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Counterfactuals and Romantic Life Experiences:  
A Longitudinal Study of the Benefits of Thinking What Might Have Been

by

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Honours Thesis

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### Abstract

A volume of research has found that although downward counterfactuals make people feel better in the moment, upward counterfactuals have been shown to better motivate individuals to change future behaviour for the better. However, there is a lack of research of the long-term impact of counterfactual thoughts, specifically applied to the romantic life domain. The present research investigated the influence of upward versus downward counterfactuals in individuals' romantic lives over time. Participants were recruited from Canada, USA, Australia, and Great Britain. Through Amazon Mechanical Turk, 267 participants completed 1 survey, while 91 participants completed an additional 2 sessions with approximately 14 days between each (for a total of 3 surveys). There was moderate support for the benefits of upward counterfactual thinking over time. Implications and future directions for research are discussed.

*Thank you to Professor Mike Morrison, for all he has taught me about planning and executing good research; and thank you to Professor David Bell, for his numerous hours spent guiding me through statistical analyses. What they have taught me will, without a doubt, carry me through my subsequent academic career.*

Counterfactuals and Romantic Life Experiences:  
The Benefits of Thinking What Might Have Been

Whether it be a crush, a new dating partner, or a long-term relationship, most of us think about our romantic life quite frequently. Sometimes individuals think about events that have occurred in their romantic life, and wish certain aspects happened differently. Maybe it's a missed opportunity with a crush, maybe they played it safe when they could have taken a risk, or maybe they shied away when they really just wanted to kiss that someone special. These consuming thoughts of how events in our romantic life could have occurred differently are examples of counterfactual thoughts; thoughts about how events could have occurred differently than they did (Epstude & Roese, 2007; Epstude & Roese, 2008; Roese, 1997).

Counterfactual thoughts have the potential to make an individual feel very poorly (Meier, 2002; Roese, 1994). However, the negative feelings they facilitate can actually be beneficial to the individual in the future. When an individual feels poorly following a counterfactual thought, they are often motivated to change their behaviour so this does not happen in the future (Epstude & Roese, 2008; Meier, 2002; Roese, 1994). The influence of counterfactuals on intentions of future behaviour is what makes them potentially beneficial; however, there is little longitudinal research on the impact of counterfactual thoughts. This leaves many questions regarding counterfactual thoughts and their long-term influence on intentions and behaviour unanswered. The present research will not only contribute to the growing body of knowledge regarding counterfactuals and behaviours within romantic relationships, but will also contribute novel information by investigating the role of counterfactual thoughts in shaping intentions and behaviour over time.

### **Counterfactual Thoughts**

Counterfactual thoughts typically go one of two ways: one can generate thoughts of how things could have turned out better, or how things could have turned out worse. These two generations of thought have two separate classifications, upward or downward counterfactuals (respectively). In a downward counterfactual, an individual compares a factual occurrence to how it could have been worse. For example, an individual has a bad date. After the date, the individual thinks to themselves, “well, at least I had a date in the first place. Better luck next time.” This direction of thinking facilitates a more positive outlook, and therefore a better mood following the downward counterfactual (Roese, 1994).

On the contrary, an individual can generate an upward counterfactual following a less desirable scenario. In an upward counterfactual, the individual compares the actual outcome to how it could have transpired more favourably. In the case of the bad date, an individual now thinks to themselves, “if only I had been funnier, maybe he would have liked me more.” Following the upward counterfactual, the individual feels more negatively about themselves and the situation (Meier, 2002; Roese, 1994). Although in the short term the consequences of the downward counterfactual are more pleasant, in the long run there are typically greater benefits to experiencing an upward counterfactual. That is, upward counterfactuals can often facilitate a behavioural intention, for instance, “next time I will tell more jokes so he thinks I’m funny,” (Epstude & Roese, 2008). This behavioural intention is a result of feeling poorly following an upward counterfactual, and wanting to correct the behaviour to alleviate the negative feelings and prevent the negative experience from recurring. These beneficial behavioural intentions are not seen to be as common with downward counterfactuals (Roese, 1994).

### **Counterfactuals, Intentions, and Motivations**

The process in which upward counterfactuals facilitate behavioural intentions can be described by the functional theory of counterfactual thinking (Epstude & Roese, 2008).

Generally, the theory states that counterfactual thoughts are functional because they can motivate us to change our future behaviour. The thoughts are triggered based on two elements: there is a deficit, and the thought will change or end the deficit. However, this does not address why individuals would be motivated to change the undesirable behaviour in the first place. The norm theory suggests experiences that deviate from the norm activate thoughts similar to counterfactuals (Kahneman & Miller, 1986). These thoughts produce hypothetical scenarios that would have been more in line with normal behaviour. As restoring normal behaviour is the goal, the norm theory suggests this is how counterfactuals generate motivation.

The literature supports that upward counterfactuals, or reflections of how things could have turned out better, have the power to change one's future behaviour by increasing intentions and motivation (Epstude & Roese, 2008; Meier, 2002). An upward counterfactual forces an individual to mentally map out how they could have facilitated a better outcome. Not surprisingly, this makes an individual feel poorly regarding their past behaviour. This alone is typically enough to motivate one to improve in the future, as the upward counterfactual is commonly followed by thoughts that would correct this behaviour in the future. Individuals seek congruence with their thoughts and their actions, which solidifies the motivation to change behaviour in the future (Epstude & Roese, 2008).

There is doubt regarding the precedence of upward counterfactuals and negative mood. Although it is documented that upward counterfactuals produce negative mood (Meier, 2002; Roese, 1994), we also see the relationship work in the opposite direction, that is, negative mood

producing more upward counterfactuals (Meier, 2002). A study done by Markman, McMullen, and Elizaga's (2008) demonstrated the influence of upward counterfactuals to generate negative mood and therefore increase motivation. In the study, participants were given an anagram task, followed by reflective and evaluative questions regarding their performance on the anagram task (counterfactual manipulation applied here), which was followed up by a second anagram test. Participants that generated upward (evaluative) counterfactuals were more persistent in finishing their second anagram task, but also performed better on the second anagram task than participants in the downward counterfactual and control groups. The relationship was significantly mediated by mood. This is evidence that manipulation of counterfactual thoughts in the upward direction generates negative mood and motivation for future performance in individuals.

Along with generating motivation, it is important to understand how counterfactuals can create intention for future behaviour in individuals. Roese (1994) investigated this idea in academic performance in students. Participants were asked to reflect on a recent academic performance that was inadequate to their personal standard. Upon reflection, participants were asked to list ways they could have performed better (upward counterfactual) or worse (downward counterfactual), depending on their assigned experimental condition. Roese (1994) found that participants in the upward counterfactual condition indicated greater intention to implement behaviours that would promote success in school in the future. Thus, the upward counterfactual thought was successful in increasing intention to perform better in the future when applied to an education domain.

Though counterfactual thoughts can generate intention, it is important to understand the specific qualities of the counterfactual and the qualities of the behavioural intention following



the counterfactual in order for the intention to successfully change behaviour. Over the course of 3 experiments, Smallman and Roesse (2009) examined the influence of two counterfactual pathways for intention to successfully change behaviour. The first would be having the same semantic content, this is referred to as a content-specific pathway. For example, if a counterfactual thought regarding one's romantic life generates a specific goal regarding their romantic life, such as improve communication with their partner, this would be considered a content-specific pathway. However, if a counterfactual thought increases general motivation to improve aspects of life, it is referred to as a content-neutral pathway. There is some support that content-neutral pathways mediate the relationship of counterfactuals and behavioural intention. However, a more sophisticated control/comparison group in Smallman and Roesse's (2009) study explored this possibility, and found a significant effect of the content-specific pathway with the content-neutral pathway controlled for. Overall, the study demonstrated the importance of matching content of the counterfactual and the behavioural intention to see an effect of counterfactual thought.

### **Counterfactuals and Romantic Life Experiences**

Romantic life regrets tend to be our most intense regrets (Morrison, Epstude, & Roesse, 2012). Theory suggests the regret is much more intense than other life domains because individuals are highly motivated to feel as though they belong. The need to belong theory says that people crave stable interpersonal relationships (Baumeister & Leary, 1995). When individuals experience a positive ongoing bond, they are reinforced with positive emotional and thinking patterns. Due to the positive outcomes, individuals seek these relationships in the future. Additionally, individuals value the sense of belonging they feel in their personal relationships. A romantic regret may threaten belonging the most, which is why these regrets are experienced

most intensely. Compared to other life domains, romantic life regrets have a stronger influence on social relationships, and tend to be the toughest to overcome (Morrison et al., 2012). In Morrison et al.'s (2012) study, there was a positive relationship between self-reports of need to belong, and more intense regrets experienced, in that those with higher personal ratings for need to belong had higher ratings of intensity in their romantic regrets.

Similar research has found that romantic life regrets are rated more frequently than other life domains, such as family, career, and education (Morrison & Roese, 2011). There has also been evidence for sex differences between reports of regrets (Morrison & Roese, 2011; Roese, Pennington, Coleman, Janicki, Li, & Kenrick, 2006). Interestingly, in one study, the romantic life domain is the only life domain to see sex differences in regret (Roese et al., 2006). In a wider study of a representative sample of Americans, it was found that men tend to have more work-related (career and education) regrets, and women more love-related (romantic and family) regrets (Morrison & Roese, 2011). Overall, there is clear evidence of sex differences in experiencing regret in romantic relationships (Morrison et al., 2012; Morrison & Roese, 2011; Roese et al., 2006).

### **Present Study**

Although the role of upward and downward counterfactuals at a given time point are well documented (Epstude & Roese, 2008; Meier, 2002; Roese, 1994; Smallman & Roese, 2009), there is little to no research on their influence of behaviour over time. To investigate their contribution to behaviour, a longitudinal study is needed to complement the existing body of research. The present research will fill this gap, by investigating the influence of counterfactuals on mood, intentions, motivation and behaviour over time.

The study will examine the role of counterfactuals on a variety of variables. The independent variable will be direction of counterfactual (with three levels: upward, downward, or control – factual description), and the dependent variables measured will be mood, importance of five life domains (romantic, health, education, social, and family), satisfaction with life overall, satisfaction in five life domains (romantic, health, education, social, and family), motivation, and intentions for future behaviour in the five life domains (romantic, health, education, social, and family).

Over the course of the study, we hypothesized a few different outcomes at different data collection points. Following the first data collection point, we hypothesized that participants in the upward counterfactual will generate more negative mood, be more motivated, have greater intentions to improve their romantic life, and be less satisfied with their romantic life. Over time, we predicted participants in the upward counterfactual condition would see greater increases in their romantic life satisfaction, positive mood, motivation, and intentions to improve their romantic life. We also hypothesized that those in the upward counterfactual condition will be most likely to show interest in improving their romantic lives at the conclusion of the study. We further expected that the main effects and the interaction effects over time would be stronger for females.

## **Methods**

### **Participants**

At time one, there were 267 participants, 114 males ( $M = 37.36$ ,  $SD = 12.66$ ) and 153 females ( $M = 37.26$ ,  $SD = 12.54$ ), 18 years or older, ranging from 19-81 years with a mean age of 37.30 years ( $SD = 12.57$ ). Participants at time one were from the United States of America ( $n = 257$ ), Canada ( $n = 6$ ), Great Britain ( $n = 3$ ), and Australia ( $n = 1$ ). Participants who completed

the entirety of the three-part study were 91 individuals from the United States of America ( $n = 88$ ), Canada ( $n = 2$ ), and Great Britain ( $n = 1$ ). For the entire study, participants were aged 18 years or older, ranging from 21-81, with a mean age of 38.51 years ( $SD = 12.63$ ). Thirty-three were male ( $M = 39.15$ ,  $SD = 11.79$ ) and 58 were female ( $M = 38.14$ ,  $SD = 13.17$ ). Participants were single (19.8%), in a relationship (12.1%), in a long-term committed relationship (20.9%), engaged (2.2%), married (42.9%), or widowed (2.2%). Participants were recruited and compensated through Amazon Mechanical Turk; they were paid \$0.20 following survey one, \$0.40 following survey two, and \$0.60 following survey three, for total compensation of \$1.20 for those who completed all three surveys.

### **Materials**

**Demographics.** Participants were asked their age, gender, and country of residence. At the third time point, relationship status was obtained. The following eight measures below were assessed at both subsequent data collection points, with a final behavioural measure only assessed at time three.

**Counterfactual condition.** Participants were randomly assigned to a counterfactual condition. Participants in the upward condition were asked, “looking back on your romantic life over the past 10 days, what could you have done to have made any aspects of it better? Provide as much detail as you can regarding how things could have gone better.” Participants in the downward condition were asked, “looking back on your romantic life over the past 10 days, what could you have done to have made any aspects of it worse? Provide as much detail as you can regarding how things could have gone worse.” Finally, the control group was asked, “in a few sentences, how would you describe your romantic life over the past 10 days?” See Appendix A.

**Mood.** The Positive and Negative Affect Schedule (PANAS) was administered to measure each participant's mood. This 20-item measure has displayed high reliability in past research,  $\alpha = 0.95$  (Crawford & Henry, 2004). Similarly, there was high reliability on each subscale at each data collection point in the given research, evident in positive affect at time 1 ( $\alpha = 0.93$ ), time 2 ( $\alpha = 0.93$ ), and time 3 ( $\alpha = 0.94$ ), as well as negative affect at time 1 ( $\alpha = 0.94$ ), time 2 ( $\alpha = 0.89$ ), and time 3 ( $\alpha = 0.90$ ). Participants rated each item on a scale ranging from 1 to 5, 1 being *very slightly or not at all*, and 5 being *extremely*. Items included a variety of positive affect questions such as, "right now I am feeling interested," and a variety of negative affect questions such as, "right now I am feeling distressed." The subscales included 10 positive affect items, items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19, as well as 10 negative affect items, items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20. Participants' scores on each subscale were averaged. See Appendix B.

**Domain importance.** A single-item measure was administered to participants regarding their importance of a variety of life domain. Importance was measured on a scale from 1 to 7, 1 being *strongly disagree*, and 7 being *strongly agree*. Participants rated each life domain (romantic life, health, education, social life, and family) by responding to a statement such as "my health is important to me," or, "my education is important to me." The health, education, social life, and family life domains were not included in analyses as they were included to serve as a guard against demand characteristics. See Appendix C.

**Life satisfaction.** Participants responded to a 5-item general life satisfaction scale to measure their overall life satisfaction (Pavot & Diener, 1993). Participants responded on a 7-point scale, 1 being *strongly disagree*, and 7 being *strongly agree*, to various statements regarding their life satisfaction such as, "I am satisfied with my life." and "If I could live my life

over I would change almost nothing.” Items were averaged to create a single life satisfaction score. The scale has demonstrated high reliability in the past,  $\alpha = 0.91$  (Eid & Diener, 2004). Similarly, the life satisfaction scale had high reliability at time 1 ( $\alpha = 0.91$ ), time 2 ( $\alpha = 0.93$ ), and time 3 ( $\alpha = 0.93$ ) in the present research. See Appendix D.

**Domain satisfaction.** A 5-item scale was adapted from the general life satisfaction scale (Pavot & Diener, 1993) for each life domain: romantic, health, education, social, and family. Participants responded to 5 items for each life domain on a 7-point scale, 1 being *strongly disagree*, and 7 being *strongly agree*. Items were similar to the general life satisfaction scale, the only difference being the specific life domain was inserted into the item, such as, “I am satisfied with my romantic life.” The life satisfaction scale adapted to the romantic life domain had high reliability at time 1 ( $\alpha = 0.97$ ), time 2 ( $\alpha = 0.97$ ), and time 3 ( $\alpha = 0.96$ ). Additionally, the life satisfaction scale adapted to the health domain had high reliability at time 1 ( $\alpha = 0.95$ ), time 2 ( $\alpha = 0.96$ ), and time 3 ( $\alpha = 0.95$ ). Similarly, the life satisfaction scale adapted to the education domain had high reliability at time 1 ( $\alpha = 0.94$ ), time 2 ( $\alpha = 0.92$ ), and time 3 ( $\alpha = 0.93$ ). The life satisfaction scale adapted to the social life domain also had high reliability at time 1 ( $\alpha = 0.96$ ), time 2 ( $\alpha = 0.96$ ), and time 3 ( $\alpha = 0.96$ ). Finally, the life satisfaction scale adapted to the family life domain also had high reliability, at time 1 ( $\alpha = 0.95$ ), time 2 ( $\alpha = 0.95$ ), and time 3 ( $\alpha = 0.95$ ). See Appendix E.

**Motivation.** Participants’ motivation was measured through a subscale of the Behavioural Inhibition System/Behavioural Approach System (BIS/BAS) (Carver & White, 1994). Participants responded to 4 items on a 4-point scale from 1 to 4, 1 being *very true of me*, and 4 being *very false of me*. Items included statements such as, “when I want something I will go all-out to get it,” and, “if I see a chance to get something I will move on it right away.” The

items on the scale were modified to represent future intention rather than its original form that measured current intention. The scale has previously shown high reliability,  $\alpha = 0.81$  (Muris, Meesters, de Kanter, & Timmerman, 2005). The scale also demonstrated high reliability in the given research at time 1 ( $\alpha = 0.91$ ), time 2 ( $\alpha = 0.92$ ), and time 3 ( $\alpha = 0.93$ ). Scores were averaged to create one approach motivation score. See Appendix F.

**Intentions.** Behavioural intentions were measured through a single-item measure for each life domain: romantic, health, education, social, and family. Participants responded on a 7-item scale from 1 to 7, 1 being *no effort at all*, and 7 being *as much effort as possible*, to statements such as, “I will put effort into my romantic life,” “I will put effort into my health,” and so on for the remaining life domains. See Appendix G.

**Behavioural measure.** At time three only, participants were asked if they would like to read an article that would inform them of three simple steps to improve their romantic life. Included was a brief introduction to the article, “Dr. Wendy Walsh, a PhD graduate in clinical psychology, has written a brief article outlining 3 simple steps to transform your romantic life,” followed by the option to read the article or not. Selecting “yes” was an indication that the participants have taken a step to improve their romantic life. Alternatively, participants had the option to select “no,” indicating they do not want to improve their romantic life. Participants who selected “yes” were taken to the article, and participants who selected “no” were bypassed over the article to debriefing. See Appendix H.

## **Procedure**

Participants were recruited through Amazon Mechanical Turk. The study was completed online via Qualtrics. Participants were first asked to create a participant ID by entering the first initial of their first name and the last 4 digits of their phone number in order to associate data

from 3 time points together. Next, participants read and agreed to the letter of consent and acknowledged they signed up for a 3-part longitudinal study. Participants were then asked demographic variables such as age, gender, and country they reside in, and moved on to the counterfactual condition when complete. Each participant was randomly assigned to one of the counterfactual conditions; they were either asked to generate upward counterfactuals, downward counterfactuals, or just a general description of their romantic life over the past 10 days.

Following this, participants filled out the mood scale, importance scales, general life satisfaction scale, domain specific satisfaction scales, motivation scale, intention scales, and the self-esteem scale. The mood scale directly proceeded the counterfactual condition to detect any immediate effect the counterfactual may have had on mood, and therefore verify that the counterfactual had influenced the participant. The motivation scale and the intention scales were placed near the end of the survey so that they followed the longest possible reflection of participants' romantic lives. Finally, self-esteem found its place at the end of all others as its placement was less important.

After completion of the measures at time one, participants were given a compensation code to be entered into Amazon Mechanical Turk to redeem \$0.20. The code was created by the researchers at random, as it was only important the code is similar among all participants in order to correctly compensate participants.

Approximately fourteen days following completion of the first survey, participants were notified via Amazon Mechanical Turk that the second survey was live and now able for them to complete. Participants then accessed the second survey which was mostly identical to the first, in that only the letter of consent was removed. Most importantly, it should be noted that the counterfactual condition was the same as the first survey and participants were required to enter the same login entered in the survey in order to access subsequent surveys. The same procedure



was followed for completion of the second survey, but participants were now compensated \$0.40 through a different compensation code. Participants were then contacted again via Amazon Mechanical Turk approximately 14 days following completion of the second survey to be notified that the third survey was live. The third survey was almost identical to the second survey, however, had one addition: the link to the behavioural measure at the end of the survey. Participants were asked to select “yes” or “no” to indicate their interest in reading the article about improving their romantic life, and then were allowed access to the information. Participants then redeemed their compensation code for a final compensation of \$0.60.

## Results

### Entire Sample at Time One

The effects of counterfactual condition on mood, satisfaction (life and romantic life), motivation, and romantic intentions at one time point were analyzed using a series of two-way analysis of variance (ANOVA) models with the time one sample ( $n = 267$ ). Counterfactual condition and gender were the independent variables and mood, satisfaction (life and romantic life), motivation, and romantic intentions were all entered as dependent variables in separate ANOVA models. The additional ratings of importance, satisfaction, and intentions in the health, education, family, and social life domains were not included in analysis.

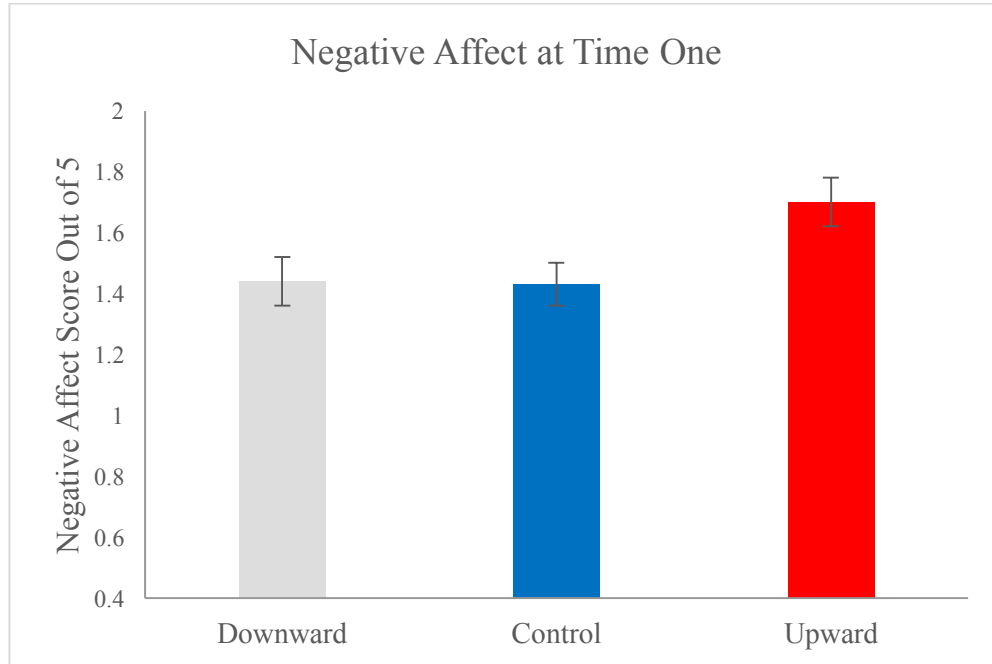
**Mood.** There was a significant effect of condition on negative affect,  $F(2, 246) = 3.99, p = 0.02$ , in that participants in the upward condition ( $M = 1.69, SD = 0.82$ ) had more negative affect than participants in the control condition ( $M = 1.43, SD = 0.68$ ). See Figure 1. There was no significant effect of condition on positive affect,  $F(2, 237) = 0.57, p = 0.57$ . There was a significant effect of gender on negative affect,  $F(1, 246) = 4.39, p = 0.04$ , in that it appeared males ( $M = 1.61, SD = 0.77$ ) exhibited more negative affect than females ( $M = 1.44, SD = 0.70$ )

overall. Gender did not have an effect on positive affect, life or romantic satisfaction, motivation, or romantic intentions in the entire time 1 sample, all  $p$ s > 0.19.

**Satisfaction.** There was a significant effect of condition on romantic satisfaction,  $F(2, 254) = 3.75, p = 0.03$ , in that participants in the downward condition ( $M = 4.95, SD = 1.60$ ) had more romantic satisfaction than participants in the control condition ( $M = 4.26, SD = 1.89$ ). There was no significant effect of condition on life satisfaction,  $F(2, 260) = 0.43, p = 0.65$ .

**Motivation.** There was no significant effect of condition on motivation,  $F(2, 258) = 0.78, p = 0.46$ .

**Romantic intentions.** There was a significant effect of condition on romantic intentions,  $F(2, 257) = 3.36, p = 0.04$ , in that participants in the downward condition ( $M = 4.89, SD = 1.64$ ) reported more romantic intentions than participants in the upward ( $M = 4.29, SD = 1.47$ ) and control ( $M = 4.43, SD = 1.70$ ) conditions.



*Figure 1.* Mean negative affect scores for entire time 1 sample. Error bars represent standard error of the mean. Participants who completed the survey at the first time point in the upward condition had significantly more negative affect than participants in the control condition.

### Longitudinal Sample at Time One

The same analyses were then completed on the time 1 data with only participants who completed all three surveys ( $n = 91$ ). There was a marginally significant effect of condition on negative affect,  $F(2, 83) = 2.46, p = 0.09$ , in that participants in the upward condition ( $M = 1.61, SD = 0.98$ ) had marginally more negative affect than participants in the control condition ( $M = 1.22, SD = 0.36$ ). There was no significant effect of condition on positive affect, life or romantic satisfaction, motivation, or romantic intentions, all  $ps > 0.12$ . There was no significant effect of gender on negative affect, positive affect, life or romantic satisfaction, motivation, or romantic intentions, all  $ps > 0.55$ . Means and standard deviations can be found in Table 1.

An attrition analysis was conducted to determine if those who completed the time 1 survey and did not continue through to the remainder of the study differed from those who completed the time 1 survey and continued on to complete all 3 surveys. A series of one-way ANOVA models were run with those who completed all 3 surveys versus those who completed only survey 1 as the independent variable, and negative affect, life and romantic satisfaction, motivation, and romantic intentions as the dependent variables in separate models. There was a marginally significant difference in negative affect between those who completed only time 1 ( $M = 1.57, SD = 0.72$ ) and those who completed all 3 ( $M = 1.40, SD = 0.66$ ) surveys,  $F(1, 250) = 3.40, p = 0.07$ . There was also a marginally significant difference in romantic intentions between those who completed only time 1 ( $M = 4.40, SD = 1.55$ ) and those who completed all 3 ( $M = 4.76, SD = 1.74$ ) surveys,  $F(1, 261) = 2.90, p = 0.09$ . There was no significant difference between groups on positive affect, life or romantic satisfaction, motivation, age, or gender, all  $ps > 0.21$ .

### Over Time

The effects of counterfactual condition over time were analyzed using a repeated measures ANOVA with condition and gender as between subjects variables and romantic importance as a covariate. For instance, negative affect was analyzed by entering counterfactual condition and gender as the independent variables, romantic importance as a covariate, and positive affect at time 1, 2, and 3 as the dependent variable. The same procedure was repeated for positive affect, life satisfaction, romantic life satisfaction, motivation, and romantic intentions.

**Mood.** There was a significant interaction of positive affect and condition over time,  $F(4, 162) = 2.65, p = 0.03$ , in that the upward condition appeared to have a greater increase in positive affect over time compared to the downward and control conditions (see Figure 2). There was no significant main effect of positive affect over time,  $F(2, 162) = 0.165, p = 0.85$ , no significant interaction of positive affect and romantic importance over time,  $F(2, 162) = 0.221, p = 0.81$ , and no significant interaction of positive affect and gender over time,  $F(2, 162) = 2.72, p = 0.07$ .

There was a significant main effect of negative affect over time,  $F(2, 164) = 3.44, p = 0.03$ , in that negative affect appeared to decrease over time. There was no significant interaction of negative affect and condition over time,  $F(4, 164) = 0.49, p = 0.74$ , or negative affect and gender over time,  $F(2, 164) = 0.47, p = 0.63$ .

**Satisfaction.** There was no significant main effect of life satisfaction over time,  $F(2, 168) = 0.15, p = 0.86$ . Additionally, there were no significant interactions of life satisfaction and romantic importance over time,  $F(2, 168) = 0.48, p = 0.62$ , life satisfaction and condition over time,  $F(4, 168) = 1.00, p = 0.41$ , or life satisfaction and gender over time,  $F(2, 168) = 0.03, p = 0.97$ .

There was no significant main effect of romantic satisfaction  $F(2, 168) = 2.42, p = 0.09$ . Additionally, there were no significant interactions of romantic satisfaction and romantic importance over time,  $F(2, 168) = 1.47, p = 0.23$ , romantic satisfaction and condition over time,  $F(4, 168) = 2.24, p = 0.07$ , or romantic satisfaction and gender over time,  $F(2, 168) = 2.34, p = 0.10$ .

**Motivation.** There was a significant main effect of motivation over time,  $F(2, 168) = 5.09, p < 0.01$ , in that motivation appeared to increase after time 1, and decrease after time 2. There was a marginally significant interaction of motivation and condition over time,  $F(4, 168) = 0.43, p = 0.08$ , in that participants in the upward condition appeared to have a greater decrease of motivation over time relative to the control condition. However, there were no significant interactions of motivation and gender over time,  $F(2, 168) = 2.03, p = 0.14$ .

**Romantic intentions.** There was no significant main effect of romantic intentions over time,  $F(2, 168) = 0.58, p = 0.56$ . Additionally, there was no significant interaction of romantic intentions and romantic importance over time,  $F(2, 168) = 0.55, p = 0.58$ , romantic intentions and condition over time,  $F(4, 168) = 1.34, p = 0.26$ , or romantic intentions and gender over time,  $F(2, 168) = 0.81, p = 0.45$ .

**Behavioural measure.** A chi-square analysis was run to examine if those who chose to read the article differed from those who did not want to read the article. There was no significant difference between those in the downward, upward, and control groups in interest to read the article,  $\chi^2(2, N = 91) = 2.31, p = 0.32$ . See Table 2. Logistic regression models were run to examine if gender interacted with condition to predict desire to read the article. There was no interaction when comparing individuals in upward condition versus those in the control condition, all  $ps > .13$ , but there was a marginally significant interaction for comparing those in

the upward versus downward conditions,  $\beta = 1.12$ ,  $p = 0.06$ . Men in the upward counterfactual condition (66.7%) were marginally more likely to want to view the article than women in the upward condition (28.6%).

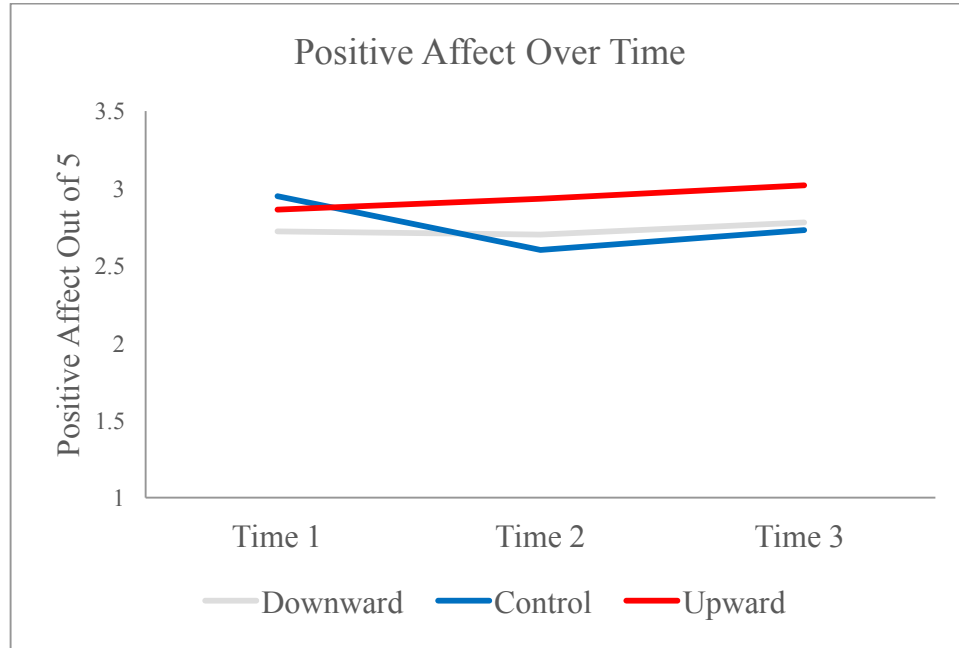
		Variable				
		Romantic Intentions	Romantic Satisfaction	Negative Affect	Positive Affect	Motivation
Condition and Time Point	Downward Time 1	5.14 (1.88)	5.04 (1.65)	1.36 (0.47)	2.73 (1.08)	2.65 (0.91)
	Control Time 1	4.97 (1.73)	4.21 (1.88)	1.22 (0.36)	2.89 (0.91)	2.69 (0.74)
	Upward Time 1	5.15 (1.92)	4.32 (2.01)	1.61 (0.98)	2.90 (0.75)	2.80 (0.71)
	Downward Time 2	5.07 (1.82)	4.93 (1.75)	1.35 (0.45)	2.71 (1.05)	2.79 (0.84)
	Control Time 2	4.97 (1.54)	4.16 (1.92)	1.31 (0.37)	2.60 (0.74)	2.80 (0.66)
	Upward Time 2	4.63 (2.02)	4.74 (1.82)	1.54 (0.69)	2.96 (0.90)	2.98 (0.84)
	Downward Time 3	5.46 (1.50)	5.09 (1.46)	1.38 (0.49)	2.75 (1.14)	2.69 (0.85)
	Control Time 3	5.56 (1.18)	4.34 (1.87)	1.26 (0.41)	2.72 (0.85)	2.72 (0.71)
	Upward Time 3	4.81 (1.90)	4.73 (1.88)	1.48 (0.69)	2.95 (0.96)	2.43 (0.95)

*Table 1.* Means and standard deviations for romantic intentions, romantic satisfaction, negative affect, positive affect, and motivation between conditions across time for participants who completed all three time points ( $n = 91$ ). Standard deviations are represented in brackets.

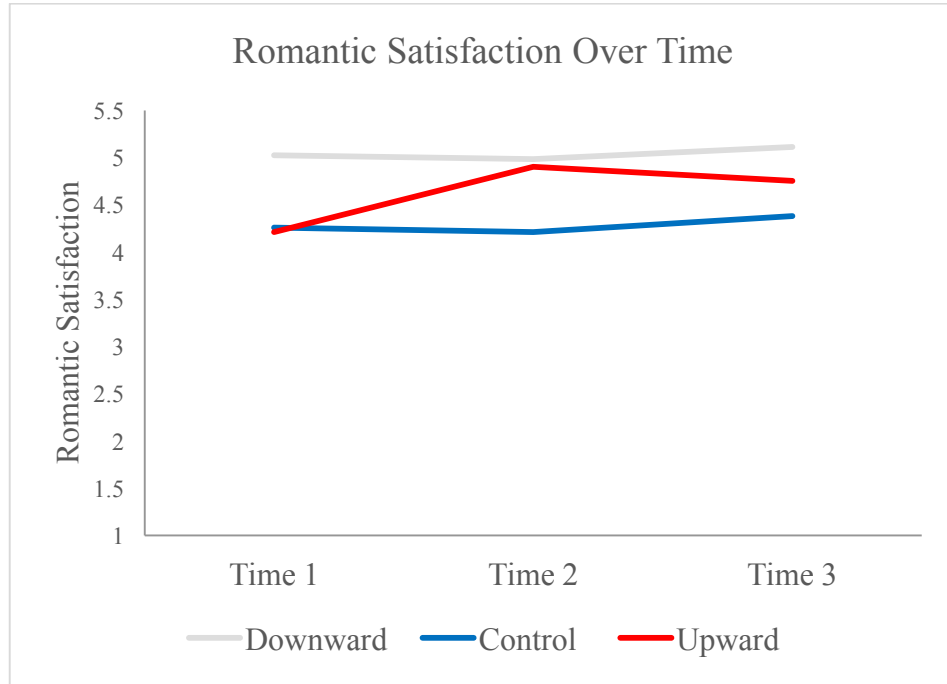


<b>Decision to Read Article to Improve Romantic Life</b>				
	<b>Yes</b>	<b>No</b>	<b>Total</b>	
<b>Condition</b>	<b>Down</b>	n = 12 (42.9%)	n = 16 (57.1%)	28
	<b>Control</b>	n = 20 (55.6%)	n = 16 (44.4%)	36
	<b>Up</b>	n = 10 (37.0%)	n = 17 (63.0%)	27
	<b>Total</b>	42	49	91

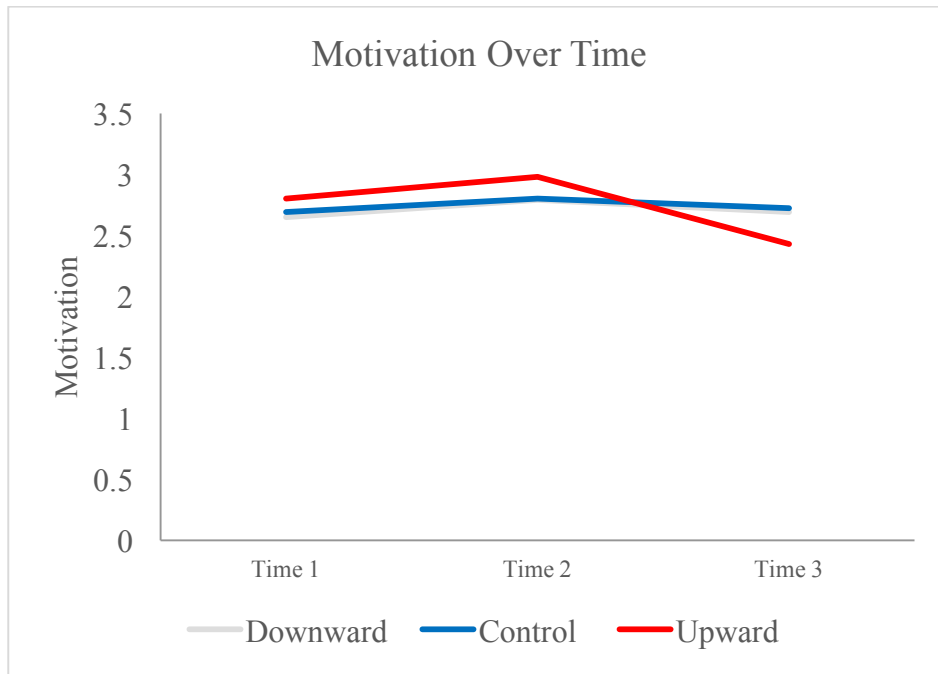
*Table 2.* Number of participants who selected “Yes” to read more about tips to improve their romantic life versus number of participants who selected “No” to read more about tips to improve their romantic life. Percentages represent within conditions. There was no significant difference between groups or gender for who selected to read the article.



*Figure 2.* Mean positive affect scores between conditions over time. It appears participants in the upward condition had a greater increase of positive affect over time than those in the downward and control conditions. See Table 1 for means and standard deviations of positive affect over time.



*Figure 3.* Mean romantic satisfaction scores between conditions over time. It appears participants in the upward condition had a greater increase of romantic satisfaction over time than participants in the downward and control conditions. See Table 1 for means and standard deviations of romantic satisfaction over time.



*Figure 4.* Mean motivation scores between conditions over time. It is notable that participants in the upward condition had an increase in motivation from time 1 to time 2, followed by a drastic drop of motivation at time 3. See Table 1 for means and standard deviations of motivation over time.

### Discussion

The present research investigated the effects of counterfactual thoughts about romantic life over time. The research examined the effects of counterfactuals on mood, romantic satisfaction, motivation, and romantic intentions at one time point, as well as explored the role of counterfactual thoughts on the given variables over approximately 4 weeks (with a total of three data collection points). The study aimed to determine if repeated generation of upward counterfactuals would make one more likely to lead to improvements in behaviour and mood over time relative to the generation of downward counterfactuals and factual descriptions of individual's romantic life. There were significant differences in negative affect, romantic satisfaction, and romantic intentions in the upward condition at one time point, although the effects diminished when restricting the time one sample to only those who participated in all three data collection points. There was a significantly larger increase in positive affect over time in the upward condition, and romantic satisfaction increased marginally more over time than the other groups. There was no significant difference between groups in reading about improving one's romantic life at the conclusion of the study.

As predicted in the first hypothesis, at time 1, participants in the upward counterfactual condition had more negative affect and more romantic intentions than participants in the control condition. Participants in the downward counterfactual condition had more romantic satisfaction than those in the control condition, which was indirectly in support of the first hypothesis that participants in the upward condition would have less romantic satisfaction than participants in the downward and control conditions. This is in line with previous research done by Roese (1994). Although there was no significant effect of condition on motivation specifically, the data revealed a significant effect of condition on behavioural intentions in one's romantic life which

provides moderate support for some type of effort to be put into one's romantic life in the future. This is in line with previous research that found counterfactuals in the upward direction to generate motivation (Epstude & Roese, 2008; Meier, 2002).

Although effects in support of hypothesis 1 were found in the entire time 1 sample, these effects diminished when the sample for analyses only included those who completed all 3 surveys. This could be simply due to reduced power when examining a smaller sample at one time point. However, the lack of differences between conditions within the longitudinal sample can also affect predicted differences on some variables over time. The theory of regret regulation states that regrets are aversive feelings we are motivated to minimize (Zeelenberg & Pieters, 2006). This theory explains why upward counterfactuals have been shown in research to increase motivation to change future behaviour, such as in the case of Roese's (1994) study. However, it is critical that individuals feel negative feelings in order to be motivated to reduce or get rid of those feelings (Zeelenberg & Pieters, 2006). In the given study, there was an approaching significant result of negative affect between counterfactual conditions, however, it is possible that due to this result being non-significant, there was no meaningful difference in negative affect experienced between groups, and therefore no differences in other variables such as motivation and romantic intentions. This is supported in the entire sample analyses of time 1, where significant differences of negative affect were complimented by significant differences in romantic intentions.

Seeing the experimental effects diminish with a restricted sample is evidence of the challenges of conducting longitudinal research. The given study had very high dropout rates after conclusion of the first survey. A smaller dropout rate throughout the entirety of the study would

have yielded greater statistical power and potentially more significant results in support of the hypotheses if more participants remained for all 3 surveys.

Disregarding the attrition of the sample over time, the effects of counterfactual thoughts over time were of greatest interest in the given research. In moderate support of hypothesis 2, the data revealed that participants in the upward condition had a greater increase of positive affect and romantic satisfaction over time compared to participants in the control condition. Greater increases in negative affect, life satisfaction, motivation, and romantic intentions were not supported, and there was no support for differences between the upward and downward conditions, rather differences were found between the upward and control conditions. One would expect that these individuals felt relatively poorer following the first generation of an upward counterfactual, took action to diminish the feelings of negative affect, and therefore experienced a greater increase of positive affect over time. Similar to the results of the time 1 data, this would be in line with the theory of regret regulation (Zeelenberg & Pieters, 2006). However, without a measure of corrective action, there is no way to confirm this explanation of the results.

Surprisingly, there was no significant effect of motivation at time 1 and no significant increase of motivation over time in the upward condition relative to the other groups. As noted in Figure 4, the upward condition experienced a slight increase in motivation following time 1, and experienced a drastic drop of motivation following time 2. Research by Markman et al. (2008) found that negative mood was critical in facilitating a burst of motivation following upward counterfactual thinking. Building off this idea, McCrea (2008) hypothesized that upward counterfactual thinking would actually decrease motivation as long as it was serving as a protective function, that is, the upward counterfactual thought excused outcomes that were less desirable than the individual expected. By thinking about how things could have been better, it is

possible individuals are indicating explanations for their poor performance. The theory behind this is that providing an excuse for the less desirable behaviour tends to make the individual feel more positive affect and therefore does not have the motivation to improve in the future (Markman et al., 2008; McCrea 2008).

This new view of counterfactual thoughts can explain the longitudinal effects, or lack of effects, in a couple ways. The first way is that motivation did slightly increase following the first time point. Evidently, the first time point also had the highest levels of negative affect reported in the upward counterfactual condition. This is in line with previous research that motivation will increase following generation of an upward counterfactual, given there is negative affect accompanied by the upward counterfactual (Epstude & Roese, 2008; Markman et al., 2008; Meier, 2002; Roese, 1994). Interestingly, negative affect decreases at every time point, and at the same time, positive affect consistently rises over time for the upward counterfactual group. According to Markman et al. (2008), this change in mood can directly explain why motivation had such a drastic drop following time 2.

From a different perspective, one can wonder about the effects of specifically thinking about one's romantic life over time. Stanton, Campbell, and Loving (2014) found that thinking about one's current relationship over time increased positive affect experienced. This reaffirms the explanation of why motivation did not increase over time, rather, it drastically declined following time 2 as levels of positive affect were rising. Overall, there is moderate support that thinking about how one's romantic life could be improved over time can be beneficial, evident in an increase of positive affect over time, and slightly meaningful increases in romantic satisfaction over time following repeated generation of upward counterfactuals.



### **Implications, Limitations, & Future Directions**

The given research has provided groundwork for subsequent longitudinal research on the effects of counterfactual thoughts over time. It has suggested potential benefits to recurrently thinking about how one's romantic life could have been better. Given that people tend to think about their romantic life often and tend to generate the most intense regrets regarding their romantic life (Morrison et al., 2012), it is useful to know that thoughts of how things could have been better can be beneficial.

Although the research had a novel contribution to the literature on counterfactuals over time, there were limitations worth mentioning. As evident in the comparison of analysis of time one data without restriction versus with restriction of only those who completed all three surveys, limiting the sample greatly impacted the power of the data. There were many results in the longitudinal analyses that were approaching significance, and one can be reasonably confident that if all 267 participants remained in the study over all three time points, some of these marginally significant results would become significant.

In addition to sample size, there were far more females who completed the survey than males who completed the survey. The issue of number of females versus number of males who completed the survey is evident in the logistic regression model of those who chose to read the article versus those who chose not to in the upward counterfactual condition. Although the percentage of males in the upward condition who wanted to read the article about improving their romantic life was more than double the percentage of females, the number of males in the upward condition was only 6 and the difference was not statistically significant. Overall, there were more females ( $n = 58$ ) than males ( $n = 33$ ) who completed the survey, which lead to an uneven representation of males and females in the data. This is problematic as the literature

states that there are gender differences between males and females, specifically in the romantic life domain (Morrison & Roesse, 2011; Roesse et al., 2006).

One can also doubt the quality of the sample obtained; given the participants were recruited through Amazon Mechanical Turk, there is no guarantee the participants were meaningfully devoting time to the completion of the surveys, or how much attention and thought they were giving to their answers. Average completion time was under 9 minutes for all three time points, which is faster than had been expected it would take. In subsequent research, it is recommended to add in quality assurance and careless responding questions to ensure the participants are contributing meaningful data.

In addition to quality assurance measures, it is also recommended that future longitudinal research include measurement of actual behaviours participants might have done since completion of the last survey. The given research included counterfactual thoughts in the form of hypothetical improvements or hypothetical worsening of their romantic life. It would have been greatly beneficial to measure qualitative and quantitative changes of behaviour at each time point that would elude to how much the participant has actually done to improve or worsen their romantic life. Future research can also examine the link between counterfactuals, intentions, motivation and behavior over greater periods of time, more time points and with different life domains.

### **Final Conclusions**

Overall, there was moderate support that thinking about how one's romantic life could have been better over time is beneficial. There was moderate support for the effects of counterfactuals at time (hypothesis 1) in that those in the upward condition had more negative affect, less romantic life satisfaction, and more romantic intentions. However, there was no effect

of counterfactual condition on motivation, and these effects diminished when the sample was limited to only those who participated in all 3 surveys over the course of the longitudinal study. There was also moderate support for hypothesis 2, in that participants in the upward condition had greater increases in positive affect and romantic satisfaction over time, however, the differences were only between the upward condition and the control condition, and not the downward condition. Additionally, the other variables in the hypothesis, motivation and romantic intentions, were not supported by the data. Finally, the third hypothesis was not supported, in that participants in the upward counterfactual condition were not more likely to read the article containing tips to improve their romantic life. Although not all hypotheses were supported, the study has provided a meaningful addition to the literature of the effects of counterfactuals over time, specifically regarding one's romantic life. Future research should aim to add to the body of literature surround how counterfactual thoughts could be beneficial to improving certain areas of one's life over time.

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## Appendix A

**REFLECTION ON ROMANTIC LIFE***Upward Counterfactual Condition:*

Looking back on your romantic life over the past 10 days, what could you have done to have made any aspect(s) of it better? Provide as much detail as you can regarding how things could have gone better.

*Downward Counterfactual Condition:*

Looking back on your romantic life over the past 10 days, what could you have done to have made any aspect(s) of it worse? Provide as much detail as you can regarding how things could have gone worse.

*Control Condition:*

In a few sentences, how would you describe your romantic life over the past 10 days.

## Appendix B

**POSITIVE AND NEGATIVE AFFECT SCALE**

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers.

1 = Very Slightly or Not at All

2 = A Little

3 = Moderately

4 = Quite a Bit

5 = Extremely

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



## Appendix C

**IMPORTANCE**

Please state your level of agreement with the following statements using the scale below:

1 = Strongly Disagree

2 = Disagree

3 = Slightly Disagree

4 = Neither Agree nor Disagree

5 = Slightly Agree

6 = Agree

7 = Strongly Agree

\_\_\_\_\_ My romantic life is important to me.

\_\_\_\_\_ My health is important to me.

\_\_\_\_\_ My education is important to me.

\_\_\_\_\_ My social life is important to me.

\_\_\_\_\_ My family is important to me.

## Appendix D

**OVERALL LIFE SATISFACTION SCALE**

Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding. The 7 point scale is as follows:

1 = Strongly Disagree

2 = Disagree

3 = Slightly Disagree

4 = Neither Agree nor Disagree

5 = Slightly Agree

6 = Agree

7 = Strongly Agree

\_\_\_\_ In most ways my life is close to my ideal.

\_\_\_\_ The conditions of my life are excellent.

\_\_\_\_ I am satisfied with my life.

\_\_\_\_ So far I have gotten the important things I want in life.

\_\_\_\_ If I could live my life over, I would change almost nothing.

## Appendix E

**DOMAIN SATISFACTION SCALES**

Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding. The 7 point scale is as follows:

1 = Strongly Disagree

2 = Disagree

3 = Slightly Disagree

4 = Neither Agree nor Disagree

5 = Slightly Agree

6 = Agree

7 = Strongly Agree

## ROMANTIC LIFE:

1 In most ways my romantic life is close to my ideal. 1 2 3 4 5 6 7

2 The conditions of my romantic life are excellent. 1 2 3 4 5 6 7

3 I am satisfied with my romantic life. 1 2 3 4 5 6 7

4 So far I have gotten the important things I want in romantic life. 1 2 3 4 5 6 7

5 If I could live my romantic life over, I would change almost nothing. 1 2 3 4 5 6 7

## HEALTH:

- 1 In most ways my health is close to my ideal. 1 2 3 4 5 6 7
- 2 The conditions of my health are excellent. 1 2 3 4 5 6 7
- 3 I am satisfied with my health. 1 2 3 4 5 6 7
- 4 So far I have gotten the important things I want in my health. 1 2 3 4 5 6 7
- 5 If I could change my health, I would change almost nothing. 1 2 3 4 5 6 7

## EDUCATION:

- 1 In most ways my education is close to my ideal. 1 2 3 4 5 6 7
- 2 The conditions of my education are excellent. 1 2 3 4 5 6 7
- 3 I am satisfied with my education. 1 2 3 4 5 6 7
- 4 So far I have gotten the important things I want from my education. 1 2 3 4 5 6 7
- 5 If I could redo my education, I would change almost nothing. 1 2 3 4 5 6 7

## FAMILY LIFE:

1 In most ways my family life is close to my ideal. 1 2 3 4 5 6 7

2 The conditions of my family life are excellent. 1 2 3 4 5 6 7

3 I am satisfied with my family life. 1 2 3 4 5 6 7

4 So far I have gotten the important things I want in family life. 1 2 3 4 5 6 7

5 If I could live my family life over, I would change almost nothing. 1 2 3 4 5 6 7

## SOCIAL LIFE:

1 In most ways my social life is close to my ideal. 1 2 3 4 5 6 7

2 The conditions of my social life are excellent. 1 2 3 4 5 6 7

3 I am satisfied with my social life. 1 2 3 4 5 6 7

4 So far I have gotten the important things I want in social life. 1 2 3 4 5 6 7

5 If I could live my social life over, I would change almost nothing. 1 2 3 4 5 6 7

## Appendix F

**MOTIVATION SCALE**

Below is a series of statements. Please indicate to what extent each of the following statements corresponds.

- 1 = Very True For Me
- 2 = Somewhat True For Me
- 3 = Somewhat False For Me
- 4 = Very False For Me

1) I will go out of my way to get the things I want

1                      2                      3                      4

2) When I want something I will usually go all-out to get it

1                      2                      3                      4

3) If I see a chance to get something I want, I will move on it right away

1                      2                      3                      4

4) When I go after something I will use a 'no holds barred' approach

1                      2                      3                      4

## Appendix G

**INTENTIONS**

Over the next 3 weeks, how much effort do you intend to expend on each of the following?  
Please rate using a scale of 1 to 7, with 1 being no effort at all, and 7 being as much effort as you can expend.

\_\_\_\_ I will put effort into my romantic life.

\_\_\_\_ I will put effort into my health.

\_\_\_\_ I will put effort into my education.

\_\_\_\_ I will put effort into my social life.

\_\_\_\_ I will put effort into my family life.

## Appendix H

**LINK FOR MORE INFORMATION**

There are several ways one can improve their romantic life. Dr. Wendy Walsh, a PhD graduate in clinical psychology, has written a brief article outlining 3 simple steps to "transform" your romantic life.

If you would like to read more, please click "yes," to be taken to the article.

YES, please take me to the article. \_\_\_\_\_

No, I don't want to see the article. \_\_\_\_\_

If yes response given:

**Love Like a Super Attacher (Someone with a secure attachment style)**

Despite what romantic movies, TV shows, and books tell you, love isn't something that simply happens. It is a work of art created by you. Really. Finding love is less about meeting the right person and more about acquiring the habits of what I call a super-attacher. People with good relationship skills and healthy attachment behavior, who believe they are lovable, are the ones suddenly finding love, as singles often perceive it.

So how can you begin to learn healthy attachment behaviors and find the relationship you want and deserve? It all starts with understanding what attachment style is and how it affects relationships.

Each of us comes into the world with a biological predisposition to attach to people in a certain way? some babies require more closeness and care than others. During the crucial first year of life, when our brains triple in size, we start to form a hardwired blue print for love based on how our caregivers respond to our needs. Then, in our adult romantic life, we attempt to replicate that version of love, even if, believe it or not, it was filled with feelings of loss or pain. Trying to replicate that love is what causes millions of singles to seek out help from coupled up friends, speed dating events, dating advice articles, and reviews of dating sites from places like DatingAdvice.com. Once we find our preferred venue for replicating that love, attachment style is the invisible force that prompts us to swipe right on someone we like or say hello to a stranger we find attractive. Attachment style is also the invisible force that determines whether or not we get into roller-coaster relationships with extreme highs and lows or not.

At the top of the mating heap are super-attachers. These people have what's known as a secure attachment style. Secure people tend to have high self-esteem. They are comfortable sharing feelings with friends and lovers. When they are suffering, they seek out social support. They take responsibility for their actions and are known for having a lot of empathy. Best of all, they have trusting, lasting relationships.



If you don't exactly fit the profile of a super-attacher, there are three simple things you can do that should help transform your dating life:

### **Give Care Without Having Strings Attached**

Yes, be an authentic nice guy or nice gal, not one whose kindness comes from fear that someone will bolt or who uses a manipulative tactic to get someone to like them. Instead, be kind, expecting nothing in return except your own sense of high self-esteem. Enjoy the ego boost. Love just for the sake of loving and you'll like yourself better.

### **Receive Care Happily**

The next time you are feeling under the weather or under a lot of stress, call in for backup. Reach out to friends and family members. I know this can be very hard for some people, but learning to have interdependent social support is great practice for one-on-one love. Let the people in your life know what you need and allow them to take care of you.

### **Don't Take Anything Personally**

If you often get emotionally hijacked by sudden feelings of abandonment or rejection, I have four words for you: **It's never about you.** There is always another side to every story, and trust me, people are more concerned with their own stuff than yours. So take a deep breath, and use every feeling of rejection as an opportunity to practice self-consoling. Remember, it's never personal.

Learning to have healthy attachments is the key to having a long and happy relationship and life in general. Because when you love better, you live better.