross-cultural research suggests that the need for connection is universal; people gather in groups throughout the world and form relationships in every known civilization (Caporael & Brewer, 1995; Coon, 1946; Mann, 1980). Thus, evidence strongly suggests that human beings evolved to be a highly social species, strongly motivated to connect to others (Brewer, 2004). Since emotions occur in response to the inhibition or cultivation of a motivation important to the individual, intense positive and negative emotions should occur often in these social contexts.

Although no study has directly examined intense emotional experiences and their eliciting factors, there is preliminary evidence in support of the hypothesis that intense emotions most often occur in interdependent contexts. For example, in a large-scale survey of 2000 people, the most frequently mentioned “bad thing” that last happened to people was interpersonal in nature (Veroff, Douvan, & Kulka, 1981). In addition, loss of a close connection through the death of a relationship partner ranks among the most negative experiences in life (Holmes & Rahe, 1967; Weiss, 1979).

### *The Current Research*

Although the studies described above provide initial evidence in support of our hypothesis, no study to date has directly tested the prediction that intense emotional experiences more often occur in interdependent than independent contexts.

Although this hypothesis is not directly based on probabilities per se, it may help to conceptualize the prediction in these terms. Specifically, we are interested in determining the probability of an interdependent experience (vs. independent) given an intense emotion:  $P(\text{interdependent experience}|\text{intense emotions})$ . This is in contrast to a similar alternative that we are *not* examining in this paper:  $P(\text{intense emotion}|\text{interdependent experience})$ . Although this alternative prediction would fit with the literature reviewed about appraisal theories of emotion and the importance of the need to belong, the design of the studies reported in this paper are best suited to examine the first hypothesis.

In order to understand emotional experiences of an intense nature, we rely on self-reports of a retrospective nature. Specifically, participants were asked to think back over a specific time frame (ranging from 1 month in one study to an entire lifetime in another study) and bring to mind the single most positive or negative emotional event that happened during that time. As appraisal theory suggests, it is not the event per se that produces the emotional reaction, rather, it is the event in the context of the individual's motivations and goals that elicit an emotion. By asking participants to report on events that already occurred and had been evaluated as important (as indexed by an emotional reaction), this design takes into account the appraisal process and allows for a direct examination of the types of experiences that most often elicited that appraisal.

As mentioned previously, the current research focused on experiences of an intense emotional nature. Since it is difficult, if not impossible, to capture experiences of this kind as they occur, retrospective accounts are a useful alternative. Although retrospective studies have their problems, we believe that the studies utilized a judicious design because intense emotional experiences are often remembered with great precision and detail (e.g., Christianson & Loftus, 1990; Schacter, 1996; White, 1989).

## **Study One**

In Study 1 participants wrote about the most positive and negative emotional experiences of their lives. We hypothesized that participants would list more interdependent than independent experiences.

### *Method*

#### ***Participants***

Participants were 70 undergraduate students enrolled in an introductory psychology class at the University at Buffalo who participated in partial fulfillment of a research requirement. Half of the participants were male, and the average age was 19. Approximately half (57%) of participants were Caucasian, 23% were Asian, 6% were African American, 4% were Hispanic, and 8% were of "other" ethnic descent.

#### ***Procedure***

Participants were asked to write a paragraph about the *most* negative and the *most* positive emotional event they had ever experienced. For example, for the positive event, participants were told to "please bring to mind the single most positive emotional event of your life. Take your time to be sure that you come up with the most positive emotional event you have ever experienced. Once you have an event in mind, please write a paragraph describing the event using as little or as much detail

as you feel is necessary.” Valence order was counterbalanced. Participants were fully debriefed upon the conclusion of their participation.

### *Results*

Participants' answers to the free-recall tasks were categorized by research assistants who were blind to the study hypotheses as either independent or interdependent. Events were coded as being independent if they were centered on the self. More specifically, coders were instructed to categorize an event as independent if it was an event that was focused on individual processes, such as achievement or physical injury to the self. In contrast, events were coded as interdependent if they were primarily about relationship processes. Coders were instructed that events involving connecting to or distancing from close others (e.g., death of a loved one) exemplify this category. Each event was coded according to the main theme of the event described. If more than one theme was clearly present, coders were instructed to categorize the event based on the theme that was discussed in more detail. The percentage of agreement between coders was .91 for the negative events and .84 for the positive events. A third coder resolved any discrepancies.

Certain events had to be excluded from the analyses because participants did not follow directions or because they described an interaction with a pet. Although these latter events are clearly more interdependent than independent, we were hesitant to use them because they did not involve human interaction. Because we were predicting that more interdependent than independent events would be reported, we felt it would be a more conservative test of our hypothesis to exclude these events. Seven events out of a total of 140 events were excluded for these reasons.

*Primary results.* A chi-squared analysis was performed on the negative paragraphs to see if the type of event frequencies differed from each other. As expected, interdependent events ( $N=53$ ) were reported more frequently than independent events ( $N=13$ ),  $\chi^2(1, N=66) = 24.24, p < .001$ . A chi-squared analysis was also performed on the positive paragraphs to see if the type of event frequencies differed from each other. As expected, interdependent events ( $N=42$ ) were reported more frequently than independent events ( $N=25$ ),  $\chi^2(1, N=67) = 4.31, p = .038$ .

A two-way chi-squared analysis was also performed with gender and the type of event recalled for both positive and negative emotional events. The gender  $\times$  event type interactions were nonsignificant for both negative,  $\chi^2(1, N=65) = 1.49, p = .223$ , and positive,  $\chi^2(1, N=66) = 1.61, p = .210$ , events.

*Further examination of essay content.* While the primary analyses confirmed our hypotheses, they do not convey detailed information about the types of experiences participants were writing about in each category. Since interdependent and independent experiences can involve many different specific events (e.g., death of a loved one, an argument with a friend), the essays were further coded in two different ways. First, a text analysis program called the Linguistic Inquiry Word Count (LIWC) examined each essay using a highly developed and validated dictionary and set of predefined categories (Alpers et al., 2005; Cohn, Mehl, & Pennebaker, 2004; Owen, Klapow, Roth, & Tucker, 2004; Pennebaker, Mehl, & Niederhoffer, 2003; Stirman & Pennebaker, 2001). The LIWC counts the number of words used in a specified category and provides output of the proportion of words used in each category out of the total number of words in that essay. The LIWC analyses

indicated that, for the negative paragraphs, 49% of participants listed one or more family members and 33% mentioned a friend or romantic partner. For the positive paragraphs, 34% of participants mentioned at least one family member and 40% listed a friend or romantic partner. In total, participants mentioned some type of close relationship (family, friends, or a romantic partner) in their responses 74% of the time in the negative essays and 61% of the time in the positive essays.

We also ran separate *t*-tests for the positive and negative paragraphs to determine if participants were more likely to have a higher proportion of words related to family and/or friends in the interdependent than the independent essays.<sup>1</sup> In support of the coding conducted for the primary analyses, for the negative paragraphs, essays coded as interdependent ( $M = 3.90$ ,  $SD = 3.32$ ) had a higher proportion of words that referenced family and/or friends than essays coded as independent ( $M = 0.60$ ,  $SD = 1.40$ ),  $t(47) = 5.50$ ,  $p < .001$ . Similarly, for the positive paragraphs, essays coded as interdependent ( $M = 2.70$ ,  $SD = 3.02$ ) had a higher proportion of words related to family and friends than essays coded as independent ( $M = 1.06$ ,  $SD = 1.49$ ),  $t(63) = 2.96$ ,  $p = .004$ .

A detailed coding scheme was also created to provide further details about the types of experiences participants were typically describing in their responses. The categories used in this coding scheme are not meant to be an exhaustive list of all possible types of events in either category. Rather, they are simply a list of the types of experiences that were mentioned in Studies 1, 2, and 4 in this paper in order to provide a richer understanding of the types of experiences that participants were writing about. See Table 1 for a complete breakdown of the frequency with which each category was mentioned.

Of the negative paragraphs coded as independent, the most frequent category mentioned was an academic failure such as doing poorly on the SATs. For the positive paragraphs coded as independent, the majority were about an academic achievement such as getting accepted into college. Of the negative paragraphs coded as interdependent, the most frequent category mentioned was the death or illness of a close other. Of the positive paragraphs coded as interdependent, the majority of descriptions were about an experience of increased connection to a close other such as an emotionally close or intimate moment with a romantic partner.

### *Discussion*

In summary, Study 1 found that individuals were more likely to list interdependent events as compared to independent events as the most positive or negative emotional experience of their lives. These effects were also consistent for both men and women. Thus, Study 1 strongly supports the hypothesis that intense emotions are more often elicited in interdependent than independent contexts. In our sample, approximately 3.59 out of 5 participants listed the most negative and positive emotional events in their lives as interdependent.

One potential criticism of Study 1 is that the majority of participants were college students. Most college students are at a point in their life in which they are forming new friendships and searching for a romantic partner. Thus, relationships may be so central for this group, not because of the centrality of interdependent events in intense emotional experiences, but because of the particular circumstances surrounding a college student's stage in development (Erikson, 1950). Thus, Study 2 was conducted with an older community sample to examine the hypothesis of interest with a different demographic group.



**TABLE 1** Percentage of Events Falling into Each Category Within the Independent and Interdependent Categories for Studies 1, 2, and 4

|                 |   | Study 1<br>College<br>aged | Study 2<br>Middle<br>aged | Study 4<br>College<br>aged |
|-----------------|---|----------------------------|---------------------------|----------------------------|
| <i>Negative</i> |   |                            |                           |                            |
| Independent     | Academic failure  | 50.0                       | 12.3                      | 43.0                       |
|                 | Personal injury or sickness   | 16.7                       | 12.3                      | 25.6                       |
|                 | Financial problems  | 0.0                        | 10.5                      | 0.0                        |
|                 | Loss or potential loss of<br>personal property                              | 0.0                        | 8.8                       | 3.5                        |
|                 | Work failure or difficulties  | 0.0                        | 43.9                      | 2.3                        |
|                 | Mental illness or drug abuse  | 16.7                       | 0.0                       | 10.5                       |
|                 | Misc. other independent events  | 16.7                       | 12.3                      | 15.1                       |
| Interdependent  | Death or illness of close other   | 39.6                       | 14.8                      | 15.7                       |
|                 | Argument or fight with<br>close other                                       | 22.6                       | 50.0                      | 11.2                       |
|                 | Ending of or significant<br>negative change<br>in relationship*             | 28.3                       | 15.9                      | 69.7                       |
|                 | Seeing a close other experience<br>personal problems                        | 0.0                        | 11.4                      | 0.0                        |
|                 | Misc. other relationship-<br>oriented events                                | 9.4                        | 7.9                       | 3.4                        |
|                 | <i>Positive</i>   |                            |                           |                            |
| Independent     | Work achievement  | 0.0                        | 45.9                      | 3.3                        |
|                 | Academic achievement  | 60.0                       | 8.1                       | 41.8                       |
|                 | Financial and personal<br>independence/success                              | 8.0                        | 08.1                      | 5.5                        |
|                 | Acquisition of personal property  | 0.0                        | 13.5                      | 15.4                       |
|                 | Achievement outside<br>of work and academic context                         | 24.0                       | 13.5                      | 19.8                       |
|                 | Misc. other independent events  | 8.0                        | 10.8                      | 14.3                       |
| Interdependent  | Increased connection or<br>positive within an<br>existing relationship      | 52.4                       | 69.7                      | 45.1                       |
|                 | Seeing a close other succeed  | 2.4                        | 12.8                      | 0.0                        |
|                 | Pregnancy or birth of a baby  | 9.5                        | 11.9                      | 0.0                        |
|                 | Beginning a new relationship<br>(e.g., first date with<br>romantic partner) | 26.2                       | 0.0                       | 45.1                       |
|                 | Misc. other relationship<br>oriented events                                 | 9.5                        | 5.5                       | 9.9                        |

*Note:* Each number represents the percentage of events in either the independent or interdependent category that fell into the particular subcategory. For example, the numbers listed next to academic failure are the percentage of the negative independent events that fell into this category, not the percentage of all of the events in that specific sub-category. \*This category was only used when the change in relationship status was described as resulting from a particular argument or fight.

## **Study Two**

Study 2 was designed as a replication and extension of Study 1. Participants were again asked to report on the most negative and most positive emotional events they had experienced. However, in Study 2 participants were asked to report on an experience that occurred in the past month rather than throughout their entire lives as in Study 1. This modification allowed us to examine intense emotional experiences of a more recent nature. Although retrospective biases can never be completely eliminated, asking participants to report on an event of a more recent nature allowed us to at least minimize them.

In order to address the age limitation present in Study 1, participants were selected from a sample of middle-aged community members already in established long-term romantic relationships. Thus, participants were at a point in their lives in which they no longer needed to search for a romantic partner. This allowed us to examine emotional experiences among a group whom, presumably, already had an aspect of their social lives fulfilled. Finally, the study used a sample from a different geographical area of the United States, which helped increase diversity across studies. We hypothesized that interdependent events would be listed more than independent events as the most positive and negative emotional experiences of the past month.

### *Method*

#### ***Participants***

Participants were recruited from the Santa Barbara community for participation in the 1-year follow-up portion of a larger study on romantic relationships.<sup>2</sup> Although 200 participants (100 couples) participated in the first portion of the study, only 158 participants completed the follow-up. Fifty-three percent of respondents on the follow-up questionnaire were female. The average age of participants was 34 (range 20–79). Most of the participants (79%) were Caucasian, whereas 6% were Asian, 1% were African American, 9% were Hispanic, and 5% were of “other” ethnic descent.

#### ***Procedure***

Participants were sent a questionnaire packet through the mail or via the internet that included questions about the participants’ views of themselves and their relationship. Relevant to this study, participants were asked to describe their most negative and most positive emotional experience of the past month. Participants were instructed to think back over the past month about negative (and positive) emotional events they had experienced and bring to mind the single most negative (and positive) event that had occurred. They were also instructed to take their time and that the event could be from any domain of their lives.

The questions asking participants to describe emotional experiences were included immediately after a set of measures about the self (e.g., physical symptoms) and before any questions about the participant’s romantic relationship. This step was taken in order to minimize priming the romantic relationship as much as possible. Furthermore, since the items of interest to this study were included in the context of a relationship study after questions about the self, it is unlikely that any one construct was primed more than another.



### Results

Participants' responses to the descriptions of their most emotional experiences were coded by trained research assistants who were blind to the study hypotheses. They were categorized as independent or interdependent following the same coding guidelines as in Study 1. The percentage of agreement between coders was .85 for the negative events and .92 for the positive events. A third coder resolved any discrepancies. Fourteen out of a total of 276 events were excluded for the reasons listed in Study 1.

Because data was often obtained from both members of a couple, dependency in the data was a potential problem. Therefore, hierarchical linear modeling (HLM) was employed using the program HLM 6.0. The models were specified as Bernoulli distributed with the data organized with person (level 1) nested within couple (level 2). The intercept for couple was treated as a random effect. A Bernoulli distributed model examines the probability of success vs. failure for any one trial, which in this case translates to the probability of an essay being interdependent vs. independent for any one person.

*Primary analyses.* An HLM analysis was conducted on the negative paragraphs to see if the probability of an essay being interdependent differed from the probability of an essay being independent. As expected, the probability that a participant wrote about an interdependent event (.60) was significantly higher than the probability that a participant wrote about an independent event (.40),  $t(84) = 2.37, p = .020$ . Similarly, for the positive paragraphs, the probability that a participant wrote about an interdependent event (.74) was significantly higher than the probability that a participant wrote about an independent event (.26),  $t(83) = 5.62, p < .001$ .

In order to see if the results obtained differed by gender, gender was entered as a level 1 predictor in the models previously described. The error for the slope of gender was set equal to zero. This was necessary for the model to converge since there were only 2 members to a couple. The gender  $\times$  event type interactions were nonsignificant for both negative,  $t(144) = 0.16, p = .87$ , and positive,  $t(145) = 0.56, p = .58$ , events.

*Further examination of essay content.* Once again, the LIWC program was used to examine the paragraphs for mention of family and friends. For the negative paragraphs, 55% of participants mentioned a family member and 10% a friend. A total of 61% of participants mentioned a family member, a friend, or both in the negative paragraphs. For the positive paragraphs, 64% of participants mentioned a family member and 18% mentioned a friend. A total of 72% of participants mentioned a family member, a friend, or both in the positive paragraphs.

In order to support the coding conducted for the primary analyses, a Bernoulli distributed hierarchical model was run for both the positive and negative paragraphs. For both analyses, the essay coding was used as the outcome variable (independent or interdependent) and the LIWC results for the proportion of total words related to family and friends was used as the predictor variable. As expected, for the negative paragraphs, the probability that an essay was coded as interdependent significantly increased as the proportion of total words related to family and friends increased,  $t(143) = 5.37, p < .001$ . Similarly, for the positive paragraphs, the probability that an essay was coded as interdependent significantly

increased as the proportion of words related to family and friends increased,  $t(143) = 4.69, p < .001$ . An inspection of the pattern of means for the proportion of words related to family and friends in each category further illustrates the probabilities found using HLM. On average, the proportion of total words used to reference family and friends collapsed across the negative and the positive events was higher for the interdependent events ( $M = 4.15, SD = 3.61$ ) than for the independent events ( $M = 0.73, SD = 1.36$ ).

The detailed coding scheme used in Study 1 to identify the types of events discussed in both the independent and interdependent categories was applied to the essays of Study 2 as well. See Table 1 for a complete breakdown of the frequencies of each category used. Of the negative paragraphs coded as independent, the majority were about a work failure or difficulty such as being laid off or feeling overwhelmed with tasks. Of the positive paragraphs that were coded as independent, the majority were about an achievement at work such as getting a promotion. Of the negative paragraphs coded as interdependent, the majority were about an argument or a fight with a close other such as a spouse or another family member. Of the positive paragraphs coded as interdependent, the majority were about an increased connection or positive experience within a relationship. For example, many participants wrote about a particular day or part of a day when they got to spend quality time with a spouse or child.

### *Discussion*

In summary, Study 2 replicated and extended the findings of Study 1 by demonstrating a very similar pattern of results—interdependent events were listed more than independent events as being participants most emotional experiences—but with an older population and with a shorter time frame. This was consistent for both men and women. In this study 3.38 out of every 5 participants listed an interdependent event as the most positive and negative event of the past month.

Thus, two studies found strong support for the hypothesis that intense emotional experiences happen more often in an interdependent than an independent context. The experiences that participants reported as the most negative and most positive emotional events of their lives tended to be interdependent (Study 1). In addition, the experiences that participants reported as the most negative and positive emotional events over the past month tended to be interdependent (Study 2). Although each of these studies had their limitations, they borrow strength from each other and demonstrate that the effects reported are consistent across a college-age sample and an adult sample.

### **Study Three**

The first two studies provided consistent evidence in support of the hypothesis that intense emotional experiences are most often experienced in interdependent contexts. According to our theoretical framework, participants were listing interdependent events more frequently than independent events because of appraisal processes of emotions and the importance of the need to belong. One alternative possibility is that participants were listing interdependent experiences more often, not because they impacted them the most, but because participants are exposed to these types of events more often, thus making them more salient and available. Indeed, it is difficult to completely rule out salience as an alternative without being able to assess

emotional reactions online as they occur during the event itself. With that being said, we can begin to rule out the exposure alternative by asking participants to reflect on events they encountered during the day that are *not* tied to emotional responses.

If the results of the previous studies were due to mere exposure to interdependent situations, we would expect that interdependent events would be listed more often in this context as well. That is, if being frequently exposed to interdependent situations increases the likelihood that participants will recall these types of experiences and our results in prior studies were not actually due to their emotionally intense nature, we would also expect participants to recall interdependent experiences when not prompted to think about emotional experiences. However, if the results of the previous studies were not due to mere exposure, we would expect either independent and interdependent events to be listed with a similar frequency, or independent events to be listed more often than interdependent events.

### *Method*

#### ***Participants***

Participants were 81 undergraduates enrolled in an introductory psychology class at the University at Buffalo who participated for partial fulfillment of a research requirement. Most of participants (69%) were female, and the average age was nineteen. Most of participants (60%) were Caucasian, whereas 18% were Asian, 11% were African American, and 4% were Hispanic. 7% of participants did not indicate their ethnicity.

#### ***Procedure***

Participants completed a daily diary for 14 consecutive days. In this diary, participants were instructed to write down 3–5 events or circumstances that happened to them that day. Importantly, no mention of emotions was used in the instructions—participants were just asked to list things that happened to them that day.

### *Results*

Each event was categorized by coders blind to the hypotheses according to the coding guidelines used in Studies 1 and 2. At least 2 of the 3 coders agreed on a code for any particular event at least 91% of the time. Since participants were simply asked to list 3–5 things they did that day and were not limited to emotional experiences, responses varied quite a bit. Between 10% and 20% of responses on any given day did not clearly fall into the independent or interdependent categories and were thus not included in the analyses. For example, participants often listed watching a favorite TV show or listed a transient state such as being tired or being bored.

In order to compare the frequencies of independent and interdependent events across the 14 days of the diary period, two aggregates were computed. The first aggregate indexed the total amount of independent experiences each participant reported over the 14 days and the other indexed the total amount of interdependent experiences. Since participants reported up to 5 events each day for 14 days, scores in each category could range from 0 to 70. A repeated-measures analysis of variance (ANOVA) was run to see if the number of independent events differed significantly from the number of interdependent events listed. The results suggested that participants listed more independent experiences ( $M = 36.73$ ,  $SD = 11.04$ ) than

interdependent experiences ( $M=11.32$ ,  $SD=6.93$ ) over the two-week period,  $F(1, 80)=218.88$ ,  $p < .001$ . A repeated-measures ANOVA with Gender as a between-subjects factor was also conducted to see if gender moderated the results. The Event Type  $\times$  Gender results were nonsignificant,  $F(1, 79)=2.07$ ,  $p = .154$ , indicating that the frequency of the independent and interdependent events reported were not significantly different for men and women.

The responses participants provided in this study were not coded in more detail as they had been in Studies 1 and 2 because this study was included to rule out the mere exposure hypothesis for the results of the prior studies. A more detailed description of the essays would not provide any additional support or lack of support for this alternative hypothesis.

### *Discussion*

The results suggest that participants in the first two studies were not describing interdependent experiences more often because interdependent experiences are more salient. When asked to list things that happened that day (with no mention of emotion), participants were more likely to list independent than interdependent events across a 14-day period.

## **Study Four**

Study 4 was designed to test the hypothesis that intense emotional events are more often interdependent than independent in nature using a slightly different paradigm than that used in the first two studies. In order to make stronger conclusions about intense emotional experiences, we pitted intense independent and interdependent events against each other. Thus, Study 4 asked participants to write about the most emotional event in each category and then rate its emotional impact. This allowed for an assessment of how much each type of event impacted participants, independent of event frequency. We hypothesized that intense interdependent events would be rated as more impactful than intense independent events.

Study 4 was also designed to bolster the argument that the reason that intense emotional experiences are most often interdependent in nature is because they are linked to belonging needs. The coding scheme developed and used in the studies thus far was aimed at tapping into experiences that were or were not centered on relationship-oriented experiences. Thus, Study 4 sought to support these data by directly asking participants about the extent to which each experience affected their belonging needs. This allowed for the examination of an additional hypothesis derived from the theoretical framework presented. Specifically, we also tested the hypothesis that the more a stimulus affected belonging needs, the more emotionally intense that experience would be.

### *Method*

#### ***Participants***

Participants were 67 undergraduates enrolled in an introductory psychology class at the University at Buffalo who participated for partial fulfillment of a research requirement. Most of participants (57%) were female, and the average age was 18. Most of participants (58%) were Caucasian, whereas 21% were Asian, 10%

were African American, 3% were Hispanic, and 6% were of “other” ethnic descent.

### *Procedure*

Participants wrote about and made impact ratings for four emotional events, two negative (independent and interdependent) and two positive (independent and interdependent). Upon arriving at the lab, participants were told that the experiment was designed to examine peoples’ memory of emotional events. Participants were first given a definition of either an independent or an interdependent event. These instructions mirrored the instructions that coders were given in the prior studies regarding the definition of each type of event. For example, the independent instructions asked participants to write about an experience that was centered on themselves. Participants were given examples such as “failing a class” or “breaking your leg” for independent events. The interdependent instructions asked participants to write about an experience centered on a relationship processes. Participants were given examples such as “breaking up with your significant other” or “losing your best friend” for interdependent events.

After reading about the type of event, participants were asked to write a paragraph describing either the most negative or the most positive emotional event they had ever experienced in that category (both valence and event type were counterbalanced). After writing about the emotional event, participants answered two questions related to the magnitude of the emotional impact. The items were: “How intense were the emotions?” and “How impacted were you by the event?” ( $r = .57$ ). Responses to these items were averaged to form one construct referred to as magnitude from herein. Participants were also asked one question related to the duration of the emotional impact: “How long did the emotions last?”

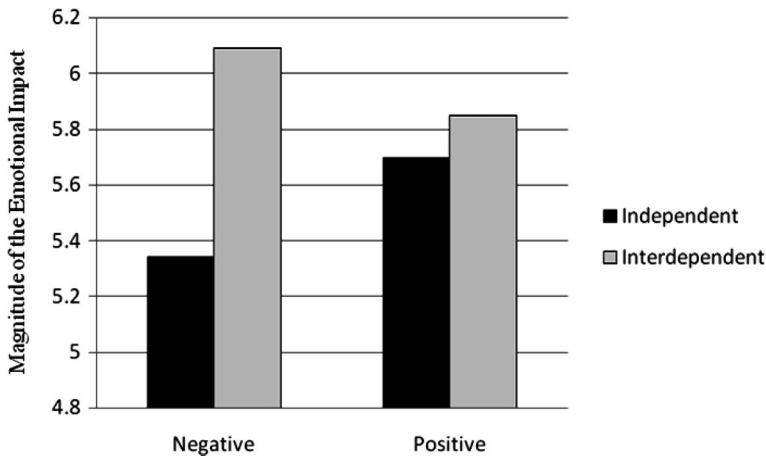
For the positive events only, participants were also asked to rate the degree to which each event helped them feel connected to others.<sup>3</sup> This question tapped into participants perceptions that an event was related to their belonging motivations and allowed for an examination of the degree to which these ratings were associated with ratings of emotional impact. Participants then completed the same steps for the remaining event within the same valence and then moved onto the events for the opposite valence.

### *Results*

One participant was dropped from all of the analyses because she was an outlier (more than 2 standard deviations away from the mean) on multiple ratings. This left a final sample of 65 participants to be analyzed.

*Magnitude of the emotional impact.* A repeated-measures ANOVA was conducted on the magnitude ratings for the negative events to see if the event ratings differed significantly from each other. In support of our hypothesis, participants rated negative interdependent events as more impactful than negative independent events,  $F(1, 64) = 17.48, p < .001$ . The differences in the mean ratings of the impact magnitude for the positive events did not significantly differ from each other,  $F(1, 64) = 1.72, p = .195$ . However, the means of the impact ratings did follow the same pattern as the negative events. See Figure 1 for a plot of the observed means for the negative and positive events.

In order to examine potential moderation by gender, a repeated-measures ANOVA was run on both the negative and the positive magnitude ratings with



**FIGURE 1** Magnitude of the emotional impact of negative and positive independent, relational and collective events (Study 4).

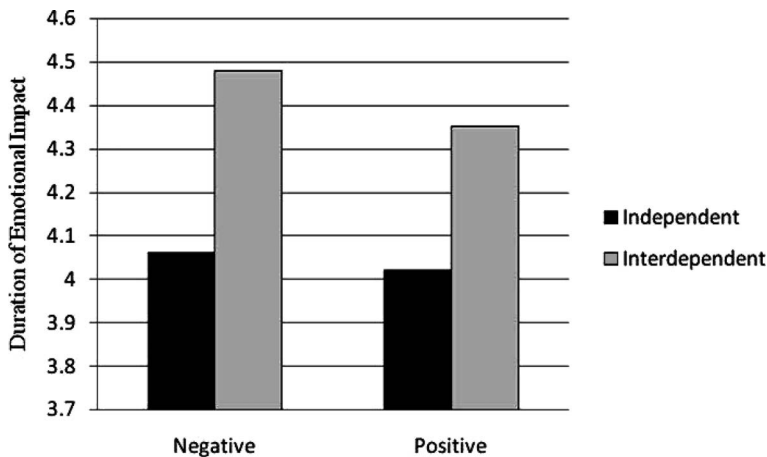
Gender included as a between-subjects factor. For the negative paragraphs there was no interaction between Gender and Event Type,  $F(1, 63) = 0.99, p = .325$ . However, for the positive paragraphs, there was a marginally significant interaction between Gender and Event Type,  $F(1, 63) = 3.70, p = .059$ . Following the original hypothesis, for men, interdependent events ( $M = 5.98, SD = 1.07$ ) were reported as having a greater magnitude of impact than independent events ( $M = 5.41, SD = 0.96$ ),  $F(1, 27) = 6.04, p = .021$ . Women, on the other hand, did not differ in their ratings of independent ( $M = 5.93, SD = 1.01$ ) and interdependent events ( $M = 5.88, SD = 1.10$ ),  $F(1, 36) = 0.06, p = .809$ .

*Duration of the emotional impact.* A repeated-measures ANOVA was conducted on the duration ratings for the negative events to see if the event ratings differed significantly from each other. In support of our hypothesis, participants rated negative interdependent events as having a longer impact than negative independent events,  $F(1, 64) = 6.92, p = .011$ . Similarly, the positive interdependent events were rated as having a longer impact than the positive independent events,  $F(1, 64) = 5.38, p = .024$ . See Figure 2 for a plot of the observed means for the negative and positive events.

In order to examine potential moderation by gender, a repeated measures ANOVA was run on both the negative and the positive duration ratings with Gender included as a between-subjects factor. There was no significant interaction between Gender and Event Type for either the negative,  $F(1, 63) = 2.30, p = .134$ , or the positive,  $F(1, 63) = 1.96, p = .167$ , events.

*Further examination of essay content.* Once again, the LIWC program was used to examine the paragraphs for mention of family and friends. As a reminder, the LIWC outputs the proportion of words in each category out of the total number of words used in that essay. As expected, for the negative paragraphs, the interdependent essays ( $M = 3.91, SD = 3.78$ ) were more likely to include reference to family and/or friends than the independent essays ( $M = 0.40, SD = 0.90$ ),  $F(1, 64) = 53.70, p < .001$ . Similarly, for the positive paragraphs, the interdependent





**FIGURE 2** Duration of the emotional impact of negative and positive independent, relational, and collective events (Study 4).

essays ( $M = 4.09$ ,  $SD = 3.74$ ) were more likely to include reference to family and/or friends than the independent essays ( $M = 0.38$ ,  $SD = 0.86$ ),  $F(1, 64) = 59.63$ ,  $p < .001$ .

The detailed coding scheme used in Studies 1 and 2 to identify the types of events discussed in both the independent and interdependent categories was also applied to the essays of Study 4. See Table 1 for a complete breakdown of the frequencies of each category used. The majority of the negative independent experiences were about an academic failure such as not getting into the college of one's choice. Most of the positive independent paragraphs were about an academic achievement such as graduating at the top of one's high-school class. The negative interdependent essays were largely about the ending of or a significant negative change in a relationship. The positive interdependent categories were often about the beginning of a new relationship or an increased sense of connection within an existing relationship.

*Examining belonging motivations.* As a reminder, one of the goals of the study was to examine the belonging hypothesis as a reason why intense emotions are elicited in the context of interdependent experiences more often than independent experiences. According to this premise, the more intense an emotional experience is, the more likely it is to involve belonging motivations. To investigate this hypothesis, we ran a series of hierarchical linear models with event type nested within persons.<sup>4</sup> First, we regressed the type of event on belonging need fulfillment. Next, we regressed the emotional impact ratings (both in terms of the magnitude and the duration of the impact) on belonging need fulfillment. Although an additional mediational analysis would finalize support for the hypothesis of interest, to the authors' knowledge, statistical methods for analyzing mediation that occurs completely at the lowest level (in this case at the level of the event) is still in development. See Kenny, Korchmaros, and Bolger (2003) for a complete description of the problems associated with mediation at this level.

As expected, participants reported feeling more close and connected to others during the events they wrote about in the interdependent category ( $M = 6.15$ ,  $SD = 0.97$ ) than in the independent category ( $M = 5.54$ ,  $SD = 1.32$ ),  $\gamma_{10} = .62$ ,

$t(128)=3.57, p=.001$ . Furthermore, higher scores on the impact ratings were associated with higher scores on the belonging measure for both the magnitude of the impact,  $\gamma_{10}=.29, t(128)=3.03, p=.003$ , and the duration of the impact,  $\gamma_{10}=.29, t(128)=3.14, p=.003$ .

### *Discussion*

In summary, with one exception, the fourth study provided evidence that among events of high intensity, interdependent experiences are rated as having more initial impact and a longer duration of impact than independent events. In addition, gender did not moderate these results, except in the case of the magnitude ratings for the positive events. This analysis demonstrated that males followed the predicted pattern of rating interdependent events as having more impact than independent events. Females did not differ in their impact magnitude ratings.

Study 4 also demonstrated that the more a positive event was rated as fostering connection with others, the more emotional impact the event was reported as having, both in terms of magnitude and duration of the impact. This provides additional evidence that intense emotional experiences are tied to belonging motivations.

## **General Discussion**

The current studies provided the first direct test of the hypothesis that intense emotional experiences are more often interdependent than independent. In Study 1, participants were more likely to list an interdependent than an independent experience as the most positive and negative emotional events of their lives. In Study 2, participants listed more interdependent than independent experiences as the most positive and negative emotional experiences of the past month. In Study 4, when asked to write about both interdependent and independent experiences and then rate their impact, participants rated interdependent events as having more impact than independent events. These effects were also very consistent across gender (with one exception in Study 4, which is fully described in the results section). Finally, Study 3 suggests that the effects found in the other studies were not due to mere exposure. When asked to report on experiences that occurred that day (with no reference to emotional content) participants were more likely to list independent than interdependent events.

Further examination of the types of independent and interdependent events participants were writing about in Studies 1, 2 and 4 also revealed interesting consistencies. First, achievement-related stresses or successes were regularly the most frequently listed independent event. For interdependent events, participants most often discussed the death of a close other or the ending of a relationship when discussing the negative events, and the beginning of a relationship or an increased connection within an existing relationship for the positive events.

According to appraisal theories of emotion, emotions occur when an event is evaluated as relevant to the progression or hindrance of an individual's goals, motives, or desires (Castelfranchi & Miceli, 2009; Frijda, 1986; Lazarus, 1991; Nussbaum, 2004; Roseman & Smith, 2001). The current research suggests that belonging motivations are one common and potent source of these appraisals. While many studies in the appraisal theory tradition have examined dimensions of emotion

elicitation (e.g., Scherer, 1986; Smith & Lazarus, 1993), this is the first study to the authors' knowledge that has examined the basic need to belong as an integral component of intense emotional experiences. Accordingly, the current work suggests that an integration of basic theories of human motivation and appraisal theories of emotion would provide very fruitful insights for both areas.

### *Limitations and Future Research*

There are a number of limitations to the current work that should be addressed. First, the hypothesis posited in the current studies is thought to apply to members of different cultural and ethnic groups. Since the need to belong is a basic human need present in cultures throughout the world, these processes should apply universally. However, the samples used in the current studies only allow for a generalization to Western cultural contexts of relative affluence.

The current research also relied completely on self-report. Thus, it is difficult to conclusively make causal statements about the influence of the need to belong on emotional experiences. A self-report methodology also falls prey to potential retrospective biases that could occur when remembering past emotional experiences. With that being said, a self-report methodology is a useful and practical option for studying events of an extreme emotional nature. In addition, although it is possible that participants misremembered information regarding their past emotional experiences, intense emotional experiences are often remembered with great detail and accuracy (Christianson & Loftus, 1990; Schacter, 1996; White, 1989).

Finally, although Study 3 was designed to address the possibility that the results of the prior studies were due to exposure and/or salience, the study represents only one possible way to address this possibility. Although completely teasing apart salience from emotional intensity may prove difficult (as emotionally intense events are, by their very nature, more salient than less emotional events), future research would benefit from a more systematic examination of this alternative hypothesis.

Keeping the limitations in mind, the current findings represent an important advance in understanding the relationship between interdependent events and intense emotional experiences. All four studies provide strong support that interdependent events are crucial in understanding emotional experiences.

### *Concluding Comments*

It is worth noting that this research did not invalidate the importance of independent events (nor did it intend to). The current studies suggest that although independent events exist and are important, they may not be as central to explaining emotional experiences as much research in social psychology has explicitly or implicitly implied. Areas within and outside of psychology can benefit from focusing more closely on interdependent experiences, their implications, and their potential to help explain the motivation behind much human behavior (see Brewer, 2004, for a discussion of this topic).

In conclusion, the current research suggests that intense emotional experiences are more often interdependent than independent in nature. It was not individual achievements such as winning awards, or completing tasks that affected participants the most. It was the moments when close relationships ended or when they began. It

was when they fell in love or found a new friend. It was when a loved one died or broke their hearts. The moments of connecting to others were the ones that touched peoples' lives the most.

## Notes

1. Since both analyses revealed a Levene's Test for the Equality of Variances less than .05, the statistics reported are for the results where equal variances are *not* assumed.
2. We are grateful to Nancy Collins for including these measures as part of her larger longitudinal study of couples.
3. An initial attempt was also made to measure the degree to which the negative events made participant feel disconnected to others. However, we soon realized that it was difficult to interpret scores that indicated that a negative event made participants feel disconnected. Specifically, participants could indicate an event *did not* make them feel disconnected either because the event actually distanced them from others or because the event did not involve belonging motives in the first place.
4. We used a variation of the following HLM equation to analyze both of the belonging hypotheses examined in Study 4:  $y_{ij} = \gamma_{00} + \gamma_{10}(\text{Predictor}) + r_{ij} + u_{0j}$ . In this equation,  $y$  is the level of belonging need fulfillment for event  $i$  in person  $j$ ,  $\gamma_{10}$  represents the unstandardized regression coefficient between the predictor and belonging need fulfillment, and  $r_{ij}$  and  $u_{0j}$  represent within-event and within-person errors, respectively.

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