Personality and Individual Differences 55 (2013) 147–151

Contents lists available at SciVerse ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Desirable responding mediates the relationship between emotion regulation and anxiety

Jody E. Arndt [a,*], Wendy L.G. Hoglund [b], Esther Fujiwara [a]

[a] Department of Psychiatry, 1E1 WC Mackenzie Health Sciences Centre, University of Alberta, Edmonton, Alberta, Canada T6G 2R7
[b] Department of Psychology, P217 Biological Sciences Building, University of Alberta, Edmonton, Alberta, Canada T6G 2E9

ARTICLE INFO

Article history:
Received 12 November 2012
Received in revised form 15 February 2013
Accepted 20 February 2013
Available online 27 March 2013

Keywords:
Reappraisal
Suppression
Anxiety
Self-deception
Impression management
Self-enhancement

ABSTRACT

Reappraisal and suppression are two commonly studied emotion regulation (ER) strategies. Their trait expression is often assessed through self-report questionnaires. Recent work suggests that trait-reappraisal is generally associated with lower levels of psychopathology while trait-suppression is linked to greater psychopathology. We propose here that the reappraisal construct represents a set of highly desirable traits, whereas suppression represents unwanted characteristics. If this were true, relationships between self-reported ER traits and psychopathology, such as anxiety, might be systematically biased. To test this hypothesis, we examined whether desirable responding (self-deceptive enhancement and impression management) mediated the link between self-reported emotion regulation traits (reappraisal and suppression) and anxiety in a sample of over 4000 college students, controlling for gender and ethnicity. Our findings show support for this hypothesis. Desirable responding, especially self-deceptive enhancement, mediated the effects of ER traits on anxiety. Our findings recommend caution in the use of self-reported ER traits when assessing links to psychopathology and underscore the influence of self-deception in subjective well-being.

1. Introduction

Emotion regulation (ER) refers to the process through which people attempt to alter their experience and expression of emotions (Gross, 1998). Two commonly studied ER strategies are suppression and reappraisal. According to Gross (1998), suppression reflects the process of inhibiting overt emotional expressions in response to emotional events (e.g., frowning when sad, laughing at a joke). In contrast, reappraisal reflects the cognitive reinterpretation of an emotional event/stimulus to render it more or less emotional. For example, re-interpreting a failed test as a learning opportunity can render this failure less emotional. Although reappraisal and suppression are often assessed as experimentally instructed strategies, their trait-expression can be measured as well, using the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003).

Both instructed and trait-reappraisal and suppression have opposing effects on the experience of emotions. Briefly, while instructed reappraisal often leads to successful down-regulation of (negative) emotions, suppression is less successful (e.g., Gross, 2002). Consequently, trait-reappraisal has been associated with fewer psychopathological characteristics and better mental well-being compared to trait-suppression. For example, in Gross and John (2003), trait-reappraisal (assessed with the ERQ) was associated with less negative and more positive emotion experience, a greater capacity for negative mood repair, higher self-rated adjustment, higher self- and peer-rated social functioning/support, and greater physiological and mental well-being (e.g., lesser incidence of depression and anxiety) compared to trait-suppression. In line with these findings, a meta-analysis by Aldao, Nolen-Hoeksema, and Schweizer (2010) found that across 114 studies, suppression was positively correlated to psychopathology, whereas the inverse was true for reappraisal. An important limitation of studies investigating relationships between trait-ER and psychopathology is that both trait-ER and psychopathology (e.g., anxiety, depression) are often measured with self-report inventories (e.g., the ERQ; Gross & John, 2003), which could be subject to desirable responding.

Desirable responding refers to attempts by an individual to endorse positive and deny negative personality traits (Paulhus & Reid, 1991). Several researchers have proposed a role of desirable responding in ER. For example, Lieberman, Inagaki, Tabibnia, and Crockett (2011) asked participants to predict the distress they might feel while reappraising emotional images and found that participants over-estimated the effectiveness of reappraisal. The authors suggest participants' predictions about the magnitude of reappraisal effects may indicate their expectations about what reappraisal *should* do. That is, individuals may *expect* that

* Corresponding author. Address: Department of Psychology, University of Calgary, 2500 University Dr. N.W., Calgary, AB, Canada T2N 1N4. Tel.: +1 403 383 5404; fax: +1 403 282 8249.
E-mail address: jearndt@ucalgary.ca (J.E. Arndt).

0191-8869/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.paid.2013.02.022

reappraisal as an ER strategy is more effective than it actually is. Additionally, Gross and John (2003) reported that people with high trait-reappraisal had closer relationships and were liked more by their peers than suppressors. Thus, a social expectation exists regarding the nature of ER strategies: Individuals are aware of the social benefits of using reappraisal and actively seek out reappraisers as social companions[1] (Gross & John, 2003). Given these findings, we might expect that individuals who endorse positive personality traits (i.e., individuals high in desirable responding) also score high on measures of reappraisal and not suppression.

We argue that self-rated trait-reappraisal may be confounded by desirability. Inspecting the content and structure of the questions in the ERQ (Gross & John, 2003), questions such as: "I control my emotions by changing the way I think about the situation I'm in" are included. These imply the desirable ability to control and harness one's own emotions and the outcomes of challenging situations. Conversely, trait-suppression is measured by items such as: "When I am feeling negative emotions, I make sure not to express them", implying deliberate and inauthentic behavioural displays of being calm. Importantly, if self-rated trait-reappraisal represents a desirable trait in itself, self-reports by individuals who would prefer to appear positively on all self-report measures, including measures of mental well-being, may skew our understanding of the relationship between trait-reappraisal and psychopathology (e.g., anxiety, depression).

A few studies assessed desirable responding along with trait-ER. Using the Marlowe-Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960) with a sample of 145 undergraduate students, Gross and John (2003) found no substantial relationship between MCSDS and ERQ trait-reappraisal ($\beta = 0.11$, small effect size, see Cohen, 1988) or trait-suppression ($\beta = -0.09$). McRae, Jacobs, Ray, John, and Gross (2012) found in 85 participants that instructed reappraisal success was positively correlated with ERQ trait-reappraisal ($r = 0.24$, $p < 0.01$; moderate effect size, see Cohen, 1988). Reappraisal success was negatively but not significantly related to desirable responding ($r = -0.16$, $p = 0.14$; small effect size) in the MCSDS. Correlations between ERQ reappraisal and MCSDS were not reported. The MCSDS assumes a one-factorial construct of desirable responding: The need for approval. MCSDS items describe behaviours and thoughts that are either desirable but uncommon (e.g., "I never hesitate to go out of my way to help someone in trouble") or undesirable but common (e.g., "I sometimes feel resentful when I don't get my way"). One could expect suppression (inhibition of desirable and undesirable emotional reactions) to be related to some aspects of such a construct of desirable responding. However, ERQ reappraisal questions describe cognitive reframing of potentially threatening thoughts and feelings which may be linked to unobservable but favourable self-presentation; a construct which is underrepresented in the MCSDS (Uziel, 2010; Ventimiglia & MacDonald, 2012).

A measure of desirable responding that may better capture the commonalities between desirable responding and ER is the Balanced Inventory of Desirable Responding (BIDR; Paulhus & Reid, 1991). In contrast to the MCSDS, the BIDR conceptualizes desirable responding as two different constructs: (1) a positively biased self-view (self deceptive enhancement scale), for example "My first impression of people usually turns out to be right"; and (2) a positively biased presentation of the self to others (impression management scale), for example "I have never dropped litter on the street". The self deceptive enhancement (SDE) subscale is associated with other defence mechanisms (repression, distancing, self-controlling) (Paulhus & Reid, 1991). Interestingly, external raters (i.e., friends and family) of high SDE scorers perceive these individuals to be less well-adjusted than high SDE scorers perceive themselves. The impression management (IM) subscale has demonstrated associations with traditional lie scales, such as those included in the Minnesota Multiphasic Personality Inventory (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989), as well as with the MCSDS (Paulhus & Reid, 1991). Thus, the SDE subscale evaluates defensiveness with the aim of protecting self-esteem, and the IM subscale evaluates a conscious response bias with the aim of making a favourable impression on others (Stöber, Dette, & Musch, 2002; but see Uziel, 2010 for a review of IM scales).

We propose that the ERQ reappraisal items may evaluate the potentially desirable ability to control the outcomes of emotionally challenging situations with the goal of protecting oneself against negative experiences. The ERQ suppression questions, in turn, may measure deliberately inauthentic outward behavioural displays of calmness. Recent findings by English and John (2012) support the latter suggestion: The authors found that self-rated inauthenticity (i.e., a consciously perceived mismatch between inner and public self) substantially influenced links between trait-suppression and poor social functioning (e.g., lower relationship satisfaction, lower social support). Given the similarity in the nature of the constructs measured in the BIDR and ERQ, we suggest that the relationship between desirable responding and trait-ER may be better clarified using the BIDR. Furthermore, we suggest that whereas ERQ trait-reappraisal is more closely related to SDE, ERQ trait-suppression is closer to IM.

Gender and ethnicity likely influence variables of interest in this study. For example, Gross and John (2003) found that men use suppression more than women, implying that emotion expression is typically considered a more feminine quality (Brody, 2000). Similarly, cultural differences exist in the frequency of expressive suppression, with greater use of reappraisal in Euro-North Americans and greater use of suppression in East Asians and other minority groups (Gross & John, 2003). Since we did not have specific hypotheses about potential *differential* influences of gender or ethnicity on the relationships between ER and anxiety, gender and ethnicity were included as control variables here rather than additional moderators.

1.1. The present research

We set out to examine the relationships among ER, desirable responding, and a self-report measure of psychopathology in a large sample of undergraduate college students. As a target measure of psychopathology we chose self-reported trait-anxiety. Notably, desirable responding is usually negatively correlated with self-reported anxiety, both in healthy populations (Weinberger, Schwartz, & Davidson, 1979) as well as in clinical groups (Deshields, Tait, Gfeller, & Chibnall, 1995). As a result, self-reported anxiety may be underestimated, especially in individuals high in desirable responding (e.g., Eysenck, 2000; Weinberger, 1990). The present study tested whether desirable responding (self-deceptive enhancement and impression management) mediates the association between two self-reported ER strategies (reappraisal and suppression) and anxiety. Based on the literature reviewed above, we expected a negative relationship between self-reported trait-reappraisal and anxiety. This relationship was expected to be mediated by desirable responding, especially by self-deceptive enhancement. Conversely, we expected a positive relationship between self-reported trait-suppression and anxiety. This relationship should be mediated by desirable responding, especially by impression management.

[1] Studies suggest that emotional expressiveness is more frequent in individualistic cultures than in collectivistic cultures, implying that emotion suppression is valued more in collectivistic cultures (e.g., Matsumoto et al., 2008; Soto, Perez, Kim, Lee, & Minnick, 2011).

2. Methods

2.1. Participants

Participants were 4737 undergraduate students from first-year introductory psychology courses. These participated in online testing sessions in the Department of Psychology at the University of Alberta. Data from 98 participants were excluded due to missing information in both of the control variables: gender and ethnicity. The final sample consisted of 4639 participants. There were 2814 (60.7%) females and 1825 males, with a mean age of 19.17 years ($SD = 2.71$ years). Participants identified their ethnicity as: Aboriginal, African, East Asian, South Asian, European, Hispanic, Middle Eastern, Euro-North American, or Other. Ethnicity was dichotomized to represent either Western ethnicity (European or Euro-North American, $n = 2689$, 58%) or non-Western ethnic background (all others, $n = 1950$, 42%).

In the online assessment, demographic questions preceded the questionnaires, which were given in a fixed order: trait-ER, trait-anxiety, and desirable responding. All participants provided written informed consent and received partial course credit for their participation.

2.2. Measures

Emotion regulation was assessed using Gross and John's (2003) Emotion Regulation Questionnaire (ERQ). The ERQ is a 10 item self-report measure of two ER strategies: reappraisal (6 items; e.g., "When I want to feel less negative emotion, I change the way I'm thinking about the situation") and suppression (4 items; e.g., "When I am feeling negative emotions, I make sure not to express them"). Questions comprise statements about the subjective experience and expression of positive and negative emotions and are answered on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). Items are formulated in a positive direction with no reversals. Gross and John (2003) reported moderate to high Cronbach alpha coefficients for both reappraisal (alpha = 0.75–0.80; cross-study $M = 4.6$, $SD = 0.94$ for males and $M = 4.61$, $SD = 1.02$ for females) and suppression (alpha = 0.68–0.76; $M = 3.64$, $SD = 1.11$ for males, $M = 3.14$, $SD = 1.18$ for females). The internal consistencies in our sample were similarly high (ERQ reappraisal: Cronbach alpha = 0.85; ERQ suppression: alpha = 0.76). Compared to Gross and John (2003), our reappraisal mean scores were higher in females ($M = 4.77$, $SD = 1.05$; $t[3748] = 4.07$, $p < 0.01$), but similar in males ($M = 4.61$, $SD = 1.04$; $t[2370] = 0.2$, $p > 0.1$). Our ERQ suppression scores were higher than those reported by Gross and John (males: $t[2370] = 8.39$, $p < 0.01$; females: $t[3748] = 8.93$, $p < 0.01$), but showed the same gender disparity: males had higher suppression scores than females (males: $M = 4.1$, $SD = 1.13$, females: $M = 3.54$, $SD = 1.19$, $t[4637] = 15.97$, $p < 0.01$).

Anxiety was assessed using the Trait version of the Spielberger State-Trait Anxiety Inventory (STAI-T; Spielberger, 1983). The STAI-T is a 20-item scale designed to assess the long-term frequency of anxious feelings (e.g., "I feel nervous and restless"). Ratings are made using a 4-point Likert scale (1 = *almost never*, 4 = *almost always*). Items address both the *presence* and *absence* of anxiety. The STAI-T has a strong internal consistency, with Cronbach alpha ranging from 0.85 to 0.95 (Spielberger, 1983). College students of the STAI norm samples showed mean STAI-T scores of 38.8 ($SD = 9.18$) in males and 40.4 ($SD = 10.15$) in females. In our sample, Cronbach alpha was slightly lower with alpha = 0.84. Means were higher than in the norm sample (males: $M = 43.29$, $SD = 7.9$, $t[2147] = 10.21$, $p < 0.01$; females: $M = 43.25$, $SD = 7.8$, $t[3343] = 7.33$, $p < 0.01$).

Desirable responding was assessed using Paulhus and Reid's (1991) Balanced Inventory of Desirable Responding (BIDR). The BIDR is a 40-item self-report measure of two constructs: self-deceptive enhancement (SDE: A positively biased understanding of the self; e.g., "My first impression of people usually turns out to be right") and impression management (IM: deliberately positively biased presentation of the self to others; e.g., "I have never dropped litter on the street"). The 20 item SDE scale and the 20 item IM scale are answered on a 7-point Likert scale (1 = *not true* to 7 = *very true*). According to Stöber et al. (2002), Cronbach alpha coefficients for the BIDR subscales when scored continuously (all answers are scored with their numerical values between 1 and 7) are higher than when scored dichotomously (only counting extreme answers '6' and '7', as recommended by Paulhus, 1994). We therefore adopted the continuous scoring method here. Stöber et al. (2002) reported Cronbach alpha were 0.69 for SDE and 0.72 for IM. Stöber et al.'s (2002) sample means in a sample of 101 students were not further subdivided into genders. Their sample's mean SDE was 77.21 ($SD = 13.11$); mean IM was 69.69 ($SD = 15.98$). In our sample, the respective alphas were 0.70 for SDE and 0.80 for IM. Our sample scored higher with a mean SDE of 82.68 ($SD = 11.74$), ($t[4738] = 4.62$, $p < 0.01$) and mean IM of 77.58 ($SD = 16.58$), ($t[4738] = 4.74$, $p < 0.01$).

2.3. Data analysis plan

Results are presented in two sections. First, we present psychometric data and bivariate correlations among our primary constructs. Second, the direct and indirect effects of ER on anxiety via desirable responding were tested using path models in the Mplus 6.11 framework (Muthén & Muthén, 1998–2011). Path analysis with maximum-likelihood estimation was used to allow for the simultaneous examination of multiple direct and indirect paths (Kline, 2011). To examine whether the relationship between self-rated trait-ER (reappraisal and suppression) and trait-anxiety was mediated by desirable responding (self-deceptive enhancement and impression management), we tested two theoretical models. First, to test whether trait-ER contributes directly to trait-anxiety, we examined a direct-effects only model where trait-anxiety was regressed on trait-ER. Second, to test our hypothesis that desirable responding mediates this relationship, we tested an indirect-effects model in which both SDE and IM were examined as mediators of the relationship between trait-ER and trait-anxiety. Following McKinnon, Lockwood, Hoffman, West, and Sheets (2002), the confidence interval around the indirect paths from trait-ER toward trait-anxiety via desirable responding was computed via the Sobel test (Sobel, 1982). For both models, the effects of gender and ethnicity on each construct were adjusted.

Model fit precision was examined using the chi-square statistic (χ^2), comparative fit index (CFI), and root mean square error of approximation (RMSEA). The χ^2 test assesses the discrepancy of fit between the observed and hypothesized models; a non-significant χ^2 value indicates a good fit to the data but is sensitive to sample size and model complexity. The CFI estimate compares the specified model with a model in which all variables are assumed to be uncorrelated; values of 0.95 or greater specify an excellent fit to the data. The RMSEA index adjusts for model complexity and favours the most parsimonious model; values of 0.05 or less indicate excellent fit to the data (Browne & Cudeck, 1993; Hu & Bentler, 1999; Kline, 2011).

3. Results

3.1. Inter-correlations among personality variables

Table 1 shows the bivariate correlations among the personality variables.

3.2. Path analysis

Our direct-effects only model (Fig. 1A) examining the direct effects of both trait-ER indicators on trait-anxiety showed an acceptable fit to the data, χ^2 (1, $N = 4637$) = 1.45, $p = 0.23$, CFI = 1.00, RMSEA = 0.01 (90% CI = 0.00–0.04). After accounting for the effects of both gender and ethnicity on each construct, the direct paths from both reappraisal and suppression to trait-anxiety were significant. These estimates indicated that greater self-rated use of reappraisal contributed to lower levels of self-reported trait-anxiety ($\beta = -0.33$, $SD = 0.01$, $p < 0.01$), whereas greater use of suppression contributed to higher levels of trait-anxiety ($\beta = 0.26$, $SD = 0.01$, $p < 0.01$). These effects were moderate in size (Cohen, 1988). This model accounted for 18.8% of the variance in trait-anxiety ($R^2 = 0.188$, $p < 0.01$).

Table 1
Correlation matrix among questionnaires.

	1	2	3	5	6
1. ERQ reappraisal	–				
2. ERQ suppression	0.00	–			
3. STAI-T	−0.32**	0.25**	–		
5. BIDR self-enhancement	0.26**	−0.09**	−0.60**	–	
6. BIDR impression management	0.12**	−0.04*	−0.21**	0.30**	–

ERQ, Emotion Regulation Questionnaire; STAI-T, Trait Anxiety Inventory; BIDR, Balanced Inventory of Desirable Responding. *$p < 0.05$ **$p < 0.01$.

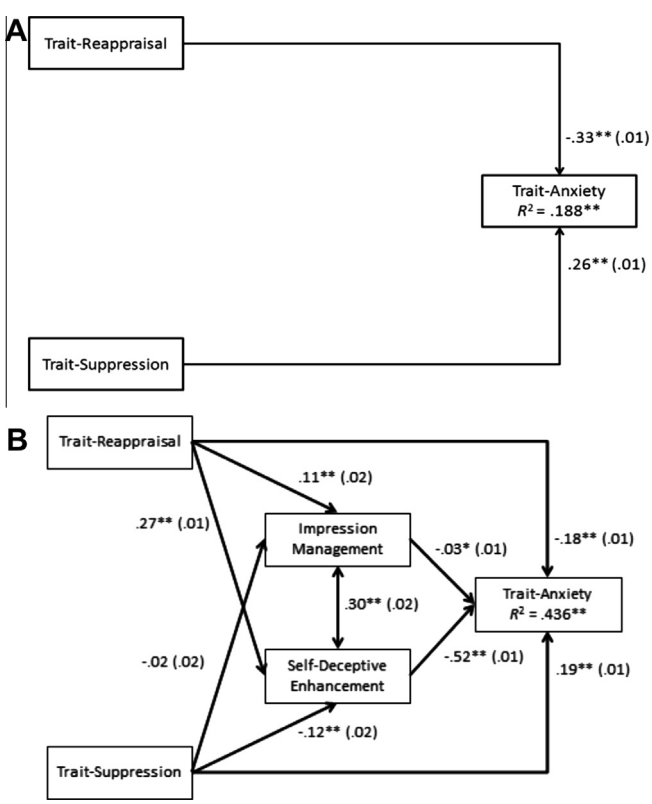

Fig. 1. Illustration of the two models. Standard estimates presented. Models adjust for effects of gender and ethnicity on each construct. *$p < 0.05$, **$p < 0.001$. (A) Direct-effects model testing the association between trait-emotion regulation and anxiety. χ^2 (1, $N = 4637$) = 1.45, $p = 0.23$, CFI = 1.00, RMSEA = 0.01 (90% CI = 0.00–0.04). (B) Indirect-effects model testing impression management and self-deceptive enhancement as mediators of the association between trait-emotion regulation and anxiety. χ^2 (1, $N = 4639$) = 1.45, $p = 0.23$, CFI = 1.00, RMSEA = 0.01 (90% CI = 0.00–0.04).

We then examined our indirect-effects model with the two desirable responding indicators (SDE and IM) tested as mediators of the relation between the two trait-ER indicators and trait-anxiety (see Fig. 1B). This model fit the data well, χ^2 (1, $N = 4639$) = 1.45, $p = 0.23$, CFI = 1.00, and RMSEA = 0.01 (90% CI = 0.00–0.04). After accounting for the effects of gender and ethnicity, trait-reappraisal contributed significantly to higher desirable responding, with a stronger effect on SDE than on IM (see Fig. 1B). Trait-suppression contributed significantly to lower SDE but was not associated with IM. In turn, both IM and SDE contributed to lower trait-anxiety, with a stronger association between SDE and anxiety than between IM and anxiety. IM and SDE were also positively correlated. In addition, the direct paths from trait-reappraisal and trait-suppression to trait-anxiety remained significant. The indirect effects from reappraisal to trait-anxiety were significant via both IM ($\beta = -0.003$, $SD = 0.00$, $p < .05$) and SDE ($\beta = -0.14$, $SD = 0.01$, $p < 0.01$), whereas only SDE partially mediated the effects of trait-suppression on trait-anxiety ($\beta = 0.06$, $SD = 0.01$, $p < 0.01$). Thus, desirable responding partially mediates the effects of trait-reappraisal and trait-suppression on trait-anxiety. Although these indirect effects were small in size, this model accounted for 43.6% of the variance in trait-anxiety ($R^2 = 0.436$, $p < 0.001$), a substantial increase of variance explanation compared to the 18.8% found in the direct-effects only model.

Gender and ethnicity modestly contributed to the personality constructs. Women reported greater trait-reappraisal and IM ($\beta = 0.07$, $p < 0.01$ and $\beta = 0.08$, $p < 0.01$, respectively), but moderately less trait-suppression ($\beta = -0.27$, $p < 0.01$) and somewhat lower SDE ($\beta = -0.16$, $p < 0.01$) than men. Participants from non-Western ethnic backgrounds reported more trait-suppression ($\beta = 0.12$, $p < 0.01$), and negligibly more IM ($\beta = 0.04$, $p < 0.05$) and trait-anxiety ($\beta = 0.08$, $p < 0.01$), as well as less SDE ($\beta = -0.07$, $p < 0.01$) relative to Westerners. Gender differences in anxiety and ethnic differences in reappraisal were not significant.

4. Discussion

We examined whether trait-ER is related to desirable responding and whether desirable responding partially explains findings suggesting that self-reported trait-reappraisal is linked to lower psychopathology (e.g., trait-anxiety), in comparison with trait-suppression. Whereas trait-reappraisal was associated with lower self-reported trait-anxiety, trait-suppression was associated with higher trait-anxiety. These findings replicate previous studies (Aldao et al., 2010; Arndt & Fujiwara, 2012; Gross & John, 2003). However, we found that the relationship between trait-ER and trait-anxiety was mediated by desirable responding. Specifically, the relationship between higher self-reported trait-reappraisal and *lower* levels of trait-anxiety was mediated by *higher* desirable responding. In contrast, the relationship between higher self-reported trait-suppression and *higher* trait-anxiety was mediated by *lower* desirable responding. Note that our findings emerged even when controlling for gender and Western/non-Western ethnicity, known influences on ER. An important implication of our findings is that the association between self-rated trait-reappraisal and trait-anxiety may be inflated in self-report studies, which may bias our understanding of the relationship between trait-reappraisal and self-report measures of psychopathology (e.g., trait-anxiety).

Self-deceptive enhancement, but not IM, mediated the relationship between trait-suppression and trait-anxiety. This was unexpected in the context of the literature on trait-suppression and

desirable responding. Inherent in the construct of suppression are attempts to alter one's outward displays of emotion. Speculatively, we suggest that despite the clear goal of regulating outward emotional displays, suppression is indeed not used just to make or fake a favourable impression on others. Rather, we suggest that suppression is used (even if unsuccessfully so) to protect against negative emotion experience. Further research assessing the social and situational determinants of ER traits is needed to clarify this suggestion.

Note that the size of the significant indirect effects reported in this study resemble the effect sizes of non-significant relationships between desirable responding and ER reported in previous studies by McRae et al. (2012) and by Gross and John (2003), as detailed in the introduction. We suggest that previous studies lacked adequate power (i.e., smaller sample sizes of 85 and 145 participants, respectively) to detect significant effects; a larger sample size may be required to detect the indirect effects reported here.

Potential limitations of the current study are that all participants were undergraduate psychology students at a Canadian university. The relationships between self-reported ER, psychopathological characteristics and desirable responding should therefore be complemented by studies in less uniform community samples, both in Western and non-Western, especially, East Asian populations. Furthermore, our model suggests a temporal order of events. That is, the independent variable precedes the mediator, which precedes the outcome variable. As the current data is cross-sectional, it does not allow examination of the timing of effects between variables. Although we speculate that different ER strategies influence the experience and expression of anxiety, it is also possible that differences in trait-anxiety lead to differences in the use of ER strategies. Further research examining the timing of ER and emotion responding is needed to clarify causality.

5. Conclusion

Our findings provide evidence from a large undergraduate student sample that self-reported trait-reappraisal may be inflated and so might be the positive influences of reappraisal on mental well-being. These findings should be replicated in community samples, spanning different age groups and more diverse backgrounds. At the least, our results imply that studies investigating the link between ER and psychopathology should consider the influence of desirable responding, especially self-deceptive enhancement, on self-report measures and/or assess ER through experimental procedures that circumvent self-report.

The influence of self-deception on the relationship between ER and mental well-being should be examined in more detail. Such influence resonates with research on positive illusions and mental or physical health (McKay & Dennett, 2009). The adaptive or maladaptive nature of self-deception specifically in the context of (trait) emotion regulation should therefore be explored further as should be potential interactions between the ERQ-traits and defense mechanisms such as rationalization, denial, and intellectualization.

Acknowledgement

This research was in part supported by the Social Sciences and Humanities Research Council of Canada.

References

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*, 217–237.

Arndt, J. E., & Fujiwara, E. (2012). Attention bias towards angry faces in trait-reappraisal. *Personality and Individual Differences, 52*, 61–66.

Brody, L. R. (2000). The socialization of gender differences in emotional expression: Display rules, infant temperament, and differentiation. In A. H. Fischer (Ed.), *Gender and emotion: Social psychological perspectives* (pp. 24–47). New York: Cambridge University Press.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Beverly Hills, CA: Sage.

Butcher, J. N., Dahlstrom, W. G., Graham, J. R., Tellegen, A., & Kaemmer, B. (1989). *The Minnesota Multiphasic Personality Inventory-2 (MMPI-2): Manual for administration and scoring*. Minneapolis, MN: University of Minnesota Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum.

Crowne, D. P., & Marlowe, D. A. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*, 349–354.

Deshields, T. L., Tait, R. C., Gfeller, J. D., & Chibnall, J. T. (1995). Relationship between social desirability and self-report in chronic pain patients. *Clinical Journal of Pain, 11*, 189–193.

English, T., & John, O.P. (2012). Understanding the social effects of emotion regulation: The mediating role of authenticity for individual differences in suppression. *Emotion*. [Epub ahead of pint].

Eysenck, H. J. (2000). A cognitive approach to trait anxiety. *European Journal of Personality, 14*, 463–476.

Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology, 74*, 224–237.

Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology, 39*, 281–291.

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*, 348–362.

Hu, L. T., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: Guilford Press.

Lieberman, M. D., Inagaki, T. K., Tabibnia, G., & Crockett, M. J. (2011). Subjective responses to emotional stimuli during labelling, reappraisal, and distraction. *Emotion, 11*, 468–480.

Matsumoto, D., Yoo, S. H., Fontaine, J., Anguas-Wong, A. M., Ariola, M., Ataca, B., et al. (2008). Mapping expressive differences around the world: The relationship between emotional display rules and individualism versus collectivism. *Journal of Cross-Cultural Psychology, 39*, 55–74.

McKay, R. T., & Dennett, D. C. (2009). The evolution of misbelief. *Behavioral and Brain Sciences, 32*, 493–561.

McKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7*, 83–104.

McRae, K., Jacobs, S. E., Ray, R. D., John, O. P., & Gross, J. J. (2012). Individual differences in reappraisal ability: Links to reappraisal frequency, well-being, and cognitive control. *Journal of Research in Personality, 46*, 2–7.

Muthén, L. K., & Muthén, B. O. (1998–2011). *Mplus User's Guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.

Paulhus, D. L. (1994). *Balanced inventory of desirable responding: Reference manual for BIDR version 6*. Unpublished manuscript. University of British Columbia: Vancouver, Canada.

Paulhus, D. L., & Reid, D. B. (1991). Enhancement and denial in socially desirable responding. *Journal of Personality and Social Psychology, 60*, 307–317.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological methodology 1982* (pp. 290–312). Washington, DC: American Sociological Association.

Soto, J. A., Perez, C. R., Kim, Y. H., Lee, E. A., & Minnick, M. R. (2011). Is expressive suppression always associated with poorer psychological functioning? A cross-cultural comparison between European-Americans and Hong Kong Chinese. *Emotion, 11*, 1450–1455.

Spielberger, C. D. (1983). *Manual for the state-trait anxiety inventory (sTAI)*. Palo Alto, CA: Consulting Psychologists Press.

Stöber, J., Dette, D. E., & Musch, J. (2002). Comparing continuous and dichotomous scoring of the balanced inventory of desirable responding. *Journal of Personality Assessment, 78*, 370–389.

Uziel, L. (2010). Rethinking social desirability scales: From impression management to interpersonally oriented self-control. *Perspectives on Psychological Science, 5*, 243–262.

Ventimiglia, M., & MacDonald, D. A. (2012). An examination of the factorial dimensionality of the Marlowe-Crowne social desirability scale. *Personality and Individual Differences, 52*, 487–491.

Weinberger, D. A., Schwartz, G. E., & Davidson, J. R. (1979). Low-anxious, high-anxious, and repressive coping styles: Psychometric patterns and behavioural and physiological responses to stress. *Journal of Abnormal Psychology, 88*, 369–380.

Weinberger, D. A. (1990). The construct validity of the repressive coping style. In J. L. Singer (Ed.), *Repression and dissociation* (pp. 337–386). Chicago: University of Chicago Press.