

Hostility in the context of depression: Testing the relevance of perceived social ranking

by

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ABSTRACT

Theoretical positions (Sloman & Gilbert, 2000), current research (Robbins & Tanck, 1997) and clinical observations (APA, 1994) have generally concluded that depressed populations tend to demonstrate an elevated level of hostility. Based on the premises of the Social Rank Theory (SRT; Sloman & Gilbert, 2000), the current study explores the purported etiological underpinnings of the co-occurrence between depression and hostility. The SRT regards depression as a state of inferiority resulting from a drop in social rank and hostility as stemming from a sense of injustice over this inferiority. To test this idea, measures of perceived social rank, depression, trait anger, anger expression and perceived injustice were administered to 97 university students at two time points, one month apart. Long-term rank change was measured retrospectively at Time 1 and short-term rank change was measured prospectively by sampling at Time 1 and Time 2. Three hypotheses were advanced: 1) social rank would be negatively associated with depression; 2) unfavourable rank change would predict greater levels of depression; and 3) unfavourable rank change from an initially superior rank would predict greater levels of anger and perceived injustice. Results were partially supportive of the hypotheses. As expected, social rank was negatively associated with depression. As well, a long-term change in social rank predicted greater levels of anger suppression. Results were discussed with respect to their consistency with the SRT. Potential weaknesses of the methodology and future directions of this line of inquiry were also presented.

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Introduction

Over the past several decades, theoretical positions (e.g., Gilbert 1994; Caines et al., 1968), research outcomes (e.g., Brody, Haaga, Kirk & Soloman, 1999; Bridewell & Chang, 1997), and clinical observations (e.g., Perlis et al., 2005; Fava et al., 1991; Goldman & Haaga, 1995; APA, 1994; Weissman, Klerman, & Paykel, 1971) have consistently indicated an elevation in various forms of hostility among depressed populations. For example, correlational studies have found an association between depression severity and levels of hostile attitudes towards others, including suspicion and resentment, among healthy samples (e.g., Becker & Lesiak, 1977; Selby & Neimeyer, 1986). Hostile attitudes are also shown to be elevated in clinically depressed patients and appear to diminish upon recovery from depression (Friedman, 1970).

Similarly, research focusing on the affective aspects of hostility has concluded that depression is often accompanied by increased levels of irritability and anger (Goldman & Haaga, 1995; Robbins & Tanck, 1997; Riley, Treiber, & Woods, 1989). For example, depressed outpatients experience more anger and engage in more anger suppression than nondepressed individuals (Goldman & Haaga, 1995). In fact, the DSM-IV recognizes irritability as an associated feature of Major Depressive Episode among adults and deems it a diagnostic criterion for children (APA, 1994). An epidemiological study estimated that around 40% of depressed outpatients are irritable more than half the time (Perlis et al., 2005).

Behaviourally, depressed individuals are reported to exhibit verbal aggression, especially to those who are close to them. Weissman et al. (1971) found that depressed women report greater belligerence and contempt towards others than nondepressed

women, especially to their spouses and children. Research settings involving non-clinical samples also showed that dysphoric women are more likely to exhibit anger in the form of criticisms towards the partner (McCabe & Gotlib, 1993). Compared to nondepressed individuals, those who are clinically depressed exhibit a higher rate of “anger attacks”, a term for sudden outbursts of anger with symptoms of sweating and trembling (Fava, Anderson & Rosenbaum, 1990). However, there is also evidence that depression is associated with anger suppression and that anger suppression stems from a fear of relationship damage and further contributes to depression (Goldman & Haaga, 1995; Brody et al., 1999).

Taken together, hostility and its related symptoms seem to play an important role in the presentation of depression across severity levels. These trends are documented across age groups, including children (Kashani, Dahlmeier, Borduin, Soltys & Reid, 1995), adolescents (Stein et al., 1998), and adults (Selby & Neimeyer, 1986), and distress severity, from normal (Robbins & Tanck, 1997), to the subclinically depressed (Gilbert et al., 1995), to psychiatric patients diagnosed with depression (Pasquini et al., 2004).

Variation in the Definition of Hostility

Research in hostility has adopted a broad definition of the construct. Some researchers refer to hostility as purely a negative attitude characterized by cynicism, resentment and denigration of others (Ekman & Davidson, 1994). This conceptualization views hostility as separate from, although contributory to, anger and aggression (Buss & Perry, 1992; Ekman & Davidson, 1994). Perhaps because hostility is closely associated with anger and aggression, many investigations (Brummett et al., 2000; Buss & Durkee, 1957; Riley et al., 1989) have chosen to view hostility as a conglomerate of resentful and

cynical attitudes, anger and aggressive behaviour. For example, Riley and colleagues stated that “hostility denotes a complex array of both anger experience and expression” (Riley et al., 1989, p.669). The current investigation has elected to view hostility as a multi-faceted construct involving hostile cognitions, angry affect and verbal and physical aggression.

Hostility in the Context of Depression: Theoretical Speculations

The elevation of hostility in depressed individuals is not only interesting from a conceptual standpoint, it also has important implications for well-being. Depressed individuals who are irritable tend to experience even greater psychological distress, poorer overall functioning, and higher rates of suicidal ideation and attempts than those who are depressed but not irritable (Boergers et al., 1998; Perlis et al., 2005; Stein, Apter, Ratzoni, Har-Even & Avidan, 1998). Hostile behaviour is also interpersonally aversive and likely leads to relationship discord (McCabe & Gotlib, 1993), which may further contribute to depressive experiences (Wiebe & McCabe, 2002). Taken together, there is a consensus among researchers that hostility is commonly co-occurring with depression, and is associated with a more severe clinical presentation. Several theoretical positions have emerged to account for this occurrence.

One theoretical position that has inspired considerable research is the psychoanalytic view that depression is an expression of aggressive feelings towards a lost love object that is directed inward towards the self (Freud, 1917). Research investigating the validity of this hypothesis has looked at the direct associations among inward anger expression, anger suppression, self-criticism and guilt. Evidence for this position is equivocal, however, as depression has been shown to be associated with not just self-

directed angry feelings like self-hate (Meehan, O'Connor, Berry & Weiss, 1996) but also other-directed expressions of anger and hostility such as verbal aggression towards others (McCabe & Gotlib, 1993; Johnston, Rogers & Searight, 1991) and other-directed cynicism (Becker & Lesiak, 1977).

Theory and research have also suggested that depression with the presence of overt hostility is a male gender expression of depression (e.g., Möller-Leimkühler, Bottlender, Strauß, & Rutz, 2004; Fava, Nolan Kradin & Rosen, 1995; Winkler, Pjrek & Kasper, 2005; Zoltán, Pestality, Pihlgren, Rutz, 1998). For example, a study on depressed patients found that, compared to females, males exhibited more anger attacks and were more likely to overreact angrily during their most recent depressive episode (Winkler et al., 2005). The fact that males are less likely to internalize their distress compared to women has been speculated to account for the elevated rate of depression among females compared to that of males (Cox, Stabb & Hulgus, 2000). For example, Harper and Arias (2004) found that feelings of shame in reaction to childhood abuse predict anger in men and depression in women and suggested that women tend to focus on themselves when feeling shameful while men tend to “bypass” their shame by becoming angry. Despite having promising clinical utility, conceptualizing hostile depression as a “male depressive syndrome” (Möller-Leimkühler et al., 2004) does not account for why female depressed individuals exhibit hostility as well (e.g., McCabe & Gotlib, 1993; Wiebe & McCabe, 2002).

There has also been recent evidence indicating that the link between depression and hostility could be explained by maladaptive cognitions (Carmony & DiGiuseppe, 2003; Wiebe & McCabe, 2002). For example, using a relational perfectionism scale,

Wiebe and McCabe (2002) have found that unrealistic relationship expectations for significant others mediates the association between depression and hostility. This outcome suggests that hostile behaviour among depressed individuals stems from unmet expectations of others. Despite its logical appeal, there have been few studies, to our knowledge, that specifically examine the effect of unfulfilled expectations in explaining hostility within depression.

The Social Rank Theory: Depression as a State of Perceived Inferiority

Although previous studies have made interesting headway in explaining hostility in the context of depression, there is still much to be explored in this area. For example, it remains unclear why certain depressed individuals would exhibit elevated levels of hostility while others do not. To investigate this question, it is necessary to generate hypotheses for situations that would contribute to both depression and hostility.

One theory that simultaneously accounts for both depressive symptoms and hostility and has been supported by empirical evidence is Social Rank Theory (SRT; Gilbert, 1994; Sloman & Gilbert, 2000). SRT posits that perceived social rank and changes in social rank cause change to both depression and aggression. SRT is an evolutionary theory, and makes extensive use of analogy with animal behaviour. SRT assumes that we behave like other social animals by instinctively organizing ourselves in a social hierarchy and constantly striving to attain and maintain a higher social status in order to gain access to resources. Thus, the authors purport that humans are in a constant struggle for dominance with each other.

According to Sloman and Gilbert (2000), in dominance competitions in social animals, a set of physiological and behavioural changes occurs in the individual who

loses a dominance competition. These changes, collectively called the Involuntary Defeat Strategy (IDS), include increased passivity, submissiveness and social withdrawal, and lowered energy and self-esteem. These changes serve two main purposes: 1) to help the losing individual recognize its subordination and 2) to signal defeat to the winner, bringing down both the defeated individual's aggression and discouraging the superior rival from attacking further.

According to the SRT, symptoms of subordination are adaptive because they help to maintain the social hierarchy and therefore serve to benefit a social group (Sloman & Gilbert, 2000). Such symptoms of defeat also allow the weaker individual to mentally and physically disengage from the unfavourable competitive situation and to move on to an easier endeavour that would have a greater probability of success (Sloman & Gilbert, 2000). The authors further speculate that modern-day humans continue to experience the effects of the IDS mechanism. Our cognitive complexity and the evolution of civilization, however, have led us to become rank-sensitive even in face of symbolic defeat, such as losing a job or a romantic interest (Sloman & Gilbert, 2000).

There are two situations that purportedly causes an individual to linger in the defeated state. First, the individual may not have an available alternative to choose from when trying to escape from the superior individual or, in contemporary terms, the defeating situation. Second, the individual may not be able to mentally disengage from the defeating situation. In both of these scenarios, the defeated individual becomes entrapped in a prolonged state of subordination, manifesting enduring submissiveness, low self-regard and passivity. Sloman and Gilbert (2000) regard these features as symptoms of depression. The SRT implies that the state of having an inferior status in

the social hierarchy and the process of losing status would both be associated with depressive symptoms (Gilbert, 1994). Indeed, a growing body of research has demonstrated an association between inferiority and depression (e.g., Allan & Gilbert, 2002; Fournier, Moskowitz & Zuroff, 2002; Gilbert et al., 1995; Irons & Gilbert, 2005; Smith, Parrott, Ozer & Moniz).

Sloman and Gilbert (2000) further argue that hostility results when an individual loses, but is unable to disengage from the competitive situation because he or she perceives that the defeat was unjust. Instead of experiencing complete acceptance of a subordinate role and being ready to move to a different target, the individual may bear resentment towards the defeat situation. Such attitudes purportedly lead to a de-escalation of overt aggression (i.e., via an onset of the IDS) and entail continued inner hostility directed toward the defeating force.

One potential situation in which an individual would perceive an unjust defeat would be a drop from a superior status to an inferior status when he or she feels deserving of a superior status. Based on ethological observations, Price (1991) argued that the nature of depression may be different between a situation in which one is initially inferior and sinks even lower, and a situation in which one is initially superior and is then forced to adopt an inferior position. He claims that when one is “coerced into lowerness”, he or she would “likely to be tempted to rebellion” (Price, 1991, p.341). He also claims that those who maintain a “pre-existing subordinate position” would simply exhibit similar characteristics of inferiority (Price, 1991, p. 331). Although his theory is not explicit as to how the two types of depression would manifest differently, it does imply that falling from an originally dominant position would lead to perceived inferiority accompanied by

inner hostility, while those who drop further from an initially subordinate position or maintain inferiority would not exhibit hostility. Thus, one possibility for a subgroup of hostile depressives might be the result of perceived drops in status from initially superior positions.

Perceived Injustice

One interesting phenomenon that the SRT mentions but does not elaborate is the cognitive processing that occurs in the mind of an individual who experiences both a fall in status and hostility. Given that falling from a superior rank to an inferior rank is likely frustrating, it is assumed that such change may also entail, at least to a small extent, perceptions of injustice or unfairness. Hence, the current study postulates that perceived injustice will arise when one experiences a drop in social rank from a superior status to an inferior status.

Although this extension of the SRT has not yet received any empirical support, several findings in the literature suggest that the perception of being trapped in an undesirable situation and externalization of frustrations are both a part of the depressive presentation (e.g., Allan & Gilbert, 2002; Carmony & DiGiuseppe, 2003; Gilbert et al., 2002; Gilbert, Cheung, Irons & McEwan, 2005). For example, clinical observations show that depressed patients exhibit “anger attacks” whenever they feel “trapped” in their depressive thoughts and mood (Fava & Rosenbaum, 1999, p. 21). Indeed, a sense of entrapment and a desire to escape have also been associated with increased anger experiences among depressed individuals (Gilbert, Gilbert & Irons, 2004).

The sense of helplessness and entrapment that plagues depressed people may foster anger and frustration when the individual believes that he or she is entitled to a

better situation. Feelings of anger and frustration may stem from a belief that one is entitled to a better situation, but is denied what he or she deserves. This notion is consistent with Wiebe and McCabe's (2002) finding that the hostility which depressed women display toward their friends is partly due to rigid expectations that are likely unmet. In addition, feeling inferior can trigger envy towards other and bitterness about one's own defeated state (Stöber, 2003). Among healthy young adults, being inferior in a performance task predicted envy towards their superior peers and feelings of depression, hostility and perceptions of injustice (Smith et al., 1994).

Furthermore, hostility appears to be an especially likely outcome if a depressed individual places blame on others for his or her misery. For example, in an experiment involving young adults, anger is shown to be higher for participants who had little power over a stressful event and made external attributions than for those who had little power but attribute their misfortunes to their own doing (Carmony & DiGiuseppe, 2003).

Taken together, previous evidence suggest that a perception of unfairness can emerge in those who self-identify as inferior, especially when there they perceive incongruence between what they are entitled to and what they are actually receiving. One situation in which this incongruence may emerge is when one falls to an inferior rank after enjoying superiority. This situation is postulated to induce perceptions of injustice and hostility in addition to depression.

Current Study

The current study aims to expand Sloman and Gilbert's theory (2000) by positing that the "resentment" experienced by those who fall in the social hierarchy is characterized by a sense of injustice. If this were true, the more superior and efficacious

one perceives oneself to be initially, the more angry and resentful one will likely feel in a state of subordination and defeat.

Since this is an exploratory study, the goal was to select a sample that would be the most sensitive to this phenomenon. First year university students appear to be a logical choice since they have presumably finished at the top half of their graduating class in order to qualify for university entrance. For example, admission to the undergraduate program at the University of Waterloo requires a minimum of 70% grade average. Upon entering university, it is also likely that they have experienced a drastic drop in their grades because of the increase in difficulty and competition. In other words, they are likely to have experienced a symbolic defeat which should result in perceived inferiority. Therefore, we expect most first year university students to perceive some level of decline in their social ranking, regardless of whether or not they have objectively dropped in their ranking. The current study measured rank change over a one-month period in a prospective longitudinal design and an extended change over a three-year period in a retrospective design. Measuring both a short-term change (i.e., over past month) and a long-term change (i.e., over past 3 years) allows for a contrast in the importance of the two types of change, information that has not been made explicit in the SRT. The current study elected to measure the emotional expression of hostility, namely, anger, because it has been successfully captured by scales with good psychometric properties (Eckhardt, Norlander & Deffenbacher, 2004). From hereafter, “hostility” in the current report refers to the emotional expression of hostility, namely, anger.

Objectives and Hypotheses

The first objective is to investigate the relevance of social rank in depression severity. In keeping with Sloman and Gilbert's theory (2000) that depression is a state of inferiority, it was hypothesized that those who perceive a lower social ranking would report elevated levels of depression (Hypothesis 1). Therefore, a negative correlation is expected to occur between measures of social rank and depression. Previous investigations have demonstrated this relationship in both normal and clinical populations (Gilbert, Allan & Trent, 1995). This association is expected to be replicated in the current sample of young adults with both academic rank and global social rank.

The second objective is to investigate whether a perceived change in social rank predicts depression severity. SRT posits that a drop in ranking, which entails a perception of being defeated, will activate cognitive, physiological and affective depressive symptoms (Gilbert, 1994). These symptoms are well-captured by the Beck Depression Inventory-II (BDI-II; Beck, Steer & Brown, 1996). Thus, the BDI-II is employed in the current study to detect changes in depression severity as a result of perceived drop in global and academic ranking. It is hypothesized that unfavourable rank change will predict more elevated depression severity (Hypothesis 2).

Finally, the third goal is to test the influence of perceived changes of social rank on students' likelihood to experience perceived injustice and hostility. To our knowledge, there has been no research directly addressing this question. Therefore, the third hypothesis is of an exploratory nature. Thus, an extension of the SRT in the current investigation postulates that a drop in social ranking when one was originally of a superior status would lead to hostility and perceived injustice. Given that most of the participants had recently finished highschool and had likely experienced competence and

academic superiority, it is likely that most of them had originally felt superior. Hence, we hypothesized that an unfavourable change in perceived ranking would predict elevated hostility and perceived injustice as a main effect (Hypothesis 3). We also expect that this relation would be stronger for those who enjoyed previously superior ranking. Therefore, unfavourable rank change is hypothesized to interact with initial rank to further predict hostility and perceived injustice (Hypothesis 4)¹.

An attempt is also made to distinguish the effects of global social ranking from those of domain-specific ranking, although no hypotheses were made to this end. The author chose to measure academic ranking due to the specific relevance to the experience of academia for first year university students.

Method

Participants

A sample of 97 university students (55 women; 42 men) taking a first year introductory psychology course at the University of Waterloo were recruited during the Fall semester of 2005. Participants averaged 19.2 years of age ($SD = 3.1$) and 0.46 years of university education ($SD = 0.95$); Seventy-five percent of participants were in their first year of university; 10% were in their second year; 15% were in their third year or higher. Thirty-eight percent of participants reported their ethnic identity as Caucasian; 28% as Asian; 5% East Indian; 5% African; 3% Middle Eastern; 2% Aboriginal; 1% Hispanic; and, 18% as Other or did not specify.

Instruments

Predictor variables

¹ To test this hypothesis, hostility and perceived injustice will be regressed onto the following three interaction terms: Past Global Rank x Long Term Rank change, Time 1 Global Rank x Short Term Global Rank Change, and Time 1 Academic Rank x Short Term Academic Rank Change.

Social Rank was measured using two variables: perceived academic ranking and perceived global social ranking (see Appendix A & B, respectively).

Perceived Academic Rank was quantified by asking participants to compare themselves with their friends and peers in terms of their academic abilities. The questionnaire presented the following two statements, “when I compare myself with my *friends*, I estimate that my general academic ability is better than...” and “When I compare myself with the *students in my classes*, I estimate that my general academic ability is better than...” The first statement was to be completed by the following choices: “all of my friends”, “Nearly all of my friends”, “Most of my friends”, “Half of my friends”, “Less than half of my friends”, “Almost none of my friends”, or “None of my friends”. The second statement was completed using similar choices, except the words “friends” was substituted by the word, “classmates”.

Perceived Global Rank was assessed by the Rank Subscale of the Social Comparison Scale (SCS-R; Allan & Gilbert, 1995). It contains pairs of adjectives of opposite valence that represent constructs relevant to hierarchical comparisons as suggested by Social Rank Theory (Sloman & Gilbert, 2000). These pairs of adjectives include: “inferior-superior”, “incompetent-competent”, “less talented-more talented”, and “weaker-stronger” (see Appendix B). Participants are asked to indicate their ranking in relation to their peers along these dimensions by choosing a number from 0 to 10 presented between the two members of each word-pair, with 0 anchored at the lower-ranked end (e.g., inferior) and 10 anchored at the higher-ranked end (e.g., superior). A low score on the SCS-R has been shown to be positively correlated with depression and

positively correlated with behavioural submissiveness in both a healthy student sample and psychiatric patients (Gilbert et al., 1995).

Rank Change. The SRT postulates that both losing social rank and the state of being in a low rank are associated with depression (Gilbert, 1994). It also seems to imply, without any explicit statements, that a fall from a superior to an inferior rank in comparison to others would also lead to hostility (Price, 1991). The current study investigates these two hypotheses by examining the effects of an individual's baseline rank and subsequent rank on depression, hostility and perceived injustice. The effects of rank change were operationalized as the effects of subsequent rank on dependent variables beyond the effects of baseline rank. Social rank was assessed at three time-points: Time 0 (up to three years ago), Time 1 (when the first questionnaire set was completed), and Time 2 (when the second questionnaire set was completed one-month after Time 1). To measure rank at Time 0, we requested the participants to complete the Global Rank measure again while keeping in mind a time when they were at their best over the past three years. These instructions were given to facilitate a recall of a specific time in the past and to ensure a greater probability to detect drop in rank. To measure social rank at Time 1 and Time 2, measures of Global Rank and Academic Rank were administered to participants at two time points, separated by a one-month interval. Therefore, Time 0 was measured retrospectively and Time 1 and Time 2 were measured prospectively. The effects of long-term changes in global rank on depression, hostility, and perceived injustice were measured by regressing the dependent variables onto both Time 0 rank and Time 1 rank. The effects of short-term changes in global rank on depression, hostility, and perceived injustice were measured by regressing the dependent

variables onto both Time 1 global rank and academic rank and Time 2 global rank and academic rank. It was expected that subsequent rank would predict subsequent depression, anger, and perceived injustice levels independent of the effects of baseline rank on the dependent variables.

Dependent variables

Depression symptoms. The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item inventory that measures the severity and frequency of the somatic, affective, cognitive, behavioral, and motivational symptoms of depression over a two-week period. Participants indicate their response on a four-point scale where 0 = no symptoms of depression and 3 = severe symptoms of depression. BDI scores range from 0 to 63, with higher scores indicating an increased level of depression. In studies examining the psychometric properties of the BDI-II, the coefficient alpha for the full scale has been reported to range from .90 to .92 (Carmody, 2005; Ward, 2006). Among college students, the BDI-II has been shown to correlate at $r = .56$ to $.77$ with other measures of depression, including the Hamilton Rating Scale for Depression and the depression factor of the State Trait Anxiety Inventory-Trait version (Cahill et al., 2006; Storch, Roberti & Roth, 2004).

Hostility. The current study employs the State-Trait Anger Expression Inventory-2 (STAXI-2; Spielberger, 1999) to measure expressions of hostility. The STAXI-2 measures state anger, trait anger, anger expression, and anger control. The State Anger dimension assesses the intensity of anger to which the respondent is currently experiencing, while the Trait Anger domain quantifies the amount of anger the respondent typically experiences. As well, the Anger Expression domain measures

outward expressions of anger and anger suppression. For the purposes of evaluating the hypotheses, only the Trait Anger (TA) domain and the Anger Expression (AE) domain were analyzed. TA consists of two 4-item subscales: Angry Temperament (level of hotheadedness) and Angry Reaction (tendency to respond to criticism with anger). AE, on the other hand, contains two eight-item scales: Anger-Out (i.e., tendency to exhibit verbal and physical aggression) and Anger-In (tendency to suppressed anger). These two scales will be used to measure the constructs *Outward Expression of Anger* and *Anger Suppression*, respectively, in the current study. Participants rated their response on a four-point scale (1= “Not At All or Almost Never”, 4 = “Very Much So or Almost Always”). The STAXI-2 is widely used tool among clinical and normal populations, with alpha reliability of the trait anger subscale ranging from .84 to .86 (Martin & Dahlen, 2005). A review of self-report instruments for anger by Eckhardt et al. (2004) concluded that the STAXI-2 operates on a rich conceptualization of anger that encompasses different styles of expressing and coping with anger. The scale also demonstrates sound criterion validity. For example, adolescents with a history of aggressive behaviour were shown to score higher on Anger-Out and Trait Anger and lower on Anger-In and Anger Control compared with non-aggressive adolescents (DiLiberto, Katz, Beauchamp, & Howells, 2002).²

Perceived Injustice was measured using ten statements developed specifically for the current study. Items were constructed with an aim to detect a sense of entitlement, injustice and being treated unfairly. Participants indicate the degree to which each statement applied to them with regard to their current work and academic life on a 5-

² In the current study, the variable, “anger suppression”, is measured by the Ang-In subscale, while the variable, “outward expression of anger” is measured by the Ang-Out subscale.

point scale (1= “Definitely Untrue”, 5= “Very True”). In a pilot study using a sample of 19 University of Waterloo undergraduate students, the PI scale was moderately correlated with state anger and trait anger as measured by the STAXI-2 (Spielberger, 1999). See Appendix C for the full scale.

Procedure

Participants were recruited from the Research Experience Group with an email advertisement and a follow-up recruitment phone call. They agreed to complete two sets of questionnaires separated by a one-month period in exchange for two participation credit points toward their course grade. As an incentive to complete the second set, participants were offered a choice of a pen or a chocolate bar upon completion of the second set of questionnaires. Scales were administered via the Internet at both time points as part of a larger questionnaire package. Rank measures were administered first, followed by the Perceived Injustice scale, the BDI-II and the STAXI-2. Participants were given a unique user number and a password to access the questionnaires. They provided their consent for participation by filling in the appropriate box after viewing a description of the study. Twelve participants did not complete the 2nd set of questionnaire and 10 participants’ data needed to be deleted partially or entirely because of missing data. Altogether, the sample size for the analyses in the current study ranged from 73 to 97.

Results

Scores on the rank measures, the BDI-II, the STAXI-2 subscales, and the perceived injustice scale were subjected to one-way analysis of variance (ANOVA), with comparisons to detect any potential effects of gender, ethnicity and years of education on subsequent correlational and regression analyses. Analyses revealed a significant gender

difference in perceived academic ranking (M, males = 8.7; M, females = 7.9, $F = 5.5$; $p < .05$). Hence, all analyses involving the Academic Rank variable would test for the effects of gender as well. Aside from Academic Rank, no other variables showed a gender effect. In addition, comparisons among groups categorized by years of post-secondary education and ethnicity did not reveal any difference on the study variables (all F -values ≤ 1.9 , all p -values $\geq .12$).

Normality of Distributions

Prior to analysis, predictor and dependent variables in the current study were subjected to preparation procedures as suggested by Tabachnick and Fidell (1996). All variables (excluding the three change variables) were screened for univariate outliers by viewing the z-scores of each data value point and by viewing a box plot representation of each variable. Any data points with a z-score absolute value of greater than 3.29 or falling beyond the upper and lower fence of their box-plot were eliminated (Tabachnick & Fidell, 1996; Samuels & Witmer, 1999). Data points from 10 different participants were eliminated in this manner.

In addition, the skewness and kurtosis of each variable was examined to determine their suitability for correlational and regression analyses. According to Kline (1998), a variable should have a distribution that has a skewness statistic between -3 and 3 and kurtosis statistic between -8 and 8 in order to satisfy the normality criterion of multiple regression analyses. All variables of the current study were found to have skewness and kurtosis within Kline's suggested cut-off points (i.e., all skewness statistics had an absolute value < 1.04 ; all kurtosis values had an absolute value < 4.5) and were considered to satisfy the normality requirement.

Descriptive Statistics of Predictor Variables

The mean, standard deviations, internal consistency reliability estimates, and test-retest reliability of social rank measures are displayed in Table 1. Values for the SCS-R obtained by the current study are comparable with those documented in previous investigations using similar samples (Allan & Gilbert, 1995). The 2-item Perceived Academic Ranking measure appears to have adequate internal consistency at both Time 1 and Time 2 (i.e., .69 and .76).

Table 1

Mean, SD, Coefficients Alpha, and Test-retest Reliability of Rank Variables

Statistic	Independent Variable		
	SCS-R Current	SCS-R Past	Academic Rank
N			
Time 1	96	96	86
Time 2	83	--	86
M			
Time 1	31.7	35.7	8.2
Time 2	30.4	--	8.3
SD			
Time 1	6.7	5.9	1.9
Time 2	6.9	--	1.9
α			
Time 1	.84	.85	.69
Time 2	.83	--	.76

Note: *** $p \leq .001$; ** $p \leq .01$; SCS-R= Social Comparison Scale, Rank subscale (measuring Global Rank).

Descriptive Statistics for Dependent Variables

As shown in Table 2, measures of depression, trait anger (i.e., Angry Temperament and Angry Reaction), anger expression (i.e., Anger Suppression and Outward Expression of Anger) and perceived injustice all have adequate to excellent internal consistency (i.e., $\alpha = .75-.92$). Means and standard deviation values of the BDI-II were comparable with those of previous studies using an ethnically diverse sample of young adults (e.g., Carmody, 2005), as were the descriptive statistics from the STAXI-2 (e.g., Spielberger, 1999).

Table 2 - *Descriptive Statistics of Outcome Variables – Anger, Depression, and Perceived Injustice*

<i>Statistic</i>	<i>Dependent Variable</i>					
	<i>Temper</i>	<i>React</i>	<i>Suppress</i>	<i>Express</i>	<i>Dep</i>	<i>Injust</i>
<i>M</i>						
Time 1	6.2	9.1	17.5	16.0	10.6	30.9
Time 2	6.3	8.6	18.1	16.2	11.4	29.3
<i>SD</i>						
Time 1	2.0	2.8	4.4	3.7	6.7	7.0
Time 2	2.5	2.7	4.2	4.1	9.2	7.4
<i>α</i>						
Time 1	.84	.81	.72	.73	.91	.81
Time 2	.91	.83	.75	.83	.92	.84

Note: Temper = Angry Temperament; React = Angry Reaction; Suppress = Anger Suppression; Express = Outward Expression of Anger; Dep = Depression; Injust = Perceived Injustice.

Testing the Associations among Social Rank, Depression, Hostility & Perceived Injustice

Bivariate correlations between social rank variables and dependent variables (i.e., depression severity, trait anger, anger expression and perceived injustice) for Time 1 and Time 2 are displayed in Table 3. Hypothesis 1 posits that social rank would be negatively associated with depression. Consistent with the current hypothesis and past findings (Allan & Gilbert, 1995), global rank at Time 1 is negatively correlated with depression at Time 1 (-.29). This finding indicates that individuals who feel more inferior or less superior tend to report greater depression severity. Similarly, perceived academic ranking at Time 1 correlated negatively with depression (-.21), indicating that students who perceive themselves to be more inferior or less superior compared to their friends and classmates in academic ability report greater severity of depression. These associations, however, were not replicated one month later at Time 2.

Table 3 - *Bivariate Correlations Involving Predictor and Dependent Variables*

Subscale	1	2	3	4	5	6	7	8
	Time 1							
1. Glob	--	.28**	-.29**	-.03	-.02	-.36***	.08	-.22**
2. Acad		--	-.21*	-.17	.14	-.04	.10	-.06
3. Dep			--	.23*	.37***	.54***	.17	.51***
4. Temp				--	.45***	.28***	.51**	.19 [†]
5. React					--	.35***	.44***	.19 [†]
6. Suppr						--	.16	.20 [†]
7. Expr							--	.23*
8. Injust								--

(Table 3 continued)

Subscale	1	2	3	4	5	6	7	8
Time 2								
1. Glob	--	.43***	-.15	.08	.01	-.15	-.01	-.08
2. Acad		--	-.02	-.18	.12	-.16	.06	.19 [†]
3. Dep			--	.41***	.29***	.45*	.27*	.40***
4. Temp				--	.54***	.20 [†]	.55***	.29**
5. React					--	.05	.28*	.15
6. Suppr						--	.06	.13
7. Expr							--	.32**
8. Injust								--

* p<.05; **p<.01; ***p<.001; [†] = trend towards significance p<.10

Note: Glob = Global Rank; Acad = Academic Rank; Dep = Depression; Temp = Angry Temperament; React = Angry Reaction; Suppr = Anger Suppression; Expr = Outward Expression of Anger; Injust = Perceived Injustice.

Results also revealed several effects that were not hypothesized but are interesting to note. For example, positive correlations emerged between depression and anger dimensions, which are consistent with previous results (Martin & Dahlen, 2005; Biaggio & Godwin, 1987). Correlations presented in Table 3 revealed two significant negative associations between Anger and Global Rank and one positive association between Perceived Injustice and Anger. However, most of the correlations are not significant.

Testing the Effects of Social Rank Variables on Depression Severity

Hypothesis 2 posits that unfavourable rank change would further predict depression, such that subsequent social rank would have a negative effect on depression scores independent of the effects of baseline social rank. Results did not provide support for Hypothesis 2. As shown in Table 4, retrospective baseline social rank at Time 0 did not predict current depression severity at Time 1, although current social rank at Time 1 did. Analyses of short-term changes in Global Rank and Academic Rank also did not reveal any effects, as neither Time 1 nor Time 2 rank scores predicted Time 2 depression severity (see Appendix D for details).

Table 4 - Testing Hypothesis 2: Hierarchical Regression Analyses Predicting Time 1 Depression with Retrospective Time 0 and Time 1 Global Rank

Dependent Variable	B	R ² Change	df	Significance of R ² Change
<u>Step 1</u>				
Past Global Rank (T0)	-.03	.02	84	.79
<u>Step 2</u>				
Past Global Rank (T0)	.16	--	--	--
Current Global Rank (T1)	-.35	.10	83	.005**

Note: **p<.01; T0 = Time 0; T1 = Time 1 (Time 0 is measured retrospectively)

In addition, we assessed the relative utility of the domain-specific rank variable and the Academic Rank variable in predicting Time 2 depression by entering each as a second step in the context of the other in two separate regression models. This revealed that Global Rank predicted depression beyond Academic Rank, but that Academic Rank

did not predict variance beyond Global Rank, suggesting that including the Academic Rank variable may not add much value in testing the study's hypotheses (Table 5).

Table 5 - *Regression Exploring the Unique Predictability of Academic Rank and Global Rank on Depression*

Dependent Variable Depression	B	R ² Change	df	Significance of R ² Change
<u>Step 1</u>				
Global Rank (T1)	-.33	.08	85	.001**
<u>Step 2</u>				
Global Rank (T1)	-.31	--	--	--
Academic Rank (T1)	-.29	.02	84	.46
<u>Step 1</u>				
Academic Rank (T1)	-.89	.04	85	.054 [†]
<u>Step 2</u>				
Academic Rank (T1)	-.29	--	--	--
Global Rank (T1)	-.31	.08	84	.003**

Note: **p<.01; * p<.05; [†] = trend towards significance p<.10; T1 = Time One.

Controlling for the Effects of Gender

Because a gender difference in Academic Rank was observed (noted above), gender was also entered into all regression models involving Academic Rank in order to test the unique effects of academic rank without the influence of gender. Note that females were dummy-coded as “0”, while males were dummy-coded as “1”. Negative betas generated by the gender variable indicate that females scored higher than males on all four Anger domains, although these differences did not reach statistical significance

(Angry Temperament $B = -.24, p = .59$; Angry Reaction $B = -1.7, p = .43$; Anger Suppression $B = -1.3, p = .18$; Outward Expression of Anger $B = -.48, p = .57$). Means of the four Anger domains for females and males are reported in Appendix D. Further exploration of higher order gender interaction was not undertaken due to the lack of theoretical hypotheses to test.

Testing the Effects of Social Rank Variables on Hostility and Perceived Injustice

The hypothesis that unfavourable rank changes predict anger and perceived injustice was addressed with regression analyses testing the effects of both baseline rank and subsequent rank on anger domain and perceived injustice scores. To test the effects of long-term changes, baseline and subsequent rank are entered into a regression model in which the effect of rank changes on Anger domains and Perceived Injustice would increase as a function of baseline rank, as shown by the following equations and explanation:

T0 = Time 0 social rank (i.e., baseline rank)

T1 = Time 1 social rank (i.e., subsequent rank)

B0 = level of Anger domain when both Time 0 and Time 1 social rank are 0 (i.e., the y-intercept; value not displayed in tables)

B1 = regression coefficients for Time 0 social rank as predictor of Anger domain

B2 = regression coefficients for Time 1 social rank as predictor of Anger domain

Y = dependent variable (i.e., Outward Expression of Anger, Anger Suppression, Angry Reaction, Angry Temperament or Perceived Injustice)

To show whether a changes in social rank from Time 0 to Time 1 predict each dependent variable (Hypothesis 3), the following equation is used:

$$Y = B_0 + B_1(\text{Time 0 social rank}) + B_2(\text{Time 1 social rank})$$

$$Y = B_0 + B_1T_0 + B_2T_1$$

Assuming that all predictors are significant, a negative B_2 after holding B_1 constant implies that a rank *drop* predicts the dependent variable. It is expected that B_1 (social rank time 0) will be positive and B_2 (social rank time 1) will be negative, which means that a drop from a superior rank would predict Anger domains and Perceived Injustice. Results for this analysis is shown in Step 1 and Step 2 of Table 6. Note that Step 3 does not apply in this analysis and will be explained at a later section.

Table 6 - Hierarchical Regression Predicting Anger Suppression with Global Rank at Time 0 and Time 1 : Testing Hypothesis 3 & 4 (analysis for Hypothesis 4 is conducted in Step 3)

Dependent Variable Anger Suppression	B	R ² Change	df	Significance of R ² Change
<u>Step 1</u>				
Past Global Rank (T0)	-.20	.09	84	.005**
<u>Step 2</u>				
Past Global Rank (T0)	-.10	--	--	--
Current Global Rank (T1)	-.17	.07	83	.01**
<u>Step 3</u>				
Past Global Rank (T0)	-.41	--	--	--
Current Global Rank (T1)	-.07	--	--	--
Past Global Rank (T0) x Past Global Rank (T0)	.005	.003	81	.84
Past Global Rank (T0) x Current Global Rank (T1)	-.003			

Note: **p< .01; T0 = Time Zero; T1 = Time One; Time Zero is measured retrospectively.

Consistent with hypothesis, Time 0 and Time 1 global rank each independently predicted Time 1 Anger Suppression (Time 0 $B = -.20$; Time 1 $B = -.17$). This finding indicates that perceiving a long-term decline in one's own rank predicts elevated anger suppression. However, this finding illustrates a type of rank drop that is different from the type that is expected. Specifically, Anger Suppression is predicted by a rank drop from a lower initial rank, rather than from a higher initial rank as anticipated. Further, because both Time 0 and Time 1 global rank are each associated to Anger Suppression as a bivariate correlation (Time 0 $r = -.29$, $p = .005$; Time 1 $r = -.36$, $p < .001$), their partialled effects on Anger Suppression are not likely due to their intercorrelation ($r = .48$, $p < .001$).

Rank drop did not appear to be predictors for other anger domains. In fact, neither Time 0 nor Time 1 global rank significantly predicted Outward Expression of Anger (Time 0 $B = .02$, $p = .68$; Time 1 $B = .03$, $p = .61$), Angry Reaction (Time 0 $B = .03$, $p = .44$; Time 1 $B = -.04$, $p = .43$), and Angry Temperament (Time 0 $B = -.004$, $p = .88$; Time 1 $B = -.02$, $p = .51$).

In testing Hypothesis 3, Perceived Injustice was also regressed onto the same set of predictors as those for anger domains. It was expected that subsequent rank would predict greater Perceived Injustice beyond baseline rank. Results did not provide evidence that rank change predicts greater Perceived Injustice, although Global Rank and Academic Rank were each associated with concurrent Perceived Injustice (Tables 7 and 8).

Table 7 - Hierarchical Regression with Long Term Rank Change Predicting Perceived Injustice: Testing Hypothesis 3

Dependent Variable Perceived Injustice	B	R ² Change	df	Significance of R ² Change
<u>Step 1</u>				
Past Global Rank (T0)	.13	.01	87	.29
<u>Step 2</u>				
Past Global Rank (T0)	.33	--	--	--
Current Global Rank (T1)	-.38	.11	86	.002**

Note: **p<.01; T0 = Time Zero; T1 = Time One; Time Zero is measured retrospectively.

Table 8 - Hierarchical Regression with Short Term Rank Change Predicting Perceived Injustice: Testing Hypotheses 3

Dependent Variable Perceived Injustice	B	R ² Change	df	Significance of R ² Change
<u>Step 1</u>				
Gender	-.18	.00	82	.91
<u>Step 2</u>				
Gender	-.05	--	--	--
Academic Rank (T1)	-.12	.001	81	.79
<u>Step 3</u>				
Gender	1.14	--	--	--
Academic Rank (T1)	.30	--	--	--
Academic Rank (T2)	-1.08	.05	80	.05

Note: †= trend towards significance; T1 = Time One; T2 = Time Two; Time One and Time Two are measured prospectively, separated by a one-month period.

A further goal was to evaluate the hypothesis that a drop in social rank from a more superior initial rank leads to greater hostility and perceived injustice than a drop in social rank from a more inferior initial rank (Hypothesis 4). To show whether a higher

initial rank (i.e., Time 0 rank) would increase the prediction of social rank drop on Anger Suppression (hypothesis 4), the following component is added to the equation:

...+ the interaction between Time 0 rank and (Time 0 rank score + Time 1 rank.score)

Hence, the entire equation predicting Anger Suppression, with the interaction component in italics, is the following:

$$\text{Anger Suppression} = B_0 + B_1T0 + B_2T1 + T0 (B_3T0+ B_4T1)$$

When the third term is distributed, the equation becomes the following:

$$\text{Anger Suppression} = B_0 + B_1T0 + B_2T1 + B_3T0^2 + B_4T0(T1).$$

A combination of positive B_3 and negative B_4 would indicate support for Hypothesis 4 that a rank drop would predict more Anger Suppression if one had a higher initial social rank. This regression analysis was conducted only for Anger Suppression, since results for Hypothesis 3 did not reveal effects of rank changes on any other dependent variables. The quadratic term of the baseline rank (i.e., Time 0 rank x Time 0 rank) and the interaction term involving baseline rank and subsequent rank (i.e., “Time 0 rank x Time 1 rank”) were entered together into the model subsequent to Time 0 rank and Time 1 rank variables. As Table 5 indicates, results did not provide support for the hypothesis that a higher baseline rank increased the effects of rank change on Anger Suppression..

Discussion

The current study investigated the role of perceived social rank in predicting hostility and depression. Drawing on the principles of Social Rank Theory (SRT), several research goals were addressed. The first goal was to evaluate the theory that depression is a manifestation of perceived inferiority via the testing of two hypotheses. First, depression was expected to be associated with personal perceptions of inferiority,

or a low social rank. Second, perceiving oneself losing status (social rank) over time would predict increased depression severity. Results indicated support for the first hypothesis, but not for the second one.

Another goal of the study was to test the speculation (Price, 1991; Sloman & Gilbert, 2000) that hostility results in a depressed individual when they have dropped from a formerly superior status. While the current study did not investigate hostility among depressed individuals, it sought to differentiate social rank changes that lead to depression from changes that lead to hostility in addition to depression. It was postulated in Hypothesis 3 that perceiving an unfavourable change in rank would positively predict hostility and perceived injustice in an individual. This hypothesis was partially supported for Anger Suppression. Further, Hypothesis 4 posited that the prediction of unfavourable rank change on hostility and perceived injustice would be especially strong when the participants' initial rank was more superior. To address this hypothesis, initial rank was tested as a moderator of rank change in predicting hostility. Results did not indicate any moderating effects of initial rank on rank change for any of the dependent variables. An additional goal of the current study was to investigate the role of perceived injustice as a potential outcome of unfavourable rank change. Because past theory and research have indicated that a sense of injustice often accompanies feelings of inferiority (Stöber, 2003) and hostility (Smith et al., 1994), it was postulated to be affected by rank changes and to be associated with hostility in the current study. Hence, it was hypothesized that perceived injustice would be positively correlated with anger, and that unfavourable rank change would predict perceived injustice, especially when the initial rank was superior.

Overall, the current study yielded partial support for its hypotheses and results are discussed in the following paragraphs.

Hostility and Depression

Indicators of hostility, including Angry Temperament, Angry Reaction, Anger Suppression, and Outward Expression of Anger, all showed a positive and significant association with depression. In other words, young adults who reported more severe symptoms of depression also reported a greater likelihood to experience anger, to express anger at others, and to suppress anger. Because it is a correlational relationship, it can be theoretically explained by various processes. For example, past literature has suggested that a lack of appropriate expressions of frustration and a constant need to suppress anger can lead to depression (Sperberg & Stabb, 1998). On the other hand, there is also evidence indicating that depression can, in turn, give rise to anger and hostility, such that verbal hostility diminishes after an individual recovers from clinical depression (Friedman, 1970). Alternatively, depression and hostility may be correlated because both constructs are associated with a common variable. The current study investigated the third possibility by testing the idea that both depression and hostility emerge from certain changes in one's perceived social ranking.

Inferiority and Depression

The results also showed that perceived social rank is associated with depression severity in the current sample of young adults. This outcome is consistent with previous findings (Allan & Gilbert, 1995; Irons & Gilbert, 2005; Smith et al., 1994). It also is consistent with the theory that depression is, in essence, an enduring state of perceived inferiority and is consistent with the speculation that inferiority and depression are

overlapping constructs (Gilbert, 1994). However, the expected effects of long-term and short-term changes in rank did not predicted severity of depressive symptoms. Hence, the results failed to support the hypothesis that a personal drop in the social hierarchy is leads to depressive symptoms of the Involuntary Defeat Strategy (Sloman & Gilbert, 2000). Nonetheless, it appears that an individuals' overall social rank is more consistently associated with depression than is ones' academic rank. This discrepancy may indicate that perceiving oneself to be inferior in academic ability is less threatening than perceiving oneself to be inferior in a broader perspective (i.e., in terms of superiority, competence, confidence, talent, and strength). This is a likely possibility, given that academic rank did not further account for a significant amount of variance beyond those explained by global rank. Nonetheless, these results generally indicate that a loss of social rank and a self-recognition of inferiority would lead to depressive symptoms (Sloman & Gilbert, 2000).

Inferiority, Rank Changes, and Hostility

Results also found concurrent associations between social rank and anger domains and demonstrated that long-term changes in global rank predicts Anger Suppression. It was theorized that rank change would interact with initial rank to predict hostility, such that the more superior one's initial rank, the more hostility would result from a rank drop. In other words, seeing oneself being "reduced" to an inferior from an originally superior rank would lead to bitterness and angry reactions. Results failed to show this moderational effect on Anger Suppression, indicating that a drop in the social hierarchy is frustrating for anyone, not especially so for those who enjoyed a previously superior rank. Interestingly, rank drop over time did not predict Outward Expression of Anger, Angry

Temperament, or Angry Reaction. It is possible that Angry Temperament and Angry Reaction, both considered to be enduring traits of an individual's long-term disposition (Spielberger, 1999), were not sensitive to changes in social rank that were relatively short-term. The finding that perceiving oneself as having dropped in social rank was associated only with anger suppression and not anger expression is consistent with Sloman and Gilbert's theory (2000) that resentment in a defeated individual is accompanied by an escalation of aggressive thoughts and a de-escalation of outward aggression.

Perceived Injustice

The current investigation also included Perceived Injustice as in order to potentially add meaning to the theoretical framework. This variable was conceptualized in the current study as a sense of unfairness, bitterness and resentment about one's negative experiences in work and academics. Consistent with previous evidence and the current hypotheses, Perceived Injustice was positively associated with hostility and depression and negatively associated with perceived social rank (Gold, 1996). These correlations suggest that perceived injustice stems from external blame for one's misfortunes. Previous research has also shown that feeling affronted and blaming an external environment give rise to hostility in reaction to defeat situations. For example, viewing an unfavourable situation (e.g., losing a job) as justified results in self-blame, guilt and shame, whereas, viewing an unfavourable situation as unjustified tends to lead to other-blame, hostility and anger (Barclay et al., 2005). Other investigations suggest that a sense of injustice entails envy and self-pity (Gold, 1996; Smith et al., 1994; Stöber, 2003), a view that fits logically with the current theoretical assumption that a state of

inferiority and loss of rank involves feelings of frustration, unfairness and a view of oneself as inadequate and helpless. The associations of perceived injustice with low social rank and increased depression corroborate the hypothesis of Social Rank Theory that depression does not involve only the symptoms of the IDS, but may also be accompanied by resentment (Sloman & Gilbert, 2000). On one hand, individuals of a low rank would perceive their own weakness and inferiority as reasons for their defeat situation (Sloman & Gilbert, 2000). Alternatively, they may also see themselves as having received unfair treatment (Gilbert et al., 2002; Stöber, 2003). A perception of injustice may help explain the link between depression and anger-focused rumination found in previous research (Gilbert et al., 2005) and the association between depression and Anger Suppression and in the current results.

Discussion of Methodology

The current study employed two measures of social rank—Allan and Gilbert's Social Comparison Scale-Rank subscale (1995), and a two-item measure of perceived academic ranking. As indicated previously, findings generated by the SCS-R were in the expected direction and were more consistent compared to those yielded by the academic ranking scale. While SCS-R was consistently associated with depression, anger, and perceived injustice, Academic Rank demonstrated minimal associations with the dependent variables. It is probable that a low academic ranking is not as threatening to one's global perceived rank, which could encompass important domains other than academic ability. Indeed, daily fluctuations in anger among university students are found to stem from various stressors, including academic setbacks, interpersonal relationships, a frustrating environment, and self-blame (Robbins & Tanck, 1997).

To our knowledge, the current study is the first to test the effects of changes in social rank on hostility and perceptions of unfairness. Previous research has neither investigated nor made predictions about the time frame required for changes in social rank to take effect on one's self-regard or mood. The current study explored this question by having participants report at Time 1 their current perceived social rank and their best social rank over the past three years and at Time 2, their current perceived social rank again. Results show that long-term changes in rank, measured retrospectively, were predictive of anger suppression. However, neither change in global rank nor academic rank over a 1-month period predicted incremental changes in depression, anger, or perceived injustice. It is possible that one month is too short a period to capture any meaningful defeat situation, whereas a time span of three years is long enough to contain meaningful experiences that could have shifted the participants' perceived social rank. However, given that Time 0 was measured retrospectively, it is difficult to determine whether the effects of Time 0 is a measure of true social rank in the past or a reflection of current self-regard. Therefore, the finding of an effect of long-term rank change on Anger Suppression should be interpreted with caution.

The construct validity of the instrument employed to measure perceived global rank in the current study (i.e., SCS-R) also warrants closer attention. In a detailed investigation on social comparisons on happiness, Klar and Giladi (1999) concluded, "in the case of comparative questions regarding internal states, respondents mainly relate to their own state rather than meeting the literal task demands of relating themselves to others." In a study looking at social comparisons in academic ability, it was found that highschool students' self-evaluations were more related to their own actual performance

than to the ability of their target of comparison (Blanton, Buunk, Gibbons, & Kuyper, 1999). These speculations highlight a potential challenge to social rank research, in that measures of one's perceived social rank may, in fact, simply be a measure of how positively they feel about themselves. Indeed, while the current study set out to measure participants' evaluation of themselves *in relation to their peers*, it may have actually measured how positively participants felt about themselves *independent of others*. If such was the case, the current study's measure of social rank may have simply measured participants' self-regard. Future investigations may consider controlling for the effects of self-regard before interpreting findings pertaining to social rank. Factor analyses examining the overlap between self-report social rank measures, such as the Social Comparison Scale used in the current study, and self-esteem questionnaires, such as the Rosenberg Self-Esteem Scale (Rosenberg, 1965) may also provide information about the discriminant validity of self-report social rank measures.

One way to measure social rank with greater construct validity would be to ask respondents to consider the relative standing of both themselves and others. For example, in a study that is currently in progress, Fournier (2006) asked members of a pre-existing group, such as a highschool class, to rate themselves and every other group member in several domains and calculated social rank using the self- and peer-ratings. As well, a measure that relies less on participants' judgment may allow participants make self-other comparisons more accurately (Klar & Giladi, 1999). For example, using a method utilized by Klar and Giladi (1999), participants may be asked to give a numerical rating about the level of confidence, talent, and efficacy for their comparison group, and then provide a numerical rating about themselves. By relying more on numbers than on

participants' own comparative judgment, this method may facilitate a more objective way to evaluate the participants' perceived ranking.

General Conclusion

Our results generally indicated that perceiving oneself as having become more inferior does, indeed lead to depressive mood. However, little support was found for the hypothesis that a rank change would predict increased depression, hostility and perceived injustice. Specifically, Anger Suppression was the only dependent variable that was significantly predicted by changes in rank. Because the current study's operationalization of rank change is questionable, this finding should be viewed with skepticism. The fact that global rank measures were more robust predictors of depression and perceived injustice than are academic rank measures may suggest that the ego-threatening effects of inferiority rests more in one's overall self-schema than one's domain-specific characteristics.

Current Limitations and Future Directions

Our study did not find any notable gender difference in the associations between social rank and dependent variables. Given that masculinity is associated with sensitivity to social ranking (Gilbert, 1995) and aggressive tendencies (Fava et al., 1995), the hypotheses that we tested may be more relevant to men than women. Future investigations examining the way in which perceptions of inferiority and injustice are manifested among women would provide researchers with more insight into clinical picture of depression and hostility among women.

Nonetheless, the present study provides support for the theory that depression stems from a self-perception of inferiority. It provides results that are consistent with the

way that the Involuntary Defeat Strategy (IDS) would work, if it does, in fact, exist. However, the current study still leaves other parts of the theory untested. For example, in addition to the adoption of a low self-regard, the IDS also involves physiological and behavioural changes that would serve to de-escalate aggression. Recent work using self-report measures has already shown that submissive behaviour in humans is associated with depression and a more inferior social rank (Irons & Gilbert, 2005; Gilbert et al., 1995). Given that these results are consistently favourable toward the IDS hypothesis, it may be worthwhile for future investigations to examine the validity of the IDS notion using behavioural measures, such as observations made by significant others.

Despite its exploratory nature and identified methodological weaknesses, the current study presents an interesting conceptualization of depression as a complex emotional phenomenon. It has provided preliminary evidence showing that the state of being depressed may not simply involve seeing oneself as inferior to others, but also an unexpressed resentment and self-pity that may be counter-productive for the individual.

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Appendix A – Academic Ranking Scale

When comparing myself with my friends, I would estimate that my academic ability is better than:

- a) All of my friends
- b) Nearly all of my friends
- c) Most of my friends
- d) Half of my friends
- e) Less than half of my friends
- f) Almost none of my friends
- g) None of my friends

When comparing myself with the students in my classes, I would estimate that my academic ability is better than:

- a) All of the students in my classes
- b) Nearly all of the students in my classes
- c) Most of the students in my classes
- d) Half of the students in my classes
- e) Less than half of the students in my classes
- f) Almost none of the students in my classes
- g) None of the students in my classes

Note: choices are presented in a drop-down menu. Participants indicated their responses by clicking on one of the options. Response choices were assigned numerical scores before statistical analysis (e.g., a = 7, b = 6, etc.)

Appendix B – Social Comparison Scale

SCS

Think about your current self and respond to the following items. In relationship to my peers I generally feel:

Inferior	0	1	2	3	4	5	6	7	8	9	10	Superior
Less Competent	0	1	2	3	4	5	6	7	8	9	10	More Competent
Less Talented	0	1	2	3	4	5	6	7	8	9	10	More Talented
Weaker	0	1	2	3	4	5	6	7	8	9	10	Stronger
Less Confident	0	1	2	3	4	5	6	7	8	9	10	More Confident

Looking back at a time when I was at my best, in relation to my peers, I was generally:

Inferior	0	1	2	3	4	5	6	7	8	9	10	Superior
Less Competent	0	1	2	3	4	5	6	7	8	9	10	More Competent
Less Talented	0	1	2	3	4	5	6	7	8	9	10	More Talented
Weaker	0	1	2	3	4	5	6	7	8	9	10	Stronger
Less Confident	0	1	2	3	4	5	6	7	8	9	10	More Confident

Note: only items in the Rank subscale are included. The rest of the items in the SCS include: More Likeable-Less Likeable, Different-Same, More Desirable-Less Desirable, More Attractive-Less Attractive, Like an Insider-Like an Outsider.

Appendix C – Perceived Injustice Scale

PI

Think about your current situation in your work/academic life. Rate the following items in how true they are for you:

- 1 = Definitely Untrue
- 2 = Somewhat Untrue
- 3 = Neutral
- 4 = Somewhat True
- 5 = Very True

- | | | | | | |
|---|---|---|---|---|---|
| 1) I often feel that I deserve better than what I have now. | 1 | 2 | 3 | 4 | 5 |
| 2) I feel that I am entitled to something better. | 1 | 2 | 3 | 4 | 5 |
| 3) In general, I have been evaluated in an unfair way. | 1 | 2 | 3 | 4 | 5 |
| 4) I can't imagine doing better than how I'm doing now.* | 1 | 2 | 3 | 4 | 5 |
| 5) I am at the best that I can possibly be.* | 1 | 2 | 3 | 4 | 5 |
| 6) Life has not been treating me well. | 1 | 2 | 3 | 4 | 5 |
| 7) Luck has not been on my side. | 1 | 2 | 3 | 4 | 5 |
| 8) My capabilities have not been fully acknowledged. | 1 | 2 | 3 | 4 | 5 |
| 9) Things should be better than how they are now. | 1 | 2 | 3 | 4 | 5 |
| 10) Given what I'm capable of, I know I deserve a better situation. | 1 | 2 | 3 | 4 | 5 |

(*items with an asterisk are reverse-scored)

Appendix D – Other Data

Table D.1: Mean level of Anger domains among males and females measured at Time 1

Anger Domain	Males	Females
Anger Suppression	17.15	18.42
Outward Expression of Anger	15.69	16.18
Reaction to Criticism	8.86	9.45
Angry Temperament	6.25	6.62

Table D.2: Regression of Depression scores on Global and Academic Rank scores

Dependent Variable Depression	R ² Change	Significance of R ² Change
Step One Time 1 Global Rank	.01	.55
Step Two Time 2 Global Rank	.02	.26
Step One Time 1 Academic Rank	.002	.68
Step Two Time 2 Academic Rank	.01	.65