The Role of Perceived Similarity in the Efficacy of Self-Esteem Maintenance Strategies for Introverts and Extraverts

By

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Abstract

Self-esteem is an important predictor for many life outcomes, both good and bad (Baumeister et al., 2003; Swann et al., 2007). A number of self-enhancement strategies used to boost self-esteem can generally be placed into two categories, social or non-socially based strategies (Vaughan-Johnston et al., 2021). Two socially-based strategies are Basking-in-Reflected-Glory (BIRG), which is the tendency to associate oneself with successful others to link that success to themselves (Cialdini et al., 1976), and downward social comparison (DSC), where people compare their performance or results to others who are less successful than themselves to feel better about their own performance (Wills, 1981). One of the things that is not well known about self-enhancement strategies are the factors that regulate their use and efficacy. Vaughan-Johnston et al., (2021) found that both introverts and extraverts benefited equally from BIRGing and that extroverts benefited more from DSC after a failure than introverts did. They found some evidence that extraverts benefitted more from DSC because they perceived greater similarity to their peers than introverts did. I tested the role of perceived peer similarity in the efficacy of BIRGing and DSC. In Study One, I was unable to replicate any of Vaughan-Johnston et al.'s (2021) key effects and unable to demonstrate the novel effects when consideration of similarity and dissimilarity was prompted. I was also unable to replicate Vaughan-Johnston et al.'s (2021) key effects and any novel effects in Study Two. I will discuss the implications, possible reasons why the key effects failed to replicate, and future directions.

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Chapter One: Introduction

Self-esteem is an important predictor for many life outcomes, both good and bad (Swann et al., 2007; but see Baumeister et al., 2003). Arguably, self-esteem is important since it is a predictor for many outcomes. Self-esteem is a negative predictor of depression (Orth & Robins, 2014) and adolescents with low self-esteem have an increased risk for poor mental and physical health as adults and have worse economic prospects than do adolescents with high self-esteem (Trzesniewski et al., 2006). Additionally, self-esteem is positively correlated with relationship satisfaction (Shackelford, 2001), job satisfaction (Judge & Bono, 2001) and positive affect (Watson et al., 2002). Maintaining high self-esteem is also thought to be an important concept to one's wellbeing (Pyszczynski et al., 2004), therefore self-esteem is important in its own right.

Self-Enhancement Strategies

People try to restore their self-esteem when they encounter challenging experiences. Self-enhancement strategies are specific tactics that are used to elevate one's self-views by increasing the positivity of one's self-concept by seeking and/or avoiding relevant information (Sedikides & Strube, 1997). There are a number of self-enhancement strategies proposed that are used to boost self-esteem. They can generally be placed into two categories, social or non-socially based strategies (Vaughan-Johnston et al., 2021). For a strategy to be considered inherently social, the reference point always has to be another individual or group of people. While it is possible for a non-socially based strategy to have a social reference point, it is not inherently socially based because for these strategies it is not required that the reference point be another person or group of people.

For example, downward social comparison (DSC) is when people compare their performance or results to others who are less successful than themselves to feel better about their

own performance (Wills, 1981). This strategy is inherently social as an individual always refers to another person or set of people to which to compare themself or their performance. Basking-in-Reflected-Glory (BIRG), which is the tendency to associate oneself with successful others in order to link that success to oneself (Cialdini et al., 1976), is another inherently socially based strategy. It requires the individual to associate themselves with a social group to which they feel they belong and want to associate themselves with. Cutting-off-Reflected-Failure (CORF) is another self-enhancement strategy that works alongside BIRG. Whereas BIRGing works by associating oneself with the success of others, CORFing implies the opposite by creating psychological distance between oneself and the unsuccessful others to avoid the negative association (Cialdini et al., 1976).

There are also some strategies that are not inherently socially based. For instance, self-serving attributions are when an individual takes personal credit for a success but blames failure on external factors (Campbell & Sedikides, 1999; Larson, 1977). An example of this is when a worker blames their poor performance on their tools rather than their lack of skill (Heider, 1958) or a student blames their poor exam mark on a poor course instructor rather than their own lack of studying. Similarly, a positive example is when a student takes all the credit for earning a high mark on their exam rather than the ease of the test. This self-enhancement strategy is not inherently socially based because it is possible to blame failure on a factor that is non-social in nature (e.g., bad tools, blaming tardiness on poor weather).

The self-enhancement strategy of self-affirmation is another strategy that is not inherently socially based. Self-affirmation theory postulates that people want to maintain a positive image of themselves, so they reflect on positive qualities or attributes about themselves to feel good. When self-image is threatened, people respond by affirming themselves on a positive quality to

restore self-worth (Sherman & Cohen, 2006; Steele, 1988). This strategy is not inherently social as it is possible to restore self-worth by reflecting on an aspect of oneself that is either social (i.e., I am a good friend) or non-social (i.e., I am good at painting). Notably, the positive quality that they self-affirm on does not need to be related to the threat. For example, after receiving a bad grade, a student does not necessarily have to self-affirm on something that is relevant (e.g., I am a good student), but they can self-affirm on something unrelated to academics (e.g., I am a good soccer player) to restore self-worth.

Central Themes of Self-Enhancement Strategies

Documented Use of Self-Enhancement Strategies

Over the years, two themes have been featured most prominently in the literature on self-enhancement strategies. First, the vast majority of research in this area has focused on demonstrating the use of these strategies in a variety of contexts (for a review of DSC see Buunk & Gibbons, 2007). Although there are other strategies such as self-serving attributions and self-affirmation, the strategies of present focus in this thesis are BIRGing and DSC. For example, DSC can occur in health settings. Cancer patients frequently make downward comparisons to less fortunate others (Wood et al., 1985), and mothers of high-risk infants make spontaneous downward comparisons when asked about their situation (Affleck et al., 1987). People even make downward comparisons in prison. Taylor et al., (2021) found that prisoners compare themselves to their peers by viewing the average prisoner's crime more negatively than their own. Prisoners viewed their crime as less representative and as more of an exception to their behaviour compared to other prisoners (Taylor et al., 2021).

Likewise, substantial evidence collected over several decades that people engage in BIRGing and CORFing. BIRGing and CORFing have been repeatedly demonstrated in the sport

literature (End et al., 2002; Larkin et al., 2022; Wann et al., 1990) and both men and women who are highly-involved with a team BIRG after a win and CORF after a game loss (Ware & Kowalski, 2012). Furthermore, people CORF frequently in sports settings when their favourite team loses, as the loss of the game is a threatening event, so they go on to distance themselves from that team (Fan et al., 2020). In a prominent set of studies conducted by Cialdini et al. (1976), university students showed a greater tendency to wear school-apparel after their school's football team won a game compared to when they lost a game. Additionally, when the school's football team won a game, students used the pronoun *we* more when referring to the winning football team compared to when they lost (Cialdini et al., 1976). By using this language, students associated themselves with the success of the team, demonstrating the use of the BIRG phenomenon. People even engage in BIRGing and CORFing during presidential elections. Yard and window signs endorsing Barack Obama were displayed significantly longer than signs endorsing his opponent after Obama won the presidential election (Miller, 2009).

Positive Outcomes of Self-Enhancement Strategies

The second theme featured in the self-enhancement literature is that the use of self-enhancement strategies has positive effects. Specifically, there is evidence that DSC has positive effects (for review see Buunk & Gibbons, 2007). For example, after experiencing a recent academic setback, students reported more favorable self-evaluations after seeing downward comparison information than students who received no comparison information (Aspinwall & Taylor, 1993). Similarly, people with low self-esteem who were given a low score on a test reported an improved mood after hearing about another students difficulties (Gibbons & McCoy, 1991). DSC is also positively related to job satisfaction and organizational commitment (Brown et al., 2007). In addition, Bauer and Wrosch (2011) found that making downward social

comparisons was associated with an increased positive affect among older adults who perceived they did not have a lot of opportunities to undo their regrets.

Unanswered Questions

In the literature, there are two questions that remain largely unaddressed. (1) What factors drive which self-enhancement strategies people decide to use, and (2) what factors drive how well these self-enhancement strategies work at making people feel good? One likely answer to both these questions is situational factors. For instance, one strategy may typically be used more in some situations than others to boost self-esteem. Furthermore, one strategy may generally work better in some situations than others to restore self-esteem. Additionally, dispositional factors, like personality, may also play a role in determining which self-enhancement strategies people use and which ones are more effective for certain people. However, to date, surprisingly little research has examined how situational and dispositional factors regulate the use and efficacy of self-enhancement strategies. Specifically, in this thesis I am going to focus on addressing the second question.

How Personality Affects Self-Enhancement Strategies

One notable exception to the lack of empirical research on the differences in how people benefit from self-enhancement strategies, is recent work by Vaughan-Johnston et al. (2021). They explored how personality influences the efficacy of several self-enhancement strategies. They predicted that extraverts and introverts would differ in the extent to which they benefitted from certain self-enhancement strategies (Vaughan-Johnston et al., 2021). Extraversion is a personality trait defined by a high level of sociability. Extraverts actively engage in the social world, whereas introverts are the opposite (McCrae & Costa, 1987).

Vaughan-Johnston et al. (2021) expected that extraverts would benefit more from self-enhancement strategies that are inherently social, such as downward social comparison and BIRG, because extraverts are inherently social people (McCrae & Costa, 1987). Extraverts have an increased tendency to socialize with other people (Lucas et al., 2008). Since similarity is essential for meaningful social comparison (Byrne, 1971; Festinger, 1954), extraverts may be more likely than introverts to see others as more similar to themselves to facilitate social comparisons. Due to extraverts' frequent social activity, they may be more experienced in processes like social comparison and/or value seeing others as being similar to themselves, since social activity is more central to their self-concept. And indeed, extraversion is positively correlated with perceived similarity (Vaughan-Johnston et al. 2021). Prior research also suggests that people can "unmake" social comparisons that they perceive as nondiagnostic (Gilbert et al., 1995). If introverts see others as being dissimilar (and thus, nondiagnostic) then perhaps they do not benefit from self-enhancement as much as extroverts since they will "unmake" their social comparison with a dissimilar person.

As predicted, following a failure that was designed to threaten their self-esteem, Vaughan-Johnston et al. (2021) found that extraverts had higher state self-esteem in the DSC condition relative to a control condition where they engaged in no form of self-esteem enhancement. In contrast, introverts did not appear to show much of any benefit from DSC relative to the control condition. In a final study, Vaughan-Johnston et al. (2021) found some evidence that extraverts benefitted more from DSC because they perceived greater similarity to their peers than introverts did.

Since there was evidence that extraverts benefitted more than introverts, by having a significant self-esteem boost in the DSC condition, Vaughan-Johnston et al. (2021) expected that

a similar result would occur for extroverts that engaged in BIRGing because it is also a socially based self-esteem strategy. Interestingly, this is not what they found. Instead, BIRGing comparably helped both introverts and extroverts at boosting self-esteem after experiencing a self-esteem threat.

Unanswered Questions Regarding the Role of Similarity

Although Vaughan-Johnston et al.'s (2021) findings are useful in that they demonstrated that introverts and extraverts benefit differently from some strategies, as with any research, their findings also raised questions as well as answer them. One question that remains partially unaddressed is whether, in fact, similarity is the critical mechanism for why DSC works better for extraverts than introverts. Although Vaughan-Johnston et al. (2021) found support for mediation, is was correlational, which does not allow us to determine the directionality of the relationship between self-esteem and perceived similarity. This relationship could be explained in one of two ways: as one feels more similar to their peers, it could lead to a change in self-esteem or it could be that higher self-esteem leads people to feel as though they are more similar to others.

Additionally, I cannot rule out that other variables with which similarity may be correlated that are actually accounting for the relationship between extraversion and self-esteem. It is possible that some other mediators that were not measured may be operating instead of perceived similarity. That is, because Vaughan-Johnston et al., (2021) could not rule out other constructs, similarity may just be correlated with a variable that is the "true" mediator that was not measured during their study. This could be one explanation as to why they had a very modest effect size for similarity as a mediator. Therefore, additional evidence is needed to strengthen the

case for a causal relationship of perceived peer similarity as the mechanism for extraverts' self-esteem boosts relative to introverts when engaging in DSC.

Interestingly, this perceived similarity mechanism may also explain Vaughan-Johnston et al.'s (2021) puzzling finding that BIRGing not only increased self-esteem for extraverts, but also for introverts. Specifically, BIRGing worked just as well for introverts which was not expected. One possible reason for this is since BIRGing focuses on shared group membership, this might tend to obscure the differences introverts see between themselves and others. BIRGing emphasizes the commonalities between the person and the group, which presumably makes the differences between them and their group less salient. Because BIRGing emphasizes group membership and its commonalities, introverts may thus presume similarity when they engage in BIRGing, which they do not do in other contexts. If so, then they should benefit just like the extroverts for whom being social comes more naturally. However, this suggests that BIRGing may be a very fragile self-esteem strategy for introverts because anything that makes salient the possible differences between a person and their group could disrupt the efficacy for introverts.

Overview of Current Studies

The goal of the proposed studies was to more definitively test the critical role of presumed similarity in differentiating how introverts and extraverts respond to socially-based self-esteem maintenance strategies. In Study One, this issue was explored by testing a condition under which introverts and extraverts should differ in how much they benefit from BIRG. The goal was to demonstrate that BIRGing for introverts is fragile by manipulating similarity to make peer similarity and dissimilarity more salient. By prompting the consideration of both peer similarity and dissimilarity, I hypothesized that introverts would be less inclined to see similarities to their peers because they are less socially inclined. Extraverts on the other hand,

should be more inclined to see similarities to their peers because they are more social. Due to these natural tendencies, a difference should emerge in the self-esteem benefits when they are engaging in a modified BIRGing that makes peer similarity and dissimilarity more salient.

In Study Two, the opposite strategy was adopted to see if introverts could have self-esteem benefits more comparable to that of extraverts when engaging in DSC. By making similarity more salient to all participants, the goal was to show that both introverts and extraverts would equally benefit from DSC when they both presume comparable levels of similarity. Even though introverts and extraverts have different tendencies in the ease of which they are inclined to see similarities, I hypothesized that by making similarity more salient to everyone, both groups would benefit from DSC.

Chapter Two: Study One

The goal of this study was to show the fragility of the effectiveness of BIRGing for introverts by manipulating similarity. The control condition examined how threat affected introverts and extraverts' self-esteem levels when there was no explicit prompting of a self-enhancement strategy. In a second condition, like Vaughan-Johnston et al.'s (2021) procedure, participants had the opportunity to self-enhance by BIRGing. Other participants were randomly assigned into a third condition, where Vaughan-Johnston et al.'s (2021) BIRG condition was modified to prompt consideration of both similarity and dissimilarity to people in their province. I hypothesized that by prompting consideration of both peer similarity and dissimilarity, a difference would start to emerge in self-esteem benefits for introverts and extroverts.

Method

Design

This experiment was a one-way design with three levels of self-enhancement strategy (control, BIRG and modified BIRG) with extraversion as a continuous predictor variable. The procedures were adapted from procedures that were used by Vaughan Johnston et al. (2021).

Participants

I recruited from the Queen's University first year psychology participant pool system. The goal was to recruit 300 participants as an optimal sample size to allow for a highly powered analysis (100 per condition), with a minimal acceptable sample size of 150 participants total (50 per condition). Based on the rate of progression of data collection for Study One and time constraints, once each condition had surpassed the minimum of 50 participants per condition, I decided to start collecting data for Study Two to try and get as many participants as possible for the subsequent study. In Study One, I ended up recruiting 211 participants with 70 participants in

the control, 71 participants in the BIRG condition, and 70 participants in the modified BIRG condition. A sample size of N=208 (three participants were removed for evidence of suspicion) would have allowed an effect size of f^2=.038 to be detected with a power of .8. Demographic information was not collected; however, participants were recruited from a pool with 78.2% females 20.2% males and 1.6% who identified as sex and gender diverse. The average age was 19.11 (SD=4.95) years. Participants earned partial course credit for their participation or \$5-10[1] as compensation.

Procedure

Phase One: Threat Inducement. The goal of this phase was to present participants with a negative experience that would threaten their sense of self. This procedure was closely modelled after Vaughan-Johnston et al. (2021). Participants entered the lab and sat at individual computers. They were told that they would be completing an emotional intelligence quotient (EQ) test called the MSCEIT (Mayer-Salovey-Caruso Emotional Intelligence Test) and were told they would be completing its four subscales: *understanding emotions*, *using emotions*, *managing emotions*, and *identifying emotions*. The task that they completed was not the actual MSCEIT EQ test, but the task and its items were modelled on the MSCEIT (Mayer et al., 2003) and were designed to make participants believe they were completing the actual EQ test. They were told that this test was highly predictive of life outcomes so that they would feel as though the test is important.

Several things were taken into consideration by Vaughan-Johnston et al. (2021) when the construct of EQ was originally chosen. First, they wanted to pick a construct that was thought to

[1] I initially rewarded \$5 for the completion of the study if participants had already earned all of their course credit. At a later period, I applied for and was granted ethics clearance to increase the compensation to \$10 as an attempt to increase sign-ups for the study.

be important to the participant. Getting an EQ test score also seems plausible as participants were participating in a psychology experiment. Lastly, EQ is a concept that many people likely do not have formal feedback on, so receiving false feedback on something that they are less familiar with would likely be more believable than receiving feedback on a concept they are already familiar with.

Then, upon completion of these items, participants estimated their score on the task by entering their percentage out of 100 into a box. This step was to confirm that introverts and extroverts did not differ in their expectations for their scores and to confirm that their expectations for their scores were higher than the feedback they were going to get. After they estimated their score, all participants were given false negative feedback on their performance. They were told that they scored 18/80 (23%) on the EQ test and were placed in the 'slightly maladaptive' category of emotional intelligence. They were then shown an image of the conversion scale that described average expectations for people at each percentage level on the EQ test (see Figure 1, Appendix B). Participants were shown the conversion scale so that people could read the negative outcomes on that chart that were written in the 'slightly maladaptive' section compared to higher scoring sections. The conversion scale chart also provided a visual aid that they had scored poorly.

Phase Two: Self-Enhancement. The goal of this phase was to see how people benefit from self-enhancement strategies. Participants were randomly assigned to one of three conditions. Participants in the control condition read generic and historical information about the EQ test. This condition was the same as Vaughan-Johnston et al.'s (2021) control condition designed to see the differences in how introverts and extraverts' self-esteem differs following a threat to self when there is no explicit prompting of a self-enhancement strategy.

The standard BIRG condition was also closely modelled Vaughan-Johnston et al.'s (2021) BIRG condition. After receiving the false feedback on the EQ task, participants selected the province in Canada that they identified with the most. I added a question where they rated the extent to which they identified with their region. This was asked right after they selected the region that they identified with the most. Participants then completed a task where they were to "record thoughts that suggest what you consider to be positive attributes of your identified region." They could list up to five positive thoughts. This part of the BIRG manipulation was designed for participants to associate positivity with their identified region. The region they selected was then placed in a series of headlines for the participant to rate (e.g., "Most Canadians Consider [region] Ideal Retirement Setting," credited to a news magazine). Participants rated the headlines positivity from *Strongly negative* (1) to *Strongly positive* (5). The positive headlines provided an opportunity for participants to self-enhance as they were presented with positive information about their region, and could associate themselves with the positive headlines.

The third or modified BIRG condition is where we made salient potential differences that the participant may have with their shared group. The beginning of the modified BIRG condition was the same as in the standard BIRG. However, after rating how much they identified with their region, participants completed an additional task where they listed similarities and differences between them and people in their region. The prompt was, "In the following task, we would like you to think about some ways in which you are similar to people in you background region, and/or some ways you think you are different. List up to 5 examples each in the box below." The rationale for asking participants to list both similarities and differences was based on the logic that extraverts should naturally focus more on similarities than introverts if extraverts see themselves as more similar to others. If this is true, then presumably introverts would be more

likely to do the opposite and place an emphasis on dissimilarities which is why the prompt included both. Pretesting data from a sample of 40 first-year psychology students revealed that most participants could list at least five examples. In the present sample, 1.4% of participants in the modified BIRG condition listed no similarities, 11.4% listed one similarity, 18.6% listed two similarities, 32.9% listed three, 11.4% listed four, 21.4% listed five and 2.9% listed six. For the differences, 4.3% of people in the modified BIRG condition listed no differences, 14.3% listed one difference, 30% 20% listed three differences, 8.6% listed four, 21.4% listed five and 1.4% listed seven. Extraversion was not correlated with the number of similarities listed $r(70)= .11$, $p =.373$, or the number of differences listed, $r(70)= -.01$, $p =.953$. The difference score was not correlated with extraversion, $r(69)=.11$, $p=.359$. After they listed their similarities and differences participants completed the remainder of the procedure in the same order as in the standard BIRG condition.

All participants then completed the State Self-Esteem Scale (SSES); (Heatherton & Polivy, 1991), which served as the dependent variable of interest and the BFI-44 (John et al., 1991). At the very end of the study, all participants also completed a funnel interview that consisted of four items aimed to capture suspicion as to whether participants believed any aspect of the study was false. Lastly, participants were debriefed. See Appendix B for relevant materials.

Measures

Province Identification. This measure assessed the extent to which participants identified with their chosen region. After participants selected the province in Canada that they identified with the most, I included a question that said, “We have just asked you to identify your regional background. Please rate how much you identify with your regional background,” on a 7-

point scale from *Not at all* (1) to *A great deal* (7). This scale had a possible range of scores from 1-7 with a *M*=5.25 and *SD*=1.49. There was a total of 6 participants (2.88% of sample) that selected 'Outside of Canada' for their province[2].

Extraversion. Participants completed all five subscales of the Big Five Inventory (BFI-44; John et al., 1991) but only the extraversion subscale was used in data analysis. This subscale included 8 items designed to assess extraversion. Factor analysis confirmed that each extraversion item had its primary factor loading (≥ |.46|) onto the same distinct factor. Only one of the extraversion items also loaded moderately (|.30|) onto another factor. Extraverts are characterized by having a high level of sociability and actively engage in the social world, whereas introverts are the opposite (McCrae & Costa, 1987). These items ranged on a 5-point scale from *Disagree* (1) to *Agree strongly* (5). This subscale included 5 positively keyed items, such as, "has an assertive personality," and, "is outgoing, sociable" (John et al., 1991). It also included 3 negatively keyed items such as, "is reserved," and, "tends to be quiet" (John et al., 1991). The negatively keyed items from the extraversion subscale were then reverse coded, and scores on all extraversion items were averaged to get an overall extraversion score with a possible range from 1-5. In the present sample, the skewness of extraversion was -.19 and the kurtosis was -.77. The extraversion subscale was found to be highly reliable (α = .89). The mean score for extraversion was 3.25 (*SD* = .89). Extraversion was positively correlated with state self-esteem, $r(206) = .28$, $p<.001$.

Although the other subscales of the BFI were not used in data analysis, responses were still collected and scored in a similar fashion. Factor analysis revealed that 32 of the remaining

[2] The control condition did not ask people to identify their province. Given random assignment I can assume there was a frequency of about 9 total 'Outside of Canada' participants (given roughly equal distribution of people in conditions). Analysis with the 6 people from outside of Canada removed revealed no substantive changes in results.

36 BFI items loaded (≥ |.30|) onto their respective subscales. See Appendix C for the descriptive statistics and reliabilities for the remaining BFI subscales.

State Self-Esteem. The State Self-Esteem Scale (SSES); (Heatherton & Polivy, 1991) was used to measure self-esteem, the dependent variable of interest. This 20-item scale has response options on a 5-point scale from *Not at all* (1) to *Extremely* (5). This scale has three subscales; however, the sum of all items are often treated as a single SESS score and was treated as such in Vaughan-Johnston's (2021) study, so the overall SESS scale score was used in the analyses. The overall SESS scale has 13 negatively keyed items, which were reverse scored, and the average of scores from all items formed a continuous measure of overall state self-esteem (α =.92, *M*=3.10, *SD*=.72). Factor analysis of the overall SSES confirmed that nearly all items (18 of 20) loaded substantially (≥ |.50|) onto the one factor. The remaining two items loaded moderately. The overall SESS skewness was -.05 and the kurtosis was -.34. Fifteen distractor items such as, "I feel emotional much of the time," and, "I feel enriched by the positive emotions of others," were randomly included within the self-esteem scale items so that the questions about self-esteem were less obvious to participants. For the three SSES subscales, factor analysis confirmed that 19 of 20 items loaded moderately (≥ |.30|) onto their respective factors, two of these items had modest double loadings on more than one factor. One item loaded moderately onto the incorrect factor. Although the three subscales of the SESS were not used in our primary data analysis, I was still interested in their results as the dependent variables (see Appendix D for the reliabilities, descriptions of the subscales and for supplementary analyses).

Suspicion Items. Suspicion was assessed using four funnel interview questions to assess whether participants believed that any procedure or any aspect of the study was untrue. If a participant believed that any aspect of the study was false, then presumably the false feedback

that participants received after completing the EQ task would have no effect on their self-esteem. Each suspicion item got progressively more directive and overt.

The first question was a very general and non-directive question that in no way implied any suggestion that some aspect of the study may have been false or misleading. The first question was, “What do you think the purposes of the study might have been?” If participants indicated evidence of suspicion on a non-directive item with no explicit mention of suspicion or something being untrue, then this response was considered compelling evidence of suspicion. The second funnel interview item was, “Do you think that there was any information regarding the purpose of the study that the researcher didn’t include in the LOI or instructions? If so, what was it?” This question was slightly more directive. It did not explicitly say anything was false or misleading, but it did imply an omission, so any indication of suspicion at this question was potential evidence of suspicion. The third question was more directive and specifically raised the idea that something may have been inaccurate. The third suspicion item was, “During the study did you think there was any information that was inaccurate? If so, what was it?” Participants may begin to think about something once it has been brought to attention based on conversational norms; therefore, suspicion here is not regarded as indication of suspicion due to the directive nature of the question. Rather, the third funnel interview item tested the robustness of the cover story where we told them that they were receiving scores on an EQ test. The fourth and final funnel interview question was, “Did you at any time doubt that the testing you performed was not real, or that the results were suspicious?” This question strongly suggested that deception may have occurred and directly asking about suspicion may lead to a falsely elevated level of suspicion. Therefore, it is not a strong indicator of suspicion, but rather, this question was a very stringent test of the robustness of our cover story.

For the purposes of scoring suspicion, a researcher who was blind to condition and extraversion level, coded responses to each funnel interview question that indicated evidence of suspicion as a 1 and coded answers that did not indicate suspicion as a 0. Responses were considered to be evidence of suspicion if participants expressed anything in their answer about believing the feedback that they were given was misleading, or if they thought the goal of the study was to evaluate their self-esteem and/or how self-esteem was affected.

Indicating suspicion on the first suspicion item was definitive evidence of suspicion; therefore, three participants were removed from data analysis who revealed suspicion in response to the first funnel interview question. A separate analysis was conducted where participants who indicated suspicion on the first and/or second suspicion item were removed. I did not run analyses with the removal of participants who indicated suspicion from the third or fourth funnel interview questions as these questions were measures of robustness of the paradigm.

Results

Performance Expectancy

For the paradigm to have successfully threatened participants' sense of self, the negative feedback that participants received needed to be lower than the score they expected to get. A one sample *t* test confirmed that participants expected to obtain scores that were higher (M = 62.14, SD = 14.18) than the false feedback of 23% that they were given on the EQ task, $t(210) = 63.64$, $p<.001$. Similarly, it was important to make sure that the scores they expected to get were not higher or lower based on their level of extraversion and it was confirmed that the scores that participants expected to get did not vary as a function of extraversion, $r(209) = .11$, $p = .111$.

Suspicion Probes

It was important that the vast majority of subjects believed the paradigm. Only three participants (1.42%) expressed suspicious responses on the first funnel interview question with a cumulative increase to 3.31% by the second question, which was a very low level of suspicion. There was a cumulative increase to 19.90% by the third and 52.13% by the fourth. These suspicion levels were comparable to Vaughan-Johnston et al.'s (2021) suspicion levels, which cumulatively ranged from 5.4-9% on their first suspicion probe, 8.7-11% on their second, 19.7-22% on their third and 40.6-43% by their fourth suspicion probe. The final sample size was *N*=208 after removing the three participants who showed suspicion on the first funnel interview question. Those who indicated suspicion on the first and/or second suspicion item were also removed in an additional analysis and there was no substantive difference (for table of results see Appendix E).

Regression Analyses Predicting State Self-Esteem

To test how the traditional and modified BIRGing self-enhancement strategies affected self-esteem, and whether this relationship was affected by extraversion level, state self-esteem was regressed on extraversion (a mean centered, continuous variable) and two dummy variables.[3] The first dummy variable was coded as assignment to the traditional BIRG condition vs. not being assigned to that condition. The second dummy variable was coded as assignment to the modified BIRG condition vs. not being assigned to that condition. Because dummy variables for BIRGing were entered simultaneously into a regression model, and thus their effects are partialed controlling for the other, each dummy variable represents the unique effect of a BIRGing condition relative to control. Specifically, in the regression analysis, the first dummy

[3] An alternative analysis was conducted that explored these variables in a hierarchical fashion, and this did not alter any substantive conclusions.

variable represented assignment to the traditional BIRG condition vs. control and the second dummy variable represented assignment to the modified BIRG condition vs. control. There were two interactions: the interaction between extraversion and the first dummy variable, and the interaction between extraversion and the second dummy variable. These analyses were conducted in IBM SPSS Statistics (Version 28) using PROCESS macro (version 4.2) (Hayes, 2022).

First, the overall model was statistically significant, $R^2 = .10$, $F(5, 202) = 4.53$, $p < .001$. Table 1 represents the test of the individual predictors in the regression model. This table includes the unstandardized regression coefficients, the standard errors, the *t*-values assessing whether each unstandardized regression coefficient is different from zero, and their associated *p*-values. Turning to Row 1 in Table 1, there was a significant first-order effect of extraversion. Based on the literature, it was expected that on average extraverts have higher self-esteem than introverts, and indeed this is what we found. The positive coefficient indicates that overall, individuals in the control condition who were more extraverted had higher self-esteem than did introverts.

Table 1

Results for Individual Predictors in Regression Model for Study One

Effect	*B*	*se*	*t*	*p*
Extraversion	.21	.10	2.23	.027
BIRG	.10	.12	.86	.393
Modified BIRG	-.14	.12	-1.20	.234
Ext x Traditional BIRG	.05	.14	.35	.730
Ext x Modified BIRG	-.01	.13	-.11	.911

Next, I examined the first-order effect of the traditional BIRG condition on self-esteem relative to the control at average levels of extraversion. I expected that people in the traditional BIRG condition would have higher self-esteem than those in the control as they are engaging in BIRGing, which was previously found to increase both introverts' and extroverts' self-esteem (Vaughan-Johnston et al., 2021). At the mean of extraversion, self-esteem in the traditional BIRG condition was not significantly different than the control (see Table 1, Row 2).

Turning to Row 3 of Table 1, I examined the first-order effect that the modified BIRG condition had on self-esteem relative to the control at average levels of extraversion. It was expected that this coefficient would be positive, indicating some self-esteem increase relative to the control, but, that this effect would not be as strong as in the traditional BIRG condition. As the modified BIRG condition made both differences and similarities salient, it was expected that this manipulation would work at boosting self-esteem for extraverts, but not introverts, so the overall effect would still be positive, but not as strongly positive as in the traditional BIRG condition. However, at average levels of extraversion, self-esteem in the modified BIRG condition was not significantly different than the control, and the direction of the effect was the opposite of what was expected.

Next, are the interaction effects. In the first interaction, extraversion did not significantly interact with traditional BIRGing relative to the control condition (see Table 1, Row 4). It was expected that there would not be a significant interaction between extraversion and the traditional BIRG condition which is consistent with Vaughan-Johnston et al.'s (2021) findings. However, although I did not expect a significant interaction, I did not replicate Vaughan-Johnston et al.'s (2021) finding because they found a significant first order effect of their

traditional BIRG condition, where I did not. They found that at the mean of extraversion, self-esteem in the traditional BIRG condition was significantly different than control.

Next, to be examined was the interaction between extraversion and the modified BIRG condition compared to control (see Table 1, Row 5). It was expected for a significant interaction to have occurred with extraversion and the modified BIRG condition. I expected that a difference would have emerged in the self-esteem benefits and level of extraversion since this condition made peer similarity and dissimilarity more salient, so introverts would tend to focus more on the dissimilarities, in contrary to the extraverts who would experience more self-esteem benefits because they focused more on similarities. However, the interaction between extraversion and the modified BIRGing condition was not significant.

State Self-Esteem Subscale Analyses

The three supplementary analyses using the three SSES subscales as the dependent variables rather than the global SSES score did not reveal any clear difference compared to the global scale score that was reported in the main analyses. Since there was no evidence of notable differences, results for the three SSES subscales as the dependent variable are reported in Appendix D.

Regression Analysis Including Only High Identifiers

Perhaps the first-order effect of the standard BIRG vs. control was not replicated because some people did not identify highly with their group. If participants did not identify highly with their group, then presumably the BIRGing manipulation would not work at boosting self-esteem. I decided to re-run the analyses excluding people who identified at a 4 or less on the identification item. A cumulative percent of 29.5% of participants selected a 4 or less on the 1-7 scale of how much they identified. Although Vaughan-Johnston et al., (2021) did not explicitly

ask their participants how much they identified, they still would have had participants with the entire range of identification in their analyses, but nonetheless, an alternative analysis was conducted (*N*=172) including only the people who highly identified with their province (i.e., scored 5 or more). None of the regression coefficients change substantially for any key effects. See Appendix F for the full table of results[4].

Summary

Overall, Study One demonstrated the trend in the literature that extraverts tended to report greater self-esteem than introverts in the control condition. However, I failed to replicate any of Vaughan-Johnston et al.'s (2021) key effects. The failure to replicate any key findings also makes it difficult to interpret the findings from the modified BIRG condition; however, I will address in more detail in the general discussion why I may have failed to replicate Vaughan-Johnston et al.'s (2021) findings.

[4] An alternative analysis was conducted where level of identification with their province was added to the regression model to see if that moderated the self-esteem effects. No one in the control condition had an entry for that item, so the model dropped the critical control condition. Nonetheless, the model compared the two BIRGing conditions to one another and there was no evidence that level of identification moderated any effect.

Chapter Three: Study Two

The goal of this study was to see if introverts can have self-esteem benefits more comparable to that of extraverts when engaging in DSC. By making similarity more salient, I aimed to show that both introverts and extraverts would equally benefit from DSC when they both presume comparable levels of similarity. Like Study One, a control condition examined how threat affects introverts and extraverts' self-esteem levels when there was no explicit prompting of a self-enhancement strategy. In a second condition, participants had the opportunity to enhance their self-esteem by being prompted to engage in DSC. Other participants were randomly assigned into a third condition, where Vaughan-Johnston et al.'s (2021) original DSC procedure was modified by making similarity salient to everyone. We hypothesized that by prompting peer similarity for everyone, that both introverts and extroverts would benefit from DSC.

This study focused on the role that extraversion played in the efficacy of DSC. However, extraversion is likely correlated with many other individual difference variables that may have effects and provide an alternative explanation to the interaction effect of extraversion in the standard DSC condition. One possible alternative variable that may be accounting for the relationship between extraversion and self-esteem is self-construal. Independence refers to a self that is separate from social context. People high in independence gain self-esteem through validating personal attributes and expressing the self (Singelis, 1994). On the other hand, people high in interdependence believe that the self and others are highly intertwined and gain self-esteem by connecting with others (Singelis, 1994). If we think about how extraversion is a measure of how sociable a person is, then perhaps extraversion is related to self-construal as it measures how much people are connected with others**.** In fact, extraversion has been found to be

positively related to interdependence (King & Broyles, 1997). Thus, for exploratory purposes, these measures of self-construal were included in Study Two to examine their potential impact on the previously reported extraversion x DSC interaction effects.

Method

Design

This experiment was a one-way design with three levels of self-enhancement strategy (control, DSC and modified DSC) and extraversion as a continuous predictor variable. These procedures were adapted from Vaughan Johnston et al., (2021).

Participants

Participants were recruited from the Queen's University first year psychology participant pool system. The goal was to recruit a total of 300 participants (targeted 100 per condition) to allow for a highly powered analysis, with a minimum goal of recruiting 150 participants total (minimum of 50 per condition). However, because data collection started at a later point in the semester than anticipated, I did not meet the minimum sample size and ended up with a total of 78 participants, with 27 participants in the control condition, 24 participants in the DSC condition and 27 participants in the modified DSC condition. A sample size of N=78 would have been able to detect an effect size of f^2=.103 with a power of .8. Vaughan-Johnston et al.'s (2021) effect size for the DSC extraversion interaction was much smaller f^2=.009. Like in Study One, demographic information was not collected; however, participants were recruited from a pool with 78.2% women, 20.2% men and 1.6% who identified as sex and gender diverse. The average age was 19.11 years (SD=4.95). Participants earned partial course credit for their participation or received $10 as compensation.

Procedure

Phase One: Threat Inducement. The threat inducement procedure was identical to the procedures set in Study One. Participants entered the lab and sat at individual computers. They were told that they would be completing an emotional intelligence quotient (EQ) test called the MSCEIT (Mayer-Salovey-Caruso Emotional Intelligence Test); however, as in Study One, the task that they completed was not the actual MSCEIT EQ test. Upon completion of the EQ task, participants were asked to estimate their score on the task by entering their percentage out of 100 into a box. After they estimated their score, all participants were given false negative feedback on their performance. They were told that they scored 18/80 (23%) on the EQ test and were placed in the 'slightly maladaptive' category of emotional intelligence. They were then shown an image of the conversion scale that described average expectations for people at each percentage level on the EQ test.

Phase Two: Self-Enhancement. Participants were randomly assigned to one of three conditions. Participants in the control condition read generic and historical information about the EQ test. This condition was the same as in Study One which was designed to see the differences in how introverts' and extraverts' self-esteem differs when there was no explicit prompting of a self-enhancement strategy (see Appendix G for Study Two materials).

The standard DSC condition was identical to Vaughan-Johnston et al.'s (2021) DSC condition. After completing the EQ task, participants were told that researchers received feedback that students generally like to know where they stand in comparison to others that have taken the EQ test, so they would be shown random scores from previous users that have taken the test. Participants were prompted to click a button and told that the computer would search for

a randomly selected participant's score. They saw that another participant received 15% on the task and that a second participant received 18% (both of which are notably lower than their own score of 23%).

The modified DSC condition is where we made salient potential similarities that the participant may have with their shared group. After completing the EQ task and receiving their poor score, participants completed an additional task. Participants were told that Queen's students share many background factors with each other and have a lot of things in common. They were to think of and list up to four ways in which they thought they were like other Queen's students. Pretesting data from a sample of 40 students revealed that most participants could list at least 4 ways in which they thought they were similar to other Queen's students. All participants in the modified DSC condition listed four similarities as they were required to type each similarity into a text box before proceeding to the next page to enter their next similarity. Participants were then shown the low scores of the other two participants.

All participants completed the State Self-Esteem Scale (SSES); (Heatherton & Polivy, 1991), which served as the dependent variable of interest, then the BFI-44 (John et al., 1991). Then, participants also completed a measure of self-construal (Singelis, 1994) for purposes of an exploratory analysis. At the very end of the study, all participants also completed the same four funnel interview questions from Study One to detect suspicion. Lastly, participants were debriefed.

Measures

Extraversion. Like Study One, participants completed all five subscales of the Big Five Inventory (BFI-44; John et al., 1991), but only the extraversion subscale was used in data analysis. Factor analysis confirmed that 7 of the 8 extraversion items loaded moderately ($\geq |.49|$)

onto one unique factor, and one extraversion item loaded moderately (≥ |.30|) onto two other unintended factors. The extraversion subscale included items that ranged on a 5-point scale from *Disagree* (1) to *Agree strongly* (5). The negatively keyed items from the extraversion subscale were then reverse coded, and scores on all extraversion items were averaged to get an overall extraversion score with a possible range from 1-5. In the present sample, the skewness of extraversion was -.02 and the kurtosis was -.74. The extraversion subscale was found to be highly reliable (α = .85). The mean score for extraversion was 3.34 (*SD* = .78). For correlations between extraversion and all other continuous measures in Study Two, see Table 4 in Appendix H.

Although the other subscales of the BFI were not used in data analysis, responses were still collected and scored in a similar fashion. Factor analysis revealed that of the remaining 36 BFI items, 33 loaded moderately (≥ |.31|) onto their respective factors. Of the remaining three items, two of them did not load substantially onto any factor, and one loaded moderately onto an unintended factor. The descriptive statistics and reliabilities for the remaining BFI subscales are reported in Appendix I.

State Self-Esteem. The State Self-Esteem Scale (SSES) (Heatherton & Polivy, 1991) was used to measure self-esteem, which served as the dependent variable of interest. Like Study One, the average of scores from all items was taken as a continuous measure of overall state self-esteem (α =.93, *M* = 3.12, *SD* = .72), which is what was used in data analysis. Factor analysis confirmed that all 20 items of the overall SSES loaded moderately (≥ |.45|) onto the one-factor model. The overall SSES skewness was -.31 and the kurtosis was .27. Fifteen distractor items were randomly included within the self-esteem scale items so that the questions about self-esteem were less obvious to the participant. For the three SSES subscales, factor analysis

confirmed that 15 of the 20 items loaded moderately (≥ |.36|) onto their respective factors. Of the remaining five items, three items loaded onto an unintended factor and two items had moderate double loadings. Descriptive statistics and reliabilities for the three SESS subscales are reported in Appendix J.

Self-Construal. Self-Construal was assessed using Singelis's (1994) Self-Construal Scale (SCS) for purposes of an exploratory analyses. This 30-item scale has response options on a 7-point scale from *Strongly Disagree* (1) to *Strongly Agree* (7). It has two subscales. The *independent* subscale (α = .83) consisted of 15-items, all of which were positively keyed, such as, "I enjoy being unique and different from others in many respects," and, "having a lively imagination is important to me." The mean score for this subscale was 4.65 (*SD*=.82) with a skewness of -.27 and kurtosis of .55. The *interdependence* subscale (α = .69) also consisted of 15-items, which were positively keyed, such as, "I have respect for the authority figures with whom I interact," and, "I will sacrifice my self-interest for the benefit of the group I am in." The mean score for the *interdependence* subscale was 5.01 (*SD* =.59) with a skewness of .17 and a kurtosis of -.77. Scores on each subscale were averaged, then mean centered to create a score of *independence* and score of *interdependence* for each participant. Factor analysis revealed that 12 of the 15 *independence* items loaded moderately (≥ |.36|) onto the first factor. However, only five of the *interdependence* items loaded moderately (≥|.33|) onto the second factor and seven of the *interdependent* items loaded predominantly onto the *independent* factor. The remaining three interdependent items had weak factor loadings on the second factor (<|.30|).

Suspicion Items. Suspicion was assessed using the same four funnel interview questions as in Study One. In the present study, we did not remove any participants from data analysis as none revealed suspicion in response to the first funnel interview question. However, we

conducted complimentary analyses where we removed two participants who were suspicious following the second funnel interview question.

Results

Performance Expectancy

Like Study One, it was important to make sure that participants expected to receive better scores than what they were given to successfully threaten their sense of self. A one sample *t* test confirmed that participants expected to obtain scores that were higher (M = 63.4, SD = 14.21) than the false feedback of 23% that they were given on the EQ task, $t(77) = 39.42$, $p<.001$. The scores that participants expected were not correlated with extraversion, $r(76) = -.03$, $p = .791$.

Suspicion Probes

No participants expressed suspicious responses on the first funnel interview question, with an increase to 3.8% by the second, 14.1% by the third, and 52.6% by the fourth. Thus, nearly all participants expressed no suspicion on the earlier suspicion probes. Even when repeatedly and directly asked about suspicion by the end of the funnel interview, roughly half of the participants still did not indicate any suspicion. Main analyses represent the entire sample size (N=78) because no participants needed to be removed for showing suspicion on the first suspicion probe. Analyses with participants removed that showed suspicion on the second funnel interview question (N=75) are in Appendix K.

Efficacy of Self-Enhancement Strategies on Self-Esteem

State self-esteem was regressed on extraversion (a mean centered, continuous variable) and two dummy variables[5]. The first dummy variable was coded as assignment to the standard DSC condition vs. not being assigned to that condition. The second dummy variable was coded

[5] I conducted alternative analyses that explored these variables in a hierarchical fashion, and this did not alter any substantive conclusions.

as assignment to the modified DSC condition vs. not being assigned to that condition. Because dummy variables for DSC were entered simultaneously into a regression model, and thus their effects are partialed controlling for the other, each dummy variable represents the unique effect of a DSC condition relative to control. Specifically, in the regression analysis, the first dummy variable represented assignment to the standard DSC condition vs. control and the second dummy variable represented assignment to the modified DSC condition vs. control. There were two interactions included in the model: the interaction between extraversion and the first dummy variable, and the interaction between extraversion and the second dummy variable. These analyses were conducted in PROCESS macro (Hayes, 2022). A note of particular importance is that Study Two did not reach the minimum sample size of 150 participants. Because the sample size was only *N*=78, the analyses are certainly underpowered, which should be kept in mind when interpreting the analyses.

First, the overall model was not statistically significant, $R^2 = .12$, $F(5, 72) = 1.90$, $p = .105$. Table 2 presents the results for the test of the individual predictors in the regression model. The first-order effect of extraversion in the control condition was statistically significant (see Table 2, Row 1). The positive coefficient indicates that as expected, individuals in the control condition who were more extraverted had higher self-esteem than introverts.

Next, I examined the effect of the standard DSC condition on self-esteem relative to the control for people at average extraversion (see Table 2, Row 2). It was expected that the coefficient would be positive because the standard DSC condition should have higher self-esteem than people in the control as they are engaging in a self-enhancement strategy. Additionally, I expected that the effect on self-esteem would be weaker than the effect from the modified DSC condition as standard DSC has been shown to work well for extraverts but not as

well for introverts (Vaughan-Johnston et al., 2021). However, at average extraversion levels, self-esteem in the traditional DSC did not differ from control, and the direction of the effect was the opposite to what was expected.

Table 2

Results for Individual Predictors in Regression Model for Study Two

Effect	*B*	*se*	*t*	*p*
Extraversion	.48	.17	2.76	.007
Standard DSC	-.03	.20	-.16	.871
Modified DSC	.07	.19	.39	.698
Ext x Standard DSC	-.31	.24	-1.26	.213
Ext x Modified DSC	-.51	.26	-1.94	.056

Turning to Row 3 of Table 2, I examined the effects that the modified DSC condition had on self-esteem relative to the control at average extraversion. It was expected that the coefficient would be positive with a larger difference in self-esteem benefits compared to the control, than in the standard DSC condition vs. control. I expected this bigger effect because the modified DSC condition prompted similarities for everybody in an attempt to help increase self-esteem for all, not just extraverts. Although the coefficient was positive, this effect was also not significant, indicating that at average extraversion, self-esteem in the modified DSC condition was not significantly different than in the control.

Next, were the examined interaction effects. In the first interaction, a significant interaction was expected between extraversion and the standard DSC dummy variable. I predicted that extraverts would benefit more from the standard DSC condition because this condition does not inherently prompt similarity, and extraverts more naturally presume similarity

with others as they are more social. However, extraversion did not significantly interact with the standard DSC dummy variable (see Table 2, Row 4). Thus, self-esteem did not vary as a result of extraversion level in the standard DSC condition relative to the control.

I decided for purely descriptive exploratory purposes to calculate the simple slopes because Study Two was severely underpowered, and there was a clear basis for our predictions based on Vaughan-Johnston et al.'s (2021) findings. I computed the simple slopes for the relationship between extraversion and self-esteem within the control condition and the relationship between extraversion and self-esteem within the standard DSC condition, to at least see if the form of the interaction was consistent with our predictions. In the control condition, higher extraversion was associated with higher self-esteem, B=.48 [.13, .83], $t(72)$=2.76, $p < .05$. However, contrary to expectations, in the standard DSC condition the relationship was weaker, B=.18 [-.16, .52], $t(72)$= 1.04, p=.303. Thus, not only was the standard DSC slope not significant, but the slope was in the direction of being weaker in this condition relative to control which was opposite of what was predicted.

For the next interaction between extraversion and the modified DSC condition compared to control (see Table 2, Row 5), I expected no difference in self-esteem benefits for introverts and extraverts since this condition made peer similarity more salient for everybody, so introverts would find more of a benefit than they did relative to the standard DSC condition. The interaction between extraversion and the modified DSC dummy variable happened to be the only other effect that began to approach traditional levels of significance (p=.056), suggesting that the self-esteem benefits might not be the same across levels of extraversion in the modified BIRG condition compared to the control. Despite the fact that there was no interaction as expected, I decided for purely descriptive purses to look at simple slopes. Compared to the control condition

slope of extraversion on self-esteem, *B*=.48 [.13, .83], *t*(72)=2.76, *p*< .05, the slope for the relationship between extraversion and self-esteem tended to be weaker in the modified DSC condition and was actually non-significant, *B*=-.03 [-.42, .36], *t*(72)= -.14, *p*=.890. Given that the interaction between extraversion and modified DSC interaction was not significant (*p*>.05), I am hesitant to make any substantive claim regarding this pattern.

Exploratory Analysis of Self-Construal

Since one of the critical variables of extraversion was a measured variable, extraversion may be correlated with other variables that affect self-esteem. The issue here is that the effect on self-esteem may not be due to extraversion but rather the one or more variables that extraversion could be correlated with. One set of variables that may make sense to look at is self-construal.

An exploratory analysis was conducted examining if self-construal accounted for the extraversion effects. Independence was not significantly related to extraversion, $r(76) = .21$, $p = .065$, and neither was interdependence, $r(76) = .18$, $p = .119$. Both these correlations were comparatively modest, and neither reached the traditional .05 standard of significance. Therefore, given these weak correlations, it is unlikely that the effects of extraversion seen in our main regression analysis were solely due to one these forms of self-construal. Nonetheless, I still examined if one of these self-construal's played a critical role in impacting self-esteem. If independence and/or interdependence were really the variables that were accounting for the effects of extraversion, then we could expect two findings. Self-construal would eliminate the prior extraversion effects in the regression model, and there might also be interactions that emerge between the self-construal's and the dummy variables.

In a first analysis, independence was examined as a predictor in the regression model to see if independence could account for the effects of extraversion on self-esteem. State self-

esteem was regressed on extraversion, independence, and two dummy variables. The first dummy variable was coded as assignment to the standard DSC condition vs. not being assigned to that condition. The second dummy variable was coded as assignment to the modified DSC condition vs. not being assigned to that condition. Because dummy variables for DSC were entered simultaneously into a regression model, and thus their effects are partialed controlling for the other, each dummy variable represents the unique effect of a DSC condition relative to control. The first dummy variable represented assignment to the standard DSC condition vs. the control condition. The second dummy variable represented assignment to the modified DSC condition vs. the control condition. There were five two-way interactions included in the model: the interaction between extraversion and the first dummy variable, extraversion and the second dummy variable, and extraversion and independence, as well two-way interactions between independence and the first dummy variable and independence and the second dummy variable. There were two three-way interactions: the interaction between extraversion, the first dummy variable and independence, and the interaction between extraversion the second dummy variable and interdependence.

If independence was really what was affecting self-esteem, then any prior extraversion effect should reduce. The prior extraversion interaction effects did not approach significance at all, so it is difficult for those effects to get even weaker with the addition of independence in the model, however, there was a change in the extraversion first-order effect. The first-order effect of extraversion at the average level of independence in the control condition, had the tendency to decrease from the original regression analysis (B=.48, se= .17, p=.007) and was no longer statistically significant (B=.24, se= .16, p=.140). If independence was really what was affecting self-esteem then there also should have been substantial independence effects. There was a

significant first-order effect of independent self-construal in the control condition which was related to higher self-esteem (B=.56, se=.13, p<.001); however, independence failed to produce any significant interactions. Therefore, there was no evidence that independence moderated the efficacy of self-enhancement strategies (see Appendix L for the full table of analyses).

A commonality analysis was conducted in R (R Core Team, 2022) using the yhat package (Nimon et al., 2021) to further investigate the extent to which self-construal accounts for the effects demonstrated by extraversion (which admittedly were comparatively minimal). See Table 3 for the percentage of variance accounted for by the total model that is attributable to each of the variables of interest.

Table 3

Results for Commonality Analysis Including Self-Construal for Study Two

Variables in Model	Total Percent
Unique to Extraversion	6.36
Unique to Independence	54.22
Unique to Interdependence	8.17
Common to Extraversion & Independence	16.36
Common to Extraversion & Interdependence	-3.12
Common to Independence & Interdependence	21.61
Common to Extraversion, Independence & Interdependence	-5.80

Note. Negative total percentages indicates that a variable is a suppressor.

In terms of the overall effect, independence accounted for the most variance, however, strictly speaking, the extraversion first order effect is not of theoretical interest. Rather, the

interaction effect of extraversion and the first dummy variable (standard DSC) is of interest and the interaction effect of extraversion and the second dummy variable (modified DSC). The interactions of these variables with the experimental conditions accounted for only trivial amounts of variance. Ultimately, this does not speak to whether Vaughan-Johnston et al.'s (2021) original interaction effects were explained by independence because the original interaction effects are of primary interest, not the first order effects.

In a second model, interdependence was added as a predictor in the regression model to see if interdependence could account for the effects of extraversion on self-esteem. This regression had the same first-order effects and interactions, with the exception that independence was replaced with interdependence. There were five two-way interactions and two three-way interactions in the model (see Appendix M for the full table of analyses). The first-order effect of extraversion at the average level of interdependence in the control condition did not change, but rather it had a slight tendency to increase (B=.53, se= .17, p<.05) so extraversion was still related to self-esteem even when adding interdependence into the model. The first-order effect of interdependence in the control condition was not significant (B=-.40, se=.23, p=.091). All interactions were also not significant, so interdependence did not interact with either dummy variable or extraversion to influence self-esteem. Overall, it seems as though interdependence acted as a suppressor in accounting for the effects of extraversion because as it was added into the model the relationship between extraversion and self-esteem in the control condition got stronger. Although, interpreting the effect of interdependence is difficult given the scale's psychometric properties performed so poorly.

Summary

Again, Study Two demonstrated from the literature that extraverts report greater self-esteem on average than introverts do in the control condition. However, I was unable to replicate any of Vaughan-Johnston et al.'s (2021) key findings. There was no evidence that the standard DSC had any significant effect on self-esteem, and the interaction between extraversion and the standard DSC did not replicate. Furthermore, none of the novel predictions regarding the modified DSC condition were supported either.

Chapter Four: General Discussion

Overall, the only effect that was consistently replicated was the significant first-order effect of extraversion in the control condition in both Study One and Two. In Study One, I failed to replicate the BIRGing first-order effect on self-esteem at average extraversion, and there was no interaction between modified BIRGing and extraversion compared to the control. In Study Two, I expected to find a significant first-order effect of the traditional DSC condition at average extraversion, and replicate the finding that extraverts benefitted more in the traditional DSC condition; however, I was unable to find either of those effects. Ironically, the only effect that was close to significance was the interaction between extraversion and the modified DSC compared to the control, which was the interaction that was expected to be non-significant.

Implications

This research project started out by attempting to provide additional evidence supporting the role that similarity plays in the effectiveness of socially-based self-enhancement strategies for introverts and extraverts. Unfortunately, no progress was made in either study. Therefore, I am unable to provide useful insights on the role of similarity because of the failure to replicate previous effects, specifically the traditional BIRGing and standard DSC first-order effects on self-esteem. Additionally, I did not find significant first-order effects at average extraversion, or interaction effects in the modified BIRGing and modified DSC conditions relative to the control. Because the first-order effects with the traditional BIRGing and standard DSC dummy variables were not produced, interpreting the results of the modified BIRGing and DSC conditions was difficult, especially since these effects were not significant either. Overall, no progress has been made in exploring the role that similarity plays in the effectiveness of self-enhancement

strategies. This then raises the issue of why the prior effects were not replicated and why the novel findings in Study One and Two were not demonstrated.

Why the Traditional BIRG Effect Failed to Emerge in Study One

Type I Error. There are a few possible reasons as to why I failed to replicate the first-order traditional BIRG effect in Study One. The first reason could be due to Type I error in Vaughan-Johnston et al.'s (2021) study. A Type I error refers to a 'false-positive' finding where a researcher rejects the null hypothesis when it was correct. Specifically, it could be that Vaughan-Johnston et al., (2021) concluded that the effect of the traditional BIRG condition was significantly different than the control and that the effect existed in that population, when it was not in fact there. There are a few things to think about when considering the plausibility of this explanation. One thing to consider is whether there is evidence that Vaughan-Johnston et al., (2021) engaged in practices or if there were conditions that existed in their original study that would have inflated the chance of a Type I error (Simmons et al., 2011). For example, maybe they ran a study with very low power, as an underpowered study would have increased the chance of a Type I error. In their study, they had an N= 514 with four conditions, so they had more than 100 participants in each condition. With more than 100 participants per condition, sample sizes were comparatively large so they likely would have had the power to detect comparatively small effects.

Additionally, it is important to consider whether they engaged in opportunistic data analytic strategies as these practices would have increased the chance of finding an effect when there was not one. I have direct access to Vaughan-Johnston et al.'s (2021) data and their planning, so it is clear they were consistent with a clear data analytic plan before they conducted their analyses. One could also wonder if they did not report all their studies where they used the

traditional BIRG condition. However, they explicitly mention their file drawer studies and provide meta-analytic data including the data from their one published study and three file drawer studies where they tested the traditional BIRGing effect. They found a significant meta-analytic first-order effect of four studies that used the traditional BIRG condition, r_{sp} = .056, Z= 2.20, p = .028, CI_{95} = [.006, .106]. The meta-analysis demonstrates that there is statistical evidence of the effect of the traditional BIRGing. The overall alpha is below .05, and there is no evidence to suggest that they did things to inflate their alpha. That being said, the effect fell only slightly below the $p \neq .05$ alpha rate; so although a Type I error is unlikely, it is still possible. Overall, although it cannot be completely dismissed, a Type I error is probably not the most compelling explanation as to why I did not find a significant first-order effect from the traditional BIRG dummy variable.

Type II Error. It is also a possibility that a Type II error occurred. A Type II error occurs when a study fails to detect a real effect that existed in the population. Specifically, it could be that Vaughan-Johnston et al.'s (2021) traditional BIRGing effect on self-esteem is real; however, there was not adequate power in the present sample to detect the effect. Given Vaughan-Johnston et al.'s (2021) sample size in their study that used the traditional BIRG condition (N=457), they had approximately 114 subjects in both the control and traditional BIRG condition, which gave them a good sample size to detect if an effect was there for a BIRG first-order effect. Although the sample of Study One exceeded the minimum sample size of 50 participants per condition, it fell short of the optimal sample size of 100 participants per condition. Using Vaughan-Johnston et al.'s (2021) effect size from their traditional BIRG first-order effect which was f^2=.009 (t=2.08), a formal power analysis for a t test conducted in G*Power (Faul et al., 2009) revealed that a sample size of 839 participants would be needed to

detect a traditional BIRG first-order effect of with .8 power, however the sample was only 208. A total sample of 839 is certainly bigger than the optimal sample size of 300 participants. Based on the power analysis, even the optimal sample was not enough to be able to detect a significant effect.

Population and Contextual Changes. Another possibility, which is mutually exclusive from a Type I but not Type II error, is that there were populations and/or contextual changes in Study One that were different than Vaughan-Johnston at al.'s (2021) study with the traditional BIRG condition. One possibility is that the sample was drawn from a different population, so maybe that was why the same effects did not occur in Study One. However, participants were sampled from the same undergraduate population that they had used. In fact, undergraduate students were sampled from the same university, and they were taking the same undergraduate class (PSYC 100). The demographics from the population they recruited from consisted of 77% women, 22% men, and 1% undeclared/other gender. Demographics from the present studies were nearly identical and consisted of 78.2% women, 20.2% men and 1.6% who identified as sex and gender diverse. Even expected scores on the EQ task were comparable to what Vaughan-Johnston et al., (2021) found. They found that participants in their studies expected to receive an average score of 64.7% on the EQ task compared to Study One where participants expected to receive a score of 64.12%.

Another possibility was that I sampled from the same population; however, there were contextual differences such as the setting in which the studies were conducted. Since the pandemic, one increasingly relevant concern is changes in the contextual setting in which studies were conducted because many studies shifted from being conducted in-person in the laboratory to being conducted online. However, Study One was conducted in-person the same way that

Vaughan-Johnston et al., (2021) studies were. Moreover, data was collected in the same laboratory, so the environment was identical.

However, one contextual variable that was different from Vaughan-Johnston et al.'s (2021) study was that data was collected in the wake of COVID-19 with a number of safety restrictions and practices in place. The broader social conditions that existed while I collected data for Study One were very different than the social conditions that existed while Vaughan-Johnston et al., (2021) was collecting data. During data collection, participants had to sanitize once their entered the lab, and they were required to wear a mask. Participants in prior months were in restrictive settings and coming into the lab to participate in a study and have direct interpersonal interactions on campus was a comparatively novel experience to what they had being doing in their daily lives over the prior year.

Although I cannot measure this difference, the social conditions due to the COVID-19 restrictions may have changed the psychological dynamics of the participants. Perhaps base rates of anxiety were higher at the time of data collection because students were returning to campus while COVID-19 was still circulating. Anxiety levels certainly increased in university students following the start of the pandemic (Ding et al., 2022; Jehi et al., 2022; Wu et al., 2021). If the baseline anxiety rate of our participants was higher than in previous years, then perhaps the negative feedback that participants received on the EQ task was not significant enough to trigger a defensive response from participants, so it did not threaten their sense of self. If so, then participants would not have benefited from the self-enhancement strategies in a robust way as seen in Vaughan-Johnston et al.'s (2021) study, because a defensive response was not triggered in the first place.

It is also possible that these social conditions lead to attributional ambiguities after receiving a poor score on the EQ task. There are two possibilities. The first is that participants wondered why they performed badly on the test, so they used the social conditions due to COVID -19 as an external explanation to their poor performance. Participants may have attributed their failure on the EQ task to them being in a new environment, feeling anxious because COVID-19 was circulating, or maybe because they were dealing with other circumstances in their life that were brought on from the pandemic (e.g., higher stress or anxiety being back in-person managing classes). In this case, participants were looking for an explanation to why they performed badly, and they may have used the pandemic circumstances as an external factor to blame their failure on. If so, then the BIRGing manipulation would not have worked to make participants feel better because they had already attributed their failure to an external factor (a self-serving attribution).

The second possibility is that participants felt bad after receiving their poor score; however, they were unsure why they felt bad and were making attributions as to why they felt that way. Participants may have attributed feeling bad because they did not perform very well on the test, so presumably the BIRGing manipulation would have been effective at boosting self-esteem for these participants. However, other participants may have attributed feeling badly from the test to just feeling anxious due to the new environment and because COVID was circulating. In this case, the BIRGing manipulation also likely would not have worked because they were using other circumstances to explain why they were feeling badly.

Another contextual variable that was different than Vaughan-Johnston et al.'s (2021) study was that participants were required to wear masks. Mask wearing could be seen as a type of anonymity manipulation, which may have had a psychological impact on the way that failure

was processed. Wearing masks may have led to a higher sense of anonymity which could have changed the effects of personal failure by taking away a strong feeling of failure that participants may normally have felt without wearing masks. Thus, the false feedback could have been less impactful and there was less of a sense of failure due to the feeling of anonymity that mask wearing may have caused. If there was less of a feeling of failure, then participants' self-esteem would not have been impacted as highly as it was in Vaughan-Johnston et al.'s (2021) original studies.

Another factor from the COVID-19 pandemic that could have affected the results is that participants in earlier years experienced social isolation, specifically in their final high school years. Since the COVID-19 pandemic restrictions generally started taking place in 2020, the majority of the first-year psychology students from the current sample were still in high school when the major restrictions launched in 2020 and consequently would have been isolated for an extended amount of time. High school classes in Ontario were being conducted online and this social isolation could have had an extended impact psychologically impacting how they view things socially and regulate their successes and failures.

Ultimately, it is impossible to empirically evaluate what the psychological impact may have been from the social effects of COVID-19 and mask wearing. However, these impacts are not mutually exclusive from one another and may have all contributed to why I failed to replicate the first-order traditional BIRG effect in Study One.

New Measure. The final possibility as to why the first-order traditional BIRG effect at average extraversion was not replicated was because there was one procedural difference in Study One compared to Vaughan-Johnston et al.'s (2021) study. Specifically, there was one additional measure that was added to Study One, that was not included in Vaughan-Johnston et

al.'s (2021) traditional BIRGing condition, which was the item that assessed the extent to which participants identified with their chosen region. In Vaughan-Johnston et al.'s (2021) traditional BIRG condition, participants simply picked the province they identified with the most and then moved on to complete the BIRGing procedures. This way of choosing their province was a more categorical way of thinking about their province – they either belonged to this group or not. In Study One, after selecting their region, participants rated the extent to which they identified with their region thus making them think about how much they identified with this region. This question could have prompted more distance as some participants may have realized that they did not identify very highly with that group. In other words, by asking them how much they identified, it made the way that they thought about group membership more continuous. By making participants think of group membership continuously, it may have made participants who identified less with that group aware that they did not really identify much with that group. Identifying positively with their chosen region might not have increased self-esteem if they were made aware that they do not actually identify very highly with their region.

Including this item may have had another impact that could have carried through to the rest of the BIRGing procedure. In both BIRGing conditions, participants rated positive headlines about their province, so that they had the opportunity to associate themselves with the success of that group. Now that some people were prompted to think about how much they identified with the group, reading the positive headlines may not have been as successful at boosting self-esteem for everybody. The participants who did not identify highly with their region would have already locked the idea in their mind that they did not identify highly with that group, so the BIRGing positive headlines would not have worked at making them feel closer and good about their group.

Summary. Other than the possibility of a Type I error, none of these explanations are mutually exclusive as possible explanations as to why I failed to replicate the traditional BIRGing effect on self-esteem. Perhaps a combination of having an inadequate sample size to detect an effect, things like COVID eroding the effects, and procedural changes explain why I failed to replicate the traditional BIRGing effect. I cannot ultimately know if there was a Type II error, although it is possible that there was a Type II error in conjunction with those other factors (barring a Type I error). Based on the similarities in the procedures, the demographic information, and the contextual environment that the study was conducted in, these do not seem like very likely explanations as to why I was unable to replicate the original BIRGing effect.

Why the Standard DSC Effect Failed to Emerge in Study Two

Type I Error. The first possible reason as to why the standard DSC and extraversion interaction effect failed to replicate in Study Two could be due to Type I error in Vaughan-Johnston et al.'s (2021) studies. Although a Type I error is always a possibility, it is less likely in this case as they were able to find the effect multiple times. Vaughan-Johnston et al. (2021) conducted a meta-analysis of nine studies (four were published and five were file drawer studies) that used the standard DSC condition. They found a significant effect of the interaction between extraversion and the standard DSC condition, r_{sp} = .066, Z= 3.69, p = .0002, CI_{95} = [.031, .100]. This relationship was clearly significant, so there is likely an interaction that exists between extraversion and the standard DSC dummy variable, especially since they were able to replicate this finding many times. Once again, there were also no data analytic problems as I had access to their file drawer. Due to the extremely small alpha value, it is unlikely that there was a Type I error, so this explanation is the least compelling as to why the extraversion and standard DSC interaction failed to replicate.

Type II Error. The second possibility is that there was a Type II error in Study Two. Specifically, it could be that Vaughan-Johnston et al.'s (2021) standard DSC and extraversion interaction is real; however, Study Two did not have adequate power to detect the effect. This explanation is probably more compelling because Study Two did not meet the minimum sample size of 150 participants let alone the optimal sample size of 300 and I ended up with a total sample of only 78 participants. Two of Vaughan-Johnston et al.'s (2021) published studies that included the standard DSC condition with the same paradigm that Study Two used had a range of 128 to 177 participants per condition. Obviously, the sample size of Study Two fell well below the sample size that they typically reached. The average effect size from two of Vaughan-Johnston et al.'s (2021) studies where they examined the standard DSC and extraversion interaction, f^2 =.01 (the average effect of t=2.05 and t=2.13), was used in a formal power analysis of a *t* test which revealed that a sample size of 682 participants would have been needed to detect the standard DSC interaction effect with power of .8. However, the sample in Study Two was only 208. Once again, even the optimal sample size of 300 participants still would have been underpowered to detect an interaction effect. Type II seems worthy for consideration as an explanation as to why the standard DSC with extraversion interaction effect failed to replicate.

Population and Contextual Changes. Another possibility is that there were population and contextual changes in Study Two that were different than Vaughan-Johnston at al.'s (2021) studies that included the standard DSC condition. Once again, sampling was conducted from the same population, and indeed, the demographics and expected scores on the EQ task from the samples were nearly identical. Second, there could have been changes contextual changes in terms of the location that Study Two was conducted, but once again Study Two was conducted in the exact same laboratory. The same attributional ambiguities also apply to Study Two, and

there were no procedural changes in the standard DSC condition compared to Vaughan-Johnston et al.'s (2021) standard DSC condition. However, like Study One, the contextual COVID issues may have still had an impact during data collection for Study Two.

Summary. Other than the possibility of a Type I error, these explanations are not mutually exclusive to each other as possible explanations as to why I failed to replicate the extraversion by standard DSC interaction. There are no population, procedural, or contextual changes in terms of the environment that would have contributed to why I was unable to replicate the extraversion by standard DSC interaction effect. What we are left with is a combination of contextual changes due to COVID-19 and Type II error that may have contributed to the results. A Type II error seems especially more plausible here than in Study One given the low sample size of Study Two.

Were They Actually 'Failed' Replications?

Based on the standard of statistical significance ($p<.05$), I consider Study One and Study Two to be failures since the BIRGing first-order effect and the DSC and extraversion interaction were not significant. By this traditional standard, one can determine whether replication is successful or not. However, there are other standards that one could use to define whether replication is successful or not and some have argued these alternatives are better (Fabrigar & Wegener, 2016; Fabrigar et al., 2020).

One standard is to assess whether the replication study produced an effect that fell within Vaughan-Johnston et al.'s (2021) confidence interval where they found a significant effect. The coefficient for the Study One BIRGing first order effect, $\beta=.07$, fell within Vaughan-Johnston et al.'s confidence interval for that effect, CI = [.01, .22]. Although Study One's BIRGing first-order effect was not significantly different from the control at average levels of extraversion, this

effect did fall within Vaughan-Johnston et al.'s (2021) confidence interval, therefore the results are a bit ambiguous to interpret.

Next, does the DSC and extraversion interaction effect from Study Two fall within Vaughan-Johnston et al.'s (2021) confidence intervals? If viewed from this standard, the extraversion and DSC interaction effect from Study Two, β=-.20, did not fall within either of Vaughan-Johnston et al.'s (2021) 95% confidence intervals from two studies [.004, .21], [.01, .22] where they found a significant extraversion and DSC interaction.

The second way to evaluate replication is to see how these studies alter Vaughan-Johnston et al.'s (2021) meta-analytic effect. If adding the effect strengthens the case for the existence of the effect (i.e., lowers likelihood of type I error) then one could say that the study has in fact replicated the effect. Alternatively, if adding the effect weakened the case (i.e., increases type I error) one could say that it was not replicated. When viewed from this standard, Vaughan-Johnston et al.'s (2021) meta-analytic effect for the BIRGing first order effect, r_{sp} = .056, Z=2.20, p=.028, CI_{95} = [.006, .106], remained virtually the same when I added Study One into the meta-analysis (r_{sp} = .056, Z=2.38, p=.018, CI_{95} = [.009, .103], however the p-value decreased suggesting that the BIRG first order effect was replicated.

For the DSC and extraversion interaction effect, Vaughan-Johnston et al.'s effect, r_{sp}=.066, Z=3.69, p=.0002, CI_{95}= [.031, .100], became weaker once I added Study Two into the meta-analysis, r_{sp}=.057, Z=2.62, p=.0087, CI_{95}= [.14, .099]) suggesting that I did not replicate the extraversion and DSC interaction.

Future Directions

Study One Future Directions. There were several issues with the contextual factors during data collection of Study One, particularly the psychological impact that COVID-19 and

mask wearing may have had on the participants. The issues pertaining to the pandemic and mask wearing will likely resolve itself over time and will not be something to worry about in future studies. Wearing masks is no longer mandated, so any influence that the masking may have had as a possible anonymity manipulation is not an issue any more for future studies. Furthermore, students have already experienced a significant amount of time where they experienced normal on-campus interactions with their peers. Incoming first-year students would have also experienced normal interactions with their peers, so the experience of being on campus is no longer a novel experience and entering the lab while COVID-19 is circulating is no longer an issue.

The remaining issues that need to be addressed are the issues that may have occurred with the addition of the measure where I asked participants to identify the extent to which they identified with their province. One option to deal with this issue is to change the placement of the item. In future studies, this item could be placed at the end of the BIRGing procedures after they have read the positive headlines and written five positive things about their province. By placing this item at the end of the BIRGing procedure, it would not interfere with the process of BIRGing because participants will not be prompted to think about how much they identify before they engage in the BIRGing procedure. However, there is still a danger with this placement as it may cause participants to reconstrue how much the prior BIRGing really meant to them, and it could still take away some of the efficacy of the technique.

The item could also be placed at the very end of the study after the critical self-esteem dependent variable. That way this item does not interfere with any other part of the study. One implication of placing this item elsewhere is that it will no longer simply be a measure of how much participants identify with their province but rather how much they identify with their

province *after* experiencing the BIRGing procedure. The potential implication here is that the item would no longer be a true measure of how much they typically identify with their province, because reading the positive headlines and thinking about positive things about the province may inflate their sense of identification and belongingness with the province that would have not occurred when it is asked before the BIRGing procedure. However, this happening is not necessarily a bad thing. If participants say that they identify more with their province after the BIRGing procedures, then perhaps higher identification would be an indication that the BIRGing manipulation was successful. Overall, placing the item at the very end of the study would probably be the best option because it would no longer interfere with the process of BIRGing and the response would be collected after the critical self-esteem dependent variable so it would not interfere with that either.

Study Two Future Directions. The largest issue that occurred in Study Two was the failure to replicate the extraversion by standard DSC interaction, which was most likely due to a combination of having low power and potential distortions due to the COVID circumstances. The contextual issues due to COVID that were relevant in Study Two will also disappear in future studies. Students have been back in-person for a year now, so being on-campus will no longer be a novel experience, and if baseline anxiety levels were elevated, they will probably go back down to their average levels. The most obvious solution to issue of being underpowered is that I plan on re-running Study Two to at least reach the optimal sample size of 300 participants, where I would be more likely to detect an effect which will most likely deal with the possibility of a Type II error.

Future Directions if Similarity is Successful

In the future, I would like to replicate the first-order effect of the standard BIRG dummy variable at average extraversion, the extraversion by standard DSC interaction, and be able to find the novel effects of similarity on the BIRGing and DSC interactions with extraversion. If these novel effects were found then this would provide evidence that similarity plays a critical role in the effectiveness of some self-enhancement strategies, and this would open the door to future directions of research.

I have investigated how individual factors, like extraversion, influenced the effectiveness of socially-based self-enhancement strategies, however, it would also be interesting to explore the tendencies that people have to choose certain strategies over others. In particular, it would be interesting to see whether after a threat to self, if extraverts tend to choose strategies like BIRGing or DSC more than other strategies like self-serving attributions if they were given the option to pick a self-enhancement strategy to use.

Another avenue of research would be to investigate the role that similarity plays in the efficacy of non-socially based self-enhancement strategies and whether their efficacy varies based on extraversion level. The logic of similarity working more strongly for socially based strategies has no relevance here because strategies, like self-affirmation and self-serving attributions are not socially based; however, I could still see if extraversion plays a role in their effectiveness.

One final avenue of research is whether the efficacy of self-enhancement strategies is affected by other individual factors. I have already explored the role of extraversion; however, another individual factors of interest could be other personality factors like conscientiousness. Perhaps people high in conscientiousness (a trait characterized by being diligent and highly organized; McCrae & Costa, 1987) would benefit differently than people low in

conscientiousness from self-serving attributions. For example, maybe highly conscientious people will be worse at claiming benefits from self-serving attributions since they will be less likely to blame their failures on external factors since they are such hard workers. In and other ways, the present work suggests interesting lines of future work.

Broader Implications

If Vaughan-Johnston et al.'s (2021) effects were replicated and the novel effects of the current studies were found, there would have been broader implications for these findings. First, this research contributes to the psychology of extraversion, specifically, self-enhancement for extraverts. The terms extravert and introvert are commonly used in society among laypeople. Although extraversion is broadly recognized as a personality dimension, less is known about how extraverts specifically self-enhance when threatened. This research investigates how there are differences among extraverts and introverts, particularly investigating how specific self-enhancement strategies may work better for extraverts than other strategies.

Finally, the literature mainly focuses on the fact that people engage in self-enhancement strategies, and the theoretical basis for why people do so. However, less research exists that aims to determine who might benefit more from self-enhancement strategies and why. This research advances the literature by looking at individual factors that impact the efficacy of self-enhancement strategies.

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Appendix A

Ethics Clearance

ROMEO - Researcher Portal

GREB Annual Renewal Form

Project Info

File No: 6021311
PI: Fabrigar Leandre R(Faculty of Arts and Science\Psychology)
Project Title: GPSYC-812-17 Integrating the Self and Personality
Submitted: Friday, June 17, 2022
Submitted by: Leandre R Fabrigar

Event Info

Event No: 6021311-1103480
Notes: === Study has been renewed for one year. Questions? contact daniel.tesolin@queensu.ca. ===These studies require in-person lab data collection so it was shut down for a year and then this past year moved slowly because of COVID restrictions. Please renew. No changes to protocol.
Approval Letter Generated?: 2022/06/20

Letter of Information

START
Letter of Information

This research project is being conducted by Ava Camposarcone, who is a graduate student working with Dr. Leandre Fabrigar of the Department of Psychology at Queen's University in Kingston, Ontario. This study has been granted clearance according to the recommended principles of Canadian ethics guidelines and Queen's policies.

In this study, you may be asked to respond to materials including an emotional intelligence test, reading some information about a topic, and/or answering a few background questions about yourself and your opinions. Your participation in all of the tasks included in this session will take no longer than 1 hour of your time. In exchange for your participation in this session, you will receive 1.0 extra credit towards your Psychology 100-level grade.

There are no known physical, psychological, economic or social risks associated with this study. Participation in this study is completely voluntary. You are free to withdraw at any time with no negative effects by informing the experimenter and exiting the computer program. This will not affect your compensation and your data will be destroyed.

We will keep your responses confidential and will store data in a locked room until it is no longer needed. Only authorized personnel will have access to this area. Although individual results will not be published and will not be made available, the collective data may be presented in a professional psychological journal or at a scientific conference. GREB may request access to your data for quality assurance purposes. Should you be interested, you are entitled to a copy of the findings. If this research is published, data will be released upon request to authorized researchers. However, no identifying information will be provided.

Any questions, complaints, or concerns about this study may be directed to Ava Camposarcone at 20ac110@queensu.ca or Dr. Fabrigar at (613)533-6492 / fabrigar@queensu.ca, or for ethical questions, the Chair of General Research Ethics Board at (613)533-6000 ext. 78281 / chair.greb@queensu.ca. Furthermore, you can contact Queen's Counseling Services at (613)533-2506. Consenting to this study does not waive any of your legal rights.
Again, thank you. Your participation in this research study is appreciated.

Consent Form

START
Consent Form

1. I have read the Letter of Information and have had any questions answered to my satisfaction.

2. I understand that I will be participating in the study called "START". I understand that this means that I will be asked to read information on a topic and answer questions regarding this information.

3. I understand that all tasks included in this experimental session should take no longer than 1 hour and I will receive 1.0 extra credit or $5-10 for my participation if I have not completed all my credits for PSYC100/200-level class.

4. I understand that my participation in this study is voluntary and I may withdraw at any time by notifying the experimenter.

5. I understand that every effort will be made to maintain the confidentiality of the data now and in the future.

6. I understand that the data will be stored in a locked room and only authorized personnel will have access to this area. The data may also be published but any such presentations will be of general findings and will never breach individual confidentiality. I understand that if the data is requested by other researchers, the information provided will not permit others to ascertain my identity.

I am aware that if I have any questions, concerns, or complaints, I may contact Ava Camposarcone (20ac110@queensu.ca) or Dr. Leandre Fabrigar (613-533-6492 / fabrigar@queensu.ca) or the Chair of the General Research Ethics Board (chair.GREB@queensu.ca or 613-533-6000 ext. 78281) at Queen's University.
If you do not consent to participate in this study, please notify the researcher of your decision.

Debriefing Form

START

The study that you have just completed was actually designed to assess whether people's reactions to receiving a failing grade would be influenced by the type of information they received after the test.

Although you were led to believe that this emotional intelligence test was widely used and empirically developed, in fact it was made simply for the purposes of this study. In addition, scores on this test were **NOT** calculated, all participants received a score of 23%. **Therefore, the mark you received was completely FALSE and in no way reflects your true emotional intelligence.**

After completing the test, participants were then randomly assigned to one of three conditions: 1) information that your identified region Canadian region is associated with a lot of success and positive attributes, 2) the same information about the Canadian region's success but with an attempt to raise how similar/dissimilar you feel to that region, or 3) information about when the test was developed, and the statistical analyses supposedly used to validate it. Broadly, our interest was in whether self-esteem, particularly if you were extraverted. Associating the self with a successful group has been shown in previous research to help people deal with self-esteem threats (e.g., poor test performance). The final condition was a control group in which the information was not intended to alter your initial reactions to your test performance.

You were then asked to fill out a measure of self-esteem to determine whether the type of feedback you received influenced your self-views. We believe that the type of information provided after the test will affect people's self-esteem scores. You were also asked to fill out a measure of personality traits because we believe personality traits will influence your reaction to the type of information you were provided after the test.

Your participation in this study is greatly appreciated. In the event that you have any complaints, concerns, questions, or would like access to study results, please contact Dr. Leandre Fabrigar (613-533-6492, fabrigar@queensu.ca). Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board (chair.GREB@queensu.ca or (613) 533-2988 or 1-844-535-2988 (toll-free). You should feel free to raise any issues of interest or concern with the research assistant running the session. If the assistant cannot answer your question, he or she will refer you to Dr. Leandre Fabrigar.

This is an ongoing research project: please do not discuss this project with anyone, as knowledge of what we are trying to find may alter the results we obtain. Thank you.

If you are interested in this area you may wish to read the following reference:

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Appendix B

Emotional Intelligence Test and Study One Materials

Emotional Intelligence test materials were adapted from Mayer et al., (2003).

Emotional Intelligence Test

What is your name? **[participant enters name]**

You are about to perform an emotional intelligence test called the MSCEIT (Mayer-Salovey Caruso Emotional Intelligence Test). This test has been used for many years to test emotional intelligence, based on people's abilities across several domains of emotional processing. It has been shown to be highly predictive of a number of life outcomes that may be of interest to you, <name is inserted here>.

The test proceeds across several components, which each represent something from real life. These are as follows... Perceiving Emotions: The ability to perceive emotions in oneself and others as well as in objects, art, stories, music, and other stimuli
Facilitating Thought: The ability to generate, use, and feel emotion as necessary to communicate feelings or employ them in other cognitive processes

Understanding Emotions: The ability to understand emotional information, to understand how emotions combine and progress through relationship transitions, and to appreciate such emotional meanings

Managing Emotions: The ability to be open to feelings, and to modulate them in oneself and others so as to promote personal understanding and growth

The various components of the test have led to the ability to test several key life outcomes. The Perceiving Emotions scale: due to its relation to understanding one's own emotions, this has been shown to predict people's ability to function under high-pressure situations. For example, CEOs tend to operate better under stress when they have this ability. Similarly, lawyers have a heightened ability to withstand large case loads when they have this trait.

Facilitating Thought: due to its role in facilitating thought, emotional intelligence can impact people's ability to make persuasive arguments (Steele & Bushman, 2012). It also seems to promote a slight advantage in thinking through complex nonverbal problems, maybe due to the ability to filter OUT emotions that would disrupt thinking (Aizen, 2014).

Understanding Emotions: this trait seems to be predictive of people's ability to be leaders (Fishbein, 1998), likely due to its relation to predicting the emotional outcomes that will happen to others. Additionally, it seems to be related to self-understanding, and again seems to predict better stress-coping abilities.

Managing Emotions: People high in this ability seem more adequate at tasks involving suppressing negative emotions. For example, this form of emotional intelligence predicts the ability to work with a disliked partner in a task (Bushman, 2000), or navigate a hostile work environment while maintaining one's efficacy and productivity (Chen, Wang and Baumeister, 2008).

An overall test score on the MSCEIT is highly predictive of your LIFE SATISFACTION (Masters & Hornby, 2015), probably because people who are able to understand emotions are able to more effectively regulate them in themselves, and understand them in others. Second, it has been shown in several studies (e.g. Baumeister and Schooler, 2007) that high scorers on this test are more often PROFESSIONALLY SUCCESSFUL, perhaps because of their competence working with clients and co-workers. Third, students who have scored well on this test in the past, have received HIGHER GRADES in introductory psychology courses, significantly more often than low scorers on this test (see an experiment by Vohs and Steele, 2014). Vohs and Steele suggested that emotional intelligence may represent a general psychological 'sense' that makes success in psychology easier to obtain.

For these reasons, please try your best on the following test, so as to receive accurate feedback, and to best predict your outcomes in these areas. Good luck, <name is inserted here>!

Emotional Expression Test 1

You are about to complete the first emotional intelligence test, which is about Understanding Emotions. The basic point of these questions is to try and step into the mindset of the person being described, and imagine how they would feel under their circumstances. For instance, you might be asked how a person feels under intense pressure. You will be given several options for each. Sometimes more than one will seem like a tempting option, in which case you are asked to simply pick whichever sounds like the best answer. Some questions will be very easy, and some will be very hard. Press continue when you are ready to begin.

Tom felt anxious, and became a bit stressed when he thought about all the work he needed to do. When his supervisor brought him an additional project, he felt:

[for Test 1: items were presented simultaneously, with participants choosing between these alternative options]

Overwhelmed
Depressed
Ashamed
Self Conscious
Jittery

When Michael lost his dog one day, he initially felt nervousness. However, over time (as the dog did not come back, and was not found) the more dominant emotion became:
Depressed
Guilty
Horrified
Anxious
Jaded

Paul and Diane (a married couple) were having an argument. Paul felt he worked very long hours and just wanted to relax when he came home. Diane felt that Paul should find more time to spend at home with herself and their children. This conflict is most likely to be resolved through:
Reluctant capitulation (surrender)
Compromise
Increased communication
Autonomy and independence
Distraction (e.g. doing something fun)

Susan is often confronted at work by belligerent customers and an unsympathetic boss. She has performed this job for five years. Suddenly, she receives an alternative job offer and accepts it. Susan most likely feels:
Relieved
Overjoyed
Nervous
Increased dislike of her existing job
Curiosity

Ashley has been seeing another man while dating her boyfriend. Occasionally, her boyfriend likes to buy her surprise gifts (not for a birthday or holiday, but 'just because'). When she receives these gifts, Ashley most likely feels:
Confused
Guilty
Anger
Self-justified
Amusement

A construction worker, Colin, is accustomed to having dangerous situations arise at his work. He often intervenes when co-workers get themselves in danger. Colin most likely feels towards his co-workers:
Contempt
Warmth
Concern
Anger
Pride

Jonathan is told by his doctor that he will be given a sleeping pill, but really the doctor provides him with a placebo. The placebo works, and his sleep improves. Later, the doctor reveals that it was not real medicine. Jonathan most likely feels:
Satisfaction
Amusement
Anger
Appreciation
Nervousness

Rashad usually enjoys his job, and on most days feels quite proud of the work he does. Recently, a new policy at work resulted in his receiving a pay increase, but no more or less than anyone else in his department (a standardized increase). Rashad felt:
Surprised and shocked
Peaceful and quiet
Content and elated
Humbled and guilty
Proud and dominant

Kelly loves watching hockey and identifies with her team. She is at the stadium one night, when her favorite star player misses a critical shot that causes her team to lose. Kelly most powerfully feels:
Sad
Anger

Neutral
Excited
Ashamed

Frederick is very close to his mother, who is a widow. One day his mother tells Fred that she has met a man twenty years younger than herself - roughly Fred's own age - and intends to date him. How does Fred most likely feel:
Jealousy
Happiness
Relief
Curiosity
Defensiveness

For the most part, Matthew considers himself a feminist. However, sometimes he enjoys sexist jokes. One day a friend calls him out on this apparent contradiction. Matt responds with:
Humour
Defensiveness
Surprise
Denial
Confusion

While working from home, Iggy takes occasionally 'coffee breaks' that often stretch out for several hours. He has done this for several years. His wife (who works at an office) comes home one day surprisingly, and confronts him about wasting his time with a video game. Iggy expresses:
Defensiveness
Acceptance
Real shame
False shame
Fear

Pauline is a new dentist, who does a lot of dental surgery, including dealing with tooth decay. While dating a man (after a month), she notices that he has early signs of tooth decay, and decides to confront him about this. She most likely expresses:
Concern
Disgust
Professional neutrality
Fear
Contempt

Ruth lives with her boyfriend Kevin, who runs very long distances. Ruth is herself quite inactive, and does not join Kevin on his workouts. Kevin announces that he is going to run a marathon, and seems to be making a point that he is more active than Ruth. Ruth responds with:
Downplaying the achievement
Self-deprecating humour
Attempting to earn pity
Changing the conversation
Sharing in Kevin's pride

Fiona usually runs a lot to get her exercise, but she hates doing it because of the effort required. Fiona is in a car accident that temporarily makes exercise impossible. She most likely feels:
Guilt

Depression
Excitement
Self Conscious
Appreciation

That is the end of this part of the test (you will only receive feedback at the end of the full test.)

Emotional Expression Test 2

This is the Managing Emotions part of the test. For each of these questions, consider the vignette provided, and then rate each of a number of options in terms of how helpful they would likely be to the person. Consider each strategy independently of the others.

Very ineffective *Somewhat ineffective* *Neutral* *Somewhat effective* *Very effective*

Mara woke up feeling pretty well. She had slept well, felt well rested, and had no particular cares or concerns. How well would each action help her preserve her mood?

[for Test 2: items were presented one at a time, with participants rating each separately]
Action 1: She got up and enjoyed the rest of her day.
Action 2: Mara enjoyed the feeling and decided to think about and appreciate all the things that were going well for her.
Action 3: She decided it was best to ignore the feeling since it wouldn't last anyway.
Action 4: She used the positive feeling to call her mother, who had been depressed, and tried to cheer her up.

Paul had been in his job for thirty years, and was unexpectedly laid off due to corporate cutbacks. He found himself with a lot of spare time, and rather bored. However, he also received a large severance package with two years' worth of salary. How could he best spend his newly opened time, and deal with his negative emotions?
Action 1: He goes on a spending spree, buying himself many things that he will enjoy both immediately and in the long-term (e.g. both eating at restaurants, and buying a boat).
Action 2: Paul takes some time to think about his life, introspect, and 'go inside himself'. He considers things like religion, philosophy, and other major life changes.
Action 3: Paul invests his money in stocks, giving himself a new task to do every day (monitor and make trades on the market).
Action 4: Paul spends more time with family, friends, and decides to get a pet to have as a companion.

Debbie just came back from vacation. She was feeling peaceful and content. How well would each action preserve her mood?
Action 1: She started to make a list of things at home that she needed to do.
Action 2: She began thinking about where and when she would go on her next vacation.
Action 3: She decided it was best to ignore the feeling since it wouldn't last anyway.
Action 4: She considered telling a lot of people about her vacation, showing pictures and telling them anecdotes about her adventures.

Mickey has always been a very serious academic student. However, one day he makes a bad decision and decides to cheat on an exam. He is torn up with guilt, and considers how best to act, now that he considers himself a dishonest person. Which actions will lead to the best outcome (in terms of his life satisfaction and emotional well-being)?

Action 1: He toughs it out, trying to avoid thinking about it, actively participating in life activities, and telling nobody.
Action 2: Mickey tells a loved one (his mother or father) about what he did, but nobody else, and asks them for advice.
Action 3: Mickey goes to the professor who teaches the class, and confesses what he did, explaining the circumstances and offering to re-do the test, or even take a failing grade, if the professor will not pass it forward.
Action 4: Mickey thinks carefully about ethics, considering what his action means. He tries to put his action on this one test into perspective, thinking of it as a single thing amid a much 'bigger picture'.

Emotional Expression Test 3

This is the Using Emotions part of the test. This test is designed to test how well you understand how emotions can be used in order to get through life situations. Please consider each vignette seriously, and then answer how much each emotion may be helpful to feel while dealing with the situation.

Not useful [no label] Somewhat useful [no label] Very useful

What mood (s) might be helpful to feel when meeting in-laws for the very first time?

[for Test 3: items were presented one at a time, with participants rating each separately]
Tension
Surprise
Joy

What mood (s) might be useful to feel when composing a military march?
Anger
Excitement
Frustration

What mood (s) might be useful when telling a loved one a difficult fact about themselves (i.e. that they have a negative trait)?
Determination
Empathy
Indirectness

What mood (s) might be useful when trying to study, despite being very bored?
Curiosity
Detachment
Acceptance

What mood (s) might be useful when attempting to feign interest in a friend's long and boring story?
Humour
Sincerity
Self-distraction

What mood (s) might be useful when trying to avoid the temptation to watch television?
Acceptance
Excitement
Self-distraction

What mood (s) might be useful when telling your parents something that you believe will disappoint them?
Determination
Humour
Self-righteousness

Emotional Expression Test 4

The following test is the Identifying Emotions part of the MSCEIT test of emotional intelligence. In this task, you will be exposed to a number of faces. These will be photographs of faces that have been edited so that only the area around the eyes will be visible. Each face will appear for just a moment, and then disappear. This is designed to represent real life, where people's expressions often change quickly, and the ability to quickly evaluate emotions plays a crucial role. Then you will be asked to evaluate the emotional expression of the person whose face appeared. To give you a chance to try this out, a practice item will follow. Are you ready? Then select CONTINUE and try to read the emotional state of the photograph's subject. Please take your best guess as to the emotional state of the character in the photograph.

jealous
panicked
concerned
hateful

playful
comforting
irritated
bored

terrified
upset
arrogant
annoyed

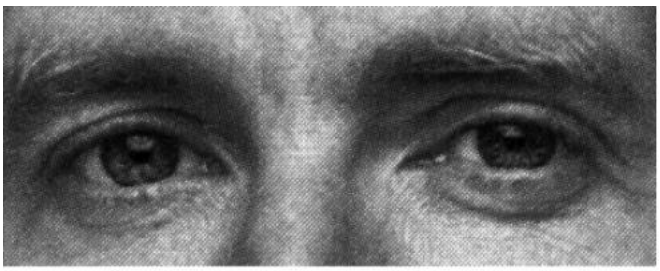
grieving
interested
friendly
confused

joking
flustered
desire
convinced

joking
insisting
amused
relaxed

irritated
sarcastic
worried
friendly

aghast
fantasizing
impatient
alarmed



apologetic
friendly
uneasy
dispirited

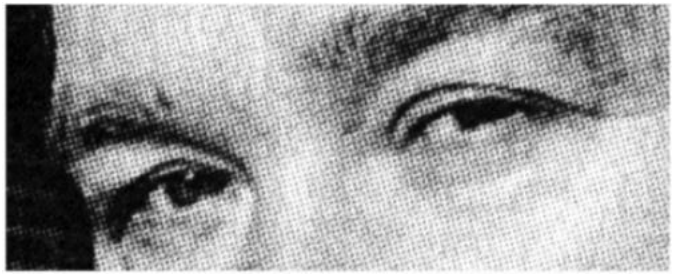
despondent
relieved
shy
excited

annoyed
hostile
horrified
preoccupied

cautious
insisting
bored
aghast

terrified
amused
regretful
flirtatious

indifferent
embarrassed
sceptical
dispirited

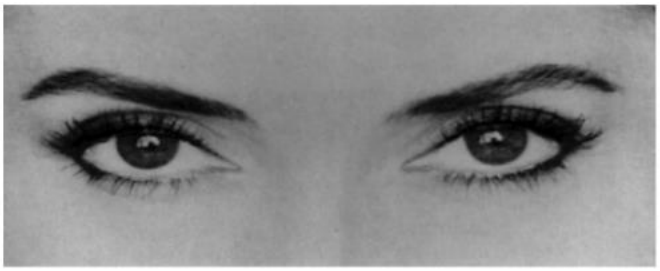


decisive
anticipating
threatening
shy

irritated
disappointed
depressed
accusing

contemplative
flustered
encouraging
amused

irritated
thoughtful
encouraging
sympathetic



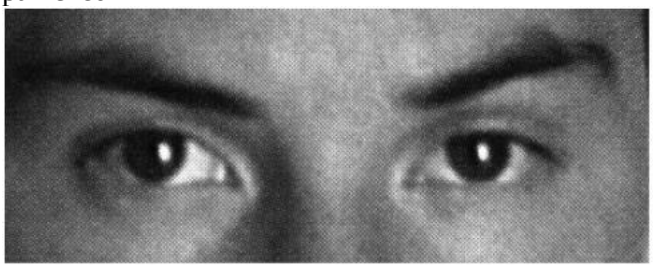
doubtful
affectionate
playful
aghast

decisive
amused
aghast
bored

arrogant
grateful
sarcastic
tentative

dominant
friendly
guilty
horrified

embarrassed
fantasizing
confused
panicked



preoccupied
grateful
insisting
imploring

contented
apologetic
defiant
curious

pensive
irritated
excited
hostile

panicked
incredulous
despondent
interested

alarmed
shy
hostile
anxious

serious
ashamed
bewildered
alarmed

False Negative Feedback

We are quite interested to know how people's self-perceptions of their emotional intelligence line up with their actual emotional intelligence scores. Please use the following space to estimate how well you did across the entire test. Note that for the MSCEIT, scores are expressed as a percentage. A 0% would represent the worst possible score; a 100% would represent a perfect score. Please express your best guess of your overall performance (across all these emotional intelligence tests) on a scale of 0-100. Do not enter the '%' mark; just indicate the number (e.g., 50) into the space. Press continue to view this item.

Please express your best guess of your overall performance (across all these emotional intelligence tests) from 0-100:
{ }

Calculating your estimated emotional intelligence score, calculated across the four subscales of the MSCEIT test of emotional intelligence. This may take a few moments.

There is a six second delay.

Overall, you scored 18 out of 80 (across all subscales), which equates to a 23% on the MSCEIT. This is equivalent to a 'slightly maladaptive' level of emotional intelligence. Please see the next page for more information.

Because it is difficult to understand an emotional intelligence score without a reference point, you can use the following rating scale to get a sense of what your emotional intelligence level (23%) might suggest (the conversion scale describes average expectations for people at each % level on the MSCEIT.) Press continue to view the chart.

Emotional Intelligence rating scale* interpretation

Score	Evaluation
81-100%	**Excellent** emotional intelligence abilities. Predictive of positive professional outcomes, with excellent self-regulation that helps people reach major life goals. In particular, this level of emotional intelligence predicts excellent coping under pressure. Elevated life satisfaction. Examples of people at this level are high-functioning: CEOs of companies, professors able to maintain multiple commitments, etc.
61-80%	**Very good** emotional intelligence abilities. People who score in this category have a natural flair for emotional processing in themselves and others. Predictive of faster rates of promotion in various occupations ranging from bankers to athletes. Very good coping under pressure, and heightened life satisfaction.
41-60%	**Modest** emotional intelligence abilities. People who score in this category usually show no particular advantages/disadvantages in professional or other outcomes.
21-40%	**Mildly maladaptive** in emotional intelligence abilities. People who score in this category include people with mild social/cognitive deficits, usually not in the spectrum of mental illness. Predictive of mild professional delays, or issues with life satisfaction. Coping under pressure is moderately compromised, and such people may use maladaptive strategies to deal with life and occupational stressors.
0-20%	**Major maladaption** in emotional intelligence abilities. Predictive of psychological issues, restrictions in professional development, and/or tremendous difficulties in self-regulation.

** Adapted from Baron-Cohen et al. (2008)*

Figure 1. Figure of EQ to participants, supposedly to help them interpret their score. All participants received a score of 23%, indicating 'mildly maladaptive' levels of EQ.

Then, participants see:

That is the end of the test. Thank you for your cooperation. Press continue to move into the next segment of the experiment.

Control Condition

Next, we would like to provide you with some additional information about the MSCEIT test.

This test was developed in 2002 by a team of researchers including Mayer, Salovey, and Caruso. The test has undergone several revisions through the years, to control for various aspects such as the ethnicity of the subjects displayed in the pictures, and the gender of the characters in the vignettes. It has now been used in many applications, such as predicting successes in coping and relationship satisfaction, and is considered the 'gold standard' for emotional intelligence testing in psychology.

Standard BIRG Condition

Please specify your regional background from the following dropdown menu. For the sake of this question, 'regional background' is the area you most identify with from having lived there currently or previously.

*** Each Canadian province, and 'Outside of Canada', are provided as options.*

In the following task, you will be asked to list several POSITIVE thoughts about the region that you identify with most. Please just try to be honest and thoughtful about what you say, and don't worry about being 100% factual; focus instead on being sincere about what you like about this region. After this, you will be shown several recent headlines about your region, collected for your interest. We are interested in whether your impressions line up with those catalogued across different kinds of publications.

In the following space, please record your thoughts on your background region of <*region*>. Please record thoughts that suggest what you consider to be positive attributes of your identified region. <region> is...

The following are a series of headlines about <*region*>, from this and the last three years. For each, please select the degree to which you consider the statement a positive one, on the scale provided (from strongly negative to strongly positive).

1) "Through Sequencing the SARS Genome, Canadian Researchers Develop 3 Vaccines and a Treatment for SARS". (Science) Explanatory note: the researchers were tagged by our data collection team as being from <*region*> : (5-point scale, *Strongly negative, Slightly negative, Neutral, Slightly positive, Strongly positive*)

2) "Canadians Hailing from <*region*> More Likely to Donate to Health Drives." (Macleans): (5-point scale, as above)

3) "Canadians Hailing from <*region*> More Likely to Donate to Health Drives." (Macleans): (5-point scale, as above)

4) "Rising Soccer Ace Originally from <*region*> - Fans Comment!" (Canadian Health Research): (5-point scale, as above)

5) "Nobel Peace Prize Hopeful Talks about Importance of Background" (Life). Explanatory note: data collection team tagged the candidate John Aldridge as being from <*region*>: 5-point scale, as above)

Press continue to conclude

Modified BIRG Condition

In a moment, we will have you identify your regional background. We are interested in how similar or dissimilar you feel you are to your background region.

Please specify your regional background from the following dropdown menu. For the sake of this question, 'regional background' is the area you most identify with from having lived there currently or previously.

*** Each Canadian province, and 'Outside of Canada', are provided as options.*

Now that you have selected your region, we would like you to just take a moment and think about how much variability or differences exist among people in that region. Do you think that people from your background region are generally pretty similar to one another? Or are there lots of differences among people from your background region? Just take a minute or two to think this over. Please proceed to the next page when you are done.

In the following task, we would like you to think about some ways in which you think you are similar to people in your background region, and/or some ways you think you are different. List up to 5 examples each in the box below. Please label your similarity examples by using SIM: and label your difference examples by using DIFF:

In the following task, you will be asked to list several POSITIVE thoughts about the region that you identify with most. Please just try to be honest and thoughtful about what you say, and don't worry about being 100% factual; focus instead on being sincere about what you like about this region. After this, you will be shown several recent headlines about your region, collected for your interest. We are interested in whether your impressions line up with those catalogued across different kinds of publications.

In the following space, please record your thoughts on your background region of <*region*>. Please record thoughts that suggest what you consider to be positive attributes of your identified region. <*region*> is...

The following are a series of headlines about <*region*>, from this and the last three years. For each, please select the degree to which you consider the statement a positive one, on the scale provided (from strongly negative to strongly positive).

1) "Through Sequencing the SARS Genome, Canadian Researchers Develop 3 Vaccines and a Treatment for SARS". (Science) Explanatory note: the researchers were tagged by our data collection team as being from <region> : (5-point scale, *Strongly negative*, *Slightly negative*, *Neutral, Slightly positive*, *Strongly positive*)

2) "Canadians Hailing from <*region*> More Likely to Donate to Health Drives." (Macleans): (5-point scale, as above)

3) "Canadians Hailing from <*region*> More Likely to Donate to Health Drives." (Macleans): (5-point scale, as above)

4) "Rising Soccer Ace Originally from <*region*> - Fans Comment!" (Canadian Health Research): (5-point scale, as above)

5) "Nobel Peace Prize Hopeful Talks about Importance of Background" (Life). Explanatory note: data collection team tagged the candidate John Aldridge as being from <*region*>: 5-point scale, as above)

Press continue to conclude

BFI-44 Extraversion

The following questionnaire will list a number of characteristics that may or may not apply to you. For example, "do you agree that you are someone who likes to spend time with others"? Please select a response that indicates the extent to which you agree or disagree with that statement. Click on the bottom-right button of this screen to begin.

1 Disagree Strongly 2 Disagree a little 3 Neither agree nor disagree 4 Agree a little 5 Agree Strongly

I am someone who is talkative
I am someone who is reserved
I am someone who is full of energy
I am someone who generates a lot of enthusiasm
I am someone who tends to be quiet
I am someone who has an assertive personality
I am someone who is sometimes shy, inhibited
I am someone who is outgoing, sociable
I am someone who is tends to find fault with others
I am someone who is helpful and unselfish with others
I am someone who starts quarrels with others
I am someone who has a forgiving nature
I am someone who is generally trusting
I am someone who can be cold and aloof
I am someone who is considerate and kind to almost everyone
I am someone who is sometimes rude to others
I am someone who likes to cooperate with others
I am someone who does a thorough job
I am someone who can be somewhat careless
I am someone who is a reliable worker
I am someone who tends to be disorganized
I am someone who tends to be lazy
I am someone who perseveres until the task is finished
I am someone who does things efficiently
I am someone who makes plans and follows through with them
I am someone who is easily distracted
I am someone who is depressed, blue
I am someone who is relaxed, handles stress well
I am someone who can be tense
I am someone who worries a lot
I am someone who is emotionally stable, not easily upset
I am someone who can be moody
I am someone who remains calm in tense situations
I am someone who gets nervous easily
I am someone who is original, comes up with new ideas
I am someone who is curious about many different things

I am someone who is ingenious, a deep thinker
I am someone who has an active imagination
I am someone who is inventive
I am someone who values artistic, aesthetic experiences
I am someone who prefers work that is routine
I am someone who likes to reflect, play with ideas
I am someone who has few artistic interests
I am someone who is sophisticated in art, music, or literature

State Self-Esteem Scale (SSES)

Please continue with some personality measures. We are interested in the type of people who do well or poorly on emotions tests, and think that some of the following may be related, or predictive of emotional intelligence. First, this is a questionnaire designed to measure what you are thinking at this moment. There is, of course, no right answer for any statement. The best answer is what you feel is true of yourself at this moment. Be sure to answer all of the items, even if you are not certain of the best answer. Again, answer these questions as they are true for you RIGHT NOW. Press CONTINUE when you are ready to begin.

1 Not at all 2 A little bit 3 Somewhat 4 Very much 5 Extremely

SSE questions:
I feel confident about my abilities
I am worried about whether I am regarded as a success or failure.
I feel satisfied with the way my body looks right now.
I feel frustrated or rattled about my performance.
I feel that I am having trouble understanding things that I read.
I feel that others respect and admire me.
I am dissatisfied with my weight.
I feel self-conscious.
I feel as smart as others.
I feel displeased with myself.
I feel good about myself.
I am pleased with my appearance right now.
I am worried about what other people think of me.
I feel confident that I understand things.
I feel inferior to others at this moment.
I feel unattractive
I feel concerned about the impression I am making.
I feel that I have less scholastic ability right now than others.
I feel like I'm not doing well.
I am worried about looking foolish.
Dupe Questions:
I am someone who is quite emotional.
I feel emotional much of the time.
I feel that emotions are an important part of my life.
I feel enriched by the positive emotions of others.
I am confused by my emotions.
I distrust the emotions of others.
I am interested in testing my own feelings against reality.

I am someone who is considered 'emotional'.
I am someone who does not care to be told how to feel.
I feel very precise and clear emotions.
I feel very vague and uncertain emotions.
I am someone considered 'cold' or emotionless.
I feel sadness as often as happiness.
I feel humor as often as seriousness.
I am someone who considers emotions to be part of the spice of life.

Suspicion Items

You will now be asked to fill out a short questionnaire regarding your participation in the START experiment. For each, consider the question, and answer in the space provided. If you have nothing to say, just type N/A into the box and press CONTINUE. (The program will not allow you to skip the question without inputting some text.) Otherwise, answer as you see fit. Please click continue to begin.

What do you think the purposes of the study might have been?

Do you think there was any information regarding the purpose of this study that the researcher did not include in the letter of information or the introductory instructions? If so, what do you think this information was?

During the study, did you think there was any information provided that was inaccurate? If so, what was it?

Did you at any time doubt that the testing you performed was not real, or that the results were suspicious? If so, when did you become suspicious and why?

Appendix C

Study One Descriptive Statistics and Reliabilities for the BFI

The agreeableness subscale had an acceptable level of reliability (α = .77) with a possible range of scores from 1-5. It had a skewness of -.48 and kurtosis of -.33. The mean score for agreeableness was 3.86 (*SD* = .64). The conscientiousness subscale (α = .78) had a possible range of scores from 1-5 with skewness of -.42 and kurtosis of -.20. The mean conscientiousness score was 3.55 (*SD* = .63). Neuroticism (α = .82) ranged from a possible scale of 1-5 with a skewness of -.12 and kurtosis of 0.46. The mean score was 3.33 (*SD* = .77). Finally, the openness to experience subscale (α = .75) had a possible range of scores from 1-5 with skewness of -.35 and kurtosis of -.17. The mean score of this subscale was 3.40 (*SD* = .62).

Appendix D

Regression Analyses of State Self-Esteem Subscales as the Dependent Variable

$R^2 = .06$, $F(5, 202) = 2.56$, $p < .05$.

Table C1. Results for Individual Predictors for Performance Self-Esteem Subscale (Study One)

Effect	*B*	*se*	*t*	*p*
Extraversion	.16	.10	1.57	.118
BIRG	.10	.12	.85	.395
Modified BIRG	-.12	.12	-.95	.345
Ext x Traditional BIRG	.05	.14	.39	.700
Ext x Modified BIRG	-.03	.14	-.20	.842

The *performance self-esteem* subscale (α = .80) consisted of 7-items. Three items were positively keyed such as, "I feel confident about my abilities," and, "I feel as smart as others." Four items were negatively keyed such as, "I feel frustrated or rattled about my performance." The mean score for this subscale was 3.21 (*SD* = .73) and skewness of this scale was -.111 and the kurtosis was -.156.

R^2 = .09, $F(5, 202) = 3.99$, $p < .01$.

Table C2. Results for Individual Predictors for Appearance Self-Esteem Subscale (Study One)

Effect	*B*	*se*	*t*	*p*
Extraversion	.23	.11	2.03	.044
BIRG	.13	.14	.93	.355
Modified BIRG	-.17	.14	-1.21	.226
Ext x Traditional BIRG	.04	.16	.22	.828
Ext x Modified BIRG	.0001	.16	.0007	.999

The *social self-esteem* subscale (α = .88) consisted of 7-items such as, "I am worried about whether I am regarded as a success or failure," and, "I feel self-conscious," all of which were negatively keyed. The skewness of this subscale was .111 and the kurtosis was -.62 with a mean score of 2.98 (*SD* = .89). The mean score was 2.98 (*SD* = .89).

R^2 = .09, $F(5, 202) = 3.77$, $p < .01$.

Table C3. Results for Individual Predictors for Social Self-Esteem Subscale (Study One)

Effect	*B*	*se*	*t*	*p*
Extraversion	.26	.12	2.15	.033
BIRG	.07	.15	.50	.618
Modified BIRG	-.14	.15	-.96	.338
Ext x Traditional BIRG	.05	.17	.30	.768
Ext x Modified BIRG	-.01	.16	-.09	.928

The *appearance self-esteem* subscale (α =.87) consisted of 6-items. Four of these items were positively keyed such as, “I feel satisfied with the way my body looks right now,” and, “I feel that others respect and admire me.” The other two items were negatively keyed such as, “I am dissatisfied about my weight.” The mean score for this subscale was 3.13. (*SD* = .85) with a skewness of this subscale was -.42 and kurtosis was -.37.

Appendix E

Regression Results after Removing Suspicious Responses on First and Second Funnel Interview Question Removed for Study One

$R^2 = .11$, $F(5, 198) = 5.12$, $p < .001$.

Effect	*B*	*se*	*t*	*p*
Extraversion	.27	.10	2.78	.006
BIRG	.05	.12	.44	.658
Modified BIRG	-.18	.12	-1.52	.129
Ext x Traditional BIRG	-.01	.14	-.06	.954
Ext x Modified BIRG	-.07	.13	-.55	.580

Appendix F

Results After Including Only High Identifiers in Study One

$R^2 = .10$, $F(5, 166) = 3.61$, $p < .05$

Effect	*B*	*se*	*t*	*p*
Extraversion	.21	.10	2.21	.029
BIRG	.10	.13	.76	.445
Modified BIRG	-.15	.13	-1.12	.264
Ext x Traditional BIRG	.07	.15	.48	.636
Ext x Modified BIRG	-.05	.14	-.35	.724

Note. We removed participants who identified with their province at a score 4 or less. We had to include everyone in condition 1 in the analysis since we did not ask them how much they identified with their province.

Appendix G

Study Two Materials

Control Condition

Next, we would like to provide you with some additional information about the MSCEIT test.

This test was developed in 2002 by a team of researchers including Mayer, Salovey, and Caruso. The test has undergone several revisions through the years, to control for various aspects such as the ethnicity of the subjects displayed in the pictures, and the gender of the characters in the vignettes. It has now been used in many applications, such as predicting successes in coping and relationship satisfaction, and is considered the 'gold standard' for emotional intelligence testing in psychology.

Standard DSC Condition

Next, we would like to provide you with some additional information about the test.

This test was developed in 1997, and used consistently since then for the purposes of analysing emotional intelligence. In the 3 years since we started our research on the validity of this test, it has come to our attention that students generally like to see where they stand in comparison with others who have taken the test, particularly recent participants in the same experiment.

Press the button, below, to have the computer randomly search for the previous user's score and report it. Depending on the size of the database, this may take a few seconds.

** *After clicking:*
Searching (please wait)

A randomly selected participant who completed the test on this computer scored 12 out of a possible 80 items correctly, which amounts to 15%. Press the button below to view another subject.

** *After clicking:*
Searching (please wait)

A randomly selected participant who completed the test on this computer scored 14 out of a possible 80 items correctly, which amounts to 18%. Press the button below to view another subject.

** *After clicking:*
Searching (please wait)

There are no other subjects in the database for this computer, or subject data stored prior was more than one week ago and archived. Please press CONTINUE when you are ready to proceed.

Modified DSC Condition

We would like you to think of what is common between you and other Queen's students. Queen's students share many background factors with each other and have a lot of things in common. Please list up to **4** ways in which you think you are SIMILAR to other Queen's students without repeating yourself. You may use a bulleted or numbered list.

Next, we would like to provide you with some additional information about the test.

This test was developed in 1997, and used consistently since then for the purposes of analysing emotional intelligence. In the 3 years since we started our research on the validity of this test, it has come to our attention that students generally like to see where they stand in comparison with others who have taken the test, particularly participants in the same experiment.

Press the button, below, to have the computer automatically search for the previous user's score and report it. Depending on the size of the database, this may take a few seconds.

Searching (please wait)

The last participant who completed the test on this computer scored 12 out of a possible 80 items correctly, which amounts to 15%. Press the button below to view another subject.

[OR]

Searching (please wait)

The last participant who completed the test on this computer scored 14 out of a possible 80 items correctly, which amounts to 18%. Press the button below to view another subject.

[THEN]

Searching (please wait)

There are no other subjects in the database for this computer, or subject data stored prior was more than one week ago and archived. Please press CONTINUE when you are ready to proceed.

Appendix H

Correlations of Predictors

Table 4

Correlations Between all Predictors in Study Two

Variable	1	2	3	4
1. Extraversion	-			
2. SSES	.25*	-		
3. Independence	.21	.61**	-	
4. Interdependence	.18	-.31**	-.26*	-

Note. *p<.05, **p<.01

Appendix I

Descriptive statistics and reliabilities for remaining BFI subscales in Study Two

The agreeableness subscale had an acceptable level of reliability (α = .77) with a range of scores from 1-5. It had a skewness of -.71 and kurtosis of -.12. The mean score for agreeableness was 3.90 (*SD* = .61). The conscientiousness subscale (α = .82) had a range of scores from 1-5 with skewness of -.30 and kurtosis of -.89. The mean conscientiousness score was 3.52 (*SD* = .67). Neuroticism (α = .79) responses ranged from 1-5 with a skewness of -.28 and kurtosis of 0.48. The mean score was 3.26 (*SD* = .73). Finally, the openness to experience subscale (α = .70) had a range of scores from 1-5 with skewness of -.41 and kurtosis of .26. The mean score of this subscale was 3.52 (*SD* = .55).

Appendix J

Descriptive statistics and reliabilities for the SSES subscales in Study Two

Responses were scored for the subscales in a similar fashion. The *performance self-esteem* subscale (α = .82) consisted of 7-items. The mean score for this subscale was 3.24 (*SD* = .73). The *social self-esteem* subscale (α = .86) consisted of 7-items with a mean score of 3.01 (*SD* = .86). The *appearance self-esteem* subscale (α =.87) consisted of 6-items. The mean score for this subscale was 3.11 (*SD* = .84).

Appendix K

Regression Results for Study Two with Suspicious Responses on Second Funnel Interview Question Removed

R^2 = .11, $F(5, 69) = 4.91$, p=.146

Effect	*B*	*se*	*t*	*p*
Extraversion	.48	.18	2.71	.008
Standard DSC	-.01	.20	-.07	.945
Modified DSC	.08	.19	.41	.681
Ext x Standard DSC	-.34	.24	-1.38	.171
Ext x Modified DSC	-.50	.26	-1.92	.059

Appendix L

Independence as a Predictor in Regression Model for Study Two

$R^2 = .45$, $F(11, 66) = 4.91$, $p < .001$.

Results for Individual Predictors in Regression Model with Independence

Effect	*B*	*se*	*t*	*p*
Extraversion	.24	.16	1.49	.140
DSC	-.03	.18	-.15	.884
Modified DSC	-.05	.17	-.27	.787
Ext x Standard DSC	-.14	.22	-.62	.539
Ext x Modified DSC	-.19	.23	-.86	.394
Independence	.56	.13	4.16	.000
Ext x Independence	-.02	.13	-.14	.887
Independence x Standard DSC	-.12	.22	-.57	.571
Independence x Modified DSC	-.14	.22	-.63	.533
Ext x Standard DSC x Independence	.08	.26	.30	.768
Ext x Modified DSC x Independence	-.47	.26	-1.79	.078

Appendix M

Interdependence as a Predictor in Regression Model for Study Two

$R^2 = .25$, $F(11, 66) = 2.00$, $p < .05$

Results for Individual Predictors in Regression Model with Interdependence

Effect	*B*	*se*	*t*	*p*
Extraversion	.53	.17	3.12	.003
DSC	.02	.20	.10	.917
Modified DSC	.09	.20	.47	.641
Ext x Standard DSC	-.34	.24	-1.43	.159
Ext x Modified DSC	-.37	.27	-1.37	.175
Interdependence	-.40	.23	-1.72	.091
Ext x Independence	-.16	.27	-.60	.555
Interdependence x Standard DSC	.24	.37	.64	.523
Interdependence x Modified DSC	-.09	.36	-.26	.799
Ext x Standard DSC x Interdependence	.30	.42	.71	.478
Ext x Modified DSC x Interdependence	.39	.46	.84	.406