GETTING OVER A RELATIONSHIP BREAKUP:

TESTING TWO INTERVENTIONS TO FACILITATE RECOVERY

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

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and hereby certify that, in their opinion, it is worthy of acceptance.

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To my Mom, for always being there.

To Kermit the Frog, for comic relief and sage words of wisdom when I needed them most.

To J. K. Rowling, for giving me a magical word in which to escape.

To my Dad, for always challenging me.

To my Sister, for her patience when listening to me shoot the breeze.

To my Brother, for a bond that has strengthened over the years.

And to my Husband, for his undying love and endless support. Thank you for experiencing this adventure with me.

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Abstract

Research suggests that individuals who have broken up from a romantic relationship and are also experiencing the transition to college may be particularly vulnerable to the stressors associated with both processes. The present study tested two online interventions aimed at facilitating recovery from a breakup for this potentially important at-risk group. 190 first-semester college students who had experienced a recent breakup were randomly assigned to an online chat, online journal, or no-treatment control condition, and then completed weekly online reports of their psychological adjustment, alcohol use, and sexual behaviors over a 12 week period. Results of analyses comparing patterns of change over time between the intervention and control groups revealed greater declines in anger, loneliness, weekday alcohol use, drinking to cope, and rebound sex among the intervention relative to the control groups. However, analyses of the mechanisms hypothesized to underlie the observed intervention effects were mixed. In sum, these two interventions had modest effects in facilitating recovery from a relationship breakup, although the mechanisms underlying these effects remain uncertain. Refining the interventions has implications for health professionals on college campuses who deal primarily with first-semester college students.

Getting Over a Relationship Breakup: Testing Two Interventions to Facilitate Recovery

The end of a romantic relationship is often cited as one of life's most distressing events, whether the relationship dissolution be a nonmarital breakup, marital divorce or separation, or bereavement (Kendler, Hettema, Butera, Gardner, & Prescott, 2003; Scully, Tosi, & Banning, 2000). Relationship dissolution has been associated with a variety of negative emotional and physical health consequences, including depression, anxiety, loneliness, fatal and nonfatal physical illness, and decreased longevity (see reviews in Gottman, 1994; Kiecolt-Glaser & Newton, 2001). More specifically, nonmarital romantic relationship breakups have been linked to increased feelings of distress and decreased self-esteem, especially for those who were "dumped" or had a higher quality or longer-lasting relationship (for a review, see Sprecher & Fehr, 1998). Such feelings are typically the strongest immediately after the breakup and then abate over a matter of months (e.g., Barber & Cooper, 2011; Sbarra & Emery, 2005). Reflecting the negative psychological outcomes associated with a relationship breakup, individuals are thought to be emotionally vulnerable in the aftermath of a breakup, which in turn is assumed to put them at risk for making poor decisions or engaging in risky behaviors.

Past research on relationship breakups has focused almost exclusively on emotional and psychological reactions to a breakup, but a few studies have examined the impact of relationship dissolution on risk-taking behaviors. For example, Davis and colleagues (2003) found that participants who were "dumped" or more committed to the prior relationship increased their use of alcohol after the breakup more than those who initiated it or were less committed. Another study found that individuals who had broken up from a cohabiting or marital relationship within the past year reported a higher monthly average number of new sexual partners in the past year compared with those who had broken up longer ago (i.e., ≥ 1 year; Wade & DeLamater, 2002). Similarly,

Barber and Cooper (2011) showed that the likelihood of having a new sex partner was elevated immediately after a nonmarital breakup, and this probability declined and then leveled off around 15 weeks post-breakup. Although there are only a few studies examining risky behaviors post-dissolution, together they are consistent with the notion that individuals who have recently experienced a breakup are at heightened risk for making poor alcohol-related or sexual decisions.

Despite the shortage of research examining post-breakup risky behaviors, a larger body of literature theoretically and empirically links general distress and low self-esteem to poor or risky decision making across a range of health behaviors. For example, people have been shown to drink in response to negative emotions (Cooper, Russell, Skinner, Frone, & Mudar, 1992; Todd, Armeli, & Tennen, 2009), and drinking to cope with negative affect has been associated with heavy and problematic drinking (e.g., Cooper, 1994; Yusko, Buckman, White, & Pandina, 2008). Similarly, having sex to cope with negative affect has been linked to a variety of negative outcomes such as more casual and risky sex partners (e.g., Cooper, Shapiro, & Powers, 1998; Gebhardt, Kuyper, & Greunsven, 2003; Grossbard, Lee, Neighbors, Hendershot, & Larimer, 2007; Hill & Preston, 1996). Furthermore, sex to reassure oneself of his or her desirability has been linked to an increased number of lifetime sexual partners (Robinson, Holmbeck, & Paikoff, 2007). Finally, in a study on post-breakup motives for sex, Barber and Cooper (2011) found that rebound and revenge sex motives (i.e., sex to get over the breakup, or to get back at the ex-partner, respectively) were positively correlated with negative emotions experienced in the aftermath of a relationship breakup. Their findings suggest that having sex for these reasons may be driven by the desire to avoid or deal with negative affect, anger and jealousy toward the ex-partner, as well as loss, loneliness, or low self-esteem post-breakup. Indeed, the fact that rebound and revenge motives are strongly correlated with avoidance reasons for having sex (e.g., to escape from or

minimize negative emotions; Barber & Cooper, 2011) and avoidance-motivated behaviors are consistently associated with poor adjustment (e.g., Cooper et al., 1998; Gebhardt et al., 2003) also supports the argument that having sex for these reasons is maladaptive or unhealthy.

In sum, individuals who have experienced a breakup have been shown to experience elevated distress and lowered self-esteem (e.g., Sprecher & Fehr, 1998) and may be at heightened risk of making poor or risky decisions regarding alcohol use and sexual behaviors. For these reasons, helping individuals post-breakup to adjust to their loss and move on more quickly should have multiple beneficial effects.

Breaking up with a High School Sweetheart and the Transition to College

Many high school relationships dissolve when one or both partners leave for college. Indeed, mass testing data from a large Midwestern university (N = 4871 introductory psych students from 2006-2009) showed that nearly 20% of first-semester freshmen had experienced a romantic relationship breakup within the past three months. For such individuals, coping with the challenges of a breakup may be compounded by the normative stresses associated with transitioning to college.

Although we are aware of no studies that have examined the joint impact of breaking up with one's high school sweetheart and entering college as a first-semester freshman, existing research nevertheless shows that the transition to college can be very stressful. Adolescents are faced with the developmental tasks of effectively coping with psychologically separating from their family as well as adapting to the rules and conditions of an adult world (Golan, 1981). Specifically, researchers have identified numerous domains that are affected by the transition to college, including changes in affiliation (e.g., relationships with parents, peers, romantic/sexual partners), achievement (e.g., heavier academic schedule, larger classes where teachers may not know students individually), and cognitive development (e.g., consideration of cultural norms when

making decisions about alcohol and sexual behaviors; Schulenberg & Maggs, 2002). As such, the college transition has been linked with decreases in both psychological well-being and physical health (e.g., Pritchard, Wilson, & Yamnitz, 2007; Verger et al., 2009), as well as with increased alcohol use (e.g., Parks, Romosz, Bradizza, & Hsieh, 2008) and sexual behavior (e.g., Farrow & Arnold, 2003; Patrick, Maggs, & Abar, 2007).

Summary

Taken together, these data suggest that individuals who have broken up from a romantic relationship and are transitioning to college may be particularly vulnerable to poor or risky decision-making, as well as heightened distress and decreased self-esteem. The current study therefore developed and tested two online interventions aimed at facilitating adjustment to a breakup for this potentially important at-risk group. The above research identifies increased feelings of distress (e.g., sadness, loneliness, anger) and decreased self-esteem following a romantic relationship breakup as potentially important intervention targets. Thus, the proposed interventions specifically targeted these psychological outcomes in order to facilitate better psychological recovery from a breakup and reduce sexual risk-taking and alcohol use.

Design and Rationale of Intervention

To help first-semester college students adjust to a recent romantic relationship breakup, the current study focuses on three mechanisms which are theoretically relevant to (and in some cases empirically linked with) increasing self-esteem and reducing distress to a variety of stressors (e.g., Koenig-Kellas & Manusov, 2003; Rains & Young, 2009; Smyth, 1998) -- social support receipt, emotional expression, and account-making. Two separate online interventions will be used to facilitate these mechanisms: online chat and journal groups. In the following review, we first focus on each mediator or mechanism for recovery and then briefly review the literature on online chat groups and journaling studies and their effects.

Mechanisms Facilitating Recovery

Social support. Research suggests that one way to help people cope with a stressful event is by providing them with social support (for reviews, see Cobb, 1976; Vaux, 1988). Social support is defined as particular functions or resources provided by interpersonal relationships (Sherbourne & Stewart, 1991), including emotional support (e.g., information that a person is accepted and worthwhile); informational or appraisal support (e.g., advice about how to cope with or understand a stressful event); tangible support (e.g., provision of financial aid or other services; also called instrumental support); and social companionship (e.g., spending leisure time with others; Cohen & Wills, 1985).

According to Cohen and Wills (1985), the provision of appropriate social support to individuals experiencing a stressful event or ongoing stressful situation can buffer (i.e., attenuate or in the extreme case, eliminate) the adverse effects of exposure to that stressor. Examples of specific mechanisms through which social support can buffer the adverse effects of stressful events include inoculation (e.g., salience of the potential stressor is reduced) or diversion from the stressor (for review, see Vaux, 1988, pp. 133-157). In addition, receiving supportive advice (informational support) may alter a person's appraisal of the stressful event (e.g., how distressed am I about this breakup?) or their resources for coping with the event (e.g., I can talk with others to reduce my distress). Lazarus and Folkman (1987) termed these evaluations "primary" and "secondary" appraisals, respectively, in their transactional theory of stress and coping.

Regardless of the specific underlying processes, social support has been widely studied as it relates to health outcomes, and many studies find that increased social support in the face of stressful events is correlated with better mental and physical health outcomes (see Cohen & Wills, 1985; Wright & Bell, 2003). Moreover, interventions that facilitate social support exchange have been shown to decrease

depression (Rains & Young, 2009) and increase post-traumatic growth following a variety of difficult life experiences, including bereavement, cancer, sexual assault, long-term illness, divorce, war, and HIV diagnosis (Prati & Pietrantoni, 2009).

However, no study to date has examined the effects of social support provision on nonmarital relationship breakups. Although one study found that perceived social support was positively related to better adjustment after a breakup (Frazer & Cook, 1993), actual social support received was not measured. In the current study, we hypothesize that the chat intervention will provide social support, and that the more social support an individual receives from the chats the quicker his or her recovery will be.

Emotional expression. Emotional expression, defined as the verbal and nonverbal manifestation of emotion (Vogel, Wade, & Hackler, 2008), has been linked to mental and physical health benefits in numerous studies (cf., Smyth, 1998). Indeed, several therapeutic approaches, including cognitive-behavioral and psychotherapeutic, are based on the core notion that encouraging clients to express their emotions is beneficial and that the failure to express one's emotions contributes to psychological maladjustment (e.g., Safran & Greenberg, 1991). However, less research has been devoted to understanding the processes that underlie and account for these therapeutic effects. As a general model for understanding this process, researchers posit that emotionally stressful events that are not discussed or processed represent a form of inhibition, which stresses the body and increases stress-related diseases (Pennebaker & Beall, 1986; Selye, 1976). Therefore, expressing one's emotions (via writing, in conversation with others, etc.) is a form of approach coping, and as such should be more beneficial than an avoidant or inhibitory response (cf., Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001).

Going beyond the broad confrontation-inhibition (approach-avoidance) model, a more specific process hypothesized to explain the benefits of emotional expression is catharsis. This process suggests that discussing one's emotions serves a cathartic function by venting or releasing built-up emotional energy, which can then lead to positive health effects (Scheff, 1979). However, research on catharsis provides mixed results for this hypothesized mechanism. Thus, the precise role of catharsis in emotional expression is unknown (cf., Pennebaker, 1997).

In sum, research shows that emotional expression can be beneficial to mental and physical well-being. Both interventions in the present study (i.e., chats, journals) will provide opportunities for emotional expression, and thus should facilitate recovery via this mechanism.

Account-making. Developing and recording a story-like narrative or explanation of a particular traumatic event, known as account-making (Weber, 1992), is a useful strategy for coping with the loss of a romantic relationship, including bereavement (e.g., Leick & Davidsen-Nielsen, 1991), divorce (e.g., Weiss, 1975), and nonmarital dissolution (e.g., Sorenson, Russell, Harkness, & Harvey, 1993). Pennebaker and colleagues (1997) have argued that insight-related (e.g., realize, understand) or causation-related (e.g., because, thus) words in journal entries of traumatic events suggest cognitive processing of the event. Thus, increases in percentages of these words over time indicate a more coherent story and should predict better long-term mental and physical health outcomes. Results (from six studies) revealed that individuals who increased their use of insight and causal words (proportionate to total number of words expressed) when writing about a stressful or traumatic event experienced subsequent increases in physical, though not mental, health over time -- anywhere from 6 weeks to 6 months post-writing (Pennebaker et al., 1997).

Several processes are thought to underlie the beneficial effects of account formation. In particular, account-making of a relationship breakup is thought to aid in recovery from a relationship loss by promoting understanding of or insight into the loss, helping one achieve closure, and giving one a sense of control over the loss (e.g., Weber, Harvey, & Stanley, 1987).

Taken together, these results suggest that account-making is helpful in accepting and getting 'over' a nonmarital relationship breakup. Both interventions in the current study should allow for formulating an account of one's recent breakup, though journaling might be expected to facilitate more account-making given that most people formulate accounts privately before they share them publicly (cf. Weber & Harvey, 1994).

Intervention Components

As previously mentioned, the current study has two separate interventions: an online chat group and a private, online journaling group. As shown in the literature reviewed below, both chats and private journals have been successfully used to facilitate recovery from, or coping with, a variety of stressful events.

Online chat groups. Computer-mediated chat groups involve a network of individuals who access an online chat room in order to communicate with each other in "real-time" (i.e., synchronous communication; Wright & Bell, 2003). Several studies show evidence that online support group interventions that include a chat group component can improve adjustment to a variety of stressors (such as cancer diagnosis, anxiety, and disordered eating), including decreasing depression and increasing well-being (e.g., Rains & Young, 2009). However, most studies use both synchronous (e.g., chat room) and asynchronous (e.g., forum, email) communication, and thus the effects of communicating with others solely through online chat rooms are less clear. Moreover, no studies to date have employed an online chat group to facilitate recovery from a relationship breakup.

A meta-analysis of studies measuring perceived social support while participating in an intervention that included an online chat component revealed that, on average, participants' perceived social support increased significantly over the course of the intervention (Rains & Young, 2009). Although studies using online chats have not directly assessed emotional expression or account-making in the chats, the chat intervention will allow participants to express their emotions, though it is less clear how well the chats will allow people to formulate an account of the breakup given that accounts, as previously discussed, are typically created in private (Weber & Harvey, 1994).

Journaling. Journaling is a written way of recording our experiences, including thoughts, feelings, and information about these experiences, over time (Stone, 1998). An abundance of studies have examined the beneficial effects of writing about a variety of personal and meaningful topics including positive life experiences (Burton & King, 2004), stressful events (e.g., transition to college; Pennebaker, Colder, & Sharp, 1990), and trauma (e.g., Pennebaker & Beall, 1986). Overwhelmingly, this research shows that writing about either negative or positive experiences confers subsequent physical and mental health improvements including reductions in the number of physician visits, less distress and self-reported depression, and higher GPA in the long-term (for a review, see Frattaroli, 2006). However, in a meta-analysis on studies of writing and health outcomes, Smyth (1998) found that although most studies find improved mental well-being over time, this may come at the expense of decreased psychological adjustment immediately following the writing intervention.

Although there are numerous studies documenting the positive benefits of writing about a personal event, only one study thus far has examined the mental health effects of writing specifically about a relationship breakup. Contrary to prediction, writing about a recent breakup (vs. a neutral topic) had no effect on participants' feelings toward their

ex-partner (e.g., anger, guilt, positive regard) or on general mood (Lepore & Greenberg, 2002). Although there was no evidence that writing about one's breakup led to better mental health outcomes, several reviews of journaling studies suggest that the effects of journaling are more robust with physical health outcomes than mental health outcomes (e.g., Pennebaker, 1989; Smyth, 1998). Second, participants were recruited if they had experienced a relationship breakup in the past year, and the average length of time since the breakup at the outset of the study was 6.3 months (*SD* = 3.7). Because prior research suggests that most psychological recovery occurs in the first few months after a breakup (e.g., Barber & Cooper, 2011; Sbarra & Emery, 2005), these participants may have already been 'over' the breakup. Under such circumstances, writing about the breakup might not lead to additional gains in mental health.

Studies using the writing paradigm consistently find that participants who write about personal events express higher proportions of emotion words and insight-related words than those who write about a neutral topic (e.g., Burton & King, 2004; Pennebaker, Colder, & Sharp, 1990). Thus, asking participants in the journal intervention to write about their recent breakup should facilitate both emotional expression and account making.

Overview and Hypotheses

The current study used a longitudinal design with 12-14 repeated weekly assessments over the course of a semester to test the effectiveness of two online interventions aimed at facilitating recovery from a romantic relationship breakup among first-semester college students. Participants who experienced a recent breakup were randomly assigned to an online chat condition, a private online journaling condition, or a no-treatment control condition. As previously discussed, the two intervention groups are hypothesized to trigger mechanisms that have been shown to help individuals cope with stressful events: social support receipt, emotional expression, and account-making.

Overall, we expected the interventions to help facilitate psychological recovery from a romantic relationship breakup as well as reduce the likelihood of risky behaviors. To the extent that risky alcohol behaviors (e.g., binge drinking) and risky sexual behaviors (e.g., casual sex) following a relationship breakup may, in part, be driven by the emotional aftermath of a breakup, the interventions' beneficial effects on these behaviors may be mediated by psychological adjustment. However, because risky behaviors are complex and influenced by numerous variables (e.g., peer influence, social norms, sensation seeking; Horvath & Zuckerman, 1993), we will test both the direct effects of the interventions on risky behaviors as well as indirect effects if the data support mediation through psychological outcomes. Specific predictions are detailed below.

Basic Recovery Trajectories: How Do Psychological Adjustment and Risky Behaviors Change Over Time?

As an initial step toward understanding and documenting the recovery process, we will first examine the trajectories of change in indicators of psychological well-being and involvement in risky behaviors over the course of the study. We expect to replicate prior findings showing self-esteem and acceptance of the breakup increase over time and eventually level off (e.g., Barber & Cooper, 2011). Conversely, we expect negative affect such as feelings of anger and loneliness to show the opposite pattern (i.e., decrease then level off; Barber & Cooper, 2011; Sbarra & Emery, 2005). To the extent that alcohol or sex are seen as antidotes to feelings of loss, loneliness, or low self-esteem, we expect that drinking to cope with distress, sex to cope with distress or low self-worth, or sex to get over the breakup should all decline over time and eventually level off, similar to the expected trajectories for anger and loneliness (see Barber & Cooper, 2011). Lastly, the trajectories of actual alcohol use or sexual behaviors are unclear -- alcohol use and sexual behaviors (e.g., likelihood of sex, new partner) may decrease over time as individuals gain more acceptance of the breakup, but these

behaviors may also increase over time as often occurs during the transition to college (e.g., Hartzler & Fromme, 2003; Patrick et al., 2007). Thus, we make no specific predictions about the basic trajectories of alcohol use and sexual behaviors per se.

Intervention Effects on Recovery: Do the Interventions Facilitate Recovery?

Figure 1 provides a schematic representation of the hypothesized intervention effects. We expect that participation in either intervention group will promote greater improvement in participants' psychological adjustment to the breakup (i.e., less anger loneliness, and distress; greater self-esteem, acceptance, and clarity) relative to similar others in the no-treatment control condition. We also expect that participants in the chat or journal groups will show lower levels of alcohol and sexual risk-taking behaviors and health clinic visits than their control group counterparts. In addition to testing the direct effects of the interventions on risky behaviors, we will also test mediation through psychological recovery (if the appropriate pre-conditions exist in our data) because alcohol and sexual behaviors may be motivated by a desire to cope with the emotional aftermath of the breakup.

Lastly, among intervention group participants (both chat and journal), we predict that higher levels of activity or participation will be associated with better psychological recovery as well as decreased risk taking, both directly and indirectly via improved psychological functioning (Barak & Dolev-Cohen, 2006; Barber & Cooper, 2011).

Process Analyses: Do the Proposed Mechanisms Mediate Effects of the Interventions on Recovery?

Figure 2 provides a conceptual representation of the hypothesized mechanisms underlying predicted intervention effects. As such, the processes portrayed in the model were only measured among individuals in the intervention groups and thus can only be tested in the subsample who participated in one of the intervention groups. As shown on the left side of Figure 2, we expect that the chat and journal groups will both provide

opportunities for emotional expression and account-making. Although we make no predictions about the chat and journal groups differing in emotional expression, we do expect (for the previously discussed reasons; Weber & Harvey, 1994) that the journal intervention will be more conducive to creating accounts. Thus, we expect to find (based on a content analysis of journal entries and chat dialogues) that, the journal group will use more insight- and cause-related words than the chat group, indicating greater account-making (Koenig-Kellas & Manusov, 2003). Additionally and as previously discussed, the chat intervention uniquely provides opportunities to receive social support and thus theoretically provides an additional pathway for psychological recovery relative to the journaling condition. However, because the two intervention groups may provide different amounts or opportunities for the various hypothesized mediating processes, we make no predictions about which intervention will be more helpful overall. Finally, as shown on the right side of Figure 2, we hypothesize that each of these mechanisms will, in turn, independently predict improved psychological functioning and, both directly and indirectly (via psychological functioning), reduced risk-taking and fewer health clinic visits.

Method

Pilot Study

Because procedures are generally well-established for journaling interventions (Pennebaker, 1997) but not for online chats, a pilot study was conducted to gain preliminary information on the feasibility and likely success of the online chat to facilitate recovery from a romantic relationship dissolution among first-semester college students. In this pilot study, 36 participants (20 women) were randomly assigned to either an online intervention or control condition. All participants were ≥ 18 years old, had experienced a breakup in the past 3 months, were not in a relationship at the outset, and were still distressed about the breakup (above the mean on current distress).

Participants in the intervention condition participated in weekly online chat sessions for 10 weeks and had access to information (e.g., evidence based self-help ways to cope, raise self-esteem, and gain closure) posted to an online message board. The online chats provided participants with the opportunity to receive social support, whereas the messageboard provided various self-help techniques that addressed the more normative changes that occur in the emotional aftermath of a breakup. Participants completed a total of three online surveys (5 weeks apart), assessing positive and negative affect, self-esteem, and loneliness, as well as feelings about their ex-partner and closure on the breakup.

Results of the pilot study provided initial support for the helpfulness of the intervention in aiding recovery from a breakup. Participants in the intervention group reported declines in negative affect across the study (b = -.37, p < .01), whereas their control group counterparts did not change significantly over time (b = -.12, *ns*). Additionally, individuals in the intervention group showed slight increases in anger during the first half of the study, but then quickly declined, whereas individuals in the control group showed the opposite pattern (first declining slightly then increasing sharply). No other significant between-group effects were observed. Undoubtedly however, the lack of significant differences stemmed at least in part from the small sample size (17 and 19, respectively, in the control and intervention groups), and the resultant low power of the between-group comparisons.

Results from internal analyses of change among intervention participants as a function of amount of participation in the intervention were also encouraging. Specifically, activity level in the online social support chats (as indexed by the total entries contributed to all ten chats) was related to steeper increases over time in positive affect (b = .01, p < .05), and to steeper declines in obsessive thoughts about the ex-partner (b = -.003, p < .07), distress over the ex-partner (b = -.004, p < .06), and general

negative affect (b = -.01, p < .05). Taken together, the intervention appeared to facilitate quicker emotional recovery in proportion to the amount of participation.

Based on a careful consideration of findings from the pilot study, including feedback from participants, we altered the dosage of the intervention for the current study. Rather than having chats once a week for 10 weeks, two chats (or journals) were offered for the first four weeks, followed by one chat (or journal) for four weeks. We also dropped the messageboard component since few participants used it.

Participants for the Current Study

Initial Sample of Participants

Participants were recruited from the University of Missouri campus via advertisements in the campus newspaper and a weekly informational email sent to the entire University. In addition, fliers were posted and announcements were made in various introductory courses. To be eligible, participants had to meet the following criteria: (1) be at least 18 years old, (2) experienced a breakup in the past 6 months, (3) not be in a relationship at the outset of the study, (4) have had sex at least once in their lifetime, and (5) be a first-semester college freshman. A total of 203 individuals met the above criteria and agreed to participate in the study after having their eligibility verified via phone. 89% of the sample was compensated with Psychology 1000 research credits, and 11% was compensated with monetary payments because they were not in a Psychology 1000 course. At the end of the study, there were four cash prize drawings totaling $500. Participants earned tickets for the drawing based on their amount of participation, such that higher compliance resulted in earning a greater number of tickets.

Overall, participants contributed a total of 2428 weekly reports. However, as shown in Table 1, 6 of the participants who were originally assigned to an intervention group (n = 3 each from chat, journal) did not participate in any of the intervention, and

were therefore dropped along with the 49 weekly reports they submitted. Although we considered treating these 6 individuals as control group participants, an examination of their recovery trajectories showed that these individuals were quite different from the other three groups (control, chat, journal). Specifically, the 6 participants appeared significantly worse off (e.g., lower self-esteem, acceptance), both initially and over time. This finding is consistent with research suggesting that those people most in need of help (e.g., counseling) are most likely to opt out of treatment (Meadows & Burgess, 2009).

Once these data were removed, 4 of the remaining 197 individuals got back into a relationship with the ex-partner during the first two weeks of the study. Thus, these individuals and the 45 weekly reports they contributed were dropped as well, since they were technically no longer broken up. Thirteen additional participants got back into (and stayed in) a relationship with their ex-partner at some later point during the study; data for these individuals were removed from the week they first indicated they were back with the ex-partner thus leading to the exclusion of an additional 74 weekly reports. Lastly, because the current study focuses on linear and quadratic change over time, we dropped 3 additional participants who contributed fewer than three weeks of data altogether (n = 6 weekly reports), which is the minimum number of reports needed to estimate a quadratic effect.

Final Sample of Participants

The final sample consisted of 190 participants (63% female, 87% Caucasian) who contributed a total of 2254 weekly reports, or an average of 11.9 per participant. This represents an overall completion rate of 86% of all possible reports that participants could have completed during the study. All analyses are based on the final sample of 190 individuals and 2254 weekly reports, except where noted otherwise.

Among the final sample of participants, the most recent relationship lasted an average of 14.9 months and the breakup occurred an average of 9.8 weeks ago (range = .29 to 30 weeks) at the time of the first report. Nearly 1/4 of the sample reported that the ex-partner had initiated the breakup, approximately 43% indicated they themselves had initiated the breakup, and 1/3 of the sample reported the breakup was mutually initiated.

Procedure

Participants were blocked on gender and then randomly assigned to the chat (n = 62), journal (n = 68), or no-treatment control (n = 60) group. The blocking procedure ensured equal numbers of males and females across the three groups. All participants completed an online 30-minute baseline questionnaire on trait self-esteem and current levels of loneliness and breakup-specific emotions (e.g., anger toward the ex-partner and acceptance/less distress over the breakup), as well as factors related to their relationship, alcohol use, and sexual behavior histories. Then, all participants completed weekly online surveys for 12-14 weeks (depending on when the individual enrolled in the study) which assessed current levels of self-esteem, loneliness, and breakup-specific emotions as well as past week sexual and alcohol related behaviors and motives. Emails containing the survey link were sent Wednesday afternoons, and participants could complete the survey anytime between 11:00 p.m. that night and 7:00 p.m. the following day (i.e., Thursday). Weekly surveys took approximately 15-20 minutes to complete, and questions about behaviors varied depending on one's experiences during the past week (e.g., only those who consumed alcohol in the last week completed questions about their motives for use). However, in all cases, those who did not receive questions contingent upon alcohol or sexual behaviors completed filler items of approximately the same length. Filler items were included to avoid inadvertently encouraging respondents to answer "no" to questions that triggered a set of contingent questions (cf., Kessler, 1995).

Participants assigned to the chat or journal groups participated in two sessions (i.e., two chat sessions or two journal entries) per week during the first four weeks of the intervention, followed by one session per week during weeks 5 through 8 of the study for a total of 12 possible intervention doses. No intervention was given during the final 4-6 weeks of the study, though weekly reports were completed throughout the study. Control group participants completed an equal number of weekly surveys but did not participate in either of the intervention activities. At the end of the study, participants completed a 10-15 minute questionnaire about their overall experience with the study. All participants had the opportunity to ask questions of the researcher and were debriefed, thanked, and compensated for their participation.

Intervention Components

As previously indicated, there were two separate intervention groups -- the chat group or journal group. Reminder emails were sent the night before a participant's scheduled chat session or journal entry. Overall, those in the journal group had higher compliance rates (M = 10 journal entries) than those in the chat group [M = 7 chat sessions; $t(104.8) = -6.22$, $p < .001$].

Online Chat Sessions

The online chat sessions were conducted in a private chat room hosted on the www.chatzy.com website, and all chats were moderated by the researcher. Those in the chat condition were assigned to a specific chat time based on their availability at the beginning of the study. Although we allowed several participants to change to a different chat time (due to changes in their personal schedules) during the first two weeks of the study, we sought to keep the same participants in a given chat to foster group cohesion and a sense of connection. Assigned chat groups ranged in size from 9 to 14 participants, and chat sessions lasted 30-45 minutes on either Mondays and Wednesdays or Tuesdays and Thursdays.

Participants were instructed that this was an opportunity to chat with other University of Missouri freshmen who had recently experienced a relationship breakup. At the chat room sign-in page, ground rules were posted (e.g., be respectful in your comments to others; only sign in with your pre-selected username). They were also informed they could talk as little or as much as they liked, and that the researcher would moderate the chats only to make sure everyone was respectful and to provide general questions if the flow of the chat slowed down.

Online Journal Entries

All journal entries were completed through an online survey site (www.questionpro.com). Participants in the journal group were instructed to select two non-consecutive days of the week on which they would complete their journal entries (e.g., Monday and Wednesday), and entries could be completed any time during the participants' selected days. Participants were given instructions similar to those given in other writing paradigm studies (see Pennebaker, 1997). Specific instructions included writing about "your very deepest thoughts and feelings about your recent relationship breakup" and exploring those emotions in their writing. For each journal entry, participants were asked to write for at least 15 minutes, and they were ensured that once they pressed the "finish" button at the bottom of the screen, only the researchers would be able to access their journal entries. At the end of the study, journal group participants were provided a copy of their entries if they chose to receive them.

Measures

Means, standard deviations, observed minimum/maximum values, skew, kurtosis, and internal consistency reliabilities (α) for all variables used in the present study are presented in Table 2. All items were scored so that higher scores equal more of the measured construct. Alpha reliabilities presented in the final column are the mean of alphas, calculated within each week and then averaged across all weeks (except for

partner initiation which is based on data from the initial survey). Within-person correlations among dependent variables are presented above the diagonal in Table 3, and between-person correlations (based on averages across weeks) are located below the diagonal. Intra-class correlation coefficients appear on the diagonal.

Demographic and Control Variables

Two types of control variables were included in the present study – those that are fixed properties of the individual and do not change over time, called time-invariant covariates, and those that can change from week to week, called time-varying covariates. Time-invariant controls were assessed in the initial survey and include gender, day in the semester the first assessment was obtained (to partial out the variance due to adjustment to school and the transition to college; Pritchard et al., 2007), relationship and breakup characteristics, and trait levels of each of the outcomes. Time-varying covariates were assessed in weekly surveys, and for some outcomes, in the initial session as well. Time-varying covariates included a dummy variable indicating the week of Thanksgiving break (to control for possible consequences of seeing or talking with the ex-partner or other changes in routine which might have occurred over Thanksgiving break), relationship with ex-partner in the past week, and approach motives for drinking and having sex in the past week. With the exception of gender (0 = female; 1 = male), Thanksgiving break (0 = no; 1 = yes), and day in the semester in which participation began, measurement of all other covariates is described below.

Time-Invariant Control Variables

Relationship and breakup characteristics. Because levels of distress are typically heightened immediately following a breakup and diminish over time (Barber & Cooper, 2011; Sbarra & Emery, 2005), initial time since the breakup was controlled to help control for adjustment to the breakup as a function of how long ago it occurred. Participants gave the date of their most recent romantic relationship breakup. For

analytic purposes, breakup date was converted to the number of weeks ago the break-up occurred relative to the date of the survey completed just before the intervention began. Similarly, whether the participant or ex-partner initiated the breakup was controlled because prior research shows that individuals who were "dumped" experience heightened emotional distress in response to the breakup (Davis et al., 2003; Sprecher & Fehr, 1998). Two items assessed the extent to which the ex-partner initiated the breakup and wanted the breakup on a 1 (*It was completely my idea/I wanted to breakup much more than my ex-partner did*) to 5 (*It was completely my ex-partner's idea/My ex-partner wanted to breakup much more than I did*) scale. The mid-point of the scale was defined as both parties wanting or initiating the breakup equally. The reliability for this 2-item composite was $\alpha = .87$.

Trait levels of positive and negative affect. To control for relatively stable between-person differences in psychological adjustment, trait levels of positive affect (PA) and negative affect (NA) were assessed in the initial survey and included as covariates in models predicting anger, loneliness, and acceptance/less distress (i.e., those outcomes for which we did not collect trait assessments). Each scale consisted of five items taken from the PANAS (Watson, Clark, & Tellegen, 1988). PA items included enthusiastic, interested, determined, excited, and inspired; NA items included scared, afraid, upset, distressed, and jittery. Participants indicated the extent to which they felt each of these emotions/feelings in the past week on a 1 (*very slightly or not at all*) to 5 (*extremely*) scale. Alpha reliabilities were .77 for positive affect, and .77 for negative affect.

Past year heavy alcohol use. To control for stable, between-person differences in patterns of heavy drinking, participants who had ever consumed alcohol were asked to indicate (1) how often they drank five or more drinks in the past year, and (2) how often they drank to intoxication in the past year. Both items were assessed in the initial survey

and were answered on a 1 (*never*) to 10 (*5 times a week or more*) scale. These items were highly correlated (r = .91, p < .001) and were thus averaged to create a composite of heavy drinking in the past year. The reliability for this 2-item composite was α = .95.

Lifetime sexual partners. To control for stable, between-person differences in sexual histories, three items in the initial survey asked participants about the number of people they had had sexual intercourse with (1) in their lifetime, (2) during the past 12 months, and (3) since the breakup. Responses were provided on a 1 (*none/no partners*) to 9 (*more than 20 people*) scale. All three items were highly correlated (r's > .70, p's < .001) and were thus averaged to form a composite of lifetime sexual partners. The reliability for this 3-item composite was α = .90.

Time-Varying Control Variables

Alcohol approach motives. Approach motives for drinking (i.e., enhancement and social motives; Cooper, 1994) were also controlled. Past research shows that these motives are moderately correlated with coping motives for use (see Cooper, Kuntsche, Levitt, Barber, & Wolf, in press, for a review). Accordingly, the increasing trends of these motives might mask the expected downward trend in coping motives if not controlled. For this reason, approach motives were measured and controlled in all analyses predicting coping motives for use. In both the initial and weekly surveys, participants rated the frequency and intensity (respectively) of drinking for enhancement (e.g., "because it gives you a pleasant feeling") and social ("because it makes social gatherings more fun") reasons. In the weekly surveys, participants who consumed at least one alcoholic beverage in the past week rated the extent to which they drank for both reasons on a 1 (*not at all*) to 7 (*extremely/a great deal*) scale. These two subscales were moderately correlated (within-person r = .35, p < .001) and are both considered approach motives, thus they were composited to form an average of alcohol approach

motives. The average alpha reliability for approach motives across weeks in the study was .74 (range .54 to .97).

Approach sex motives. For reasons similar to those described above for approach motives for alcohol use, respondents also rated the extent to which they had sex with each non-ex partner in the past week to: (1) achieve or increase intimacy (e.g., "to feel emotionally close to your partner"), and (2) for pleasure or excitement (a factor Cooper and colleagues [1998] called, "enhancement;" e.g., "because it feels good"). Participants rated intimacy and enhancement sex motives on a 7-point scale (1 = *Not at all*, 7 = *Extremely/A great deal*). Because these motives were not highly correlated with each other (within-person r = -.10, p > .10), they were treated as separate control variables. Average alpha reliabilities were .93 for intimacy (range .82 to .97) and .83 for enhancement (range .73 to .94) motives.

Relationship with ex-partner in the past week. Although, as previously discussed, participants who got back into a relationship with the ex-partner and stayed in that relationship were considered no longer "broken up" and were thus dropped from the analyses, some participants temporarily or periodically reunited with their ex-partners. To control for episodic changes in feelings and behavior that being together with one's ex-partner might have among this latter group, participants indicated in each weekly survey whether or not they currently considered themselves to be in a relationship. Those who answered 'maybe' or 'yes' indicated whether the relationship partner was their most recent ex-partner, a prior ex-partner, or someone new. A dichotomous variable was created where 1 = yes or maybe in a relationship with the most recent ex-partner that week, and 0 = not in a relationship with the most recent ex-partner that week. (Note that fluctuations due to being together with the ex-partner would otherwise go unmodeled and be treated as random within-person error.)

Hypothesized Mediating Mechanisms

Total Participation

For those participants in either intervention, total participation was calculated by standardizing and averaging the total number of words contributed and the total number of chats/journals completed.

Emotional Expression and Account-Making

Among chat and journal entries, the content of words was measured using the LIWC text analysis program (Pennebaker, Booth, & Francis, 2007). This program counts the number of words that are used from a given category (e.g., positive emotion) and divides that by the total number of words to yield a percentage or proportion of total words in each category. We obtained proportions of 4 content categories that were specific to the hypothesized mechanisms: positive emotion and negative emotion words (i.e., index of emotional expression), and insight-related and causation-related words (i.e., indication of account-making; cf., Pennebaker et al., 1997). Because insight- and causation-related words are thought to both represent the larger process of cognitive processing and have been previously combined (cf. Tausczik & Pennebaker, 2010), we combined those categories for a proportion of general insight/cause related words.

Social Support

Using chat dialogues only, the total number of social support comments a participant received was coded by two independent raters using general definitions of social support provided by Cohen and Wills (1985) and Sherbourne and Stewart (1991), including emotional, esteem, and appraisal/informational types of support. All chat comments were first read to see if they were socially supportive, and if so to whom the supportive comment was directed. Overall, 88% of comments were coded similarly across two independent raters. Discrepancies between the two raters were reconciled by the author.

Dependent Variables

Each set of dependent variables discussed below (except for physical health and clarity) was measured in both the initial and weekly surveys. Instructions were identical in the initial and weekly surveys, except where noted otherwise.

Psychological Outcomes

Self-esteem in the past day (for weekly reports) or in general (for the initial report) was measured by Rosenberg's (1989) self-esteem scale. Ten items assessed the extent to which the respondent felt satisfied with and good about him/herself (e.g., "I feel that I have a number of good qualities"). All responses were provided on a 1 (*strongly disagree*) to 4 (*strongly agree*) scale. The average alpha reliability across weeks in the study was .91 (range .87 to .93).

Three different feelings toward the ex-partner and breakup were assessed: (1) acceptance of the breakup, (2) emotional detachment from the ex-partner, and (3) angry and vengeful feelings toward the ex-partner. Items were adapted from Beike and Wirth-Beaumont (2005), Davis et al. (2003), and Rubin (1973). Specifically, eight items assessed the extent to which the participant had accepted the breakup and moved on (e.g., "Do you feel like you've emotionally moved on from the breakup in the past week?"). An additional eight items measured emotional detachment from the ex-partner and feelings of less distress (e.g., "In the past week, how much did you want to get back together with your ex-partner?"; reverse scored), and two items assessed the extent to which the participant experienced angry or vengeful feelings toward the ex-partner: (e.g., "In the past week, how much did you wish bad things on your ex-partner?"; "How much did you fantasize about getting revenge on your ex-partner during this past week?"). In both the initial and weekly surveys, participants indicated the extent to which they experienced each emotion or feeling in the past week on a 7-point scale (1 = *Not at all*, 7 = *Extremely/A great deal*). Maximum Likelihood Factor Analysis of initial survey items provided a three-factor structure where items assessing anger, emotional

detachment/less distress, and acceptance all loaded on separate factors. However, factor analyses of the weekly reports did not always yield clean acceptance and detachment/less distress factors. Moreover, these subscales were highly correlated (within-person $r = .75$, $p < .001$). Thus, both subscales were composited into a measure of acceptance/less distress with higher scores meaning greater acceptance/closure on the break-up, and greater detachment from, and less distress over, the ex-partner. As shown in Table 2, feelings of anger/revenge were non-normally distributed, so this variable was log-transformed to provide a more normally distributed variable that would uphold normality assumptions of the current analyses. Weekly alpha reliabilities ranged from .95 to .97 for acceptance/less distress (mean $\alpha = .96$) and .82 to .96 for anger (mean $\alpha = .88$).

Loneliness in the past week was measured by a 4-item version of the UCLA Loneliness scale (Russell, Peplau, & Cutrona, 1980). Participants rated the extent to which each item was descriptive of them in the past week (e.g., “people were around me but not with me”) on a 1 (*never*) to 4 (*always*) scale. Weekly reliabilities ranged from .80 to .88 (mean $\alpha = .84$) in the present study.

Two measures of clarity were assessed: (1) clarity about the breakup, and (2) clarity about relationships in general. Items were created for this study and assessed in the exit survey. Specifically, two items assessed the extent to which the participant understood why the break up happened (e.g., “to what extent do you understand why the relationship with your ex-partner ended?”), and three items assessed the extent to which the participant understood him/herself as a relationship partner and what is important in a future partner (e.g., “to what extent are you able to see your own strengths and weaknesses as a relationship partner?”). Maximum Likelihood Factor Analysis of all 5 items provided a two-factor structure. Alpha reliabilities were .89 for clarity about the breakup (2 items) and .77 for general relationship clarity (3 items).

Alcohol Outcomes

Three measures of alcohol involvement were included in the present study. In the initial survey, participants indicated their average frequency of alcohol use during the past year. In the weekly surveys, participants were asked whether they consumed at least one alcoholic beverage during the past week. Those who answered yes were then asked to report the number of drinks they had on each day of the previous week as well as how trashed/wasted and tipsy/buzzed they were (1 = *not at all*, 7 = *extremely/a great deal*) on each day they consumed alcohol. The two intoxication items were averaged together, and then this mean was averaged with the number of drinks consumed. Separate indices were created for weekend (i.e., Thursday through Saturday) and week days (i.e., Sunday through Wednesday) in order to capture normative patterns of heavy drinking on weekends vs. little or no weekday drinking (Orcutt & Harvey, 1991). Weekly alpha reliabilities ranged from .93 to .96 (mean α = .94) for the composite measure of weekend alcohol use, and from .85 to .91 (mean α = .89) for the composite measure of weekday use.

Drinking to cope, defined as drinking to avoid, escape, or minimize unpleasant or aversive feelings, was assessed by 3 items from Cooper's (1994) Drinking Motives Questionnaire-Revised. In the initial survey, participants who had ever consumed alcohol rated the relative frequency with which they drink to cope with negative affect (e.g., "to forget your worries") on a 1 (*never*) to 7 (*always*) scale. In the weekly surveys, participants who consumed at least one alcoholic beverage in the past week rated the extent to which they drank to cope in the past week on a 1 (*not at all*) to 7 (*extremely/a great deal*) scale. The average alpha reliability for coping motives across weeks in the study was .91 (range .80 to .97).

Sexual Outcomes

Four measures of sexual experience were assessed in the present study. The number of lifetime sex partners was assessed in the initial survey. The number and type of sexual partners in the past week was assessed by three items asking whether the participant had oral sex and/or intercourse in the past week, how many sex partners they had, and whether any of these was the ex-partner. From these data, a dichotomous variable was created indicating whether the individual had sex with an 'other' (i.e., non-ex) sex partner each week. For up to two 'other' sex partners each week, respondents also rated the extent of their prior sexual experience with that partner (1 = *none, this was the first time*; 8 = *more than 10 times*). This item was reverse scored so that higher values indicated the extent to which the partner was a "new" partner.

Sex to cope with negative affect or feelings of personal insecurity was assessed by 5 items from Cooper et al.'s (1998) sex motives questionnaire. Respondents rated the extent to which they had sex with each non-ex partner in the past week (or in general, for the initial survey) to cope with negative feelings (e.g., "to cheer up or to feel better") or to self-affirm (e.g., "to reassure yourself of your desirability"). Although coping and affirmation were originally seen as closely linked but distinct motive factors, items intended to assess both motives loaded on the same factor in a maximum likelihood factor analysis of the weekly survey items; scales (based on the original factor structure) were also moderately correlated (within-person $r = .39$, $p < .001$). Thus for these reasons, a single composite was used to assess the use of sex to cope (broadly construed) with either general negative affect or feelings of insecurity and low-self-esteem. In addition, four items developed by Barber and Cooper (2011) were used to assess rebound sex--that is, having sex to get back at or to 'get over' the ex-partner and the breakup (e.g., "to forget about your ex-partner"). Participants rated both sex to cope and rebound motives on a 7-point scale (1 = *Not at all*, 7 = *Extremely/A great deal*).

Average alpha reliabilities were .80 for coping (range .58 to .92) and .86 for rebound (range .64 to .98) motives.

Student Health Clinic Visits

The total number of visits made to the Student Health Clinic (SHC) during the course of the study (i.e., over the fall semester) was used as a final outcome. SHC visits include all primary care (e.g., medical doctor, doctor of osteopathy, nurse practitioner) and mental health visits (e.g., psychiatrist, psychologist, nurse practitioner). Information was provided by the SHC for each student who consented to release this information to the researcher (n = 107 participants). 45 participants did not consent to release this information, and 38 participants did not return the consent form. Comparing these three groups on gender, relationship characteristics (i.e., initial time since breakup, who initiated the breakup, relationship duration), initial levels of psychological outcomes, and general motives for alcohol use and sexual behavior revealed only a single significant difference. Those who never returned the form had marginally ($p < .07$) longer lasting relationships than participants who returned the form but did not consent to release their health records. Additionally, a Pearson chi-square statistic revealed that the proportions of those who consented, did not consent, and did not return the form were not statistically different across the intervention conditions [$\chi^2(4) = 1.60$, $p = .81$]. Finally, because there were only two participants who saw a mental health provider, we created a composite of the total number of mental and physical health visits to the SHC.

RESULTS

Preliminary Analyses

Pre-Intervention Group Differences

As discussed in the methods section, participants were randomly assigned to intervention condition at the beginning of the study. Although random assignment is meant to prevent pre-existing group differences, we nevertheless wanted to examine if

this was indeed the case. We compared the three groups on gender, break up time ago, who initiated the breakup, relationship duration, levels of psychological outcomes reported the week before the intervention started (i.e., week 0), trait-level alcohol and sexual motives, and lifetime reports of alcohol and sexual behaviors. Results revealed no significant differences among the groups on these variables which suggests the random assignment procedure was valid.

Normative Patterns of Change

Overview of Analyses

Hierarchical linear modeling (HLM version 6.08; Raudenbush, Bryk, Cheong, & Congdon, 2004) was used to describe patterns of change in weekly reports of all outcomes across the 14 week study. To account for dependencies among the weekly reports, they were modeled at Level 1 (L1) and nested under individuals (modeled at Level 2; L2). Patterns of change in feelings, behaviors, and motives were predicted by week in the study. Week in study ranged from -1 to 12, where week 0 equals the week prior to the first week of the intervention. For control participants, week 0 was set to the average date corresponding to week 0 in the intervention groups. Although change over time could have been modeled as a function of time since the breakup or week in the semester, the primary focus here is on the effects of the interventions. Thus we chose to model change over time as a function of week in the study while controlling for initial time since the breakup and day in the semester in which participation began. Each model consisted of three terms: (1) an intercept or average level of the outcome at week 0 in the study; (2) a linear growth component, assessing linear change from week 0; and (3) a quadratic component, assessing the eventual slowing or leveling off of change over time. However, because estimating a fixed quadratic curve model may cause an artifactual upturn (a U shape) or downturn (an inverted U shape) at the end of the growth curve when in fact the trajectory levels off (Long & Ryoo, 2010), we also tested a cubic

growth component for the subset of models in which a significant and visually apparent upturn (or downturn) was detected.

Table 4 shows the number of participants who contributed 0, 1, 2, 3, and 4 or more weekly reports for a given set of outcomes. As previously discussed, a participant must have at least three valid weekly reports in order to contribute to the estimation of the quadratic effect in a given model. Examining this table thus tells us the maximum number of individuals available for each of our analyses (i.e., all participants with 3 or more valid reports). As shown in the first row, there are 190 participants who contributed 3 or more reports of psychological outcomes. However, only a subset of these individuals contributed reports of alcohol use or sexual behaviors (see first row for each panel of outcomes). Specific details about the number of participants and weekly reports contributing to each of those sets of outcomes are discussed below in conjunction with the base growth models.

Selecting Covariates

A set of base models was estimated to identify the relevant control variables for inclusion in each of the primary growth curve analyses. Two covariates at L1 and five covariates at L2 were evaluated to determine if they should be controlled in the primary analyses. As previously discussed, time varying covariates (modeled at L1) included whether the survey was completed during Thanksgiving break and whether the participant was in a relationship with the ex-partner that week. At L2, gender, day of the semester in which a participant started the study (e.g., day 7), weeks since the breakup, who initiated the breakup, and trait levels of each of the outcomes were also modeled.

As previously discussed, two additional time-varying covariates were evaluated for inclusion in analyses predicting drinking to cope, sex to cope, and rebound sex. In models predicting drinking to cope, approach alcohol motives were modeled at L1 to control for a general desire to drink that week. Similarly, in models with sex motive

outcomes, intimacy and enhancement motives for sex were modeled at L1 to rule out a general motivation to have sex that week and thus better estimate effects on the motive of interest (e.g., rebound).

Eleven separate models were estimated (one for each primary outcome) in which each component of the growth curve (i.e., the intercept, linear term, and quadratic term) served as the dependent variable and was predicted from the full set of L1 and L2 covariates. To minimize the number of terms in the model and thus enhance the stability and power of the final models (Bryk & Raudenbush, 1992), only significant terms were retained as controls/covariates in the final base model for each outcome. The Appendix shows the significant covariates that were retained in each base model.

A conceptually similar approach was taken to identify covariates for the three analyses predicting outcomes obtained at the end of the study (i.e., health clinic visits, general clarity, and breakup clarity). Using ordinary least squares regression analyses, four of the five L2 covariates (all except trait level of the outcome) were entered simultaneously as predictors of a given outcome. Only significant covariates were retained in the final model for each outcome. Specifically, gender was controlled in models predicting health clinic visits and general clarity, and partner initiation was controlled in models predicting general and breakup-specific clarity.

Base Growth Models

The initial analyses describe normative patterns of change over the 14 weeks of the study, regardless of intervention group. The purpose of these models was to determine if patterns of recovery conformed to prior research and expectation. Additionally, these models served to illuminate the patterns of change in outcomes previously not studied after a breakup (e.g., weekday alcohol use). A total of 11 multilevel models was estimated, one for each of the outcomes examined in the present study. Results for the final trimmed models (including all significant L1 and L2 covariates

listed in the Appendix) are summarized in Table 5. The intercept or predicted values of the outcome at week 0 (i.e., the last pre-treatment data point) are shown in the second column, and linear and quadratic changes in the outcome are shown in the 3rd and 4th columns, respectively.

Psychological outcomes. As shown in Table 4 and as expected, the pattern of change over time was similar for three of the four psychological outcomes, as indicated by significant linear and quadratic components of opposing signs: Self-esteem and acceptance/less distress of the breakup increased significantly and then leveled off, whereas feelings of loneliness declined significantly and then leveled off. Plotting the trajectories showed that change in these outcomes leveled off around weeks 8-9 of the study which is consistent with the leveling off observed in the only previous study to assess psychological recovery over a similar time period (Barber & Cooper, 2011). Figure 3 illustrates two of these trajectories from the current study. Lastly, feelings of anger toward the ex-partner did not change significantly over time.

Alcohol outcomes. Analyses of alcohol use were restricted to the subset of participants who consumed alcohol at least once during the study (164 participants, 1795 weekly reports; see Table 4), and coping motives were restricted to the weeks in which these participants reported alcohol consumption (1026 weekly reports). As shown in the second panel of Table 5, weekend use declined and then leveled off around week 7-8 of the study. However, neither level of weekday use nor drinking to cope changed significantly over time.

Sexual outcomes. Analyses of sex with an “other” (i.e., non-ex) partner were restricted to the subset of participants who ever had “other” sex over the course of the study (108 of 190 participants, 1182 weekly reports; see Table 4). Moreover, analyses of new partner and motives for sex were restricted to the weeks in which these participants had an “other” sexual partner (379 weekly reports). As shown in the third panel of Table

5, the probability of having sex with an “other” partner did not change over time. However, the newness of these partners and coping motives both declined over time, as predicted. Lastly, but contrary to expectation, average levels of rebound motives did not change significantly as a function of week in the study.

Summary. Overall, the trajectories of psychological outcomes largely conformed to expectation and replicated prior research (e.g., Barber & Cooper, 2011). However, patterns of change in alcohol use and sexual outcomes were only sometimes consistent with expectation. Specifically, weekend alcohol use, sex to cope, and rates of new partners each declined over time, as expected, but average levels of weekday alcohol use, drinking to cope, likelihood of having sex, and rebound sex did not change over the course of the study. This suggests that some alcohol and sexual behaviors may be more strongly affected by the relationship breakup than others.

Intervention Effects on Recovery: Do the Interventions Facilitate Recovery?

Effects for intervention group differences were evaluated in a series of analyses in which the intercept, linear, and quadratic components of the growth curve for each outcome were regressed on a set of intervention group dummy variables. In order to test for specific differences among the intervention groups, three dichotomous dummy variables were created which allowed tests of the significance of differences between chat vs. control, journal vs. control, and chat vs. journal contrasts. To test all three intervention contrasts, two sets of analyses were run in which the intercept, linear, and quadratic components of the growth curve for each outcome were regressed on two (of the three possible) dummy coded predictors (all three cannot be entered simultaneously because they are perfectly collinear; see Cohen & Cohen, 1984). Intervention effects (modeled by pairs of dummy variables at L2) were tested in full models with linear and quadratic components (even if those growth terms were not significant in a given base models).

Effects on the intercept test whether variation in the predictor is associated with average levels of the outcome at week 0 -- for example, whether chat participants were more upset on average than journal participants the week prior to beginning the intervention. Significant effects on the linear and quadratic components indicate the presence of cross-level interactions, which signify that patterns of change varied reliably as a function of the L2 predictor. For example, a significant effect on the linear component when comparing chat vs. control groups would mean that these two groups differed significantly in the rate of linear change over time on a particular outcome (e.g., self-esteem). Following recommendations of Bryk and Raudenbush (1992), full models including all higher-order terms were initially tested. Non-significant higher-order terms were then dropped to develop trimmed models in which only significant effects, or lower-order effects required to provide valid tests of significant higher-order effects, were retained. When patterns of change were found to differ across conditions, separate growth curves were estimated (e.g., for chat, control) to determine whether these patterns conformed to expectation. Additionally, these models were re-estimated with the intercept centered at week 9 (i.e., the first week after the intervention ended) and week 12 (i.e., the last week of the study) to see if group differences existed one week and one month after the intervention ended.

Results comparing all three groups revealed no significant differences between the two intervention groups on any component (i.e., intercept, linear, or quadratic) of any dependent variable. Thus, we were able to simplify our analyses by collapsing these two groups into an ‘intervention group’ and testing differences between the intervention and control groups using a single dummy coded predictor. These results are shown in Table 6. Positive coefficients indicate the intervention group average was higher on that term than the control group. For example, a positive coefficient on the week 9 intercept

indicates that the intervention group mean was higher than the control group mean the week after the intervention ended (i.e., week 9).

Psychological Outcomes

Results revealed three marginally significant intervention group differences for psychological recovery (see Table 6). As shown in Figure 4 (top panel) those in the intervention group did not differ from the control group in their levels of anger at the outset of the study (i.e., week 0). However, the intervention group declined marginally more steeply in their anger than the control group, as expected. A similar pattern was found for feelings of loneliness -- the intervention group started out marginally lonelier at week 0 than the control group, but their loneliness declined marginally more steeply than those in the control group, as expected (see Figure 4, bottom panel). However, the two groups did not differ from one another at either week 9 or week 12. Taken together, two out of the four linear effects were marginally significant in the expected direction suggesting that the intervention group had modest beneficial effects on psychological recovery, although this advantage did not translate into better adjustment by the end of the study.

Alcohol Outcomes

There were six significant or marginally significant effects of intervention group on alcohol outcomes. As shown in Figure 5 (top panel), the intervention group started out with marginally higher weekday alcohol use than the control group, but the intervention group's use quickly declined and leveled off around week 9 of the study. Moreover, the control group reported very little change in their weekday alcohol use until weeks 5-6 of the study when they begin to decline. Although the groups did not differ at week 9 or week 12, the linear pattern suggests the intervention reduced weekday alcohol use more quickly. The clearest intervention effect was observed for the use of alcohol to cope. Whereas the intervention and control groups reported comparable

levels of drinking to cope at week 0, those in the control group showed an increase over time while those in the intervention showed no change (see Figure 5, bottom panel). More importantly, as shown in the last two columns of Table 6, those in the intervention group reported significantly lower coping motives at week 9 and week 12 relative to the control group. Taken together, two out of three linear effects were significant (at least marginally) in the expected direction suggesting that participation in the intervention led to less risky alcohol involvement compared to the control group.

Sexual Outcomes

As shown in Table 6, there were 6 significant or marginally significant intervention effects on sexual outcomes. As shown in the top panel of Figure 6, the intervention group maintained a steady downward pattern of growth in new partners throughout the study. In contrast, the control group initially reported higher values on the new sex partner composite than the intervention group, and then quickly declined, reaching levels comparable to the intervention group, before going back up again (testing a cubic growth term was not significant). By the end of the study, those in the intervention group reported marginally lower levels of new partners than the control group. The remaining significant differences were for rebound motives. As shown in Figure 6 (bottom panel), the intervention and control groups did not statistically differ at week 0. However, the intervention group reported greater declines in rebound sex, while the control group did not change over time. By the end of the study (i.e., week 12), the intervention group reported significantly lower levels of rebound sex motives than the control group, as expected. In sum, although only one linear effect was significant in the expected direction, group differences at week 12 suggest that the intervention group engaged in fewer risky sexual behaviors than the control group by the end of the study.

Analysis of Effects on Health Clinic Visits and Relationship Closure

A univariate GLM analysis was conducted to determine if the intervention and control groups differed significantly in the total number of Student Health Clinic (SHC) visits after controlling for significant covariate effects. Although estimated marginal means were in the predicted direction (i.e., the control group had a higher average number of SHC visits), the intervention and control groups did not differ significantly [$F(1, 104) = 1.40$, $p = .24$].

Similarly, univariate GLM's on the two measures of clarity/closure at the end of the study revealed no significant group differences in clarity on the breakup [$F(1, 176) = .05$, $p = .83$)] or general relationship clarity [$F(1, 175) = 2.42$, $p = .12$) at the end of the study. Although estimated marginal mean levels of general clarity were in the expected direction (i.e., the control group reported lower general clarity), the reverse was true for breakup-specific clarity (i.e., the intervention group had lower breakup clarity).

Interestingly, when comparing differences among all three groups (i.e., chat, journal, control) on the above outcomes, the chat group consistently showed the best recovery (i.e., lower SHC visits, higher clarity), though none of the differences between the chat, journal, or control groups was statistically significant (all contrast t's < 1.6, p's > .11).

Effects of Total Participation

Multilevel modeling was used to determine if overall level of intervention participation predicted better recovery among those in the two intervention groups. Similar to the above analyses, the total participation composite was allowed to predict the intercept, linear, and quadratic components of the growth curve for each outcome. However, these analyses differed from the earlier analyses in two important ways. First, the intervention vs. control group dummy variable was also controlled in each analysis to avoid confounding with any intervention effects themselves. Because participation rates in the journal group were significantly higher than in the chat group [$t(128) = -8.63$, $p <$

.001], failure to control for the intervention dummy variable would yield a potentially biased estimate of participation effects per se. Accordingly, the intervention group dummy variable was always controlled on the intercept, and retained if significant on the linear and quadratic terms.

Also in contrast to the earlier trajectory analyses, only the weeks of data collected after the end of the intervention period were included. This was done to ensure that the predictor variable (participation in weeks 1 - 8) was temporally (and therefore presumably causally) prior to the outcomes being examined (functioning at weeks 9 through 12). Issues of temporal priority were not of concern for the intervention group comparisons because assignment to groups was random, and thus could not have been influenced by the prior functioning of participants. In contrast, the extent of participation may well have been influenced by an individual's level of functioning, thus creating the need to control for this possibility by imposing a clear temporal order on the analyses. Initial trait levels of functioning on each outcome were also controlled, which served to further control for any initial differences that might have influenced both the rates of participation and post-intervention functioning. Restricting the analyses to the weeks after the intervention resulted in 355 weekly reports for psychological outcomes, 310 weekly reports for alcohol use, 147 reports for alcohol motive outcomes, 209 reports of sex partners, and 62 reports of sexual motives. As before, effects of total participation were tested on the week 9 intercept (immediately following the end of the intervention) as well as the week 12 intercept (one month later).

As shown in Table 7, only two significant or marginally significant effects were found for total intervention participation. Those who participated more reported marginally higher levels of self-esteem just after the intervention ended, and this difference persisted over the following 4 weeks. Additionally, those who participated more also had significantly lower feelings of anger immediately after the intervention

ended. However, this difference was no longer significant by week 12. Lastly, linear regression analyses of total participation effects on SHC visits, general relationship clarity, and breakup-specific clarity revealed no significant effects of total participation. Although there were only a few significant effects of participation on recovery, they suggest that greater participation in the intervention predicted better psychological recovery.

Internal Analyses: Does Amount of Hypothesized Active Ingredient Predict Recovery?

Preliminary analyses showed that the chat and journal reliably differed on the levels of all three hypothesized mechanisms. Specifically, independent-samples t-tests revealed that the journal group provided higher average proportions of negative emotion and insight/cause words, whereas the chat group used higher average proportions of positive emotion words. Thus, to yield a clearer test of the effect of the hypothesized mechanisms independent of intervention condition, all internal analyses that included both intervention groups controlled for the chat vs. journal comparison on the intercept. Moreover, this term was retained on the linear and quadratic components whenever it was significant.

Internal analyses, using multilevel modeling, were conducted to determine if amount of the three hypothesized mechanisms predicted better recovery among intervention participants. Analyses were conducted in a parallel fashion to those conducted to assess the effects of total participation. That is, the intercept, linear, and quadratic growth components were regressed on the proportion of positive emotion, negative emotion, and insight/cause words used in the chats or journal entries, and only outcome data from the last 4 weeks of the study were analyzed, and all effects were tested on both the week 9 and week 12 intercepts. As with the total intervention participation models, trait level of the DV was controlled on the intercept and retained if significant on the linear and quadratic terms. Finally, the number of socially supportive

comments directed to each individual was also analyzed in the chat condition following an identical protocol, except that the chat vs. journal dummy variable was not included.

Emotional Expression

As shown in Table 8, 10 of 44 effects tested (i.e., 2 content predictors X 11 outcomes X 2 intercepts) were significant or marginally significant. However, only half of these were in the expected direction. For example, higher proportions of positive emotion words predicted lower levels of anger and weekday alcohol use both immediately after the intervention (i.e., week 9) and one month later (i.e., week 12). However, positive emotion words also predicted lower self-esteem and higher coping motives for sex. The effects of negative emotion words were similarly inconsistent across outcomes. For example, higher proportions of negative emotion words were associated with lower rates of new sex partners but also lower self-esteem.

Linear regression analyses of emotional expression effects on total SHC visits, general relationship clarity, and breakup-specific clarity revealed a single effect. Higher proportions of positive emotion words predicted fewer SHC visits. However, there were no effects for negative emotion words. Taken together, these results provide little consistent evidence for the efficacy of emotional expression.

Account-Making

Also as shown in Table 8, there were 5 significant effects of the 22 tested (i.e., 1 content predictor X 11 outcomes X 2 intercepts). Similar to emotional expression, effects for insight/cause words were also mixed. Whereas higher proportions of insight/cause words predicted lower rebound motives for sex, they were also associated with higher coping motives for both alcohol use and sexual behavior. Moreover, linear regression analyses of account-making effects on total SHC visits, general relationship clarity, and breakup-specific clarity revealed one marginally significant effect -- higher proportions of insight/cause words marginally predicted *less* (not *more*) clarity on the recent breakup.

Overall, these results suggest the hypothesized mechanism of account-making was ineffective at predicting recovery.

Social Support

As previously discussed, analyses of social support effects could be conducted only among those who participated in the chat intervention. Results are shown in Table 9. There were four significant effects, but only two were consistent with prediction. Those who received more socially supportive comments during the chats had higher self-esteem at both weeks 9 and 12. However, counter to hypotheses, social support comments also predicted lower acceptance/higher distress of the breakup at week 9 as well as higher levels of coping motives at week 12. Linear regression analyses of social support effects on total SHC visits and both measures of clarity revealed no significant effects of this hypothesized mechanism. Overall, increased self-esteem was the only effect that was both consistent with expectation and across time. Thus, there is little evidence that social support is an effective mechanism in predicting recovery.

Mediation Analyses: Can Intervention Effects on Decreased Risk-Taking be Explained by their Effects on Better Psychological Adjustment?

According to Baron and Kenny (1986), three pre-conditions must be met in order to establish mediation. First, the putative cause (in the present case, the interventions vs. control) must be related to the outcomes of interest (in this case, alcohol and sexual outcomes). Examining the data in Table 6 reveals three effects that might be mediated -- intervention effects on the linear change for weekday alcohol use, drinking to cope, and rebound sex (we do not consider intervention effects on new sex partners because this effect was not in the expected direction).

Second, the putative cause must be related to the putative mediators (in this case, psychological outcomes). Examining the data in Table 6 reveals two intervention effects on linear growth in anger and loneliness.

And finally, the putative mediators must be related to the outcomes. Examining the within-person correlations in Table 4 reveals only five significant or marginally significant effects: feelings of anger covaried positively with weekday alcohol use, drinking to cope, and rebound sex; and feelings of loneliness covaried positively with drinking to cope and rebound sex.

When these patterns are considered together, five possible mediation pathways are suggested:

(1) The effects of intervention on weekday alcohol use might be mediated by feelings of anger;

(2) The effects of intervention on drinking to cope might be mediated by feelings of a.) anger, or b.) loneliness.

(3) The effects of intervention on rebound sex might be mediated by feelings of a.) anger, or b.) loneliness.

One final series of models was run to test these meditational pathways. Specifically, analyses similar to those reported in Table 6 were re-estimated with the addition to the L1 model of either feelings of anger or loneliness. Complete mediation by these feelings would be indicated if the relevant intervention effects were no longer significant in this model; partial mediation would be indicated if the effects were reduced but still significant.

Results showed that the linear effect of intervention on drinking to cope was no longer significant when loneliness was added to the model; thus, loneliness completely mediated the intervention effect on drinking to cope. Put differently, those who participated in either intervention experienced less loneliness, and it is through this loneliness pathway that they were less likely to drink for coping reasons. Similarly, the linear effects of intervention on weekday alcohol use and rebound sex were reduced, though still significant, when controlling for anger. This indicates partial mediation where

those who were in an intervention reported lower feelings of anger, which in part lead to decreased levels of drinking to cope and rebound sex. Finally, the linear effects of intervention on drinking to cope did not change when anger was added to the model. Likewise, intervention effects on rebound sex also did not change when loneliness was added to the model. Thus, intervention effects on alcohol coping motives were not mediated by anger, nor were the effects of intervention on rebound sex mediated by loneliness.

Discussion

Summary

The current study tested the efficacy of two interventions in facilitating recovery from a relationship breakup among first-semester college freshmen. Consistent with expectation, results showed that participating in either intervention (i.e., chat or journal) conferred some benefits. The intervention group decreased more steeply over time than the control group in anger, loneliness, weekday alcohol use, drinking to cope, and rebound sex. Moreover, three intervention effects remained significant at one month after the intervention ended (i.e., week 12) -- participants in the intervention reported lower levels of drinking to cope, rebound sex, and new sex partner ratings than those in the control group. Mediation analyses suggest the decline in drinking to cope was mediated through decreased loneliness in the intervention group, and decreases in weekday alcohol use and rebound sex were partially due to decreases in anger among intervention participants. Those who participated more in the intervention also reported higher levels of self-esteem and lower levels of anger just after the intervention ended. Overall, although there were not as many intervention effects as we predicted, those that were significant suggest the intervention group had modest beneficial effects on psychological adjustment and perhaps somewhat more robust effects on risky health behaviors.

Despite modest but consistent indication of the interventions' effectiveness, there was little evidence that the mechanisms hypothesized to produce these gains actually did so. Although a small number of significant effects were found for measures of emotional expression, account-making, or social support, these effects were in the expected direction only about half of the time, and were seldom consistent across outcomes. Thus, we found little support for emotional expression, account-making, or social support as effective mechanisms in predicting recovery.

Implications

Taken together, there were modest effects of intervention participation on recovery, though these effects do not appear to be due to the hypothesized mechanisms. Future research should seek to replicate these effects as well as explore other possible mechanisms. For example, perhaps participating in the chat allowed participants to see that their peers did not typically try to cope with the breakup by having sex or drinking alcohol, thus altering their beliefs about the norm of these behaviors as a way to get over a relationship breakup (see Barber & Cooper, 2011). Given that perceived behavior of one's peers has been shown to strongly influence both alcohol use (Hartzler & Fromme, 2003) and sexual behavior (Martens et al., 2006) among college students, changes in perceived norms might account for the observed effects. Future research could test this possibility by assessing beliefs about how one's peers typically attempt to cope with a relationship breakup (including the specific behaviors people engage in) at the beginning and end of the intervention.

Additionally, the only previous study to use a journal intervention to facilitate recovery from a relationship breakup found no effect of writing about the breakup on participants' psychological adjustment (Lepore & Greenberg, 2002). Thus, although the effects of writing about a traumatic event have been widely documented for a variety of

stressors, previous research and the current study suggest these effects may not extend to writing about a recent relationship breakup.

Although the intervention effects were not highly robust or strong, all effects were in the predicted direction. Moreover, effects were generally stronger and more consistent for reduction of risk-taking behaviors than for psychological outcomes. To the extent that these findings can be replicated, referring incoming college freshmen who are also experiencing a recent relationship breakup to journal or chat interventions could still be valuable, particularly in light of the potentially serious negative consequences associated with these risk behaviors and the relatively low costs of delivering these interventions. Although the results of this initial study are promising, the utility of these interventions should be replicated and further efforts to understand how and why they work, and how their efficacy might be improved, should be undertaken before they are implemented on a wide scale basis.

Strengths and Limitations

The present study has a number of important strengths. First, although previous research has investigated the effects of online chat groups or journaling on a variety of life stressors (some including the transition to college or a relationship breakup), none have tested both of these interventions on first-semester college students who have also experienced a relationship breakup. Thus, the current study provided a novel approach to facilitating recovery from a breakup among this population. Second, this study aimed to understand the mechanisms or processes that underlie the effectiveness of these interventions. Prior research using chats or journals has not focused extensively on why these interventions work (cf., Frattaroli, 2006; Pennebaker, 1997), thus underscoring the potential value of the present study's focus on this issue. Indeed, the fact that the present study failed to yield clear findings regarding these mechanisms highlights underscores the continuing importance of such efforts in future research. Finally,

previous intervention studies using chats or journals typically collect one post-intervention assessment (Frattaroli, 2006). However, the present study used a weekly diary methodology to collect weekly data during the intervention and for four weeks after the intervention ended. This allowed us to see how psychological and behavioral outcomes changed over time as a function of the intervention as well as the effects of the intervention one-month later.

Despite these important strengths, a number of limitations must also be acknowledged. One limitation is that we did not limit recruitment to participants who were still highly distressed over the breakup, as was done in the pilot study. This has ramifications for several aspects of our study. First, it could affect the power of our analyses. For example, because the intervention is designed to help facilitate recovery, this necessitates that participants need help in recovering from the breakup. If only half of participants in the intervention groups needed help recovering, then our power to detect intervention effects could be adversely affected. However, we investigated this issue by testing the interactions of initial levels of the DV by group and found very few significant results. Of course, the failure to obtain significant cross-level interactions between initial levels of the outcomes and group could also be due to low power. Thus, these analyses must be considered suggestive, rather than conclusive.

Second, many studies examining online chat groups or social support communities use non-student samples who actively seek out help from others and are genuinely interested in being a part of those groups (Rains & Young, 2009). In contrast, the current study recruited mostly Psychology 1000 participants who were required to participate in a given amount of research during the semester. Thus, the strength of our findings might have been influenced by the fact that our participants were not as intrinsically motivated to participate in the interventions as they were in some other studies.

Another methodological limitation is that we do not have mechanism data for the control group. Thus, we cannot test the full model in Figure 2 for all participants. It might be the case that after a breakup most adolescents talk with their friends and come up with explanations for what went wrong, etc. Thus, instead of our intervention speeding up the recovery process, it might have been used as a substitute for naturally-occurring mechanisms. This might explain why we didn't see greater intervention effects, but the best way to know if our intervention was a substitute for rather than a supplement to naturally occurring processes would have been to measure the hypothesized intervening mechanisms for all three groups (and for the intervention groups, measuring the hypothesized mechanisms they engaged in/received outside of the intervention). This would have allowed us to see what processes occur naturally.

Related to this issue, the current study is limited in its ability to test the effects of account-making. Most studies on account-making analyze the narrative completeness of actual accounts of the breakup itself (see Koenig-Kellas & Manusov, 2003) or the change in insight-related words from the first to last journal entries (see Pennebaker et al., 1997). However, we only asked participants at the beginning of the study to give a 1-2 sentence summary about why the relationship ended. In order to better address how account-making affects recovery, future research should ask all participants to give an account of why and how the breakup happened both at the beginning and end of the study. That would have allowed us to better determine the effects of the intervention on account-making, and the effects of account-making on recovery outcomes.

A general issue related to this is that all content measures were based on total productions in the chat and journal groups, not on the subset of comments related to the breakup. Thus, additional analyses separating out chat and journal comments related specifically to the breakup or the ex-partner might yield clearer results.

One final limitation is the lack of a no-breakup comparison group of first-semester college students. Inclusion of such a group would have provided a more unambiguous test of whether students who have undergone a recent breakup are indeed at heightened risk of poor outcomes during the transition to college. The results of the trajectory models indicate that those who were "dumped" or broke up more recently were more distressed and less accepting of the breakup, and were more angry with the ex-partner (see Appendix) which implies that at least some individuals in our study were experiencing stress specific to the breakup in addition to any normative stress associated with the transition to college. However, a no-breakup comparison group would have allowed us to state this with more certainty.

Concluding Thoughts

Overall, the current study's interventions were somewhat helpful in facilitating recovery from a romantic relationship breakup for first-semester students, though the mechanisms underlying these effects are less clear. There were several limitations that can be addressed by future research, including recruitment of only participants who are still distressed about the breakup as well as having a no-breakup comparison group. Finally, replicating these results or revising the interventions would provide a more complete and perhaps more compelling picture of the importance of these interventions in helping individuals recover from a relationship breakup while also experiencing the transition to college.

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Appendix

Covariate Effects in Outcome Trajectories as a function of Week in Study

Variable	L1 covariates	L2 covariates		
		Intercept	Linear	Quadratic
		Psychological outcomes		
Self-esteem	--	Trait level .87***	Trait level -.10***	Trait level .006***
			Semester Day .002**	
Acceptance/less distress	Ex Rel -.75***	BU time ago .05***	Partner init. .03**	Trait PA .008**
		Partner init. -.37***	Trait PA -.09*	
		Trait NA -.37**	Trait NA .02†	
		Gender .41†	Gender -.05*	
		Semester Day -.06**	Semester Day .01*	
Anger/revenge	--	Partner init. .02†	Trait NA -.004*	Semester Day .0001*
		Trait NA .05**	Gender .01*	
		Gender -.06*	Semester Day -.001†	

Variable	L1 covariates	L2 covariates		
		Intercept	Linear	Quadratic
Loneliness	Cubic -.001**	Trait PA -.32*** Trait NA .28*** Gender .16* Semester Day -.02*	Trait NA -.04**	Trait NA .002*
		Alcohol outcomes		
Weekend use	Turkey -.71***	Trait level .36***	BU time ago -.002† Partner init. .06* Trait level -.04**	Partner init. -.005** Trait level .003*
Weekday use	Turkey .27*	Trait level .12*** Gender -.11†	Trait level -.03**	Trait level .002**
Coping motive	Approach -.12*	Trait level .62***	Trait level -.01* BU time ago -.002†	--

Variable	L1 covariates	L2 covariates		
		Intercept	Linear	Quadratic
		Sexual outcomes		
P. of sex with other	Ex Rel -1.04†	Trait level .29**	Gender -.07†	--
New partner	Turkey -.91*	Partner init. .86**	Partner init. -.09*	--
		Gender .94*		
Coping motive	Enhan. .08†	Trait level .78***	--	--
		Gender -.36*		
Rebound motive	Enhan. -.11**	Partner init. .35*	Partner init. -.13**	Partner init. .009**
		Trait level .21*		

Note. Tabled coefficients are unstandardized. A positive coefficient indicates the average of the intervention group was higher on that term than the average of the control group. '--' indicates there was not a significant difference between intervention and control groups on that term. 'BU' stands for 'breakup'; 'init.' means initiation; 'PA' and 'NA' are positive, negative affect (respectively); 'Ex Rel' means being in a relationship with the ex-partner; 'Turkey' means Thanksgiving break; 'Enhan' means enhancement motives for sex. † = $p < .10$, * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Table 1

Number of Participants Dropped and Rationale

	Control	Chat	Journal
Initial N	63	68	72
	Reason Dropped		
Non-compliant with intervention	--	3	3
Got back into relationship with ex during first 2 weeks of study	1	2	1
Contributed < 3 weekly surveys	2	1	--
Final N	60	62	68

Table 2

Descriptive Information for Dependent and Covariate Variables

Variable	Mean (SD)	Min, Max (observed)	Skew	Kurtosis	N	Mean Alpha (# items)
			Demographic and control variables			
Gender	.37 (.49)	0, 1	0.53	-1.74	190	n/a
Breakup time ago (wks)	9.85 (7.54)	0.29, 30	0.97	-0.09	190	n/a
Partner initiation	2.68 (1.26)	1, 5	0.19	-1.10	190	.87 (2)
Positive affect	3.36 (0.72)	1.2, 4.8	-0.41	-0.02	190	.77 (5)
Negative affect	2.45 (0.88)	1, 5	0.73	-0.14	190	.77 (5)
LT heavy drinking	5.10 (2.44)	1, 9	-0.33	-1.21	174	.95 (2)
LT sex partners	2.78 (1.13)	1.33, 6.67	0.78	-0.09	190	.90 (3)
Trait alcohol coping motive	2.60 (1.31)	1, 6.4	0.85	0.31	175	.89 (5)
Trait avoidance sex motive	1.48 (0.62)	1, 4.97	2.28	6.83	190	.69 (3)
Approach alcohol motive	5.63 (1.33)	1, 7	-1.07	0.76	1024	.74 (2)

Variable	Mean (SD)	Min, Max (observed)	Skew	Kurtosis	N	Mean Alpha (# items)
Intimacy motive	3.21 (2.04)	1, 7	0.49	-1.12	379	.93 (3)
Enhancement motive	5.08 (1.55)	1, 7	-0.42	-0.79	375	.83 (3)
Relationship w/Ex	0.03 (0.17)	0, 1	5.54	28.74	2254	n/a
Thanksgiving break	0.13 (0.33)	0, 1	2.26	3.09	2254	n/a
			Hypothesized mediating mechanisms			
Positive emotion	5.75 (2.65)	2.13, 15.00	1.28	1.64	130	n/a
Negative emotion	2.34 (.80)	0, 4.69	0.11	0.74	130	n/a
Insight/cause	4.59 (1.58)	0, 7.82	-0.24	-0.69	130	n/a
Social support	41 (27.87)	1, 134	1.39	2.09	63	n/a
Total participation	0.00 (0.88)	-1.94, 2.56	-0.06	-0.08	130	n/a
			Psychological outcomes			
Self-esteem	3.13 (0.54)	1, 4	-0.45	0.17	2215	.91 (10)
Acceptance/less distress	4.91 (1.72)	1, 7	-0.46	-1.00	2178	.96 (16)

Variable	Mean (SD)	Min, Max (observed)	Skew	Kurtosis	N	Mean Alpha (# items)
Anger/revenge	1.46 (1.13)	1, 7	3.05	9.58	2188	.88 (2)
Loneliness	2.08 (0.78)	1, 5	0.61	0.10	2231	.84 (4)
General clarity	6.02 (0.87)	2.67, 7	-0.81	0.52	179	.77 (3)
Breakup clarity	6.12 (1.26)	1, 7	-1.70	2.49	179	.89 (2)
			Alcohol outcomes			
Weekend use	1.38 (1.61)	0, 5	0.57	-1.29	2024	.94 (3)
Weekday use	0.29 (0.79)	0, 3.88	2.71	6.12	2021	.89 (3)
Coping motive	1.94 (1.35)	1, 7	1.63	2.02	1026	.91 (5)
			Sexual outcomes			
P. of sex with other	.31 (.46)	0, 1	0.84	-1.29	1182	n/a
New partner	4.91 (2.89)	1, 8	-0.24	-1.64	387	n/a
Coping motive	2.09 (1.20)	1, 6.83	1.15	0.95	372	.80 (5)
Rebound motive	1.45 (0.98)	1, 7	2.87	8.89	375	.86 (4)

Variable	Mean (SD)	Min, Max (observed)	Skew	Kurtosis	N	Mean Alpha (# items)
			Student Health Clinic visits			
Health Clinic visits	0.64 (0.88)	0, 4	1.52	2.55	107	n/a

Note. 'LT' means 'lifetime'; 'n/a' means an alpha reliability cannot be computed for this single-item measure. Total participation is standardized.

Table 3

Within-Person and Between-Person Correlations among Dependent Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
						Psychological Outcomes								
1. Self-esteem	(.56)	.27***	-.21***	-.50***	n/a	n/a	-.03	-.01	-.34***	.08*	-.02	-.23***	-.12†	n/a
2. Acpt/less distress	.17*	(.60)	-.25***	-.27***	n/a	n/a	-.01	-.03	-.11**	.09**	-.08	-.05	-.40***	n/a
3. Anger/revenge	-.30***	-.02	(.43)	.23***	n/a	n/a	.02	.04†	.20***	-.04†	.06	.17*	.35***	n/a
4. Loneliness	-.72***	-.04	.26***	(.55)	n/a	n/a	.02	.02	.27***	-.13***	.13†	.21**	.28***	n/a
5. General clarity	.32***	.24**	-.07	-.31***	(--)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
6. Breakup clarity	.12	.24**	-.12†	-.10	.37***	(--)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
						Alcohol Outcomes								
7. Weekend use	.02	-.10	.01	-.09	-.01	-.00	(.41)	.28***	.11**	.16***	.17*	-.00	-.04	n/a
8. Weekday use	-.05	.03	.09	-.02	.05	.00	.62***	(.14)	.03	.06†	.02	.03	.02	n/a
9. Coping motive	-.44***	-.10	.32***	.38***	-.19*	-.23**	.14	.22	(.65)	-.07	.00	.28**	.18*	n/a
						Sexual Outcomes								
10. P. sex with other	.00	.14	-.04	-.05	.11	-.03	-.08	.12	-.01	(.22)	n/a	n/a	n/a	n/a
11. New partner	-.04	-.04	-.08	.01	-.04	-.00	.13	-.03	.04	-.50***	(.37)	.08	.13*	n/a
12. Coping motive	-.47***	-.10	.45***	.35***	-.14	-.24*	.02	.07	.51***	.04	-.03	(.65)	.30***	n/a
13. Rebound motive	-.28**	-.23*	.62***	.19†	-.07	-.16	.09	.15	.32**	-.09	-.13	.56***	(.60)	n/a

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
						Student Health Clinic Visits								
14. Health clinic visits	-.21*	-.02	.04	.11	-.17†	-.08	-.01	-.04	.02	.10	-.15	.15	-.10	(--)

Note. Numbers above the diagonal are with-person correlations; numbers below the diagonal are between-person correlations; numbers along the diagonal in parentheses are intra-class correlation coefficients. 'Acpt' represents 'acceptance.' 'n/a' means the within-person correlation could not be computed because at least one variable was invariant. '--' means an Intra-class correlation could not be computed because the outcome was measured only once and is thus invariant.

† = p < .10, * = p < .05, ** = p < .01, *** = p < .001.

Table 4

Number of Participants Contributing Various Weeks of Data by Outcomes

Condition	No weeks	1 week	2 weeks	3 weeks	4 or more weeks	Total N in analyses
			Psychological outcomes			
Total	0	0	0	3	187	190
Control	0	0	0	0	60	
Chat	0	0	0	3	59	
Journal	0	0	0	0	68	
			Alcohol use outcomes			
Total	25	0	1	3	161	165
Control	7	0	0	1	52	
Chat	11	0	2	0	49	
Journal	6	0	0	2	60	
			Alcohol motive outcome			
Total	25	16	18	16	115	165
Control	7	4	6	5	38	
Chat	11	5	9	4	33	
Journal	7	7	3	7	44	
			P. of sex partner			
Total	82	0	0	1	107	108
Control	26	0	0	0	34	
Chat	29	0	0	0	33	
Journal	27	0	0	1	40	
			New partner and sex motive outcomes			
Total	82	43	15	13	37	108
Control	26	13	2	5	14	
Chat	29	12	4	6	11	
Journal	27	18	9	2	12	

Table 5

Base Growth Curve Models for Outcomes as a function of Week in Study

Variable	Intercept	Linear	Quadratic
	Psychological outcomes		
Self-esteem	3.05***	.02**	-.001†
Acceptance/less distress	4.97***	.15**	-.010***
Anger/revenge	.13***	--	--
Loneliness	2.44***	-.08***	.014***
	Alcohol outcomes		
Weekend use	1.82***	-.12*	.008*
Weekday use	.47***	--	--
Coping motive	1.83***	--	--
	Sexual outcomes		
P. of sex with other	.27*** [a]	--	--
New partner	6.18***	-.11*	--
Coping motive	2.14***	-.02†	--
Rebound motive	1.66***	--	--

Note. The base model includes the intercept, linear week in study, and quadratic week in study (i.e., week in study squared). These are trimmed base models such that if a higher-order term was not significant at $p < .10$, then it was deleted from the model and denoted as "--" in this table. Tabled coefficients are unstandardized.

[a] For this dichotomous variable, the intercept value is the predicted probability calculated from the unstandardized logistic regression coefficient.

† = p < .10, * = p < .05, ** = p < .01, *** = p < .001.

Table 6

Intervention vs. Control Group Differences in Outcome Trajectories as a function of Week in Study

Variable	Week 0 Intercept	Linear	Quadratic	Week 9 Intercept	Week 12 Intercept
			Psychological outcomes		
Self-esteem	--	--	--	--	--
Acceptance/less distress	--	--	--	--	--
Anger/revenge	.03	-.01†	--	--	--
Loneliness	.15†	-.02†	--	--	--
			Alcohol outcomes		
Weekend use	--	--	--	--	--
Weekday use	.21†	-.10*	.01*	--	--
Coping motive	-.11	-.03†	--	-.39*	-.49*
			Sexual outcomes		
P. of sex with other	--	--	--	--	--
New partner	-1.39*	.63*	-.05*	-.10	-1.63†
Coping motive	--	--	--	--	--
Rebound motive	.27	-.05*	--	-.20	-.35*

Note. Tabled coefficients are unstandardized. Intervention group is coded 1; control group is coded 0. '--' indicates there was no significant difference between intervention and control groups on that term.

† = $p < .10$, * = $p < .05$.

Table 7

Total Participation Effects on Primary Outcomes among Intervention Participants

Dependent Variable	Week 9 Intercept	Week 12 Intercept
	Psychological outcomes	
Self-esteem	.09†	.09†
Acceptance/less distress	--	--
Anger	-.04*	--
Loneliness	--	--
	Alcohol outcomes	
Weekend use	--	--
Weekday use	--	--
Coping motive	--	--
	Sexual outcomes	
P. other sex partner	--	--
New partner	--	--
Coping motive	--	--
Rebound motive	--	--

Note. Tabled coefficients are unstandardized. '--' indicates there was no significant participation effect on that term.

† = $p < .10$, * = $p < .05$.

Table 8

Content Effects on Primary Outcomes among Intervention Participants

Content Predictor	Dependent Variable	Week 9 Intercept	Week 12 Intercept/ End of Study
Positive emotion	Self-esteem	--	-.06*
	Anger	-.01†	-.01†
	Weekday alcohol use	-.06*	-.06*
	Coping sex motive	.27**	.27**
	Health clinic visits	n/a	-.07*
Negative emotion	Self-esteem	--	-.14†
	New Partner	-1.21*	-1.21*
Insight/cause	Coping alcohol motive	.37*	--
	Coping sex motive	.23†	.23†
	Rebound sex motive	-.08*	-.08*
	Breakup clarity	n/a	-.12†

Note. Only dependent variables with significant content effects are presented here. Tabled coefficients are unstandardized. '--' indicates there was no significant content effect on that term. 'n/a' indicates this effect was not tested because the DV was not measured at week 9.

† = $p < .10$, * = $p < .05$, ** = $p < .01$.

Table 9

Social Support Effects on Primary Outcomes among Chat Group Participants

Dependent Variable	Week 9 Intercept	Week 12 Intercept/ End of Study
	Psychological outcomes	
Self-esteem	.004†	.004†
Acceptance/less distress	-.01*	--
Anger	--	--
Loneliness	--	--
General clarity	n/a	--
Breakup clarity	n/a	--
	Alcohol outcomes	
Weekend use	--	--
Weekday use	--	--
Coping motive	--	--
	Sexual outcomes	
P. other sex partner	--	--
New partner	--	--
Coping motive	--	.05*
Rebound motive	--	--
	Student Health Clinic Visits	
Health clinic visits	n/a	--

Note. Only dependent variables with significant content effects are presented here. Tabled coefficients are unstandardized. '--' indicates there was no significant social

support effect on that term. ‘n/a’ indicates this effect was not tested because the DV was not measured at week 9.

† = $p < .10$, * = $p < .05$.

Figure Captions

Figure 1. Intervention main effects model.

Figure 2. Intervention process model.

Figure 3. Top panel: Base growth curve model for acceptance of the breakup. Bottom panel: Base growth curve model for feelings of loneliness.

Figure 4. Top panel: Feelings of anger toward the ex-partner over time as a function of intervention group. Bottom panel: Feelings of loneliness over time as a function of intervention group.

Figure 5. Top panel: Weekday alcohol use over time as a function of intervention group. Bottom panel: Alcohol coping motives over time as a function of intervention group.

Figure 6. Top panel: New sex partner ratings over time as a function of intervention group. Bottom panel: Rebound sex motives over time as a function of intervention group.

Figure 1

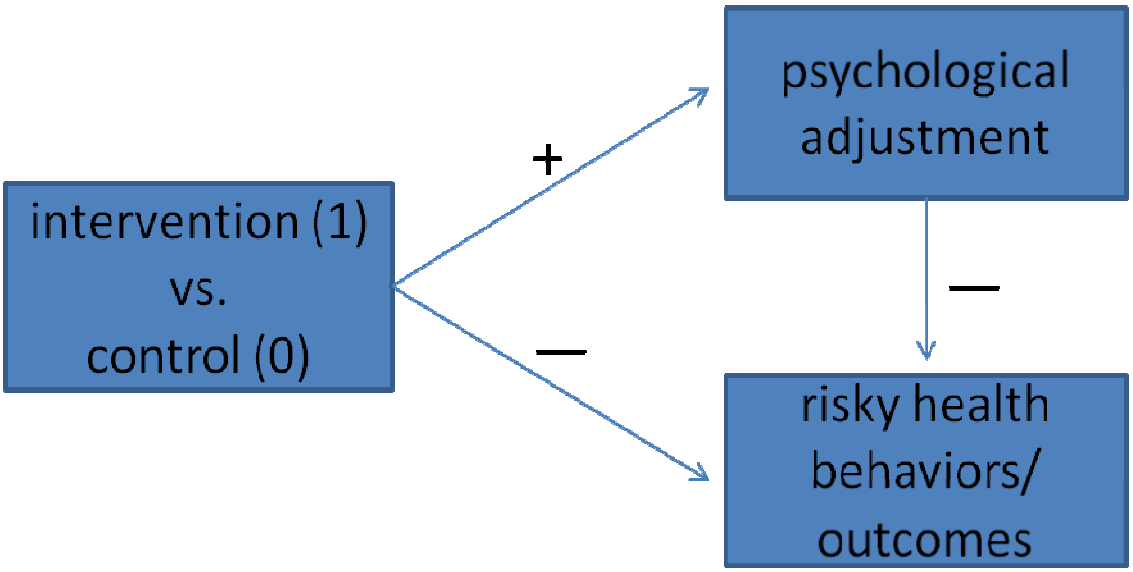

psychological adjustment
+
intervention (1) vs. control (0)
—
—
risky health behaviors/ outcomes

Figure 2

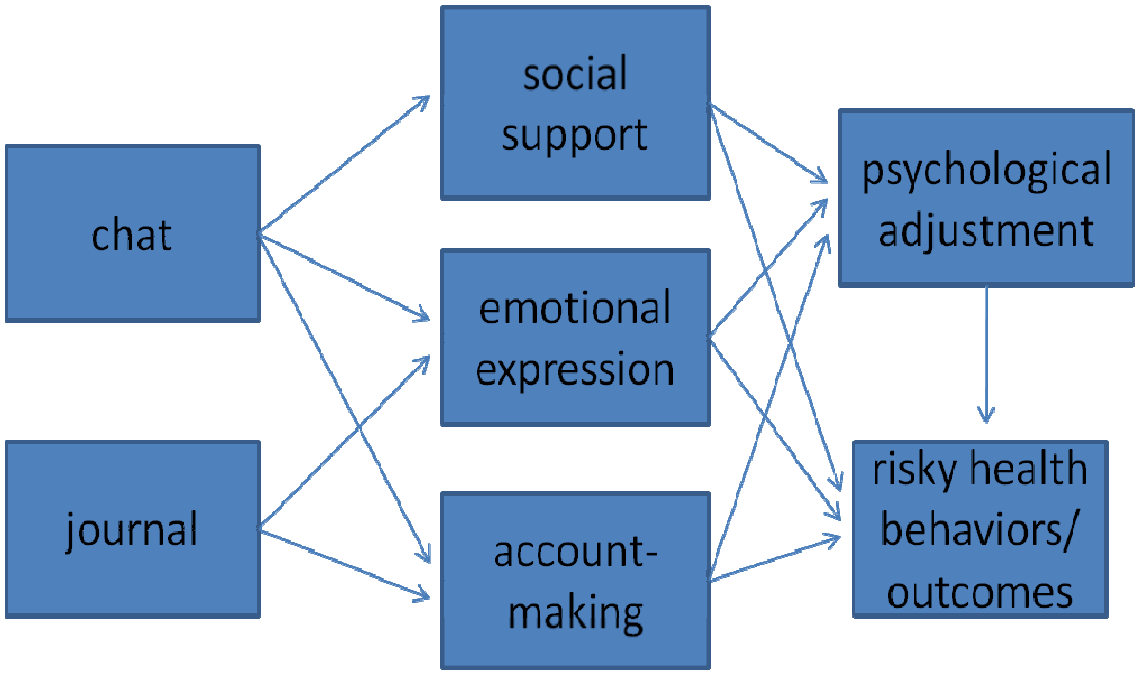
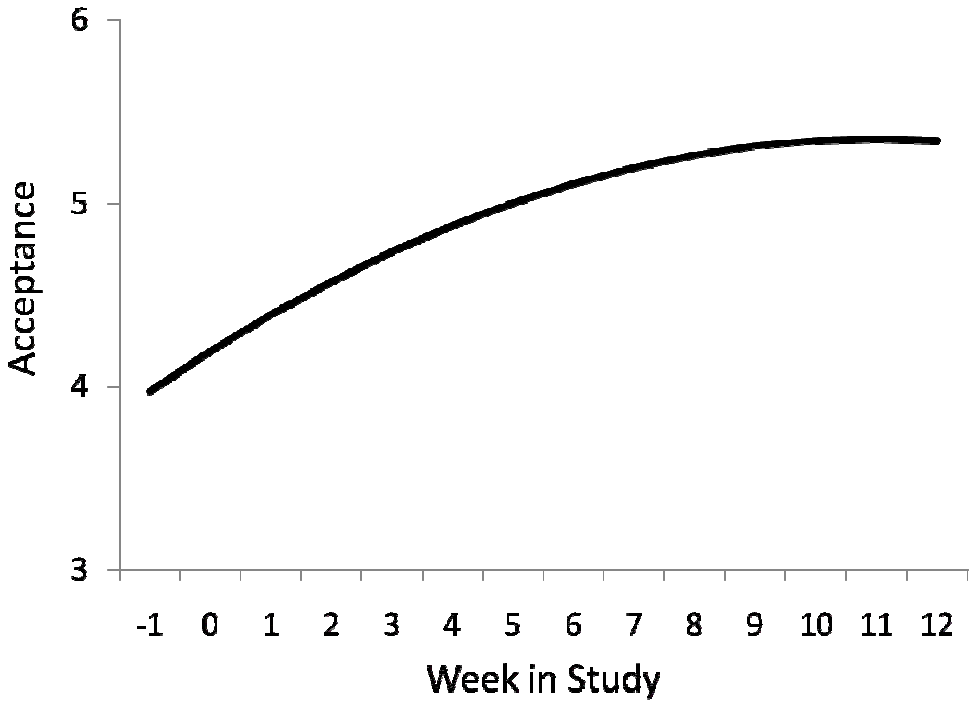

chat
journal
social support
emotional expression
account-making
psychological adjustment
risky health behaviors/ outcomes

Figure 3


6
5
4
3
Acceptance
-1 0 1 2 3 4 5 6 7 8 9 10 11 12
Week in Study

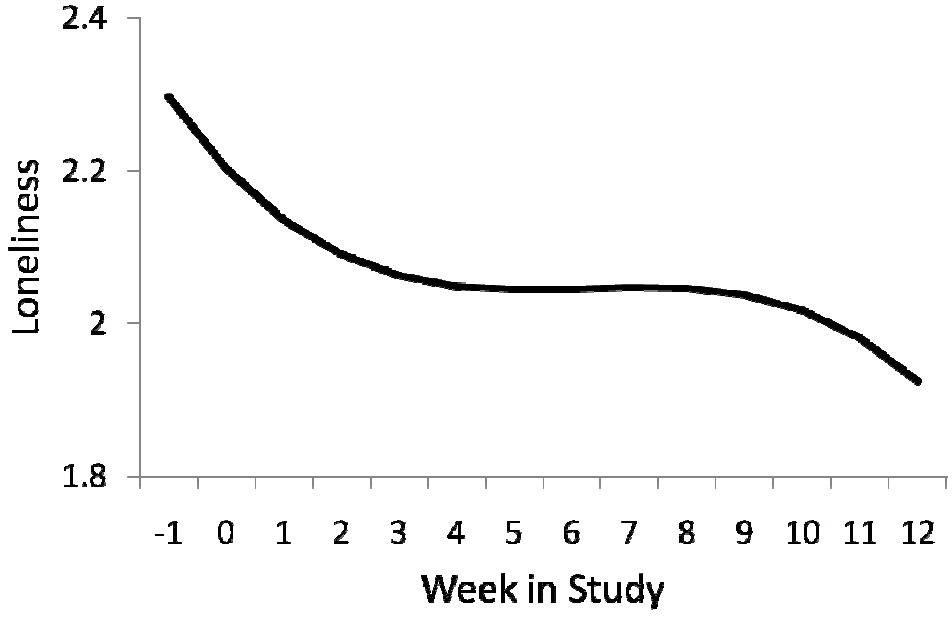
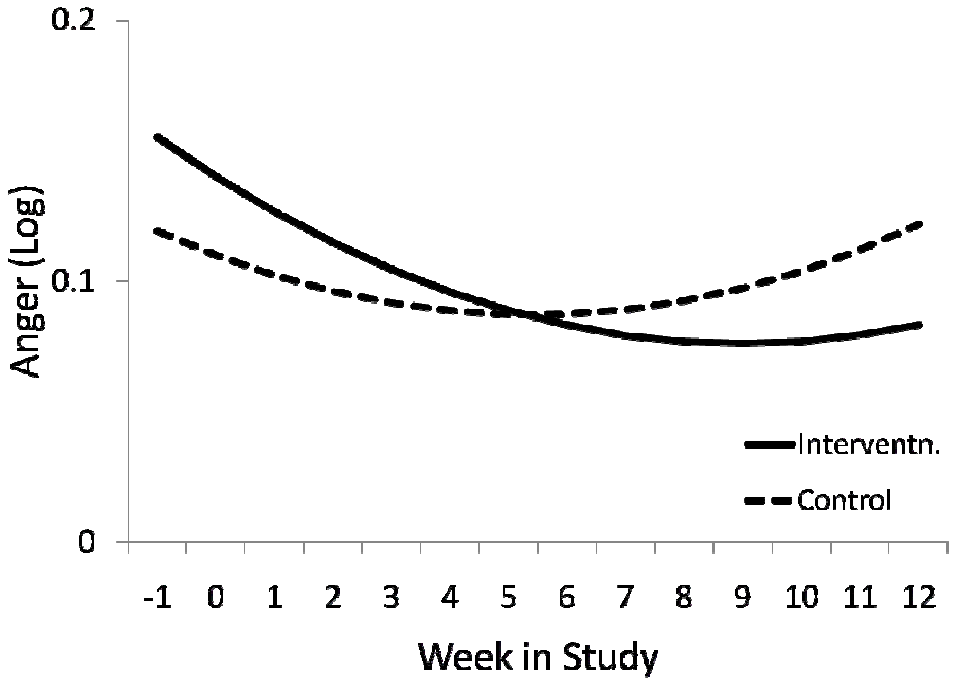

2.4
2.2
2
1.8
Loneliness
-1 0 1 2 3 4 5 6 7 8 9 10 11 12
Week in Study

Figure 4


0.2
0.1
0
Anger (Log)
Interventn.
Control
-1 0 1 2 3 4 5 6 7 8 9 10 11 12
Week in Study

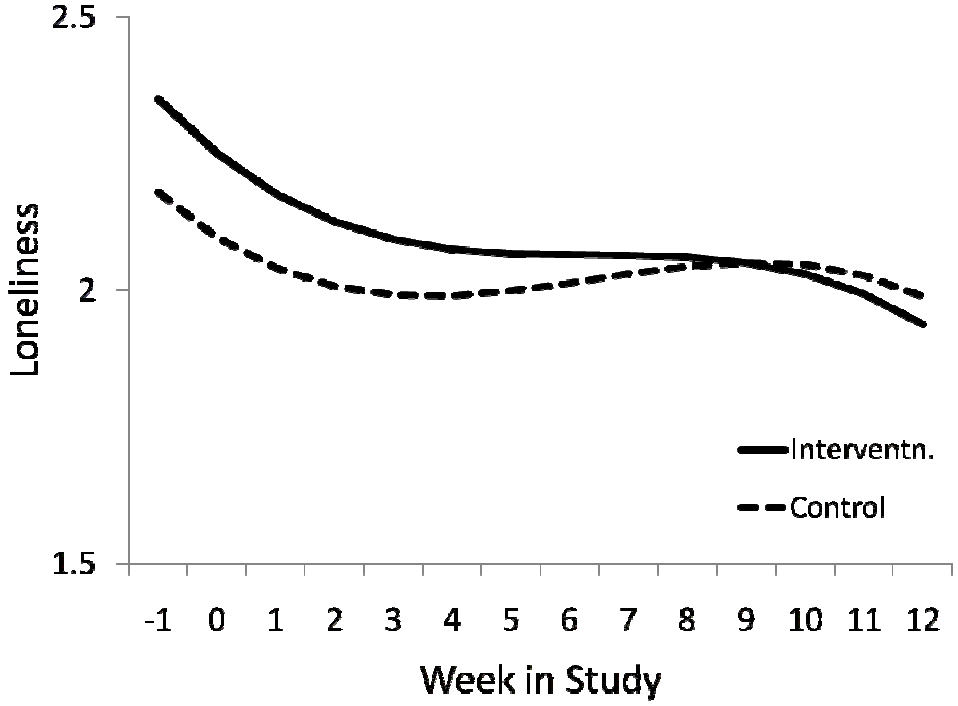
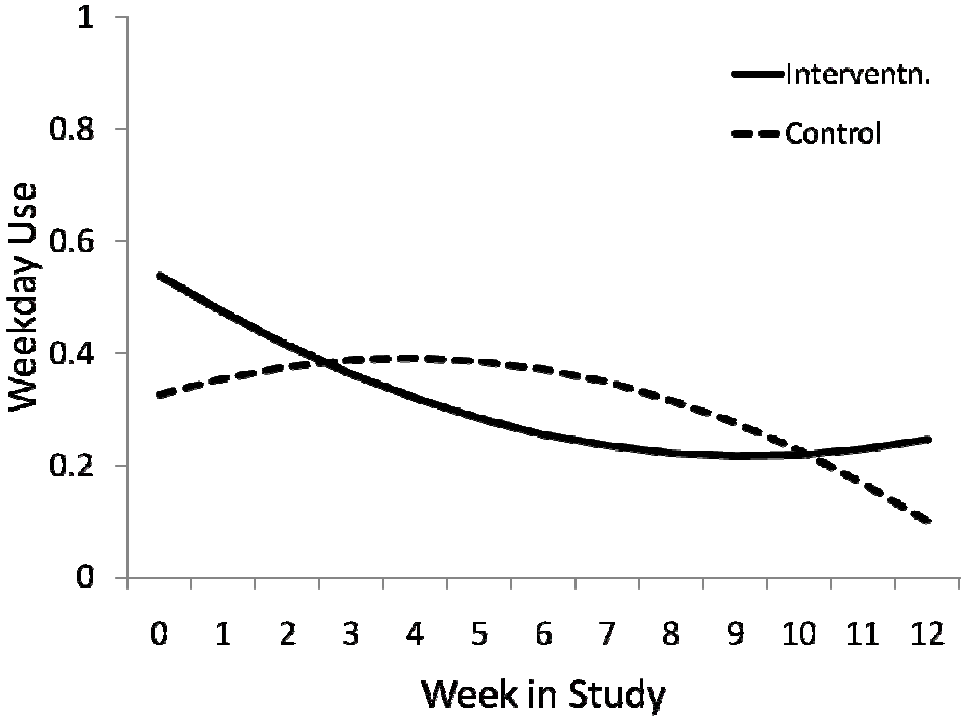

2.5
2
1.5
Loneliness
Interventn.
Control
-1 0 1 2 3 4 5 6 7 8 9 10 11 12
Week in Study

Figure 5


1
0.8
0.6
0.4
0.2
0
Weekday Use
Interventn.
Control
0 1 2 3 4 5 6 7 8 9 10 11 12
Week in Study

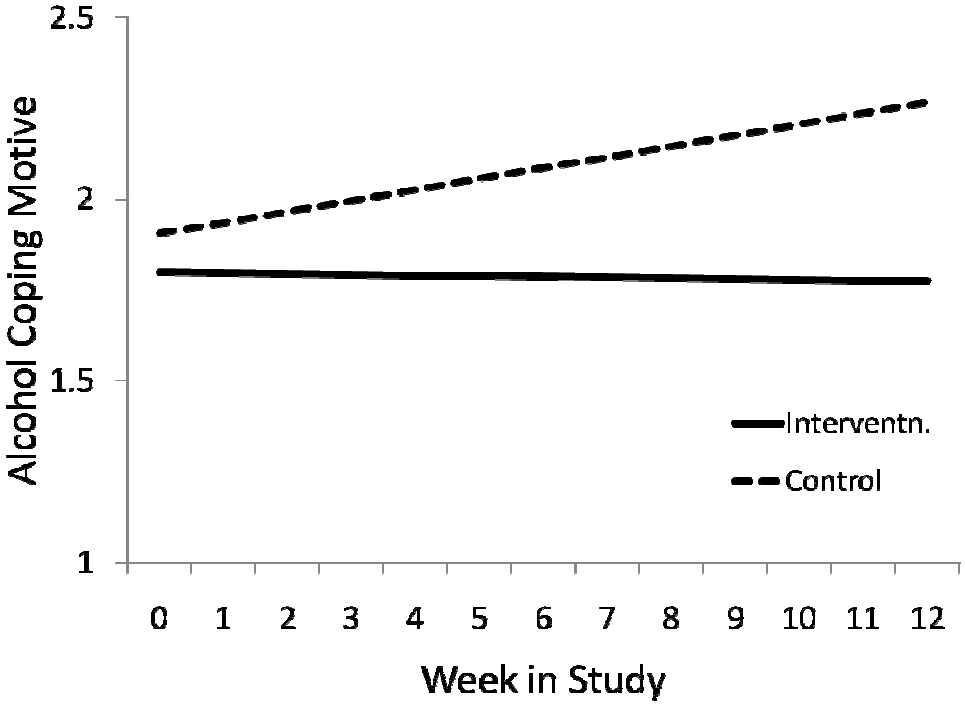
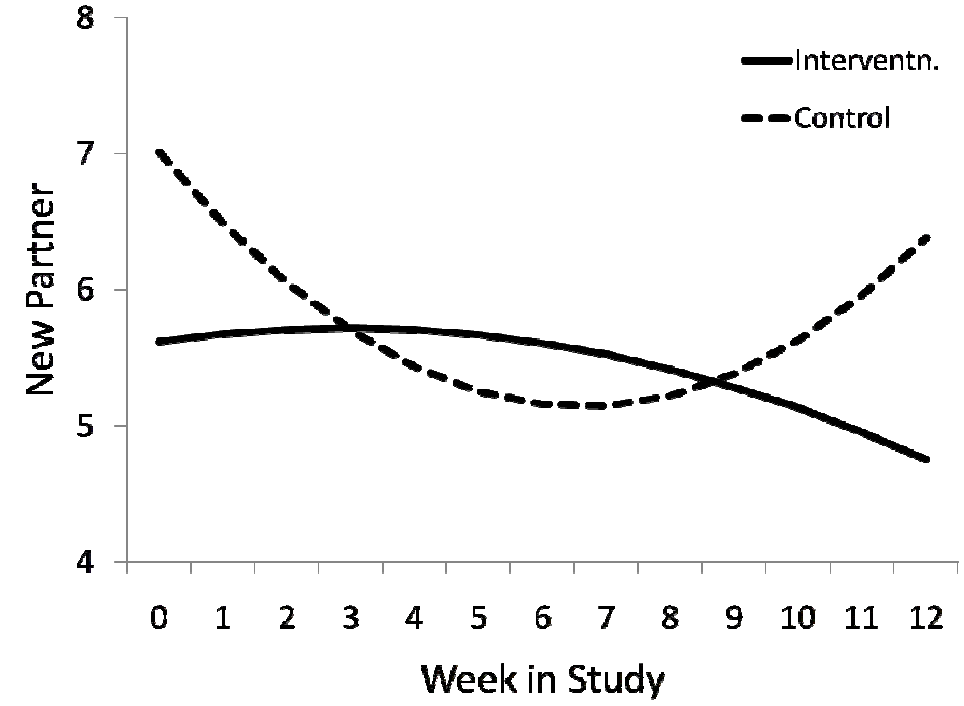
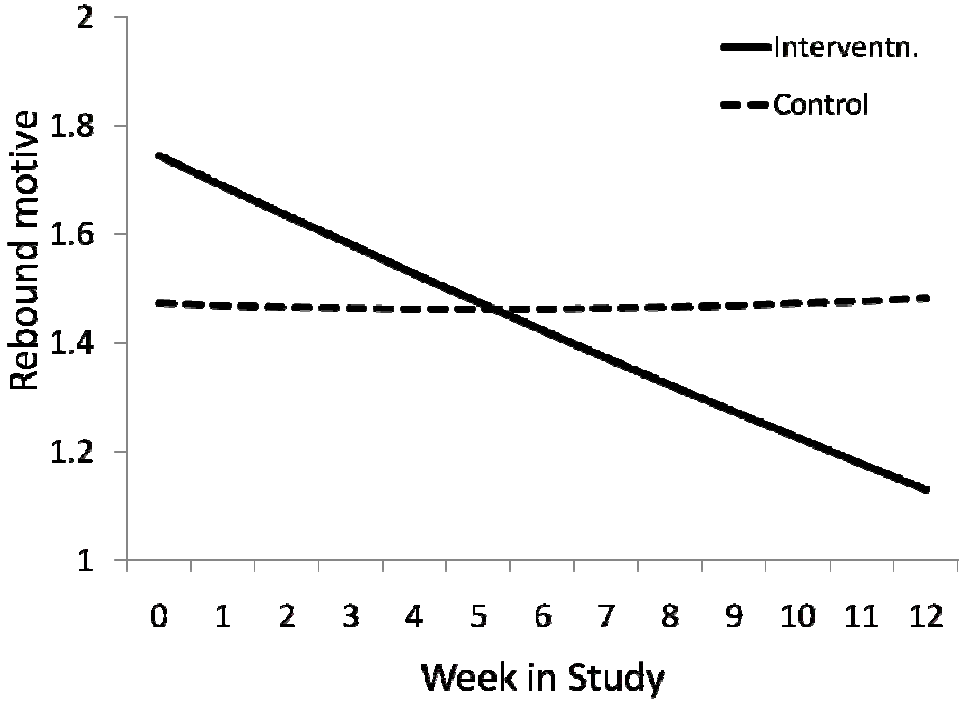

2.5
2
1.5
1
Alcohol Coping Motive
Interventn.
Control
0 1 2 3 4 5 6 7 8 9 10 11 12
Week in Study

Figure 6


8
7
6
5
4
New Partner
Interventn.
Control
0 1 2 3 4 5 6 7 8 9 10 11 12
Week in Study


2
1.8
1.6
1.4
1.2
1
Rebound motive
Interventn.
Control
0 1 2 3 4 5 6 7 8 9 10 11 12
Week in Study

VITA

Lindsay L. Barber was born in Zanesville, Ohio as the middle of three children. She started playing the piano at age 8 and raised rabbits throughout middle school and high school. After receiving a B.S. from The Ohio State University in 2005, she completed her Ph.D. from the University of Missouri in 2011. She enjoys fiber arts, gardening, and being outside. She currently resides in Columbus, Ohio with her husband (Marc) and their dog (Ladybird).