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## SOCIAL PSYCHOLOGY | RESEARCH ARTICLE

# Self-referent upward counterfactuals and depression: Examining regret as a mediator

Anne Gene Broomhall<sup>1\*</sup> and Wendy J. Phillips<sup>1</sup>

**Abstract:** Previous research has found that self-referent upward counterfactuals are associated with depression. However, empirical evidence regarding the way self-referent upward counterfactuals exert their influence on depression remains scarce. This study examined whether regret intensity mediates the relationship between self-referent upward counterfactuals and depression. This possibility is in line with a sequential negative cognitions-to-affect theoretical framework, given that self-referent upward counterfactuals that blame the self for not bringing about desired outcomes may elicit feelings of regret. Adding to the limited number of studies involving Asian samples about counterfactual-related depression, the study was conducted on 147 university-educated residents of the Philippines ( $M_{age} = 28.28$ ,  $SD = 9.23$ ; Range = 18–62) who completed an online survey. Mediation analysis using multiple regression found that regret intensity fully mediated the relationship between self-referent upward counterfactuals and depression, after controlling for the effects of three variables related to regret regulation (self-deceptive enhancement, other-referent upward and nonreferent downward counterfactual thinking).

### ABOUT THE AUTHORS

Anne Gene Broomhall is currently a PhD student from University of New England, Australia. She holds a post-graduate diploma in Psychology, and has worked as a tutor in Psychology subjects such as Psychological Medicine and Human Development (Developmental Psychology) and Statistics at James Cook University, Australia. She is also an Associate Member of the Australian Psychological Society (APS). Her research interests include counterfactuals, depression and Philippine culture. The findings reported in this paper may inform psychotherapy techniques for counterfactual-related depression in the Philippines.

Wendy J. Phillips is currently a senior lecturer in Psychology at the University of New England, Australia. Her research interests include mental health and psychological well-being, and cognitive models of behaviour, risk perception and decision-making in applied contexts. She is particularly interested in the relative influence of implicit (automatic, affective, fast, experiential) vs. explicit (deliberate, rule-based, slow, rational) processes involved in regulating emotions, managing problems or making decisions.

### PUBLIC INTEREST STATEMENT

People may imagine ways in which an unfortunate event should not have happened. This mental exercise is called counterfactual thinking, as people think of scenarios contrary to reality. They may generate self-referent upward counterfactuals, which involve blaming oneself for not doing something that could have made the situation better. This counterfactual type has been linked to depression, but little is known about how this association occurs. The current study investigated whether this relationship depends on the emotional experience of regret that may be felt in response to self-referent upward counterfactual thinking. University-educated Filipino residents completed an online survey assessing various counterfactual thinking tendencies, depression and self-deceptive enhancement. The results indicated that more frequent generation of self-referent upward counterfactuals was associated with more intense regret, which in turn was associated with more depression symptoms.

Specifically, greater tendencies to generate self-referent upward counterfactuals were associated with greater regret intensity which, in turn, was associated with higher levels of depression symptoms. This finding suggests that depressed individuals who report more frequent self-referent upward counterfactuals may benefit from treatment strategies that lower regret intensity.

**Subjects: Mental Health; Psychological Disorders - Adult; Mood Disorders in Adults - Depression**

**Keywords: counterfactual thinking; self-referent upward counterfactuals; regret; depression; self-enhancement**

## 1. Introduction

Various cognitive models of depression suggest that engaging in negative self-referential cognitions evokes negative affect, which is an essential element in the development and maintenance of depression (Beck, Rush, Shaw, & Emery, 1979; Wisco, 2009). A cognitive activity that is associated with high levels of depression symptoms is self-referent upward counterfactual thinking (Rye, Cahoon, Ali, & Daftary, 2008). When people generate *self-referent upward counterfactuals*, they compare a factual negative outcome with an imagined better outcome and blame themselves for their wrongful action and for failing to take the action required to produce the better outcome (Howlett & Paulus, 2013; Rye et al., 2008). They also experience *regret* – the negative emotional concomitant of self-referent upward counterfactual thinking (Epstude & Roese, 2008). Landman, Vandewater, Stewart, and Malley (1995) suggested that depression could be a consequence of too much negative affect arising from personally relevant counterfactuals. However, there is a paucity of studies explicating how generating self-referent upward counterfactuals is related to depression tendencies. A possible indirect pathway through which self-referent upward counterfactuals could influence depression is the experience of intense regret. Examining this possibility is an important research aim of the current study.

### 1.1. Counterfactuals, regret and depression

Counterfactuals may be upward (imagining better outcomes) or downward (imagining worse off outcomes) in direction (Markman, Gavanski, Sherman, & McMullen, 1993), and may or may not involve blame attributions for the negative event (Byrne, 2016). Researchers often specify the referent in upward counterfactuals, which represents individual tendencies to externalise and internalise blame for the negative event (Callander, Brown, Tata, & Regan, 2007; Catellani & Bertolotti, 2014; Rye et al., 2008), whereas downward counterfactuals often do not involve blame attributions because these are irrelevant when people consider themselves lucky to have avoided a much bigger misfortune (Mandel, 2003). Rye et al. (2008), factor-analytically identified four distinct types of counterfactuals that differ in direction and attribution of blame: self-referent upward, other-referent upward, nonreferent upward and nonreferent downward counterfactuals. As alluded to earlier, more frequent self-referent upward counterfactuals are generated when people blame themselves for not bringing about the imagined desired results, whereas more frequent other-referent upward counterfactuals are generated when blame is deflected on others. More frequent nonreferent upward counterfactuals and nonreferent downward counterfactuals are generated when imagining better and worse off alternatives without blame for the negative event, respectively. These orthogonal counterfactual types are often assessed by the Counterfactual Thinking for Negative Events Scale (CTNES; Rye et al., 2008). While validating the CTNES, Rye and colleagues found that generated self-referent upward and nonreferent upward counterfactuals were significantly positively associated with depressive symptoms, but only self-referent upward counterfactuals were also significantly positively correlated with regret. In contrast, nonreferent downward counterfactuals and other-referent upward counterfactuals were neither associated with depression nor with regret.

On functional grounds, Epstude and Roese (2008) suggested that amongst all counterfactual types, self-referent upward is the most beneficial in facilitating behavioural change because people realise how their decisions or actions could have contributed to the unfavourable result. Consequently, the insights derived from imagining what one could have done differently may serve a preparative function (Sirois, Monforton, & Simpson, 2010). Several studies have demonstrated that counterfactual insights facilitate behavioural intentions in participants (e.g. Morris & Moore, 2000; Quelhas, Power, Juhos, & Senos, 2008; Smallman, 2013; Smallman & McCulloch, 2012; Smallman & Roese, 2009). For example, after engaging in upward counterfactual thinking following a failed exam (i.e., “I wouldn’t have failed if I had worked harder”), student participants expressed greater intentions to work harder in preparation for future exams (Quelhas et al., 2008; Study 2), suggesting that counterfactual insights can serve as behavioural guides to prevent the same negative outcomes from happening in the future (“content-specific pathway”; Epstude & Roese, 2008; Roese & Epstude, 2017). Consequently, counterfactual insights have been found to yield favourable effects on performance (e.g. Kray, Galinsky, & Markman, 2009; Kray, Galinsky, & Wong, 2006; Myers, McCrea, & Tyser, 2013). However, this learning function could backfire if an individual incessantly dwells on the past and excessively blames oneself for the undesirable event (Branscombe, Wohl, Owen, Allison, & N’gbala, 2003). To this extent, depression is hypothesised to ensue given the excessive negative affect associated with the contrast between reality and the imagined better alternative, and the blame attributions focused on the self (Epstude & Roese, 2008). Quelhas et al. (2008) also identified this potential dysfunctional consequence, since the preparative effect of upward counterfactual thinking was not observed in their student participants who were subsequently classified as depressed.

The experience of regret is contingent on personal responsibility for undesired outcomes (Zeelenberg & Pieters, 2007). A large body of literature has theoretically discussed and empirically demonstrated the self-referential characteristic of underlying upward counterfactuals in the experience of regret (Mandel, 2003; Roese & Hur, 1997). Regret has also been found to be associated with self-agency (i.e. attributing cause to the self) (Bossuyt, Moors, & De Houwer, 2014; Contractor & Kumar, 2013; Zeelenberg, van Dijk, Pieters, & van den Bos, 2002) and self-attacking cognitions (Schmidt, Renaud, & Van Der Linden, 2011). Thus, evidence suggests that one cannot feel regret without some heightened self-blame (Roese & Morrison, 2009; Roese et al., 2009) over one’s inactions and/or actions that led to the undesirable result (Gilovich & Medvec, 1995; Gilovich, Medvec, & Kahneman, 1998). Accordingly, several studies have found significant associations between generating self-referent upward counterfactuals and regret (Mandel, 2005; Rye et al., 2008).

Since regret is a distressing emotion (Landman, 1995), its influence on depression has been extensively documented in the literature. These studies have demonstrated that regret is a significant predictor of high levels of current and future depressive symptoms across various research themes including surgery-related decision-making (e.g. Harcourt et al., 2011; Sheehan, Sherman, Lam, & Boyages, 2007), grief and bereavement (Torges, Stewart, & Nolen-Hoeksema, 2008), life outcomes in various stages of adulthood (e.g. Lecci, Okun, & Karoly, 1994; Schmidt et al., 2011; Wrosch, Bauer, & Scheier, 2005), and experienced stigma (e.g. Gore-Felton et al., 2008; Kissane et al., 2013). Notably, a study by Roese et al. (2009) found that regret predicted current depression, and its combined effect with repetitive thoughts explained more variance in distress. Thus, regret experienced in response to relentless cognitions in the form of self-referent upward counterfactuals may play an important role in increasing depression symptoms.

#### 1.1.1. Counterfactual-related depression

Individuals may become distressed if they brood over their failure and imagine the ways in which they could have prevented their misfortune; a process which may outweigh any lessons from the experience that could be useful for future behavioural change (“spinning their wheels”; Kray et al., 2010). Indeed, a maladaptive internal attributional style has been implicated in one’s vulnerability for depression (Abramson, Metalsky, & Alloy, 1989; Alloy, Lipman, & Abramson, 1992; Beck, 1967, 1987; Phillips, Hine, & Thorsteinsson, 2010; Wisco, 2009) because it triggers or sustains negative

affect (Shaver & Drown, 1986; Teasdale, 1988; Wisco, 2009), particularly amongst those who are self-blaming (Zahn et al., 2015). A considerable number of studies have demonstrated that self-blaming emotions are associated with heightened depression, such as shame and guilt (e.g. Luby et al., 2009; Martin, Gilbert, McEwan, & Irons, 2006; Tilghman-Osborne, Cole, Felton, & Ciesla, 2008; Zahn et al., 2015). In a study conducted on patients with major depressive disorder, Zahn et al. (2015) found that the majority experienced heightened feelings of inadequacy, which coincided with their depressed mood and depressive symptoms, such as hopelessness and anhedonia.

With regards specifically to regret, a recent study by Kraines, Krug, and Wells (2017) demonstrated that depressed individuals experience greater self-blame for regrettable decisions compared to their never depressed counterparts. The study corroborates past findings about depressed individuals experiencing more regret (e.g. Monroe, Skowronski, MacDonald, & Wood, 2005) and adds to the literature that has examined depression as a determinant of upward counterfactual thinking tendencies (e.g. Chase et al., 2010; Feng et al., 2015; Markman & Miller, 2006; Monroe et al., 2005). However, to the best of our knowledge, no previous studies have investigated the facilitating influence of regret in the relationship between self-referent upward counterfactuals and depression. More research is therefore needed to demonstrate if a sequential negative cognitions-to-affect framework is relevant to the counterfactual-depression link. Given that self-referent upward counterfactuals are cognitions that reflect a negative internal attributional style (Rye et al., 2008) which cause one to feel regret (Epstude & Roese, 2008; Howlett & Paulus, 2013), the latter may represent the negative affect that may lead to depressive moods. If depression is believed to be a consequence of negative self-views and biases impairing one's ability for emotion regulation (Phillips et al., 2010), then the unsettling emotion of regret may serve as a link to an individual's depression risk related to self-referent upward counterfactuals.

### **1.2. The lost opportunity principle**

Beike, Markman, and Karadogan (2009) proposed the notion of the *lost opportunity principle*. This concept is a refinement of Roese and Summerville's (2005) "opportunity principle", which states that regret is more intense for outcomes wherein future opportunities for change are perceived to be available. Beike et al. (2009) reformulated this concept by demonstrating that regret is more intense for negative outcomes that could have been avoided in the past – at a time when there was still an opportunity to do so – but is no longer changeable. They argued that hope stems from perceived available future opportunities which could lead to the achievement of one's goals, but with regards to lost opportunities, regret is more intense because an individual is no longer afforded the chance to prevent what went wrong, and is now suffering the consequences of this mistake. A study by Contractor and Kumar (2013) supported the lost opportunity tenet. They found that regret is amplified by personal agency when the superior outcome is made salient and the undesired outcome is irreversible.

There are two reasons why the lost opportunity principle is relevant to the experience of depression according to Beike et al. (2009). First, hopelessness becomes more intense given the minute chance of reversing one's misfortune. Second, a sense of low psychological closure regarding the life event is experienced (see also the Zeigarnik effect, Zeigarnik, 1927), which indicates that resolution is still needed, and memories of the event could still evoke emotional responses (Beike, Adams, & Wirth-Beaumont, 2007; Beike et al., 2009; Beike & Wirth-Beaumont, 2005). Beike et al. (2009) argued that an indication of low psychological closure is when people engage in finding meaning in the face of traumatic and unexpected experiences, even though it brings them greater distress (e.g. Davis, Lehman, Wortman, Silver, & Thompson, 1995). The lack of closure is also associated with unattained goals (e.g. Jokisaari, 2004; Lecci et al., 1994); thus, they persist in the mind and evoke disquiet (Robbins & Stanley, 2012) because people are reminded of incomplete tasks (Epstude & Roese, 2008). In line with the above evidence, Landman et al. (1995) found that middle-aged women who had experienced missed opportunities reported significantly higher levels of depression than middle-aged women who had not experienced missed opportunities.

Over the years, a substantial number of studies have linked upward counterfactuals, regret and depression, which appeared to be informed by the lost opportunity principle (Broomhall, Phillips, Hine, & Loi, 2017). These studies involved participants facing irreversible life events such as their impending death (e.g. Reker & Woo, 2011; Schmidt et al., 2011) and the death of their loved ones (e.g. Eisma et al., 2015; Torges et al., 2008). However, to our knowledge, past research has not provided evidence about how counterfactual thinking and regret explicitly couched within the lost opportunity framework by Beike et al. (2009) may relate to high depression symptoms.

## 2. The current study

Most previous studies that have assessed the relationship between upward counterfactual thinking and depression have not explicitly indicated the object of reference (Broomhall et al., 2017). The current study addressed this lack of research by specifically focusing on self-referent upward counterfactuals. We aimed to examine whether the intensity of regret experienced in response to a lost opportunity plays a pivotal role in the relationship between tendencies to generate self-referent upward counterfactuals and depression symptoms. We hypothesised that greater self-referent upward counterfactual thinking tendencies would be associated with greater regret intensity which, in turn, would be associated with higher levels of depression symptoms.

A great body of literature has examined the relationship between upward counterfactual thinking and depression, in general, in Western cultures (Broomhall et al., 2017; Stroebe et al., 2014), suggesting the need for studies involving people from Asian backgrounds. The limited number of existing studies involving Asian samples largely involved Chinese and Japanese samples, and these studies were not explicitly informed by Epstude and Roese's (2008) theory of counterfactual-related depression (e.g. Akiyama, Numata, & Mikami, 2010; Feng et al., 2015; Lam et al., 2014). Hence, we chose to conduct our study on a Philippine sample because: (1) there is an apparent lack of studies about counterfactual thinking and depression conducted in this cultural group, and (2) Filipinos have a past temporal orientation that compels them towards retrospection (Ligo-Ralph, 1990), which may make them particularly likely to generate counterfactuals and to experience regret. Although previous studies have examined regret in Filipinos that may reflect lost opportunities, these studies did not investigate depression as a possible negative mental health outcome (e.g. Maximo, Berlanga, Aquisay, Valencia, & Daoen, 2012; Osorio et al., 2012). Therefore, it is not known whether the same positive relationships between upward counterfactual thinking and depression exist in this population. One aim of the current study is to provide initial information about these relationships in this relatively under-investigated population.

We limited our sample to university-educated Filipinos given past findings that higher education may serve as a buffer against regret-related depression (Roese et al., 2009), as highly-educated individuals may find it easy to rationalise their regrettable outcomes. Hence, limiting our sample to university-educated individuals should provide a conservative estimate of the proposed model, while still capturing culturally specific values and propensities.

In this study, we controlled for the effects of other-referent upward, nonreferent downward counterfactual thinking and self-deceptive enhancement variables. Other-referent upward and nonreferent downward counterfactual thinking tendencies were used as statistical controls because blaming others for one's misfortune and engaging in downward-oriented comparisons are techniques for regret regulation (Markman et al., 1993; Pieters & Zeelenberg, 2007; Roese & Olson, 2007; Zeelenberg & Pieters, 2007), and thus, could provide a buffering effect against depression. Self-deceptive enhancement was also statistically controlled because this pertains to participants' tendencies to give positive appraisals of themselves (Paulhus, 1991a, 1991b). Since recalling negative events may pose a challenge to one's self-views, participants may be inclined to make unrealistic portrayals of themselves, which could influence the truthfulness of their self-reports.

### 3. Method

#### 3.1. Participants

The sample comprised of 147 (51 males and 96 females) individuals who had commenced or completed university education and currently resided in the Philippines. A minimum required sample size of 116 was calculated *a priori* using a power analysis, based on achieving power of 90%, with an alpha value of .05, and an expected medium effect size of .15. The final sample size was therefore more than enough to address the main research aim. The age range of participants was between 18 and 62, with a mean age of 28.23 ( $SD = 9.23$ ). The mean number of years of Philippine-residence was 27.48 ( $SD = 9.12$ ). No incentives were received for participation. Almost all participants were born in the Philippines (99%). Regarding educational background, 44% of participants had completed a Bachelor's degree, 15% had completed a postgraduate qualification (Master-level degree,  $n = 18$ ; Doctoral degree,  $n = 4$ ) and 41% had some university education (freshmen,  $n = 7$ ; sophomores,  $n = 7$ ; juniors,  $n = 23$ ; and seniors,  $n = 23$ ). The current sample was composed of university students (33%), and people working in the education (17%), managerial (12%), health sciences (3%), information technology (3%), arts and design (3%), business (3%), finance (3%) and legal (2%) sectors. Other occupations were related to engineering, entertainment, food, hospitality, property and housing, research and social work (each less than 2%). There were also unemployed participants (12%), one retired, and one who did not provide information.

#### 3.2. Procedure and measures

Participant recruitment was conducted by posting an invitation and Qualtrics (Qualtrics, Provo, UT) survey link on Filipino social groups on Facebook. Participants were also encouraged to share the survey link to their networks to generate more participants (snowballing technique). Using the custom validation options of Qualtrics, potential participants who indicated they were below the age of 18 and had no university education were excluded. The measures were administered in English (one of the official languages in the Philippines) given that it is the language of academic instruction (Bernardo, 2004, 2007). Moreover, the current study specifically targeted highly-educated Filipinos, whereby English is deemed more fitting to use than the vernacular Tagalog/Filipino (Bernardo & Estrellado, 2014). Past researchers who have investigated university-educated Filipinos have successfully used psychological assessments in their original English form without the need for assessment in fluency (e.g. Bernardo, Clemente, & Nalipay, 2016).

First, participants answered demographic questions. Given the recent trend of including religiosity when investigating negative mental health outcomes (Cruz et al., 2016), and that religious beliefs are important to Filipinos (Bernardo et al., 2016), participants were also asked to rate their perceived level of religiosity on a scale ranging from 1 (*not religious*) to 7 (*very religious*). Participants were then asked to complete the following assessments as described below. After completing the assessments, participants were provided with the number of a free counselling service in the Philippines to call if they felt distress because of participation. The study was approved by the Human Research Ethics Committee of the university where the two authors are affiliated.

##### 3.2.1. Depression symptoms

Participants completed the 7-item depression subscale of the Hospital Anxiety and Depression Scale (HADS-D; Zigmond & Snaith, 1983). The HADS-D assesses cognitive and emotional symptoms of depression (Smarr & Keefer, 2011) and has been used in previous research on upward counterfactual thinking and depression (e.g. Eisma et al., 2015; van Tol-Geerdink et al., 2015) and depression in Filipinos (e.g. Aherrera, Abraham, Racaza, Train, & Jara, 2015; de Guzman, 2013; Tay, Cheung, & Mak, 2015). Using a 4-point Likert scale, participants indicated how often they have been experiencing each described feeling (e.g. "I feel as if I am slowed down".) in the past week. Cronbach's alpha for the HADS was .74. Scores were summed, in which a higher score corresponds to more experienced depression symptoms. The HADS-D was especially appropriate for the current study because of its brevity, as keeping the survey short was needed to minimise attrition due to the slow and intermittent internet connection in the Philippines (Marasigan, 2015).

### 3.2.2. Counterfactuals

Specific counterfactuals generated were assessed by the subscales of the CTNES (Rye et al., 2008). The CTNES was constructed in such a way that it could be adapted to assess counterfactuals instigated by a specific stimulus (Rye et al., 2008). In the current study, participants were prompted to generate counterfactual thoughts using the following instruction of the CTNES which reflected the tenet of the lost opportunity principle by Beike et al. (2009): “Please think of an event that occurred recently which had a negative impact on you. This event should have an undesirable outcome which could have been prevented at the time of its occurrence but can no longer be resolved at the present time”. Participants indicated their agreement on the four orthogonal measures of counterfactual thinking tendencies from 1 (*never*) to 5 (*very often*), each with four items: self-referent upward (e.g. “I think about how much better things would have been if I had acted differently”;  $\alpha = .80$ ), other-referent upward (e.g. “If only another person (or other people) had not been so selfish, this whole mess could have been avoided”;  $\alpha = .89$ ), nonreferent upward (e.g. “I feel sad when I think about how much better things could have been”) and nonreferent downward (e.g. “I think about how much worse things could have been”;  $\alpha = .68$ ). Item scores were summed to obtain a score for each subscale. Higher scores indicate more tendencies to engage in each counterfactual thinking type. Following preliminary factor analyses (reported in the results), the nonreferent upward counterfactuals subscale was not used in this study, and one nonreferent downward item was removed from the subscale.

### 3.2.3. Regret

Participants rated their regret intensity as a response to the recalled negative event following this instruction adapted from Beike et al. (2009): “Rate the intensity of regret you currently experience regarding your choices or decisions in relation to the negative event using the scale below”. They indicated their agreement on a 6-point Likert scale ranging from 1 (*not at all*) to 6 (*intensely*). A single-item regret assessment has been successfully employed in previous studies (e.g. East, Chien, & Barber, 2012; Newall, Chipperfield, Daniels, Hladkyj, & Perry, 2009; Stewart & Vandewater, 1999; Towers, Williams, Hill, Philipp, & Flett, 2016).

### 3.2.4. Nature of the negative event

Participants also indicated the nature of the negative event they experienced by selecting one of the 12 life domains identified by Roese and Summerville (2005): education, career, romance, parenting, self-improvement, leisure, finance, family, health, friends, spirituality and community.

### 3.2.5. Self-deceptive enhancement

Participants’ inclination for making excessive positive self-appraisals was measured by the 20-item Self-Deceptive Enhancement (SDE) subscale of the Balanced Inventory for Social Desirable Responding (Paulhus, 1991b). Each item (e.g. “My first impressions of people usually turn out to be right”) was rated on a 7-point Likert scale ranging from 1 (*not true*) to 7 (*very true*). Following its scoring procedure (Paulhus, 1991a), after reverse-scoring negatively worded items, an additional point was added for each highest possible response (6 or 7). Scores were summed to obtain an overall score of self-deceptive enhancement, with higher scores indicating higher tendencies. In the current study, reliability for this scale was satisfactory ( $\alpha = .75$ ).

## 4. Results

### 4.1. Structure of the CTNES

To our knowledge, this is the first time the CTNES has assessed counterfactual thinking in a Filipino sample. We therefore conducted a preliminary confirmatory factor analysis in AMOS 23.0 (Arbuckle, 2015) to assess whether the four factors identified by Rye et al. (2008) also fitted our data-set. Based on Kline (2005), we defined good fit as a comparative fit index (CFI) and goodness-of-fit index (GFI) greater than .90, a root mean square error of approximation (RMSEA) less than .08 and a standardised root mean square residual (SRMR) of less than .10. After allowing the four latent factors to covary, the model provided a marginally satisfactory fit to the data: CFI = .91; GFI = .85; RMSEA = .09;

SRMR = .08. However, a very high correlation ( $r = .89$ ) between the latent factors for self-referent upward and non-referent upward counterfactuals indicated that the two subscales were not independent.

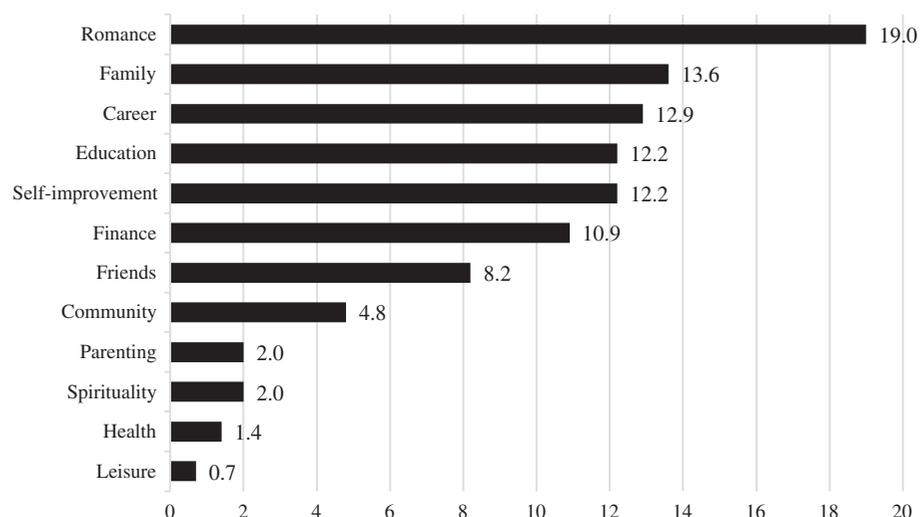
A subsequent principal axis factoring analysis in SPSS 24, with oblimin rotation, indicated a three-factor solution in which nonreferent upward counterfactual items and self-referent upward counterfactual items loaded on the same factor. As our study specifically aimed to address self-referent upward counterfactuals arising from lost opportunities, we elected to exclude items that assessed nonreferent upward counterfactuals from the study. Excluding these four items resulted in a three-factor structure that explained 65.4% of the variance in the data-set, which assessed self-referent upward counterfactuals, other-referent upward counterfactuals and nonreferent downward counterfactuals. Eleven items loaded between .47 and .96 on their respective factors, with no cross-loadings above .30. However, one nonreferent downward item (“I count my blessings when I think about how much worse things could have been”) loaded at only .37 and was removed from the subscale. The removal of this nonreferent downward item increased that subscale’s alpha from .68 to .73.

#### 4.2. Descriptives

We did not find normative data for the HADS in Filipinos. However, applying cut-off scores recommended by Zigmond and Snaith (1983), 65% of our participants scored within the normal range on depression (between 0 and 7), 22% were mildly depressed (8 and 10) and 12%<sup>1</sup> were severely depressed ( $\geq 11$ ). Following Roese and Summerville (2005), we also ranked the frequency of life domains associated with participants’ regret (Figure 1). The majority of regrets pertained to issues concerning romance, followed by family, career, education and self-improvement (both ranked 4th), finance and friends. The current study corroborated past findings by Morrison, Epstude, and Roese (2012) that the most intense regrets experienced are about close relationships (i.e. romance and family) rather than those that are less socially relevant (e.g. career, education).

Given that the depression scores had a positively skewed distribution, they were transformed using the square root transformation formula to improve the non-normality of the regression residuals. All other assumptions of multiple linear regression were met, and no missing values were observed. Table 1 shows the Pearson’s correlations, means, and standard deviations of the study variables. Significant medium to large correlations were observed amongst variables of primary interest.

**Figure 1. Percentage of negative events recalled across different life domains.**



**Table 1. Summary statistics of study variables**

Variables	1	2	3	4	5	6	7	8	9	10
1. Depression	1	.34**	.30**	.30**	-.01	-.26**	-.07	-.12	-.14	-.33**
2. Regret		1	.57**	.31**	.24**	-.26**	.07	-.17*	.05	-.23**
3. Self-referent upward			1	.35**	.20*	-.27**	-.01	-.18*	.05	-.28**
4. Other-referent upward				1	.31**	-.16	.18*	-.03	.03	-.08
5. Nonreferent downward					1	-.01	.19*	-.02	.18*	.12
6. Self-deceptive enhancement						1	.07	.27**	-.04	.23**
7. Religiosity							1	.02	.20*	.06
8. Age								1	-.09	.49**
9. Gender									1	.12
10. Educational attainment										1
Mean	2.32	3.81	12.87	12.51	8.83	100.97	3.99	28.23	1.65	6.37
SD	0.74	1.39	3.74	4.26	2.49	13.01	1.64	9.23	0.48	1.35

Note:  $n = 147$ . Gender, Male = 1, Female = 2.

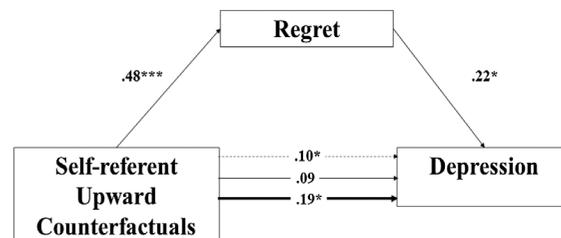
\* $p < .05$ .

\*\* $p < .01$ .

### 4.3. Mediation analysis

Multiple linear regressions were conducted to examine the possible mediating function of regret in the relationship between self-referent upward counterfactuals (independent variable) and depression (dependent variable), after controlling for other-referent upward counterfactuals, nonreferent downward counterfactuals and self-deceptive enhancement tendencies. The mediational analysis was conducted using the SPSS macro called PROCESS, with a recommended bootstrap of 5,000 samples using 95% confidence intervals to determine the significance of the indirect effect (Hayes, 2013). The bootstrapping method increases statistical power to detect an indirect effect and minimises the likelihood of a type II error (Hayes, 2013; Preacher & Hayes, 2008). To facilitate interpretation of effects, the mediation analysis was repeated using z-scores to generate standardised beta coefficients (values are shown in Figure 2). A hierarchical regression was also conducted on the raw

**Figure 2. Mediational model representing the direct pathway (solid line) and indirect pathway (dotted line) from self-referent upward counterfactuals to depression via regret, while controlling for other-referent upward counterfactuals, nonreferent downward counterfactuals, and self-deceptive enhancement.**



Notes: The total effect is in boldface. Standardised beta coefficients are reported.  
 \*\*\* $p < .001$ , \*  $p < .05$ .

scores using SPSS 22 to obtain semi-partial correlations (*sr*) because these are not generated by PROCESS.

Model statistics, unstandardised coefficients and semi-partial correlations are shown in Table 2, and standardised coefficients are presented in Figure 2. The mediation model explained 20.5% of the variance in depressive symptoms. Together, self-referent upward counterfactuals and the three covariates explained a significant 17.4% of the variance in depressive symptoms, and intensity of regret explained an additional and significant 3.0% of the variance. Examination of the total effect revealed that, after controlling for the effects of the three covariates, generating self-referent upward counterfactuals significantly predicted heightened depression symptoms. Self-referent upward counterfactuals also significantly predicted intense regret.

**Table 2. Regret as mediator of the relationship between self-referent upward counterfactual thinking and depression**

Variable	Effect	Regret					Depression				
		B	SE	p	95% CIs	sr	B	SE	p	95% CIs	sr
Self-referent upward	Total						0.04	0.02	.03	0.01 to 0.07	.17
Covariates											
Other-referent upward							0.04	0.02	.00	0.01 to 0.07	.22
Nonreferent downward							-0.04	0.02	.13	-0.09 to 0.01	-.12
Self-deceptive enhancement							-0.01	0.01	.04	-0.02 to -0.00	-.16
Model							$F(4, 142) = 7.50, p < .001, R^2 = .17$				
Self-referent upward		0.18	0.03	<.001	0.13 to 0.23	.44					
Covariates											
Other-referent upward		0.03	0.02	.23	-0.02 to 0.08	.08					
Nonreferent downward		0.06	0.04	.12	-0.02 to 0.14	.11					
Self-deceptive enhancement		-0.01	0.01	.09	-0.03 to 0.00	-.11					
Model		$F(4, 142) = 19.92, p < .001, R^2 = .36$									
Regret							0.12	0.05	.02	0.02 to 0.22	.17
Self-referent upward	Direct						0.02	0.02	.37	-0.02 to 0.05	.07
Covariates											
Other-referent upward							0.04	0.02	.01	0.01 to 0.07	.20
Nonreferent downward							-0.04	0.02	.07	-0.09 to 0.00	-.14
Self-deceptive enhancement							-0.01	0.01	.07	-0.02 to 0.00	-.14
Model		$F(5, 141) = 7.26, p < .001, R^2 = .21$									
Self-referent upward	Indirect						0.02	0.01		0.00 to 0.05	

Note: Unstandardised beta coefficients are reported.

As hypothesised, regret mediated the relationship between self-referent upward counterfactuals and depression, as evidenced by a significant indirect effect (based on the 95% bootstrap confidence intervals that did not include zero) and a direct effect that was not significant.<sup>2</sup> The results indicate that generating highly frequent self-referent upward counterfactuals was associated with greater regret intensity, which in turn were associated with high levels of depressive symptoms; and that generating self-referent upward counterfactuals was no longer directly associated with depression after regret was added to the model. Amongst the covariates entered, only other-referent upward counterfactuals contributed significantly to the mediation model by yielding a positive relationship with depression. This relationship was unexpected, as it is contrary to previous observations (Rye et al., 2008).

#### 4.4. Post hoc mediation analysis

Given the significant positive relationship between other-referent upward counterfactuals and depression, we conducted a *post hoc* analysis to determine whether regret also mediated this relationship. A mediation analysis using PROCESS, with generated self-referent upward counterfactuals, nonreferent downward counterfactuals and self-deceptive enhancement as covariates, indicated that the indirect effect was not significant,  $B = 0.00$  ( $\beta = .02$ ),  $SE = 0.00$ , 95%  $CI = -0.00$  to  $0.01$ .

### 5. Discussion

The current study investigated regret as a mediator of the association between self-referent upward counterfactual thinking and depression. As hypothesised, the more participants frequently generate self-referent upward counterfactuals, the more intense regret over a lost opportunity they experienced which, in turn, was associated with higher levels of depression symptoms. Further, after including regret in the model, self-referent upward counterfactual thinking was no longer significantly associated with depression. This pattern of results, and a significant indirect effect, indicate that regret fully mediated the relationship between self-referent upward counterfactual thinking and depression. This finding is consistent with previous research that has demonstrated significant associations between generated self-referent upward counterfactuals and regret (Rye et al., 2008) and between regret and depression (Bruine de Bruin, Dombrovski, Parker, & Szanto, 2016; Roese et al., 2009; Schwartz et al., 2002). Our results also indicate that the same positive relationships between self-referent upward counterfactuals, regret and depression that have been observed in Western populations (e.g. Rye et al., 2008) are also evident in a Filipino sample.

Our results are also consistent with one theoretical explanation for depression, which underscores the role of negative affect arising from upward counterfactual thinking activity; that is, upward counterfactual thinking activity may bring about negative emotions, which may pave the way for depressive episodes (Davis & Lehman, 1995; Landman et al., 1995; Roese & Olson, 1997). In relation to the current findings, generating maladaptive thoughts in the form of self-referent upward counterfactuals may evoke feelings of regret, and this emotional response may negatively impact one's depression risk (Epstude & Roese, 2008). Regret may likely link self-referent upward counterfactual thinking and depression, given that this emotion makes one feel responsible for the misfortune. This is because regret is a distressing emotion (Landman, 1995); it involves beating oneself up for not being able to do the right thing, whilst wishing to rectify wrongdoings (Zeelenberg & van Dijk, 2005) when there is no more opportunity to do so – reflecting the tenet of the lost opportunity principle (Beike et al., 2009). To this extent, depression may possibly ensue as a consequence of the intense regret experienced. The current results correspond to classic cognitive theories of depression that underscore the role of self-referential cognitions that induce negative responses, thereby leading to increased depression risk (Abramson et al., 1989; Beck, 1987; Teasdale, 1988).

Although the literature suggests that downward counterfactual thinking activity may serve as a strategy for emotional regulation (Markman et al., 1993; Roese, 1994; Sanna, Turley-Ames, & Meier, 1999; White & Lehman, 2005; Zeelenberg & Pieters, 2007), our results indicate that generated non-referent downward counterfactuals did not significantly predict decreased depression symptoms, which is inconsistent with past findings suggesting that people often imagine worse off situations

following adverse events (e.g. Sanna & Turley-Ames, 2000; Teigen & Jensen, 2011). This is a surprising finding because when individuals reflect over lost opportunities, they are often motivated to employ strategies to regulate their emotions, such as seeking downward-oriented comparisons (Roese & Epstude, 2017). A possible explanation for this non-significant relationship is the inability or lack of desire to lighten one's mood that is commonly associated with depression (White & Lehman, 2005). Further, some experiences can be so traumatic and distressing that seeking downward-oriented comparisons, so the current situation looks better could hardly induce positive moods (Rye et al., 2008; White & Lehman, 2005). Our result, nevertheless, is consistent with a few previous findings in the literature, whereby downward counterfactuals were neither related to decreased distress (Gilbar & Hevroni, 2007) nor less depression symptoms (Rye et al., 2008). It is also important to note that we examined nonreferent downward counterfactuals in aggregation with other distress-buffering variables that may have cancelled out its impact. Past findings suggest that imagining worse off alternatives to regulate one's emotions can be attenuated if such negative moods are externally attributed (Sanna, Meier, & Turley-Ames, 1998). Hence, it is reasonable to suspect that other-referent upward counterfactuals (which represents externalisation) may have rendered non-referent downward counterfactuals irrelevant in the model given that it significantly predicted depression.

### **5.1. Other-referent upward counterfactuals**

Notably, we observed an unexpected significant positive relationship between other-referent upward counterfactuals and depression, which was not mediated by regret. The direct relationship is inconsistent with previous findings that generating other-referent upward counterfactuals is unrelated to depression in samples sourced from Western cultures (e.g. Markman & Miller, 2006; Rye et al., 2008), and contradicts previous assumptions about blame shifting as a strategy to regulate regret (Zeelenberg & Pieters, 2007), in order to lessen distress and depression (e.g. Rye et al., 2008; Wrosch et al., 2005).

A possible explanation for the current finding is that Filipinos may perceive that their social environment influences the favourability of their outcomes given their collectivist outlook (for extensive discussions see, Church, 1987; Church & Katigbak, 2000). More specifically, people from collectivist cultures are more predisposed to social conformity than their individualist (less collectivist) counterparts (Bond & Smith, 1996; Chen et al., 2006; Fukushima, Sharp, & Kobayashi, 2009). Hence, it is not uncommon in collectivist cultures to blame others when an outcome is unsatisfactory (Carpenter, 2000). This may be because, for Filipinos, achieving the outcome they want may depend upon the outputs and decisions of others. For instance, they are likely to compromise their own needs and give in to societal expectations in order to maintain harmonious interpersonal relationships and interactions (Lynch, 1973). If they do not compromise, however, their despondency may further increase given that social harmony is an important condition in order to achieve happiness in a collectivist environment (Datu, King, & Valdez, 2016; Markus & Kitayama, 1991). To this extent, the lack of control over one's outcomes may represent the helplessness involved in the experience of depression (Seligman, 1975).

### **5.2. Therapeutic implications**

Our results suggest that regret plays a crucial role in the link between self-referent upward counterfactuals and depression. That is, the current framework indicates that generating self-referent upward counterfactuals in response to lost opportunities may not necessarily lead to depression, but their concomitant negative affect may become a catalyst for developing depression. This provides support to the view that depression could be a negative mental health consequence if individuals are not adept in regulating their emotions (Ehring, Fischer, Schnülle, Bösterling, & Tuschen-Caffier, 2008; Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010; Kring & Werner, 2004). Hence, inhibiting negative emotional reactivity is an important strategy for therapy.

Several intervention approaches may successfully reduce regret arising from self-referent upward counterfactuals. For example, Cognitive Behavioural Therapy (CBT) targets and corrects information

processing that is biased against oneself (Beck & Dozois, 2011; Beck et al., 1979; Beck & Weishaar, 2005). In CBT, individuals are helped to identify and curb their negative automatic thoughts and maladaptive assumptions, examine the validity of these cognitions, reframe their thinking towards a more reasonable interpretation of their circumstances, and recognise that their thoughts may impact on their feelings and behaviours (Beck & Weishaar, 2005). CBT has been found to be an effective psychotherapy in the treatment of depression in adults (Cristea et al., 2015; Cuijpers et al., 2013), not just in the developed world but also in developing countries (Vally & Maggott, 2015). With regards to individuals who tend to generate frequent self-referent upward counterfactuals, CBT can be used to make them aware that such thoughts could result in distressing feelings. Specifically, a reattribution cognitive technique is highly recommended to modify their strong beliefs that they brought misfortune to themselves. Awareness about the link between cognitions and affect will empower individuals to take control over their emotional reactions so they can refocus their attention to finding solutions to recover from their hardships.

CBT could also be modified by incorporating self-compassion. Interventions based on self-compassion have been found to help individuals regulate negative emotions arising from difficult experiences (Diedrich, Grant, Hofmann, Hiller, & Berking, 2014; Diedrich, Hofmann, Cuijpers, & Berking, 2016). Neff (2003b) defined self-compassion as a positive self-attitude that involves accepting one's pain, shortcomings, or failures in a non-judgemental manner, and viewing a negative life episode as something that others also experience (Neff, 2003a). Self-compassion has been found to be negatively associated with depression (Krieger, Altenstein, Baettig, Doerig, & Holtforth, 2013; MacBeth & Gumley, 2012), and a lack of self-compassion is a predictor of subsequent depression (see also, Krieger, Berger, & Holtforth, 2016; Krieger et al., 2013). Practicing self-compassion may also serve as a catalyst for self-improvement associated with learning from regrettable experiences, because it helps people to adapt to their circumstances and embrace acceptance and self-forgiveness (Zhang & Chen, 2016). It has also been associated with the effective selection of healthy life goals and intentions to engage in success-facilitating behaviours to achieve these goals (Neely, Schallert, Mohammed, Roberts, & Chen, 2009; Neff, Ya-Ping, & Dejitterat, 2005; Terry & Leary, 2011). Consequently, individuals will be more likely to eschew the temptation to constantly look back and engage in self-referent upward counterfactual thinking. They could easily move forward with their lives by seeking opportunities that could eventually result in better outcomes.

Another therapeutic intervention that helps to regulate negative emotions is Emotion-Focused Therapy (EFT; Greenberg & Watson, 2005; Lafrance Robinson, McCague, & Whissell, 2014). In EFT, the client's negative emotions are accessed, and their underlying meanings are uncovered in order to convert them into useful and adaptive emotions (Greenberg, 2008; Timulak, 2014). Individuals also become adept at accessing useful insights embedded in these negative emotions which may assist them to live with flexibility under difficult circumstances (Pos & Greenberg, 2007) and to respond adaptively to future similar situations (content-specific) or more general situations (content-neutral) (Epstude & Roese, 2008). Such an approach to regret corresponds with the view that its primary purpose is behavioural regulation (Roese, Summerville, & Fessel, 2007; Saffrey, Summerville, & Roese, 2008; Zeelenberg, 2007).

The observed direct positive relationship between other-referent upward counterfactuals and depression suggests that blaming others when imagining better outcomes is not protective against depression in the current sample. Although we primarily recommend CBT to reduce depression risk associated with frequent self-referent upward counterfactuals, it may also assist Filipino individuals who tend to generate highly frequent other-referent upward counterfactuals. CBT instils awareness in individuals of how their unduly negative thoughts about others could influence their feelings and behaviours (Beck & Dozois, 2011). In CBT, the therapist helps individuals to examine the truthfulness of their beliefs and change their behaviours (Hollon & Dimidjian, 2014). For example, the therapist may challenge the validity of the helplessness narrative in other-referent upward counterfactuals (e.g. If only my parents could afford to send me to university ...) and highlight other options to achieve desired outcomes.

Interpersonal Psychotherapy (IPT) may also be useful to mitigate depression risk associated with frequent other-referent upward counterfactuals. IPT addresses difficulties arising from social interactions across four life issues: grief, role transition due to major life changes, relationship disputes and interpersonal deficits (e.g. social isolation) (Klerman, Weissman, Rounsaville, & Chevron, 1984; Lipsitz & Markowitz, 2013; Weissman, Markowitz, & Klerman, 2007). IPT aims to enhance an individual's social support and social skills, minimise interpersonal stress and facilitate in the processing of negative emotions (Lipsitz & Markowitz, 2013). It has been found to be an effective psychotherapy in the treatment of depression (Cuijpers, Donker, Weissman, Ravitz, & Cristea, 2016; Cuijpers et al., 2011, 2013). IPT is premised on the view that current stressors are caused by interpersonal problems, so the therapist's goal is to lessen the impact of these stressors on the individual (Lipsitz & Markowitz, 2013). For example, the therapist may decrease helplessness associated with a culturally stifling environment by allowing their clients to freely talk about their feelings and come up with ways to become assertive. In the same way as grief, lost opportunities can be emotionally processed to facilitate transition into finding new opportunities for self-development, thus misfortunes are left in the past and become less salient.

## 6. Limitations and future directions

There are several limitations that need to be considered when interpreting the findings of the current study. This study was exclusively conducted with university-educated Filipino residents to provide a more conservative assessment, considering previous findings that higher education may regulate regret, and thus may likely serve as a buffer against depression. Hence, the results cannot be generalised to the entire Philippine population or to other populations. Examining this mediational model in less educated Filipinos or the general population of Filipinos could be a future research avenue. The use of a non-clinical sample also precludes interpretations that the relationships identified in the current study will also be found amongst individuals diagnosed with depression.

Further, although our results were consistent with theoretical models of depression, the cross-sectional design of the study means that we cannot infer causal relationships. Instead, it provides a framework which future researchers can use to determine the validity of this direction of causality as articulated by Epstude and Roese (2008). Past research on the reverse direction of causality has already demonstrated that depressed individuals are more regretful (Monroe et al., 2005) and that depressive states may exacerbate upward counterfactual thinking tendencies (Feng et al., 2015). On the other hand, there is a paucity of studies demonstrating that upward counterfactual thinking may lead to depression (Broomhall et al., 2017), hence the need for the current investigation. Future investigations using an experimental research design to examine our model may allow the drawing of causal inferences. Experimental research may also examine the possibility of a bi-directional feedback loop amongst variables, in which depression may increase the generation of self-referent upward counterfactuals, intensify feelings of regret, and lead to more self-referent upward counterfactuals, thereby increasing depression symptoms in a vicious cycle (Monroe et al., 2005).

The use of a single-item regret assessment may be viewed as a limitation in the current study because a longer regret scale may have captured individual facets of regret and allowed reliability to be assessed. However, a single-item regret measure has been commonly used in the counterfactual literature (e.g. Bonnefon & Jiehai, 2008; East et al., 2012; Newall et al., 2009; Towers et al., 2016). Single-item regret assessments have demonstrated convergent and divergent validity in previous research (e.g. Beike et al., 2009; East et al., 2012) and offer a viable solution to an observed problem with longer self-report regret scales that may be logistically difficult to administer (Buchanan, Summerville, Lehmann, & Reb, 2016), such as in the current study.

Our unexpected finding that other-referent upward counterfactuals were significantly associated with depressive symptoms in our Filipino sample is also worthy of future investigation, as this differs markedly from non-significant relationships previously observed in Western samples (Markman & Miller, 2006; Rye et al., 2008). The result of our *post hoc* analysis found that regret did not mediate this relationship, and therefore may not represent a crucial mechanism in the link between

other-referent upward counterfactuals and depression amongst educated Filipinos. It is possible that harmonious interpersonal relationships associated with collectivism may play a role in this relationship, and thus, could be an informative avenue for future investigation.

The CTNES has been validated using Western samples. In this study, we validated the CTNES in a Filipino sample. We found that a three-factor model of the CTNES fits our data better than the original four-factor model, with no clear distinction found between self-referent upward and nonreferent upward counterfactuals. Consequently, we elected to discard the nonreferent upward items. Our finding does not suggest that the self-referent upward counterfactual items of the CTNES are not valid; rather, it suggests that the two constructs may have a conceptual overlap in a Filipino sample. This finding needs to be replicated and is consistent with the view that upward counterfactual constructs can be conflated (Broomhall et al., 2017). However, the CTNES questions that assess these two types of upward counterfactuals differ in theoretically relevant ways. The self-referent upward items reflect a maladaptive internal attributional style in the prediction of depression, whereas the nonreferent upward counterfactual items correspond to a global attributional style (Rye et al., 2008). Given that we were specifically examining self-blame in upward counterfactual thinking, it was not appropriate to include the nonreferent upward items. Most relevant to the “content-specific pathway” in behavioural change are self-referent upward counterfactuals because these thoughts specify mistakes that one should avoid making in the future, albeit at the expense of experiencing distress (Epstude & Roese, 2008; Roese & Epstude, 2017).

Demonstrating regret as a mediator in this model does not preclude the possibility that other variables may mediate the relationship between self-referent upward counterfactual thinking and depression. Future researchers may fruitfully explore other potential mediators. These may involve other counterfactual emotions in the form of disappointment, rejoicing or elation, which can be compared with the influence of regret – regarded as the primary counterfactual emotion (Lorini & Schwarzenuber, 2011). Also, we chose covariates that may serve as a buffer against depression, informed by the theory of Regret Regulation (Pieters & Zeelenberg, 2007; Zeelenberg & Pieters, 2007). However, future researchers could consider examining other possible covariates that may impact the proposed associations, such as hopelessness, which is believed to be the proximate cause of depressive symptoms (Abramson et al., 1989; Alloy, Abramson, Walshaw, & Neeren, 2006), and perceived future opportunities for change (Roese & Epstude, 2017). Controlling for hopelessness will tease apart the unique contribution of intense regret feelings in the association between self-referent upward counterfactuals and depression. With regards to future opportunities for change, determining if having available opportunities for corrective action may influence depression tendencies associated with upward counterfactual thinking is a future research avenue.

In conclusion, our results extend the counterfactual thinking literature by examining self-referential upward counterfactuals and regret about lost opportunities (Beike et al., 2009) in relation to depression. Specifically, we found that regret intensity mediated the association between tendencies to generate self-referent upward counterfactuals and depression. The current study also adds to the small number of studies about the relationship between upward counterfactual thinking and depression conducted in Asian samples, and may inform the choice of treatment strategies for depressed or vulnerable individuals who tend to generate highly frequent self-referent upward counterfactuals.

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### Erratum

This article was originally published with errors. This version has been corrected. Please see Erratum (<https://doi.org/10.1080/23311908.2018.1440996>).

### Notes

1. As the survey was anonymous, we were not able to identify participants who reported being severely depressed. However, in addition to the counselling service number provided, participants were also given the contact information of the authors should they need to discuss any concerns.
2. Given the significant negative associations of age with self-referent upward counterfactuals and regret, and negative associations of educational attainment with self-referent upward counterfactuals, regret and depression, we repeated the analysis with age and educational attainment as covariates. Mediation was also established when age and education were added to the model,  $B = 0.02$  ( $\beta = .09$ ),  $SE = 0.01$ , 95% CI = 0.00 to 0.04,  $p < .001$ . The individual contribution of education to the model was significant,  $B = -0.14$  ( $\beta = -.25$ ),  $SE = 0.05$ ,  $p < .05$ , but age was not,  $B = 0.01$  ( $\beta = .08$ ),  $SE = 0.01$ ,  $p = .37$ . Religiosity was not investigated as a covariate because it did not correlate significantly with self-referent counterfactuals, regret or depression.

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