COGNITIVE BIASES IN SOCIAL ANXIETY: IMPACT ON THE COMPREHENSION OF VERBAL IRONY

by

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Abstract

Social anxiety is associated with a number of cognitive biases that influence the way that social information is processed. One particular bias that has been identified, coined a judgmental bias (Foa, Franklin, Perry, & Herbert, 1996), involves overestimation of the probability and costs associated with negative social events. While research has established that judgmental biases occur in social anxiety, it is not clear whether they have a notable impact on cognitive processes in everyday life. The present study investigated the impact of social anxiety on the interpretation of verbal irony, a complex and commonly encountered form of ambiguous language, and whether judgmental biases play a mediating role in any observed interpretation biases. Participants high and low in social anxiety completed written measures of depression, judgmental bias, and irony interpretation. Mixed model analyses of variance conducted on several factor analytically derived interpretation scales suggested that, contrary to expectation, social anxiety had a negligible effect on the interpretation of both personal and non-personal instances of verbal irony, although it may have minimal gender specific effects on the use of specific types of comments. Potential covariates are explored and implications of the findings, limitations of the study, and future directions are discussed.
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Dedication

For Neil
I. Overview and Summary

Social anxiety can be a debilitating psychological condition. Emerging as early as 6 years of age (Bögels & Tarrier, 2004), it can lead to serious interpersonal difficulties and social withdrawal (Alden & Taylor, 2004). Cognitive biases that occur in social anxiety can influence the way that individuals view social situations and may subsequently play a role in maintaining their fears (Hirsch & Clark, 2004). The literature in this area suggests that socially anxious individuals tend to view ambiguous social situations more negatively than non-anxious individuals (Huppert, Foa, Furr, Filip, & Mathews, 2003). However, this does not shed light on the way that socially anxious individuals view specific aspects of a social situation, such as the comments made during an interaction. The research to date suggests that ambiguous comments made by conversational partners may be vulnerable to misinterpretation by socially anxious recipients. This may affect the way that socially anxious individuals interpret an encounter and may exacerbate subsequent anxiety. It would be informative to know whether misinterpretation is more common with specific types of social statements, as these statements may prove useful as tools for illustrating and combating cognitive biases in the treatment of social anxiety. The present study examines whether social anxiety influences the interpretation of a specific form of ambiguous social comment, verbal irony, and whether judgmental biases that have been identified in social anxiety help to account for any observed differences in interpretation.

1.1 Cognitive Biases in Social Anxiety

Socially anxious individuals demonstrate a number of cognitive biases that may influence their affective response to specific aspects of social interactions. For example, socially anxious individuals show attentional biases towards internal and social-threat cues (Musa, Lepine, Clark, Mansell, & Ehlers, 2003; Pineles & Mineka, 2005; Rinck & Becker, 2005; Spector, Pecknold, &
Libman, 2003) and towards negative self related information (Mellings & Alden, 2000). These attentional biases may be relatively complex, with initial hyper-vigilance to threat related stimuli followed by subsequent avoidance of these stimuli to minimize the perception of danger (e.g., Bögels & Mansell, 2004; Vassilopoulous, 2005). Socially anxious individuals also demonstrate memory biases, although the research in this area has been less consistent. A number of studies have failed to identify memory biases in the recall of vignette details (e.g., Brendle & Wenzel, 2004; Wenzel, Finstrom, Jordan, & Brendle, 2005) and disorder related words (Rapee, McCallum, Melville, Ravenscroft, & Rodney, 1994; Rinck & Becker, 2005). Other studies have found biased recollection of social threat words (Gotlib et al., 2004) and enhanced implicit memory for social threat information (Amir, Foa, & Coles, 2000). Mellings and Alden (2000) found enhanced memory for negative self-related information one day after a social interaction, supporting the existence of memory biases in ecologically valid situations. This research suggests that memory biases may exist under certain conditions, although these conditions are not particularly well understood. By causing socially anxious individuals to focus on the negative aspects of past and present social interactions, these memory and attention biases may contribute to negative interpretations of otherwise innocuous social stimuli, including ambiguous comments.

Interpretive biases have been fairly well documented in social anxiety. As mentioned above, social anxiety has been associated with a tendency to interpret ambiguous social situations in a negative fashion. These interpretive biases vary in intensity as a function of the severity of social anxiety symptoms (Huppert et al., 2003). Interpretive biases have also been found in the detection of negative emotion, with participants high in social anxiety showing a tendency to rate ambiguous facial expressions as negative (Winton, Clark, & Edelmann, 1995).
Biases in interpretation have also been identified for unambiguous situations, with socially anxious participants making more negative (Wenzel et al., 2005) and less positive interpretations of the details of vignettes, particularly those describing self-relevant positive events (Brendle & Wenzel, 2004). Socially anxious participants have been found to catastrophise in response to unambiguous mildly negative social events, interpreting these events as having global and negative implications for their self-image and future (Stopa & Clark, 2000). Although these interpretive biases may be exacerbated by depression (Wilson & Rapee, 2005a) and general distress (Brendle & Wenzel, 2004), they tend to persist after controlling for depression (Wilson & Rapee, 2005b). These studies suggest that a pervasive negative interpretive bias exists in social anxiety, with socially anxious individuals interpreting both ambiguous and non-ambiguous social stimuli and events more negatively.

One particular form of interpretive bias that has received a fair deal of attention in recent years focuses on subjective estimates of danger (Hirsch & Clark, 2004) and is generally referred to as a judgmental bias. Foa, Franklin, Perry, and Herbert (1996) found that socially anxious participants tend to rate negative social events as being more probable and more costly than non-anxious participants. These probability and cost estimates decrease with treatment, suggesting that judgmental biases are tied to the severity of social anxiety. McManus, Clark, and Hackmann (2000) demonstrated decreases in judgmental bias after both cognitive and pharmaceutical treatment, changes that did not appear to be due to repeated assessment. Inflated probability and cost estimates have also been observed in adolescents with social anxiety (Rheingold, Herbert, & Franklin, 2003). Potentially exacerbating the impact of this bias, Gilboa-Schechtman, Franklin, and Foa (2000) found that participants with social anxiety also underestimate the probability that positive social events will occur and anticipate more frequent and intense negative reactions to
both positive and negative social events. These biases increase the expectation that social interactions will be both negative and costly, potentially priming negative interpretations of ambiguous social cues that occur during these interactions.

Overall, the literature on cognitive biases in social anxiety supports the existence of attentional biases towards social threat cues, negative interpretive biases for social situations (and stimuli), and judgmental biases that affect expectations about the probability, nature, and costs associated with social interactions. The research on interpretive and judgmental biases is particularly compelling, as much of it has been conducted using complex stimuli that have greater ecological validity than single words (the stimuli commonly used in memory and attention tasks). For example, a number of studies have investigated interpretive and judgmental biases using descriptions of social scenarios (e.g., Foa et al., 1996; Gilboa-Schechtman et al., 2000; Huppert et al., 2003; McManus et al., 2000; Rheingold et al., 2003; Stopa & Clark, 2000, Wilson & Rapee, 2005a, b). Other studies have investigated these biases using video vignettes (Wenzel et al., 2005) and facial expressions (Winton et al., 1995). These stimuli reflect more social information than isolated words and provide greater insight into the way that these cognitive biases affect socially anxious individuals. However, the majority of these studies looked at general appraisals of social scenarios and did not address the way that participants interpret specific aspects of these scenarios (e.g., comments made by others). This makes it difficult to draw inferences about the specific impact that these biases have on individuals, the way that they interact with others, and how they interpret specific elements of these interactions.

There is one notable exception to this trend. A study conducted by Amir, Beard, and Bower (2005) investigated the interpretation of ambiguous, positive, and negative statements in socially anxious, generally anxious, and non-anxious participants. Participants were presented
with brief video clips in which a confederate approached the camera and commented on positive, negative, or ambiguous aspects of the participant’s actions or belongings. The participants were then asked to rate how they would feel if the speaker had directed the comment at them personally. Individuals with social anxiety rated the ambiguous videos more negatively than the control participants, suggesting that specific ambiguous stimuli may be particularly prone to interpretation biases and hence pose a greater interpretive challenge for these participants. This study adds to previous research by demonstrating that interpretive biases affect the interpretation of specific comments made by others. However, the specific comments used in this study lacked context. It is difficult to think of a situation in which an unfamiliar person (as was presumably the case in this study) approaches and makes a direct isolated comment about you (particularly an ambiguous or negative one). This is a fairly atypical scenario. It would be more informative to determine how socially anxious participants interpret specific comments made in the context of a social interaction with accompanying contextual information.

1.2 Interpretation of Verbal Irony

Verbal irony is an interesting type of social comment that is particularly well suited to this investigation. Irony is fairly common, occurring in approximately eight percent of conversational turns in talk between friends (Gibbs, 2000). Many people see themselves as sarcastic (a specific form of verbal irony), and although people report being more likely to use irony with close friends, they are not unlikely to use irony in relationships that are less intimate (Ivanko, Pexman, & Olineck, 2004). Irony is a somewhat unique form of social communication as it is complex and involves contradictory contextual and content information. As a result, ironic comments can be ambiguous. The speaker of an ironic comment is generally trying to make a specific point, and this is typically apparent from the mismatch between the context and
the content of a statement. However, verbal irony can be misunderstood, potentially leading to communicative problems and interpersonal difficulties. Irony is part of a complex communicative event that directly involves people’s emotional intentions and reactions (Leggitt & Gibbs, 2000), and it would be interesting to determine whether these comments are interpreted as intended by socially anxious individuals and whether the cognitive biases (specifically judgmental biases) found in social anxiety influence irony interpretation. Providing participants with literal and ironic statements presented in context will help to enhance our understanding of how socially anxious individuals attend to and integrate contextual and content information in social interactions when interpreting specific ambiguous statements.

The present study focuses on two relatively common forms of verbal irony: ironic criticism and ironic praise. Ironic criticism involves using a positive statement to comment on a negative behavior or outcome. For example, someone may say “Nice hair” to a friend who has walked in from a storm and has messy and tangled hair. This form of verbal irony is often referred to as sarcasm, particularly when the comment targets an identifiable ‘victim’ (Jorgensen, 1996). Ironic praise, on the other hand, involves using a negative statement to comment on a positive behavior or situation. For example, a man may say “You’re just too lazy at work” to his wife after she has worked long hours for months and has published ten research articles in the past year. Ironic criticism tends to be used more frequently than ironic praise when making sarcastic comments (which makes sense, given that in this context sarcasm was defined as a situation wherein individuals speak positively in order to convey negative intent), while ironic praise is more common than ironic criticism in jocularity (Gibbs, 2000). Given that jocularity and sarcasm are the two most commonly used forms of verbal irony (Gibbs, 2000), it appears that both ironic praise and ironic criticism occur frequently in social interactions.
Although verbal irony can be a risky form of communication, people may choose to use it for a number of reasons. Irony can be used to express surprise (Colston & Keller, 1998) or to indirectly express a speaker’s attitudes and reactions (Utsumi, 2000). Speakers may choose an ironic statement over a literal statement in an attempt to be humorous. They may also use irony to confirm or strengthen relationship bonds by emphasizing the common ground between the speaker and the listener and communicating the level of interpersonal comfort that an individual feels in the relationship (Dews & Winner, 1995). Irony can be used to mute the meaning of criticism or praise (Dews & Winner, 1995), serving a face saving function (Jorgensen, 1996) by making criticisms (and the speaker) seem less harsh and praise seem less embarrassing. The Tinge Hypothesis argues that this may occur because the surface (literal) meaning of the statement ‘tinges’ the interpretation of an ironic statement, making criticisms seem more positive and praise seem more negative (Dews & Winner, 1995). Although speakers are risking misinterpretation when they use verbal irony, there is generally a good chance that they will reap communicative payoffs.

These communicative payoffs can be seen in the way that people generally interpret ironic comments. Ironic comments are seen as more humorous than literal comments, particularly in close relationships, with ironic praise seen as more humorous than ironic criticism (Pexman & Zvaigzne, 2004). Ironic criticism is generally perceived as more polite than literal criticism (Ivanko & Pexman, 2003; Pexman & Olineck, 2002; Pexman & Zvaigzne, 2004), is rated as less critical, and is thought to have a less negative impact on the relationship (Dews & Winner, 1995). Framing a criticism as an ironic comment may potentially reduce feelings of defensiveness, anger, insult, and unfriendliness in the recipient, particularly when the criticism concerns a trivial offense (Jorgensen, 1996).
However, using ironic speech can have drawbacks, as people who use indirect ironic criticism are perceived as intending to be more offensive, verbally aggressive, anger provoking, and mocking than people who use direct literal criticism (Toplak & Katz, 2000), even though the comments themselves may be seen as being more positive than literal criticism. Ironic praise is also perceived as more teasing (Pexman & Zvaigzne, 2004) and less polite than literal praise (Pexman & Olineck, 2002; Pexman & Zvaigzne, 2004). In addition, ironic praise is seen as less praising than literal praise and as having a less positive impact on the relationship between the speaker and the listener (Dews & Winner, 1995). These results are largely in line with the Tinge Hypothesis (Dews & Winner, 1995). Both ironic criticism and ironic praise can be considered forms of social risk taking, although it appears that ironic praise may involve more risk than ironic criticism. After all, a literal interpretation of ironic criticism gives us literal praise, whereas a literal interpretation of ironic praise gives us literal criticism.

Many factors can influence the way that people interpret verbal irony, including the closeness of the relationship between the speaker and listener (Pexman & Zvaigzne, 2004), the gender of the person interpreting the comment (Jorgensen, 1996), and self-perceived sarcasm use (Ivanko, Pexman, & Olineck, 2004). As a result, people do not always interpret irony accurately, and a speaker may not always correctly anticipate how a listener will react (Toplak & Katz, 2000). The interpretation of irony can be tricky, particularly given that ironic statements, unlike other forms of figurative language such as metaphor, can be understood (or misunderstood) as literal statements (Kreuz, Kassler, Coppenrath, & McLain Allen, 1999). To complicate matters, in some situations a speaker may be making both a literal and ironic statement, commenting literally on the speaker’s attitude or expectations and ironically on how the speaker’s expectations have been violated (Ivanko & Pexman, 2003). In addition, the paralinguistic cues
(e.g., intonation) that are often associated with irony use are not always present (Clift, 1999). As a result, ironic comments can be ambiguous and may be misunderstood.

Recognizing that a comment is ironic ultimately relies on detecting a mismatch, or situational disparity, between the conversational turn expected in a sequence, given the context, and the comment that ultimately fills this slot, with the degree of situational disparity influencing the salience of irony (Gerrig & Goldvarg, 2000). An ironic comment may be misunderstood if the mismatch between the comment and the expected conversational turn is not highly apparent (Clift, 1999). People are more likely to expect a literal criticism following a strongly negative context (Ivanko & Pexman, 2003), creating a greater mismatch between the slot and a positively toned (valenced) ironic comment that allows sarcasm to be detected. However, after a mildly negative or neutral context people are equally likely to expect either an ironic comment or a literal comment (Ivanko & Pexman, 2003), making the mismatch less apparent and affecting the perception of irony.

By affecting socially anxious individuals’ expectations and interpretations during social interactions, the cognitive biases commonly observed in social anxiety may influence the interpretation of verbal irony. Although the situations depicted in irony interpretation tasks are typically unambiguously positive or unambiguously negative, the tendency to overestimate the probability of negative social events and underestimate the probability of positive social events may lead socially anxious participants to anticipate a negative social outcome. In addition, socially anxious participants may overestimate the costs associated with both positive and negative social events. This, combined with the general negative interpretive biases found in social anxiety, could lead them to interpret both the unambiguously negative and the unambiguously positive situations in a more negative fashion. This in turn may influence the
degree of situational disparity that is perceived between an ironic comment and its social context, affecting the way that socially anxious individuals perceive and interpret verbal irony.

If a negative social situation is interpreted more negatively, participants may perceive greater situational disparity between a positively valenced ironic criticism and the negative social context, enhancing the perception of irony. Once an ironic criticism is interpreted as criticism, the tendency to overestimate the costs of negative social situations could lead to a particularly negative interpretation of the ironic comment. Socially anxious participants may be anticipating highly negative social outcomes and take criticism, in any form, as an indication that the interaction has become negative. This tendency could also lead to a more negative interpretation of literal criticism.

Alternatively, if a positive social situation is interpreted more negatively and participants anticipate a negative outcome, they may perceive less situational disparity between negatively valenced ironic praise and the positive social context of the comment, potentially interfering with the perception of irony. This interference could lead a socially anxious individual to misinterpret ironic praise as literal criticism. The tendency to overestimate the costs of social situations could then lead to a particularly negative interpretation of ironic praise. The tendency to overestimate the costs of positive social situations could also influence the interpretation of literal praise, leading to a somewhat more negative interpretation of positive comments made in positive social contexts. Ultimately, the judgmental biases found in social anxiety may have a noticeable impact on how socially anxious individuals interpret verbal irony.

These biases in the interpretation of verbal irony may be particularly evident when ironic praise and criticism specifically target the individual making the interpretation, rather than targeting general events that are external to the participants in a given interaction. If a friend
remarks that "You look terrible" when you have spent hours getting ready for an event and know that you look great, you may interpret this comment somewhat differently than if the same friend remarks that "This weather is terrible" when you are both sitting outside and it is sunny and beautiful. Given that socially anxious individuals demonstrate attention biases towards negative self related information (Mellings & Alden, 2000) and a fear of negative evaluation (e.g., Weeks et al., 2005), it is likely that these individuals will be particularly prone to misinterpreting instances of personal irony. This would be consistent with the interpretive biases demonstrated in social anxiety, particularly the finding that judgmental biases in social anxiety appear to be specific to social stimuli (Foa et al., 1996) (i.e., personal comments may be seen as more social in nature than non-personal comments). If socially anxious individuals also demonstrate interpretive biases for non-personal instances of verbal irony (wherein the remark comments on some aspect of the situation that is external to the listener and is clearly not in the listener's control), it is possible that these differences in interpretation may be attributable to heightened anxiety and related cognitive processing deficits (e.g., Eysenck, Derakshan, Santos, & Calvo, 2007) rather than specific interpretive biases related to social anxiety.

The majority of irony interpretation studies reviewed here have investigated personal irony, with comments targeting the listener or someone known to both the speaker and listener (e.g., Dews & Winner, 1995; Ivanko & Pexman, 2003; Ivanko et al., 2004; Pexman & Olineck, 2002; Pexman & Zvaigzne, 2004; Toplak & Katz, 2000). In addition, the study by Amir et al. (2005) also used personal comments in all of their task conditions. One study on the production of ironic statements conducted by Ivanko, Pexman, and Olineck (2004) included both personal and non-personal (or general) irony. However, it is not clear that any studies to date have investigated the interpretation of personal and non-personal ironic comments, let alone whether
social anxiety affects these interpretations. Including examples of both personal and non-personal irony in the present study will help to determine whether any interpretive biases that are related to social anxiety are specific to the interpretation of personal comments (suggesting a greater role of specific biases) or whether they also influence the interpretation of non-personal comments (suggesting a greater role of general heightened anxiety).

1.3 Hypotheses

Given the cognitive biases found in social anxiety, we hypothesize that social anxiety will have an impact on irony interpretation, with socially anxious participants expected to give more negative interpretations in general, across all of the task conditions. It is anticipated that this will be particularly true for personal irony. In addition, we expect to find an effect of statement type, with literal criticism rated as the most negative statements, literal praise as the most positive, and the ironic statements falling in between. This pattern has been found in previous research by Pexman & Olineck (2002), with ironic insults seen as less negative than literal insults and more negative than ironic compliments (which were, in turn, more negative than literal compliments). This pattern is expected to hold for non-anxious participants, but not for socially anxious participants as an interaction is anticipated, with socially anxious participants expected to give significantly more negative interpretations of ironic praise. Again, this effect is expected to be more pronounced in the personal condition. It is also hypothesized that any observed differences in irony interpretation will be associated with judgmental biases. These effects are expected to be independent of participant gender, culture, and depression.

This research will help to address three gaps that exist in the literature. As mentioned above, it will help to determine whether the general judgmental biases found in social anxiety are associated with biases in the interpretation of a specific type of complex social comment that is
commonly encountered in everyday interactions. It will also help to determine whether social anxiety is a relevant individual difference variable that is associated with the interpretation of verbal irony. In addition, this research will help to establish whether personal and non-personal irony are interpreted differently and whether any interpretive biases associated with social anxiety are specific to the personal items. Irony does not always have the impact intended by a speaker, and understanding the factors that influence irony interpretation will help us to better understand why this occurs. This study may enhance our understanding of cognitive biases in social anxiety and may aid in the development of future theories of irony comprehension.

II. Pilot Study 1

Although irony interpretation tasks have been used in prior studies (e.g., Ivanko et al., 2004; Pexman & Olineck, 2002; Pexman & Zvaigzne, 2004), these measures were custom built, including features (e.g., manipulation of the closeness between the speaker and listener) that are not of interest in the present study and that could unnecessarily complicate the analyses. In addition, these measures did not include both personal and non-personal irony. The purpose of the first pilot study was to select items that could be used for an irony interpretation task.

2.1 Method

2.1.1 Participants

Twenty-four undergraduate students (17 females; mean age = 23.58 years, SD = 5.10; mean years of post-secondary education = 3.38 years, SD = 1.91) rated the personal task items. Thirteen of these participants identified themselves as being of European descent, 7 as Asian descent, 1 as Indian descent, and 3 as “other”. An additional 24 undergraduate students (19 females; mean age = 19.67 years, SD = 2.14; mean years of post secondary education = 1.85, SD = 1.36) rated the non-personal task items. Ten of these participants identified themselves as
being of European descent, 12 as Asian descent, and 2 as Indian descent. Participants were recruited using the online research participation system at the University of British Columbia and were awarded partial course credit for their participation. All participants were required to speak English as a first language, or to have spoken English by age five, as native language has been shown to influence figurative language comprehension (Charteris-Black, 2002). This selection criterion was used throughout all of the studies reported. Participants were permitted to complete only one stage of the study in order to prevent item sensitization.

2.1.2 Measures

A demographics sheet requested the age, sex, native language, years of education, and ethnicity of the participants. The measure development rating task for the personal condition requested that participants rate 56 vignettes, each describing a social scenario, for how plausible, positive, likely, and negative the event described was and how close the relationship was between the speaker and the listener in the vignette. Several of these vignettes and statements were adapted from items used by Pexman and Zvaigzne (2004) and Ivanko, Pexman, and Olineck (2004). Participants also rated 112 statements, addressing aspects of the addressee or their behavior, for how positive and how negative the statements were. Identical ratings were requested for 32 vignettes and 64 statements in the non-personal condition, with the statements addressing topics external to the addressee (e.g., the weather). All ratings were made using seven-point scales (1 = not at all, 7 = very). The personal and non-personal items were evaluated separately to reduce task demands. Two versions of each vignette were developed, describing a positive and a negative outcome for the same scenario. All vignettes were written in such a way that the participant was cast as an actor in the scenario (e.g., “You and your brother Tom…”; “Tom says to you…”). Four possible end statements were developed for each vignette, two
positive and two negative, with statements varying in the strength of their positive or negative modifiers (e.g., excellent vs. good). Each participant received one version of each vignette and two of the four statements relevant to the vignette (one positive and the other negative), with four versions of the measure required to accommodate all possible combinations of positive and negative statements. Each participant received an equal number of positive and negative vignettes and statements, with items randomly ordered within the respective task sections.

2.1.3 Procedure

Participants were tested in small groups in a conference room in the psychology department at the University of British Columbia. Following informed consent, the procedures and task instructions were described in detail using a written script to minimize variation in task administration. Participants were asked to complete the demographics sheet and measure development rating task described above. Written instructions were presented at the start of each section. The four versions of the task were randomly assigned to participants based on their order of arrival. Participant debriefing followed completion of the measure.

2.2 Results

Mean ratings were obtained for each rating scale for the positive and negative variant of each vignette and each of the four corresponding statements. Items were eliminated if either version of the vignette had a mean plausibility rating below 5. This criterion resulted in the elimination of 13 items in the personal condition and 8 items in the non-personal condition. Items were also eliminated if there was less than 2 points separating the positive and negative variants of the vignettes on both positivity and negativity. This resulted in the elimination of 11 items in the personal condition and 7 in the non-personal condition. The remaining items were required to have closeness and likelihood ratings of 4 or higher, resulting in the loss of 3
additional items in the personal condition and 1 item in the non-personal condition. A total of 29 items (vignettes) were retained in the personal condition and 16 in the non-personal condition. The remaining items were highly plausible, likely to occur, reflected close relationships between the speaker and the listener, and were well defined, with good separation between the positive and negative versions of each vignette on both positivity and negativity.

For each of the remaining items, two statements were selected (one positive and the other negative) such that the positive statement was approximately as far above the midpoint on the positivity scale as the negative statement was below the midpoint. When two statements were tied on positivity (e.g., both negative statements had the same mean rating), the negativity ratings were examined to identify the statement that most closely matched the selected statement (of the opposite valence) in disparity from the midpoint of the negativity scale. This approach to measure development was adapted from Pexman and Zvaigzne (2004). The mean ratings and standard deviations for the selected vignettes are presented in Table 1 and the mean ratings and standard deviations for the selected statements are presented in Table 2.

III. Pilot Study 2

Once the vignettes and statements were selected for the irony interpretation task, the irony conditions were created. The purpose of the second pilot study was to determine the effectiveness of the irony manipulation, regardless of a participant’s level of social anxiety, depression, or judgmental bias. Any items that were not rated in the anticipated direction on a scale assessing perceived irony were eliminated from the study. Once again, personal and non-personal items were evaluated separately.
3.1 Method

3.1.1 Participants

Thirty-two undergraduate participants (21 females; mean age = 23.13 years, $SD = 5.81$; mean years of post secondary education = 3.55, $SD = 1.63$) rated the personal items. Twelve of these participants were of European descent, 13 were of Asian descent, 4 were of Indian descent, and 3 reported “other”. Twenty four participants (19 females; mean age = 19.17, $SD = 1.24$; mean years of post-secondary education = 1.5, $SD = 1.01$) rated the non-personal items. Nine of these participants were of European descent, 8 were of Asian descent, and 7 reported “other”. One additional participant was excluded from the personal condition for biased responding and two were excluded from the non-personal condition for failing to meet language requirements.

3.1.2 Measures

A demographics sheet (described above) was administered. In addition, two irony interpretation tasks were constructed, one task including personal items and the other including non-personal items. These irony interpretation tasks were administered to separate groups of participants. The vignettes and statements selected from the first pilot study were combined to create four irony conditions. As there were a limited number of items remaining in the non-personal condition, all 24 items that passed the plausibility check were included in this task. The literal praise condition combined the positive variant of a vignette with its respective positive statement. Literal criticism combined the negative vignette with the negative statement. Ironic praise combined the positive vignette with the negative statement. Lastly, ironic criticism combined the negative vignette with the positive statement. Please see Appendix I for sample items presented in each of the four conditions and Appendix II for a comprehensive list of the vignettes and statements used in the irony interpretation task.
The irony interpretation tasks presented each item in one of the four irony conditions to each participant. Each participant received an approximately equal number of items in each irony condition. Four versions of each irony interpretation task were constructed, allowing each vignette to appear in all four of the irony conditions across versions. The items were randomly ordered and the items in each condition varied across versions of the task (i.e., the items did not 'travel together' across task conditions). Each item was followed by fifteen rating scales intended to comprehensively assess the way that participants interpreted each statement. These rating scales are presented in Appendix III. All ratings were made using 7-point scales (1 = not at all, 7 = very).

3.1.3 Procedure

This study followed the same procedure as the first pilot study. Participants completed the demographics sheet followed by one of the irony interpretation tasks. They were instructed to imagine themselves in the situation described by the vignette and to complete the rating scales accordingly. Task version was randomly assigned to the participants based on their order of arrival. The non-personal task was administered after data collection for the personal task had been completed.

3.2 Results

Mean ratings for the scale “ironic” were obtained for each item presented in each of the irony conditions. These mean ratings were used as a manipulation check. Any items that did not score in the anticipated direction (with the ironic variants scoring at or above 4.25 and the literal variants scoring at or below 3.75 on this scale) were discarded. An item was required to conform to this criterion in all four irony conditions to be selected for the final irony interpretation task. This resulted in the elimination of 11 items in the personal condition and 2 items in the non-
personal condition. As few items were lost in the non-personal condition, the remaining items flagged by the first pilot study were also eliminated, resulting in the elimination of 16 additional items. The two items closest to elimination in the personal condition were also removed, leaving 16 items in the personal condition and 16 in the non-personal condition. See Table 3 for the mean irony ratings in each irony condition for the selected items.

IV. Participant Pre-Screening for Main Experiment

4.1 Method

4.1.1 Participants

Participants were recruited from undergraduate psychology classes at the beginning of the fall and winter sessions. In total, five hundred twenty one participants were recruited. One hundred forty nine participants were excluded from the study for failing to meet English language requirements or failing to provide contact information. 372 participants were retained for the experiment proper (233 females, mean age = 19.29, SD = 2.87; average years of post-secondary education = 1.33, SD = 1.30). 153 of these participants identified themselves as being of European descent, 143 as Asian descent, 26 as Indian descent, 2 as First Nations Canadian, and 47 as “other”. Ethnicity data was missing for one participant. Participants were granted partial course credit for their participation.

4.1.2 Measures

A demographics sheet was administered, including a space for participants to provide contact information for the main study. The Social Interaction Anxiety Scale (SIAS) (Mattick & Clark, 1998) was used to assess the severity of participants’ social anxiety. The SIAS is a 20 item measure, providing ratings on a five-point scale ranging from 0 (not at all characteristic or true of me) to 4 (extremely characteristic or true of me). The items describe cognitive, affective,
and behavioral reactions to different social interactions. The SIAS has high internal consistency (Cronbach's alphas = .86 - .94) and high test-retest reliability over four to 12 weeks (rs ranging from .86 to .92 respectively). Correlational data provide support for the convergent and discriminant validity of the SIAS (e.g., Heimberg et al., 1992 as cited in Orsillo, 2001; Mattick & Clarke, 1998).

The Social Probability Cost Questionnaire (SPCQ) (McManus et al., 2000) was used to assess judgmental bias. This measure was administered during pre-screening to reduce task requirements during the main study. The SPCQ includes 33 items describing negative social events. Participants rate the probability that these events will happen to them "in the near future" and the likely cost associated with each event (i.e., how bad it would be if the event actually happened to them) on one hundred-point scales (0 = not at all likely to happen/ not at all bad/distressing; 100 = almost sure to happen/ really bad/very distressing). For both the probability and cost items, the SPCQ had high internal consistency (Cronbach's alpha = .96 and .97 respectively) in a mixed group of participants with social phobia, other anxiety disorders, and non-anxious controls. It also showed high internal consistency in social phobia alone (Cronbach's alpha = .95 and .95 respectively) (McManus et al., 2000). The SPCQ was modeled after the Probability/Cost Questionnaire constructed by Foa, Franklin, Perry, and Herbert (1996) and was designed to focus on social events, as social anxiety effects are typically found only for social items (Foa et al., 1996).

4.1.3 Procedure

Participants were recruited using an advertisement presented on an overhead projector. Questionnaires were distributed to interested participants after class. Participants completed the
booklets at home and returned them either after their next class or to the psychology department. Written task instructions were provided at the start of each measure.

4.2 Results

Four participants were missing data on their average years of post-secondary education. Independent samples t-tests suggested that the eligible participants recruited during the fall term differed slightly from the eligible participants recruited during the winter term in age, \( t(370) = -2.16, p < .05, Cohen's d = -0.22 \), with participants in the winter term being older \( (M = 19.54, SD = 2.86 \text{ vs. } M = 18.89, SD = 2.85) \), and in years of post-secondary education, \( t(366) = 5.85, p < .001, Cohen's d = .61 \), with participants in the winter term reporting more years of education \( (M = 1.63, SD = 1.33 \text{ vs. } M = 0.85, SD = 1.08) \). However, these participants did not differ in their level of social anxiety \( t(370) = 0.64, p > .05, Cohen's d = 0.07 \). As the purpose of this pre-screening process was to identify participants for the main study, no further analyses were conducted at this point.

V. Main Experiment

5.1 Method

5.1.1 Participants

The participants in the top and bottom 25% of pre-screening SIAS scores were selected for participation in the main study (representing high and low social anxiety, respectively). Seventy-four participants were selected from the fall term and 114 participants were selected from the winter term. A total of 128 participants (90 females; mean age= 19.48, SD= 2.72; mean years of post-secondary education= 1.50, SD= 1.03) completed the main study. Sixty-one participants were of European descent, 47 were of Asian descent, 6 were of Indian descent, and 14 participants were of “other” cultural descent. As the number of participants of Indian descent
was deemed too small for this group to form a useful subgroup in the statistical analyses and Indian culture is clearly distinct from Asian culture, the Indian cultural group was grouped with the heterogeneous “other” category for the purposes of the analyses. The participants who were selected during the fall term did not differ from the participants selected during the winter term in age, \( t(126) = -1.34, p > .05, \text{Cohen's } d = -0.24 \), years of post-secondary education, \( t(126) = -1.97, p > .05, \text{Cohen's } d = -0.35 \), social anxiety, \( t(126) = 1.56, p > .05, \text{Cohen's } d = 0.28 \), or depression, \( t(126) = 1.21, p > .05, \text{Cohen's } d = 0.22 \). Sixty four of the participants were high in social anxiety, as rated by the SIAS (\( M = 39.70, SD = 8.47 \)), and 64 were low in social anxiety (\( M = 8.64, SD = 3.48 \)), a difference that was significant, \( t(126) = -27.13, p < .001 \). Participants were awarded partial course credit for their participation.

5.1.2 Measures

A demographics sheet was administered along with the final version of the irony interpretation task. This task included the 16 personal and 16 non-personal items selected during the second pilot study. Four personal items and four non-personal items were presented in each of the four irony conditions. Four versions of the task were required to include all variants of each item. As with the second pilot study, the items did not ‘move together’ in clusters across conditions in the different versions of the task. The task was structured identically to the measure used in the second pilot study.

The Beck Depression Inventory – II (BDI-II) (Beck, Steer, & Brown, 1996) was also administered to assess the existence and severity of depression. The BDI-II includes 21 groups of statements corresponding to different symptoms of depression. Participants are required to select the statement that best describes how they have felt over the past two weeks. The BDI-II has good internal consistency, with a coefficient alpha of .93 for college students, and has a test-
retest correlation of .93 for outpatients. Correlational studies provide support for the convergent and discriminant validity of the BDI-II as a measure of depression (see Beck, Steer, & Brown, 1996 for a brief review of the reliability and validity data for the BDI-II).

5.1.3 Procedure

Selected participants were contacted by email after the selection process had been completed for the session. Interested participants were tested in small groups in a conference room in the psychology building at UBC. All measures were assembled into a single booklet with written task instructions presented at the start of each section. The procedure used was identical to that of the second pilot study.

5.2 Factor Analyses

The irony interpretation measure that was developed for the main study asked participants to rate each task item using fifteen rating scales. Although these scales do provide a comprehensive assessment of item interpretation, conducting analyses on each individual scale would be cumbersome. As the goal of the main study was to understand general group differences in overall irony interpretation, it was not necessary to maintain the distinction between all fifteen of the scales in the subsequent analyses. In addition, a number of the rating scales that were included in the interpretation task assessed similar dimensions of interpretation and are highly correlated with one another. Common factor analysis was used to identify a way to combine the individual scales into composite scales that reflect more basic dimensions of interpretation. These scale scores were then analyzed using mixed model analyses of variance to address the research questions driving the main study. As several of the rating scales did not appear to be relevant to the non-personal items (e.g., “Is the speaker praising you?”), the factor analyses were conducted separately for the personal and non-personal items.
5.2.1 Scoring

Prior to conducting the analyses, a mean score was calculated for each participant across the four items presented in each irony condition. These means were calculated independently for each of the fifteen rating scales in both the personal and non-personal conditions. Nine ratings were missing in the dataset, with no participants missing more than one out of the four possible ratings included in each mean. Using these mean scores proved advantageous as, once the means had been calculated, there was no missing data in the variables intended for the analyses. These mean scores will be used for all subsequent analyses.

As the goal of the factor analyses was to determine a factor solution that worked across all four irony conditions, composite scale scores were then calculated for each participant by adding the means for each scale across the four irony conditions. This ultimately resulted in fifteen composite scales, one for each rating scale. These composite scale scores were used for the factor analyses. Three scales were excluded from the factor analysis for the non-personal condition. These scales included “praising”, “teasing”, and “better”. The wording of these scales suggested that they did not apply to the non-personal condition. In addition, during data collection, several participants had commented that the scales did not seem to be relevant to the non-personal items. This suggests that it is advantageous to remove these scales from the analysis of the non-personal items.

5.2.2 Preliminary Analyses and Results

Prior to conducting the two factor analyses, the data were evaluated for problems with normality, non-linearity of the bivariate relationships, the presence of outliers, and the possibility of problematic disparate subgroups. Normality was assessed through evaluation of the skewness and kurtosis of each of the composite scales.¹ Frequency histograms were examined for variables
that were potentially non-normal. No variables demonstrated problematic levels of non-normality in the personal condition. In the non-personal condition, four variables, “positive” \( (skewness = 3.36, kurtosis = 3.18 \) in the non-anxious group), “upsetting” \( (skewness = 3.58, 3.76, 3.37, \) and 4.16 in the non-anxious, female, and European groups and in the total sample, respectively), “likely” \( (kurtosis = 3.64 \) in the male group), and “close” \( (kurtosis = 3.48 \) in the anxious group) were flagged as potentially non-normal. However, only the frequency histogram for “upsetting” demonstrated notable skew. A natural logarithm transformation was applied to “upsetting” to increase the normality of this variable. After transformation, the skewness of this variable was not significant at \( \alpha = .05 \). Examination of the bivariate scatterplot matrices failed to reveal notable departures from linearity or disconcerting levels of heteroscedasticity in either the personal or non-personal condition.

Observed values that were more than 3.5 standard deviations away from the scale mean were flagged as univariate outliers. In the personal condition, one univariate outlier was detected for the variable “praising”. This value was Winsorized to bring it back into an acceptable range for the variable (i.e., the value, which was below the mean in both the full sample and the female group, was replaced with a value that was one unit lower than the next lowest female score). In the non-personal condition, one univariate outlier was detected for the variable “positive”. This outlier, which was an outlier above the mean in the full sample, the non-anxious group, and the male group, was also Winsorized, replacing it with a value one unit higher than the next highest score in the non-anxious male group. These replacement values maintained the rank of the scores while bringing them back into a more desirable range. No further univariate outliers were identified. Multivariate outlier detection proceeded through examination of the Mahalanobis Distance values for each observation. Three cases exceeded the Chi-square critical value of
$\chi^2(15) = 37.70, \alpha = .001$, in the personal condition. Closer examination of the Cook's D values for these cases indicated that these three cases had low influence, suggesting that they do not represent problematic outliers. However, two cases had Cook's distance values greater than 1, the cutoff typically used to evaluate influence, when the “other” cultural group was examined separately. One case had moderately high influence, $Cook's-D = 1.05$, while the other case appeared to be more problematic, $Cook's-D = 3.72$. Both cases were flagged as multivariate outliers. No cases had Mahalanobis distance values exceeding the cutoff of $\chi^2(12) = 32.91, \alpha = .001$, in the non-personal condition. However, one case in the “other” cultural group had a Cook's D value greater than 1, $Cook's-D = 1.50$. This case was also flagged as an outlier. These cases did not share common demographic features and were not characterized by any strong systematic patterns of responses to the rating scales. To minimize potential distortions in the correlation matrices, these outliers were withheld from the relevant factor analyses.

Following outlier detection, multivariate analyses of variance were conducted to evaluate whether problematic disparate subgroups exist in the dataset, using the relevant composite scales as dependent variables. No significant mean differences were identified for social anxiety group in either the personal condition, $F(15, 110) = 1.73, p > .05$, or the non-personal condition, $F(12, 114) = 1.39, p > .05$, suggesting that it is appropriate to pool the data across social anxiety at the raw data level. A second MANOVA failed to identify significant mean differences between the genders in either the personal condition, $F(15, 110) = 0.73, p > .05$, or the non-personal condition, $F(12, 114) = 0.61, p > .05$. Lastly, no mean differences were identified based on cultural background (European, Asian, “Other”) in either the personal, $F(30, 220) = 1.43, p > .05$, or non-personal, $F(24, 228) = 0.83, p > .05$, conditions. Overall, these multivariate tests suggest
that there are no problematic disparate subgroups in this dataset and that it is appropriate to pool the data at the raw data level.

As a final check prior to conducting the factor analysis, multicollinearity and potential singularity of the correlation matrix were evaluated by examining the squared multiple correlations for the composite scales (i.e., the $R^2$ values that resulted when each composite variable was predicted by the remaining variables). None of the squared multiple correlations exceeded .90 in either the personal or non-personal conditions, suggesting that we do not have problematically high levels of multicollinearity or singularity in our dataset.

5.2.3 Analyses

Personal Condition

Common factor analysis was used to identify a way to combine the individual rating scales into composite scales reflecting more basic dimensions of interpretation. The correlation matrix between the fifteen composite scales used in this analysis is presented in Table 4. A principal-component analysis was conducted in order to obtain the eigenvalues for the initial correlation matrix and to obtain Cattell’s (1966) scree test to help determine the correct number of factors to retain. The eigenvalues for the correlation matrix are presented in Table 5. The Kaiser-Guttman rule (i.e., retaining as many factors as there are eigenvalues of the correlation matrix greater than 1.0) suggested that three factors should be retained. However, the scree test showed a noticeable increase in slope at five factors, suggesting that five factors should be retained. The likelihood ratio tests associated with a series of maximum likelihood common factor analyses yielded the following results: For three factors, $\chi^2(63)=275.09, p < .001$; for four factors, $\chi^2(51)=169.54, p < .001$; for five factors, $\chi^2(40)=62.01, p = .01$; for six factors,
\( \chi^2(30)=42.26, p > .05; \) for seven factors, \( \chi^2(21)=26.29, p > .15. \) Based on these likelihood ratio tests, up to seven factors may be required to obtain an adequate factoring of the data.

The residual correlations that remained after three and four factors extracted using unweighted least squares (ULS) common factor analysis were used to reproduce the original correlation matrix were obtained and examined to help clarify the correct number of factors to retain. Three ULS factors yielded four residual correlations greater than .10 (at -.11, .33, .12, and .20) and 83 (79.05% of the 105) residual correlations that were less than .05. This suggests that a three factor solution does not provide an optimal factorization of the data. Four ULS factors yielded one residual correlation greater than .10 (at .20) and 96 (91.43%) residual correlations less than .05, suggesting a reasonable factorization of the data. Five ULS factors yielded residual correlations in which none of the 105 were greater than .05, suggesting completeness of factorization. This suggests that the four factor solution provides a reasonable factorization of the data, although it is slightly less optimal than the five factor solution.

Unfortunately, none of the commonly used indicators for determining the correct number of factors (i.e., the Kaiser-Guttman rule, the scree test, and the likelihood ratio tests) agreed with one another. The scree test suggested that five factors should be retained. In addition, examination of the residual correlations when five factors are used to reproduce the original correlation matrix suggests completeness of factorization, supporting a five factor solution. However, examination of the scales constructed by linearly combining the variables with salient factor loadings in the five factor pattern matrix suggests that, despite the fact that the factors themselves correlated at a reasonable level (\( r = .60 \)), the correlations between two of the scales are undesirably high (with an average correlation of .76 across the four irony conditions). This suggests that it is optimal, for the purposes of the present study, to go with the four factor
solution, which ultimately collapses these two factors into a single factor. Four factors also gave a reasonable residual correlation matrix. When four factors are extracted, none of the correlations between the scales derived on the basis of the factor analysis exceed .62, an improvement over .76. Based on this, it was determined that four factors would be retained.

The optimal four factor solution was obtained using the ULS approach to common factor analysis. The factors were then transformed to an oblique simple structure using the Harris-Kaiser procedure (Harris & Kaiser, 1964), varying the degree of obliquity via the constant $c$. These transformations were conducted using the Alberta General Factor Analysis Program (Bay & Hakstian, 1972). Oblique transformation was selected as it appears likely, given the correlations between the variables, that the factors that result from this analysis will be correlated. However, as a range of $c$ was evaluated, it was possible to select an orthogonal solution, should this solution ultimately demonstrate the most optimal structure. The obliquely rotated pattern matrices were evaluated to identify the transformation with the best simple structure. The optimal four factor transformation was obtained using $c = 0.25$. The proportion of primary factor pattern coefficients falling into the factor hyperplane was 55% for the band of $0^\dagger < 0.10$. Three pattern coefficients fell into the ambiguous range of 0.2-0.3, affecting the variables "react", "close", and "time". No variables demonstrated salient factorial complexity and none of the correlations between the factors exceeded .53.

RESULTS AND DISCUSSION

The ULS common factor analysis of the fifteen composite rating scales resulted in a fairly clean four factor solution. The primary factor pattern coefficients and communality estimates for the optimal obliquely rotated simple structure solution are presented in Table 6 and the correlations between the factors (i.e., $\Phi$) are presented in Table 7. The pattern coefficients for
factor three were reflected (i.e., the signs of the pattern coefficients for these factors were reversed) in Table 6 to increase the ease of interpretation by making all of the salient coefficients positive, and the correlations in Table 7 were adjusted accordingly to reflect this change.

The interpretation of these factors, in terms of their common conceptual themes, offers little difficulty. However, it is important to note that these interpretations are, of course, subjective, particularly given that the rating scales used in the irony interpretation task were not selected for theoretical reasons but rather for their contributions to the general comprehensiveness of the ratings. Other readers may come up with alternative interpretations of these factors. In addition, the factor structure identified here necessarily applies only to the irony interpretation task used in the present study and does not necessarily reflect the structure of the general domain of irony interpretation. The primary purpose of conducting this factor analysis was not to explore the dimensionality of irony interpretation as a whole, but rather to reduce the fifteen rating scales used in the irony interpretation measure down to a smaller number of more basic scales. The factors identified here provide a useful way to combine the scales of the irony interpretation task, although they may not prove useful outside of this measure.

**Factor 1: Production Likelihood (PI).**

The first factor that was identified appears to address the probability that a participant would use the type of comment presented in a given vignette during everyday interactions. Two rating scales have salient loadings on this factor, assessing the likelihood that the participant would use a similar statement if they were in the speaker’s position and how frequently the participant uses similar statements in their daily life. This factor is somewhat undesirable in that it has only two salient loadings. Ideally, factors should have at least three salient loadings, as these factors are more stable and clearly defined. However, only two rating scales were included
in the irony interpretation task that addressed the tendency to use the different types of statements. As the two rating scales are not entirely redundant with one another, they share clear conceptual characteristics that are not encapsulated by other rating scales in the irony interpretation task, and no other rating scales were included in the task that could have added bulk to this factor, this factor does appear to be both meaningful and useful.

**Factor 2: Interaction Negativity (In).**

This factor was loaded by three scales that address the unpleasantness of a given interaction. These scales assess whether the participant would feel negatively about the speaker after hearing the comment, whether the speaker is being critical, and whether the statement would be upsetting to the participant. All three scales deal with themes of negativity but target slightly different aspects of the interaction: the participant’s reaction to the speaker, the speaker’s intent, and the statement itself. This factor appears to be best understood as reflecting the aversiveness of a given interaction, with particular focus on the nature of the comment.

**Factor 3: Figurative Teasing (Ft).**

From the results in Table 6, this factor appears to reflect the degree to which a participant accurately detects a speaker’s intent to tease and speak ironically. This factor is defined by three scales that assess how teasing, ironic, and humorous the speaker in the vignette is being. These scales are unified by a common theme of teasing or joking, but the factor also reflects (via the “ironic” scale) whether the participant has adequately detected the literal or non-literal nature of the comment. Based on this, Figurative Teasing appears to be a reasonable title for this factor.

**Factor 4: Interaction Positivity (Ip).**

The seven scales that define this factor focus on whether the comment made by the speaker was interpreted positively and elicited a positive reaction from the participant. These
scales assess whether the speaker was saying something polite, praising the addressee, or saying something positive, whether the comment would make the participant feel better about themselves, and whether the participant anticipates that they would react positively to the comment, feel close to the speaker, and want to spend more time with the speaker. All of these scales target slightly different aspects of the interaction, including the tone of the comment and the participants' reaction to the speaker. They are also unified by a theme of positivity. Overall, Interaction Positivity appears to be a reasonable title for this factor.

**Non-Personal Condition**

An identical approach was used for the common factor analysis of the non-personal rating scales. The correlation matrix between the twelve composite scales used in this analysis is presented in Table 8. As mentioned above, the scales "teasing", "praising", and "better" were removed from the analyses, as their wording was problematic in the non-personal condition. The transformed version of "upsetting" was used. The eigenvalues for the correlation matrix are presented in Table 9. The Kaiser-Guttman rule suggested that four factors should be retained while the scree test suggested that five factors should be retained. The likelihood ratio tests associated with the maximum likelihood common factor analyses yielded the following results: For four factors, $\chi^2(24) = 62.30, p < .001$; for five factors, $\chi^2(16) = 14.05, p > .50$. Based on this, the likelihood ratio tests also support five factors.

The residual correlations that remained after four and five factors extracted using unweighted least squares (ULS) common factor analysis were used to reproduce the original correlation matrix were obtained and examined to help clarify the completeness of factorization using these numbers of factors. Four ULS factors yielded three residual correlations greater than .10 (at .22, -.11, and .15) and 53 (80.30% of the 66) residual correlations that were less than .05.
This suggests that a four factor solution does not provide an optimal factorization of the data. However, five ULS factors yielded residual correlations in which only one of the 66 was greater than .05 and none were greater than .10, suggesting completeness of factorization. This too supports a five factor solution.

In this case, three out of four indicators concur that five factors should be retained. Examination of the scales constructed on the basis of the five factor solution suggests that the correlations between the finished scales are all at or below .47. Ultimately, five factors were retained in the non-personal condition. The five factor solution was obtained using ULS and the Harris-Kaiser technique for oblique transformation, with the optimal simple structure obtained using c= 0. The proportion of primary factor pattern coefficients falling into the factor hyperplane was 65 % for the band of 0⁺.10. Five pattern coefficients fell into the ambiguous range of 0.2-0.3, affecting the variables “positive”, “critical” and “react”. No variables demonstrated salient factorial complexity and none of the correlations between the factors, rounded to two decimal places, exceeded .49.

RESULTS AND DISCUSSION

The ULS common factor analysis of the twelve composite rating scales in the non-personal condition resulted in a fairly clean five factor solution that maps on well to the solution found in the personal condition. The primary factor pattern coefficients and communality estimates for the optimal obliquely rotated simple structure solution are presented in Table 10 and the correlations between the factors (i.e., Φ) are presented in Table 11. The pattern coefficients for factor five were reflected in Table 10 and the correlations presented in Table 11 were adjusted accordingly. The interpretation of these factors is largely in line with the interpretation of the factors found in the personal condition. Unfortunately, removing the three
rating scales “teasing”, “praising”, and “better” (which tended to be highly factorially complex if included in the analyses) resulted in three of the five scales having only two salient loadings. While, as noted above, it is desirable to have more than two salient loadings for each factor, the consistency between the factor pattern obtained in the non-personal condition and the five factor pattern obtained in the personal condition suggests that the small factors observed here reflect the underlying structure of the variables and that the factors are small simply because there are not enough variables to add bulk to the factors. Based on this, all five factors were interpreted.

Factor 1: Statement Positivity (Sp).

The three scales that define this factor focus on whether the comment made by the speaker was interpreted positively by the participant. These scales assess whether the speaker was saying something polite, saying something positive, and whether the participant would react positively to the comment. All three scales target slightly different aspects of the statement itself and Statement Positivity appears to be a reasonable title for this factor.

Factor 2: Interaction Negativity (In).

This factor is in line with the Interaction Negativity factor found in the personal condition and was loaded by the same three scales, “negative”, “critical”, and “upsetting”. Based on this, this factor is given the same interpretation in the non-personal condition.

Factor 3: Production Likelihood (Pl).

This factor is in line with the Production Likelihood factor found in the personal condition and was loaded by the same two scales, “likely” and “frequent”. It is given the same interpretation in the non-personal condition.

Factor 4: Interpersonal Reaction (Ir).
The fourth factor was loaded by two rating scales addressing slightly different aspects of the participant’s anticipated reaction to the interaction and, more specifically, to the speaker. These two scales assess whether the participant would feel close to the speaker and whether they would want to spend more time with the speaker after hearing the comment. Both scales focus on the degree of interpersonal closeness that a participant would feel with the speaker. This suggests that the title Interpersonal Reaction is a reasonable fit for this factor. This factor is conceptually similar to factor 1, Statement Positivity. However, the correlation between the two factors is .44 (.47 between the scales), suggesting that the two factors are reasonably independent. Both factors will be retained, although it is reasonable to anticipate that the pattern of means for the two anxiety groups may be similar for the scales derived on the basis of these two factors.

**Factor 5: Figurative Teasing (Ft).**

From the results in Table 10, this factor is consistent with the Figurative Teasing factor found in the personal condition, with both “ironic” and “humorous” demonstrating significant loadings. Based on this, the interpretation developed for the personal condition will be used here.

**5.3 Scale Evaluation**

The scales that loaded onto the four personal and five non-personal factors were averaged together to form the nine scales that will be used for the main analyses. Cronbach’s alpha values were obtained for each of the irony conditions and were then averaged to give an idea of the general internal consistency of the scales. These values are presented in Table 12. The correlations between the scales, again averaged across the four irony conditions, are presented in Table 13.
5.4 Main Analyses

After scale construction, the data were evaluated for the presence of univariate outliers, again defined as values more than 3.5 standard deviations away from the scale mean. In the personal condition, one univariate outlier, a non-anxious European male, was detected in the literal praise condition of the Figurative Teasing scale. Once this outlier was removed, no further outliers were identified in the personal condition. In the non-personal condition, three univariate outliers were detected. Two non-anxious European females were flagged, one in the literal criticism condition of the Interaction Negativity scale and the other in the ironic praise condition of the Interpersonal Reaction scale. In addition, an anxious European male was flagged in the literal criticism condition of the Figurative Teasing scale. One additional outlier was identified after these cases were removed, a non-anxious European female in the literal praise condition of the Interpersonal Reaction scale. The main analyses were repeated both with and without relevant outliers. As the results of the analyses were identical, the results reported below are from the analyses conducted using all of the participants.

Data were analyzed using a mixed-model analysis of variance (ANOVA) framework. Social anxiety group (a between subjects factor), speaker intent (i.e., praise vs. criticism, within subjects), and ironic intent (literal vs. ironic comment, within subjects) served as independent variables. The primary effect of interest was the three-way interaction between social anxiety, intent, and irony, indicating whether the anxiety groups differed in how they interpreted items presented in specific irony conditions. As the scales for the personal and non-personal conditions contained slightly different items (with the exception of Production Likelihood and Interaction Negativity), the analyses were conducted separately for the personal and non-personal conditions. Given that the scales within both the personal and non-personal conditions are
correlated, a Bonferroni correction was applied to the results to control type I error rates. Based on this, the ANOVA results in the personal condition were evaluated at $\alpha = 0.0125$ (correcting for the four analyses within this set) and the results in the non-personal condition were evaluated at $\alpha = 0.01$ (correcting for the five analyses within this set).

Significant interactions were followed up via examination of the simple effects and through simple and complex comparisons. As the follow up analyses ultimately focused on the significant interaction between intent and irony, an effect that was anticipated based on the irony literature, these analyses were treated as planned comparisons and no further alpha correction was applied (i.e., the results were evaluated at the same conservative alpha levels of 0.0125 for the personal condition and 0.01 for the non-personal condition). The means for each of the rating scales, organized by irony condition and by social anxiety group, are presented in Table 14.

5.4.1 Personal Condition

Production Likelihood

The assumption of homogeneity of variance (HOV) was met for this analysis, with a non-significant Levene's test of equality of variances in all four of the irony conditions. Given that both of the within-subjects variables had two levels, the assumption of sphericity is not relevant to any of the ANOVAs conducted. Confirming the effects found in the verbal irony literature, a significant effect of intent was identified, $F(1, 126) = 206.82, p < .001$, $partial \eta^2 = .62$, as well as a significant effect of irony, $F(1, 126) = 133.00, p < .001$, $partial \eta^2 = .51$. These effects were qualified by a significant interaction between intent and irony, $F(1, 126) = 384.92, p < .001$, $partial \eta^2 = .75$. Pairwise comparisons indicated that participants were significantly more likely to use literal praise than ironic criticism, $F(1, 126) = 341.34, p < .001$, $partial \eta^2 = .73$, were more likely to use ironic criticism than ironic praise, $F(1, 126) = 9.07, p < .005$, $partial \eta^2 = .07$, and
were more likely to use ironic praise than literal criticism, $F(1, 126)= 10.49, p < .005$, partial $\eta^2 = .08$. The means used for these analyses are presented in Table 15 and in Figure 1. The effects of group, $F(1, 126)= 0.91, p > .05$, partial $\eta^2 = .01$, the irony by group interaction, $F(1, 126)= 0.13, p > .05$, partial $\eta^2 = .00$, and the intent by irony by group interaction, $F(1, 126)= 0.08, p > .05$, partial $\eta^2 = .00$, were not significant, nor was the interaction between group and intent, although this effect was marginal, $F(1, 126)= 4.60, p > .0125$, partial $\eta^2 = .04$.

Interaction Negativity

The assumption of HOV was met in the literal praise, ironic praise, and literal criticism conditions and was violated in the ironic criticism condition, $F(1, 126)= 4.04, p < .05$. As there are an equal number of participants in each social anxiety group, any bias caused by heterogeneous variances is likely to be conservative bias. However, examination of the pattern of means, the significance of the effects, and the effect sizes in this analysis suggests that it is unlikely that this affected the results obtained (i.e., the non-significant results are far from significant). The effect of intent was again significant, $F(1, 126)= 530.64, p < .001$, partial $\eta^2 = .81$, as was the effect of irony, $F(1, 126)= 20.62, p < .001$, partial $\eta^2 = .14$. These effects were qualified by a significant intent by irony interaction, $F(1, 126)= 236.78, p < .001$, partial $\eta^2 = .65$. Pairwise comparisons indicated that participants rated literal criticism as significantly more negative than ironic criticism, $F(1, 126)= 79.44, p < .001$, partial $\eta^2 = .39$, ironic criticism as more negative than ironic praise, $F(1, 126)= 31.83, p < .001$, partial $\eta^2 = .20$, and ironic praise as more negative than literal praise, $F(1, 126)= 220.71, p < .001$, partial $\eta^2 = .64$. The means used in these analyses are presented in Table 15 and Figure 2. The effects of group, $F(1, 126)= 0.41, p > .05$, partial $\eta^2 = .00$, intent by group, $F(1, 126)= 1.62, p > .05$, partial $\eta^2 = .01$, irony by group,
Figurative Teasing

The assumption of HOV was met in all four of the irony conditions. The effect of intent was significant, $F(1, 126) = 50.27, p < .001, \text{partial } \eta^2 = .29$, as was the effect of irony, $F(1, 126) = 1326.29, p < .001, \text{partial } \eta^2 = .91$. These effects were again qualified by a significant interaction between intent and irony, $F(1, 126) = 81.21, p < .001, \text{partial } \eta^2 = .39$. Pairwise comparisons indicated that participants rated ironic praise and ironic criticism as equally teasing, $F(1, 126) = 3.31, p > .05, \text{partial } \eta^2 = .03$. A complex comparison indicated that participants rated literal criticism as less teasing than the average of the two irony conditions, $F(1, 127) = 616.25, p < .001, \text{partial } \eta^2 = .83$. Participants also rated literal praise as significantly less teasing than literal criticism, $F(1, 126) = 191.75, p < .001, \text{partial } \eta^2 = .60$. Relevant means are presented in Table 15 and in Figure 3. The effects of group, $F(1, 126) = 0.59, p > .05, \text{partial } \eta^2 = .00$, intent by group, $F(1, 126) = 1.28, p > .05, \text{partial } \eta^2 = .01$, irony by group, $F(1, 126) = 0.16, p > .05, \text{partial } \eta^2 = .00$, and the intent by irony by group interaction, $F(1, 126) = 0.36, p > .05, \text{partial } \eta^2 = .00$, were not significant.

Interaction Positivity

The assumption of HOV was met in all four irony conditions. The effect of intent was once again significant, $F(1, 126) = 685.50, p > .05, \text{partial } \eta^2 = .84$, as was the effect of irony, $F(1, 126) = 134.90, p < .001, \text{partial } \eta^2 = .52$. The interaction between intent and irony was also significant, $F(1, 126) = 449.27, p < .001, \text{partial } \eta^2 = .78$. Consistent with the results for the Interaction Negativity scale, participants rated literal praise as significantly more positive than ironic praise, $F(1, 126) = 486.18, p < .001, \text{partial } \eta^2 = .79$, ironic praise as significantly more
positive than ironic criticism, \(F(1, 126) = 14.53, p < .001, \text{partial } \eta^2 = .10\), and ironic criticism as significantly more positive than literal criticism, \(F(1, 126) = 120.41, p < .001, \text{partial } \eta^2 = .49\). Relevant means are presented in Table 15 and Figure 4. The effects of group, \(F(1, 126) = 0.01, p > .05, \text{partial } \eta^2 = .00\), intent by group, \(F(1, 126) = 1.55, p > .05, \text{partial } \eta^2 = .01\), irony by group, \(F(1, 126) = 0.31, p > .05, \text{partial } \eta^2 = .00\), and the intent by irony by group interaction, \(F(1, 126) = 0.67, p > .05, \text{partial } \eta^2 = .01\), were not significant.

5.4.2 Non-Personal Condition

Statement Positivity

The assumption of HOV was met for all four irony conditions. The effect of intent was significant, \(F(1, 126) = 283.52, p < .001, \text{partial } \eta^2 = .69\), as was the effect of irony, \(F(1, 126) = 383.46, p < .001, \text{partial } \eta^2 = .75\). As with the personal items, these effects were qualified by a significant interaction between intent and irony, \(F(1, 126) = 663.72, p < .001, \text{partial } \eta^2 = .84\). Pairwise and complex comparisons indicated that participants rated literal praise as significantly more positive than ironic criticism, \(F(1, 126) = 716.21, p < .001, \text{partial } \eta^2 = .85\), ironic criticism as significantly more positive than the average of ironic praise and literal criticism, \(F(1, 126) = 41.23, p < .001, \text{partial } \eta^2 = .25\), and ironic praise and literal criticism as equally positive, \(F(1, 126) = 0.04, p > .05, \text{partial } \eta^2 = .00\). The means used for this analysis are presented in Table 15 and Figure 5. The effects of group, \(F(1, 126) = 1.36, p > .05, \text{partial } \eta^2 = .01\), intent by group, \(F(1, 126) = 1.02, p > .05, \text{partial } \eta^2 = .01\), irony by group, \(F(1, 126) = 0.27, p > .05, \text{partial } \eta^2 = .00\), and the interaction between intent, irony, and group, \(F(1, 126) = 0.00, p > .05, \text{partial } \eta^2 = .00\), were not statistically significant.
Interaction Negativity

The assumption of HOV was met for all four irony conditions. The effect of intent was significant, \( F(1, 126) = 8.09, p < .01, \text{partial } \eta^2 = .06 \), as was the effect of irony, \( F(1, 126) = 135.02, p < .001, \text{partial } \eta^2 = .52 \), with these effects once again qualified by a significant interaction between intent and irony, \( F(1, 126) = 216.13, p < .001, \text{partial } \eta^2 = .63 \). Overall, participants rated ironic praise as more negative than the average of literal and ironic criticism, \( F(1, 126) = 44.35, p = .001, \text{partial } \eta^2 = .26 \), literal criticism and ironic criticism as equally negative, \( F(1, 126) = 2.15, p > .05, \text{partial } \eta^2 = .02 \), and the average of the two criticism conditions as more negative than literal praise, \( F(1, 126) = 248.59, p < .001, \text{partial } \eta^2 = .66 \). The means used for this analysis are presented in Table 15 and Figure 6. The effects of group, \( F(1, 126) = 0.25, p > .05, \text{partial } \eta^2 = .00 \), intent by group, \( F(1, 126) = 0.12, p > .05, \text{partial } \eta^2 = .00 \), irony by group, \( F(1, 126) = 0.03, p > .05, \text{partial } \eta^2 = .00 \), and the interaction between intent, irony, and group, \( F(1, 126) = 1.27, p > .05, \text{partial } \eta^2 = .01 \), were not statistically significant.

Production Likelihood

The assumption of HOV was met for all four irony conditions. As per usual, the effect of intent was significant, \( F(1, 126) = 79.55, p < .001, \text{partial } \eta^2 = .39 \), as was the effect of irony, \( F(1, 126) = 294.45, p < .001, \text{partial } \eta^2 = .70 \), and the intent by irony interaction, \( F(1, 126) = 393.70, p < .001, \text{partial } \eta^2 = .76 \). These effects were qualified by a significant intent by irony by group interaction, \( F(1, 126) = 8.92, p < .005, \text{partial } \eta^2 = .07 \). The simple interaction of group and intent was significant in the literal condition, \( F(1, 126) = 12.71, p < .001, \text{partial } \eta^2 = .09 \), but was not significant in the ironic condition, \( F(1, 126) = 0.82, p > .05, \text{partial } \eta^2 = .01 \). Closer examination of this significant simple interaction indicated that socially anxious individuals reported that they were less likely to use non-personal literal praise, \( F(1, 126) = 9.38, p < .005, \text{partial } \eta^2 = .07 \), and
were equally likely to use literal criticism, $F(1, 126)= 0.00, p > .05$, partial $\eta^2 = .00$, relative to non-anxious participants.

Examined another way, the interaction between intent and irony was significant in both the non-anxious, $F(1, 126)= 260.55, p < .001$, partial $\eta^2 = .67$, and anxious, $F(1, 126)= 142.06, p < .001$, partial $\eta^2 = .53$, groups. Both groups demonstrated the same pattern of means, with participants reporting more use of literal praise than the average of the two criticism conditions, $F(1, 126)= 87.86, p < .001$, partial $\eta^2 = .41$, with no interaction between group and this contrast, $F(1, 126)= 5.49, p < .05$, partial $\eta^2 = .04$. In addition, both the non-anxious, mean difference (MD) = -0.04, $SE= 0.16, p > .05$, and the anxious, MD = 0.39, $SE= 0.16, p > .01$, participants indicated that they would be equally likely to use literal and ironic criticism, and both groups indicated that they would be more likely to use criticism (averaged) than ironic praise, $F(1, 126)= 461.11, p < .001$, partial $\eta^2 = .79$, again with no interaction between this contrast and group, $F(1, 126)= 0.01, p > .05$, partial $\eta^2 = .00$. The means used for this analysis are presented in Table 15 and Figure 7. The effects of group, $F(1, 126)= 0.59, p > .05$, partial $\eta^2 = .00$, intent by group, $F(1, 126)= 2.21, p > .05$, partial $\eta^2 = .02$, and irony by group, $F(1, 126)= 0.01, p > .05$, partial $\eta^2 = .00$, were not significant.

**Interpersonal Reaction**

The assumption of HOV was met for all four irony conditions. The effect of irony was significant, $F(1, 126)= 104.53, p < .001$, partial $\eta^2 = .45$, and this effect was qualified by a significant interaction between intent and irony, $F(1, 126)= 197.97, p < .001$, partial $\eta^2 = .61$. Pairwise comparisons indicated that participants reported that they would feel closer to the speaker after hearing literal praise as opposed to ironic criticism, $F(1, 126)= 55.63, p < .001$, partial $\eta^2 = .31$, after hearing ironic criticism as opposed to literal criticism, $F(1, 126)= 12.69, p$
<.005, partial $\eta^2 = .09$, and after hearing literal criticism as opposed to ironic praise, $F(1, 126) = 57.38, p < .001$, partial $\eta^2 = .31$. The means used for this analysis are presented in Table 15 and Figure 8. The effects of intent, $F(1, 126) = 0.02, p > .05$, partial $\eta^2 = .00$, group, $F(1, 126) = 1.36, p > .05$, partial $\eta^2 = .02$, intent by group, $F(1, 126) = 1.02, p > .05$, partial $\eta^2 = .02$, irony by group, $F(1, 126) = 0.27, p > .05$, partial $\eta^2 = .00$, and the interaction between intent, irony, and group, $F(1, 126) = 0.00, p > .05$, partial $\eta^2 = .01$, were not significant.

**Figurative Teasing**

The assumption of HOV was met for all four irony conditions. The effect of intent was significant, $F(1, 126) = 228.86, p < .001$, partial $\eta^2 = .65$, as was the effect of irony, $F(1, 126) = 1242.46, p < .001$, partial $\eta^2 = .91$, qualified by a significant interaction between intent and irony, $F(1, 126) = 55.92, p < .001$, partial $\eta^2 = .31$. Overall, participants rated ironic criticism as more teasing than ironic praise, $F(1, 126) = 173.66, p < .001$, partial $\eta^2 = .58$, ironic praise as more teasing than literal criticism, $F(1, 126) = 317.47, p < .001$, partial $\eta^2 = .72$, and literal criticism as more teasing than literal praise, $F(1, 126) = 34.33, p < .001$, partial $\eta^2 = .21$. This suggests that participants were somewhat less sensitive to the humorous and ironic intent of ironic praise relative to ironic criticism in the non-personal condition. The means used for this analysis are presented in Table 15 and Figure 9. The effects of group, $F(1, 126) = 3.83, p > .05$, partial $\eta^2 = .03$, intent by group, $F(1, 126) = 3.49, p > .05$, partial $\eta^2 = .03$, irony by group, $F(1, 126) = 0.12, p > .05$, partial $\eta^2 = .00$, and the intent by irony by group interaction, $F(1, 126) = 3.45, p > .05$, partial $\eta^2 = .03$, were not statistically significant.

### 5.5 Evaluation of Potential Covariates

Previous research has suggested that gender may affect the interpretation of verbal irony (e.g., Jorgensen, 1996). In addition, it has been suggested that depression may have an effect on
the interpretive biases found in social anxiety (e.g., Wilson & Rapee, 2005a). Finally, although it is not clear whether prior research has formally investigated the impact of culture on irony interpretation, it is possible that cultural factors may affect the way that individuals interpret verbal irony. The effect of depression (as measured by the BDI-II) was examined by including this variable as a covariate and repeating the analyses. The effects of gender and culture were examined by including these variables in the ANOVA models and repeating the main analyses. As the “other” cultural group was quite heterogeneous in its makeup and was quite small (with only 20 participants), only the European and Asian participants were used in the analyses that included culture as a variable. Judgmental biases (i.e., probability and cost estimates from the SPCQ) were not examined as potential covariates. These judgmental biases had been suggested as potential mediators or moderators of differences in the interpretation of verbal irony associated with social anxiety. As no differences in interpretation were observed, it does not appear that additional analyses including the scales of the SPCQ are required.

Including participant BDI-II scores as a covariate in the analyses did not change the pattern of significant results for the majority of the scales. For the personal Interaction Negativity scale, including depression as a covariate led to the non-significance of the effect of irony, \( F(1, 125) = 2.35, p > .10, \text{partial } \eta^2 = .02 \). Similarly, including depression as a covariate for the non-personal Interaction Negativity scale resulted in a non-significant effect of intent, \( F(1, 125) = 4.33, p > .0125, \text{partial } \eta^2 = .03 \). All other effects were unchanged and the intent by irony interaction remained significant for both scales. Pairwise comparisons revealed an identical pattern of means in both cases, although ironic praise and ironic criticism became equally negative for personal Interaction Negativity when depression was included as a covariate, \( F(1, 125) = 5.08, p > .0125, \text{partial } \eta^2 = .04 \). Overall, it does not appear that depression had a
substantial or problematic effect on the analyses, causing only a single difference in the results at the pairwise comparison level across the nine response scales.

Gender did not have any significant effects nor did it alter the results when it was included as a variable in the models for personal and non-personal Interaction Negativity, personal and non-personal Figurative Teasing, personal Interaction Positivity, non-personal Statement Positivity, or non-personal Interpersonal Reaction. When gender was included as a variable in the model for personal Production Likelihood, the four way interaction between intent, irony, group, and gender was significant, $F(1, 124)= 8.55, p < .005$, partial $\eta^2 = .06$. Examination of the simple interactions between intent, irony, and group at each gender suggested that this three way interaction was significant for males, $F(1, 124) = 6.77, p < .0125$, partial $\eta^2 = .05$, but not for females, $F(1, 124) = 1.85, p > .15$, partial $\eta^2 = .01$. The simple simple interaction between group and intent was significant for males for the ironic condition, $F(1, 124) = 6.67, p < .0125$, partial $\eta^2 = .05$, but not for the literal condition, $F(1, 124) = 0.79, p > .05$, partial $\eta^2 = .01$. Examination of the simple simple simple main effects of group at levels of intent suggested that non-anxious and anxious males do not differ in their use of personal ironic criticism, $MD = -0.11, SE = 0.38, p > .05$, but do differ in their use of personal ironic praise, $MD = 1.13, SE = 0.41, p < .0125$, with anxious males reporting that they would be less likely to use personal ironic praise ($M = 2.51, SE = .30$) than non-anxious participants ($M = 3.64, SE = 0.28$).

When gender was included as a variable in the analysis of non-personal Production Likelihood, there was a significant interaction between gender and intent, $F(1, 125) = 8.24, p < .01$, partial $\eta^2 = .06$. However, the simple effect of gender was not significant within either praise, $F(1, 124) = 3.55, p > .05$, partial $\eta^2 = .03$, or criticism, $F(1, 124) = 1.62, p > .05$, partial $\eta^2 = .01$, and the simple effect of intent was significant for both males, $F(1, 124) = 45.98, p <
The pattern of means for praise and criticism was identical for males and females, suggesting that this difference is a matter of degree (supported by the asymmetry in effect sizes between males and females), and is not highly consequential to the conclusions of the analyses. In addition, the three way interaction between intent, irony, and group became non-significant, $F(1, 124)= 4.05, p > .01, partial \eta^2 = .03$, when gender was included in the model for non-personal Production Likelihood. Closer examination of the simple effects suggested that this three way interaction continued to be significant for females, $F(1, 124)= 12.54, p = .001, partial \eta^2 = .09$, although it was not significant for males, $F(1, 124)= 0.01, p > .50, partial \eta^2 = .00$. As suggested by the breakdown of the three way interaction presented above for the main analyses, socially anxious females used less non-personal literal praise ($M= 5.63, SE= 0.10$) than non-anxious females ($M= 6.11, SE= .11$), $MD= 0.48, SE= 0.15, p = .001$.

Considered collectively, these results suggest that gender did not have a major influence on the interpretation of task items, although it may have a limited impact on the likelihood of using specific comments. Socially anxious males reported that they would be less likely to use personal ironic praise than non-anxious males, while socially anxious females reported that they would be less likely to use non-personal literal praise than non-anxious females. These results are consistent with research suggesting that males and females differ in how they use ironic comments (e.g., Colston & Lee, 2004; Ivanko et al., 2004).

Including culture (European vs. Asian) as a variable in the analyses did not affect the pattern of results obtained for personal Interaction Negativity, personal Figurative Teasing, personal Interaction Positivity, non-personal statement positivity, and non-personal Interpersonal Reaction. When culture was included as a variable in the analysis of personal Production
Likelihood, there was a significant interaction between irony and culture, $F(1, 104)= 7.36, p < .01$, $\text{partial } \eta^2 = .07$. The simple effect of culture was not significant within either the literal, $F(1, 104)= 0.81, p > .05$, $\text{partial } \eta^2 = .01$, or ironic, $F(1, 104)= 3.96, p > .0125$, $\text{partial } \eta^2 = .04$, conditions and the simple effect of irony was significant for both Europeans, $F(1, 104)= 32.13, p < .001$, $\text{partial } \eta^2 = .24$, and Asians, $F(1, 104)= 71.16, p < .001$, $\text{partial } \eta^2 = .41$. The pattern of means for the literal and ironic conditions was identical for both groups, suggesting that this difference is a matter of degree (again supported by asymmetries in the effect sizes between the groups) and is not highly consequential to the conclusions of the analysis. Including culture as a variable in the non-personal Interaction Negativity analyses resulted in a non-significant effect of intent, $F(1, 104)= 4.07, p > .05$, $\text{partial } \eta^2 = .04$. However, all other effects, including follow up tests, were consistent with the main analyses, suggesting that this difference is relatively inconsequential.

In the non-personal Production Likelihood condition, including culture as a variable in the model resulted in non-significance of the intent by irony by group interaction, $F(1, 104)= 3.41, p .05$, $\text{partial } \eta^2 = .03$. Closer examination suggested that this effect was not significant within either cultural group (European: $F(1, 104)= 3.17, p > .05$, $\text{partial } \eta^2 = .03$; Asian: $F(1, 104)= 0.82, p > .35$, $\text{partial } \eta^2 = .01$). This suggests that the three way interaction identified in the main analysis may be dependent on the relatively large sample size used in the main study and may be partially driven by the "other" cultural group. Lastly, when culture was included in the model for non-personal Figurative Teasing, a significant interaction was found between irony and culture, $F(1, 104)= 9.57, p < .005$, $\text{partial } \eta^2 = .08$. As with personal Production Likelihood, the simple effect of culture was not significant within either the literal, $F(1, 104)= 4.12, p > .01$, $\text{partial } \eta^2 = .04$, or ironic, $F(1, 104)= 3.47, p > .05$, $\text{partial } \eta^2 = .03$, conditions and the simple
effect of irony was significant for both Europeans, $F(1, 104)= 779.61, p < .001$, partial $\eta^2 = .88$, and Asians, $F(1, 104)= 394.78, p < .001$, partial $\eta^2 = .79$. Both groups demonstrate an identical pattern of means between the literal and ironic conditions and again there was some asymmetry in the effect sizes obtained in each group. Overall, it appears that culture did not have a highly consequential impact on the conclusions of the analyses, although these results do call into question the three way interaction between intent, irony, and group found in the non-personal Production Likelihood main analyses.

VI. Discussion and Recommendations for Further Work

6.1 Discussion

Contrary to expectation, social anxiety did not have any discernable effect on the interpretation of the irony task items for eight of the nine interpretation scales examined. One significant effect did emerge, with socially anxious participants reporting that they would be less likely to use non-personal literal praise than non-anxious individuals. This difference is relatively slight, with a raw mean difference of only 0.39 points on a 7 point scale, it may apply only to female participants, and it appears to require a substantial sample size in order to be detected, with this effect proving to be elusive in the smaller European and Asian groups. When gender was included in the model, a similar effect emerged for males on the personal Production Likelihood scale, with anxious males reporting that they would be less likely to use ironic praise than non-anxious males. This effect is slightly more substantial, with a raw mean difference of 1.13 points between the anxious and non-anxious males.

Given the potential social risks inherent in using ironic praise to comment on a conversational partner or their behavior (e.g., Pexman & Zvaigzne, 2004), it is not surprising that socially anxious individuals report that they are less likely to use this type of comment. In
addition, given that men appear to use irony to reduce social vulnerability (Ivanko et al., 2004) and ironic praise may increase vulnerability by increasing the risk of misinterpretation, it is not necessarily surprising that this effect applies specifically to males. It is not, however, entirely clear why socially anxious females would use less non-personal literal praise than their non-anxious counterparts. It is possible that the social conventions for using non-personal literal praise are different than the conventions for personal literal praise. Non-personal literal praise presumably does less to enhance intimacy in a relationship, a conversational goal that has been attributed to females (Ivanko et al., 2004) and that may be particularly salient to socially anxious individuals, than personal literal praise. This may potentially account for this difference in self-reported production likelihood. Alternatively, socially anxious females may refrain from using unnecessary non-personal literal praise in an attempt to avoid drawing attention to themselves. However, given the minute size of this effect, there may not be much here to explain. Ultimately, social anxiety did not have a notable impact on the way that participants interpreted the comments in the irony interpretation task. This failure to identify significant biases in irony interpretation suggests that the general cognitive biases found in social anxiety do not necessarily affect the interpretation of specific ambiguous comments that are presented in context. It also suggests that social anxiety is not an individual differences variable that is relevant to the study of irony interpretation.

Consistent with the irony literature, the effects of intent, irony, and the intent by irony interaction were significant in all of the analyses, with the exception of the effect of intent in the analysis of the non-personal Interpersonal Reaction scale. The pattern of means, as seen in Table 15, is largely in line with expectations based on the irony literature (e.g., Pexman & Olineck, 2002; Pexman & Zvaigzne, 2004), particularly in the personal condition. In the personal
condition, literal praise was seen as the most positive, least negative, and the type of statement most likely to be used by participants. Literal criticism was seen as the least positive, most negative, and least likely to be used. The two ironic conditions fell in between, with ironic praise seen as more positive and less negative than ironic criticism but with participants also reporting that they would be less likely to use ironic praise. This may be related to the greater inherent risk involved in using ironic praise. Figurative Teasing ratings were also in line with expectations, with ironic criticism and ironic praise being seen as equally teasing, literal criticism as less teasing, and literal praise as the least teasing in the personal condition. It is interesting that participants rated literal criticism as more teasing than literal praise. This suggests a slight self-enhancement bias that may allow individuals to maintain a more positive self image and a more positive view of their interpersonal relationships by taking criticism less seriously than praise.

In the non-personal condition, the results were somewhat different. Literal praise was again seen as the most positive, least negative, and as the most likely type of comment to be used and it instilled greater feelings of interpersonal closeness with the speaker. However, unlike in the personal condition, literal criticism and ironic praise were seen as being equally positive and ironic praise was seen as being more negative than literal criticism. In addition, ironic praise was the least likely to be used and led to the lowest ratings on interpersonal closeness. Literal criticism came next in both cases, with ironic criticism falling between literal praise and literal criticism. The Figurative Teasing ratings also differed somewhat, with ironic criticism seen as the most ironic, followed by ironic praise, literal criticism, and literal praise. The mean ratings on this scale were above the midpoint for both of the ironic conditions and were below the midpoint for the literal conditions. This suggests that participants recognized the ironic intent behind ironic praise, although they saw ironic praise as less teasing than ironic criticism.
However, despite recognizing this ironic intent, participants interpreted ironic praise almost literally, seeing it as being equally or more negative than literal criticism when the comments were non-personal in nature. This represents a notable departure from the results obtained for the personal condition.

It is not entirely clear why participants interpreted ironic praise negatively in the non-personal condition. One possibility is that, as mentioned above, the social conventions for personal and non-personal comments may be different. It may be more common and acceptable to use ironic praise when making personal comments in close relationships, as these comments may serve to enhance relationship solidarity through teasing (Dews & Winner, 1995). On the other hand, given that the comments lack a personal focus, solidarity goals may be less salient when a speaker uses non-personal ironic praise. In addition, conversational partners may lack clear expectations about what the speaker will say when they make a non-personal comment. This may reduce perceived situational disparity between the context and the content of a statement, potentially leading to a literal interpretation of ironic praise. However, participants did pick up on the ironic intent behind non-personal ironic praise, suggesting that this did not occur.

Another possibility is that the “tinge hypothesis” (Dews & Winner, 1995) operates more strongly in the non-personal condition, with the positive tone of ironic criticism leading to a more positive interpretation of the statement and the negative tone of ironic praise leading to a more negative interpretation, perhaps overshadowing the ironic intent of the statement. In addition, when ironic praise is personal in nature, participants may be motivated to interpret these ambiguous comments in a positive way to enhance and maintain a positive self image and a positive view of their relationship to the speaker. Participants may not feel the same motivation to interpret ironic praise as positive when the target of the comment is the weather (i.e., non-
personal). This may contribute to the negative interpretation of non-personal ironic praise seen here. Non-personal ironic praise may also violate social expectations that call for positive comments about positive non-personal events and stimuli, potentially contributing negative reactions by the recipient of the comment. Overall, future psycholinguistic research on irony interpretation may benefit from considering the role that the target of a statement plays in the interpretation of ironic comments.

The present study adds to the psycholinguistic literature in several ways. By including scales that assess interaction negativity and potential feelings of interpersonal closeness after hearing a comment, this study adds new dimensions to our understanding of irony interpretation. Also, the factor analyses conducted here demonstrate that a number of rating scales that have been assessed and analyzed independently in prior studies (e.g., irony, humor, and teasing in Pexman & Zvaigzne, 2004; politeness and praising in Pexman & Olineck, 2002 and Pexman & Zvaigzne, 2004) can be fruitfully combined into composite scales. These composite scales may provide more stable ratings and may simplify analyses in future studies. In addition, the present study included a non-personal task condition. Previous irony interpretation tasks have typically used vignettes in which the speaker makes a comment about the listener (e.g., Dews & Winner, 1995; Pexman & Zvaigzne, 2004) or about a person who is presumably known to both the speaker and listener (e.g., Ivanko & Pexman, 2003; Pexman & Olineck, 2002). It seems reasonable that ironic comments about the weather may be interpreted somewhat differently than comments with a more personal focus. However, prior research has not directly investigated differences in the interpretation of personal and non-personal ironic comments. Although the differences in the obtained factor patterns for the personal and non-personal items made direct comparison of these conditions untenable for most of the scales in the present study,
including both personal and non-personal items allowed us to investigate differences in the observed pattern of the means. Future research may be able to improve on this by including more scales relevant to both personal and non-personal task items and running a more complex within subjects design.

There are a number of possible reasons that we may have failed to observe the anticipated biases in irony interpretation associated with social anxiety. One possibility, as suggested above, is that the interpretive biases in social anxiety may be general biases that affect the interpretation of overall social scenarios but do not affect the interpretation of specific ambiguous stimuli such as ironic comments. This would be somewhat consistent with the identification of interpretive biases in tasks that focus on general interpretations of overall scenarios (e.g., Foa et al., 1996; Gilboa-Schechtman et al., 2000; Huppert et al., 2003; McManus et al., 2000; Rheingold et al., 2003; Stopa & Clark, 2000, Wilson & Rapee, 2005a, b). However, this is clearly not the only possible explanation, particularly given that some studies have found biases in the interpretation of specific stimuli (e.g., Amir et al., 2005).

Another potential explanation for our failure to observe interpretation biases relates to the nature of our participant sample. An analogue undergraduate sample was used that consisted of well educated, highly functioning individuals with (presumably) sub-clinical levels of social anxiety. While an effort was made to increase the separation between the non-anxious and anxious participants by using a quartile split on the SIAS with a large sample of pre-screened participants, it is possible that the anxious participants’ level of social anxiety was not high enough nor impairing enough to produce the biases in irony interpretation that we were searching for. Other studies have successfully detected cognitive biases using undergraduate samples (e.g., Amir et al., 2005; Brendle & Wenzel, 2004; Huppert et al., 2003; Mellings &
Alden, 2000; Wenzel et al., 2005; Wilson & Rapee, 2005b; Winton et al., 1995; Vassilopoulos, 2005), suggesting that, if a bias was present, it could potentially be detected with an undergraduate sample. However, it is still possible that a quartile split left us with participants who were not sufficiently anxious to demonstrate biases in irony interpretation.

The nature of the interpretation task itself may have also contributed to the non-significant effects in the present study. The use of a paper-pencil task with written vignettes allows for ease of participant testing. However, despite efforts to make the vignettes compelling, written interpretation tasks lack ecological validity. Reading about a social interaction is, after all, quite different from participating in the interaction. Participants had ample time to determine how they would like to respond to the task. In addition, without participating in an actual social interaction, it is unlikely that completing the interpretation task elicited much anxiety, if any. The anxiety that socially anxious participants feel during social interactions may amplify cognitive biases. It is possible that interpretation biases would have emerged had the participants been more socially anxious while completing the interpretation task.

Lastly, it is also possible that the task items lacked ambiguity, potentially limiting our ability to detect interpretive bias. Amir et al. (2005) found that participants demonstrated negative interpretation biases for ambiguous statements presented in isolation. While irony is inherently ambiguous in nature, the items chosen for the interpretation task in the present study were selected to be clearly ironic or non-ironic. This is advantageous in that it makes it clear whether biases occur in the interpretation of irony as opposed to comments that may be ambiguous or problematic for other reasons. However, this may have inadvertently maximized situational disparity. In addition, presenting instances of irony next to literal comments may have highlighted the distinction between the two, making irony more salient and hence less
ambiguous. This may have limited our ability to detect biases in irony interpretation. Arguably, if biases cannot be identified when clear instances of irony are used, any biases that do exist may not be substantial enough to be of interest. However, this is a potential limitation of the current design.

Overall, the present study had a number of relevant strengths and weaknesses, many of which have been discussed above. These weaknesses include the use of an analogue sample, the use of a paper-pencil interpretation task, the possibility that participants were not anxious enough to demonstrate significant bias, and the possibility that the irony interpretation task may have inadvertently enhanced situational disparity and limited our ability to detect bias. An additional limitation in the present design is that, by excluding the rating scales “teasing”, “praising”, and “better” in the non-personal condition, the composite scales constructed in the personal and non-personal conditions included slightly different items. As mentioned above, this prevented direct comparison of the responses to the personal and non-personal items. In addition, the sample size was somewhat small from a factor analytic standpoint (e.g., Mundfrom, Shaw, & Ke, 2005). As the factor analyses were intended for scale development rather than the investigation of the true factor structure of irony interpretation, 126-127 participants may be acceptable, although the relatively small variables to factors ratio found here suggests that our factor analyses may have been enhanced by increasing our sample size. Lastly, males, females, and the two primary cultural groups were not equally represented in the final sample. While neither gender nor culture were of primary importance in the present study, this may have affected our ability to detect potential gender and culture effects.

The present study also had a number of relevant strengths, including the use of a relatively large group of participants, from an analysis of variance standpoint. In addition, this
study incorporated a larger and more comprehensive set of rating scales for each task item and used factor analyses to construct more stable composite scales that reflect more basic dimensions of interpretation. This helped to simplify and reduce redundancy in the analyses. Also, this study incorporated instances of both personal and non-personal irony. As mentioned above, prior studies of irony interpretation had not directly investigated this distinction. Task items were rigorously pilot tested before constructing the final irony interpretation task, weeding out items that were implausible and otherwise problematic, written and scripted task instructions minimized variability in task administration, and the design of the interpretation task was consistent with measures that have previously been used in the irony literature.

6.2 Recommendations for Further Work

This study carries implications for future research in both psycholinguistics and clinical psychology. In psycholinguistics, researchers should continue to investigate the role of statement target in the interpretation of verbal irony and potential causes for differences in interpretation. In addition, as mentioned above, written irony interpretation tasks have limited ecological validity. Research investigating irony interpretation during actual social interactions may enhance our understanding of this interpretive process and the factors that influence irony interpretation. Role playing tasks may be useful in helping to set up instances of verbal irony in ongoing social interactions. Further attention could also be given to the role of culture in the interpretation of verbal irony. In the present study, the decision to include only participants who spoke English as a first language may have limited our ability to detect cultural differences in interpretation. Research that specifically targets cultural differences and that allows for greater variability in language experience may shed more light into the role of culture in irony interpretation.
In the clinical area, future research investigating bias in the interpretation of specific social stimuli should focus on identifying stimuli that are reasonably ambiguous and that, ideally, can be presented to participants in the context of a natural ongoing social interaction. Levenson and Gottman (1983) developed an approach that uses a dial to obtain continuous reports of affect during on-line tasks. A similar approach may be useful to monitor participant responses and anxiety during live social interactions. These responses can then be linked back to specific comments made during the interaction. This approach could prove somewhat difficult with verbal irony, as it may be challenging to work planned instances of irony into a natural ongoing interaction and role-playing tasks may feel somewhat artificial, potentially affecting anxiety levels and limiting interpretation biases. Other forms of ambiguous comments may prove useful (e.g., ambiguous comments similar to those used by Amir et al., 2005). Testing participants' responses to specific comments made during actual (i.e., non laboratory) social interactions would be particularly enlightening as these interactions may elicit greater anxiety, potentially enhancing cognitive biases.

Future research using written tasks to investigate interpretive biases in social anxiety may find it beneficial to increase participant anxiety prior to task completion by incorporating some form of social interaction or a speech preparation task into the study. Speech preparation tasks used by Fredrickson and colleagues (e.g., Fredrickson, Mancuso, Branigan, & Tugade, 2000; Tugade & Fredrickson, 2004) have been shown to increase cardiovascular reactivity in individuals who are not explicitly socially anxious, suggesting that these manipulations increase social performance anxiety. This may allow researchers to investigate cognitive biases in a larger population (i.e., by inducing social anxiety through similar manipulations) and, by eliciting anxiety in socially anxious individuals, may enhance cognitive biases. With general
improvements in research design (i.e., incorporating appropriate contextual information, identifying appropriate stimuli, identifying ways to further increase ecological validity and enhance observed biases), it may be possible to demonstrate conclusively whether the general cognitive biases observed in social anxiety also affect the interpretation of specific social stimuli such as verbal irony.
Table 1

Mean Ratings for the Vignettes Selected During the First Pilot Study (Standard Deviations in Parentheses).

<table>
<thead>
<tr>
<th>Vignette Valence</th>
<th>Personal Condition</th>
<th>Non-Personal Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Plausibility</td>
<td>5.93 (1.18)</td>
<td>5.77 (1.17)</td>
</tr>
<tr>
<td>Positivity</td>
<td>6.14 (1.03)</td>
<td>2.48 (1.37)</td>
</tr>
<tr>
<td>Closeness</td>
<td>5.39 (1.14)</td>
<td>5.24 (1.22)</td>
</tr>
<tr>
<td>Likelihood</td>
<td>5.27 (1.45)</td>
<td>5.05 (1.45)</td>
</tr>
<tr>
<td>Negativity</td>
<td>1.37 (0.87)</td>
<td>4.54 (1.60)</td>
</tr>
</tbody>
</table>
Table 2

Mean Ratings for the Statements Selected During the First Pilot Study (Standard Deviations in Parentheses):

<table>
<thead>
<tr>
<th>Statement Valence</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positivity</td>
<td>6.11 (0.93)</td>
<td>1.83 (1.43)</td>
</tr>
<tr>
<td>Negativity</td>
<td>1.24 (0.71)</td>
<td>5.35 (1.54)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statement Valence</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positivity</td>
<td>5.77 (1.25)</td>
<td>1.98 (1.09)</td>
</tr>
<tr>
<td>Negativity</td>
<td>1.73 (1.21)</td>
<td>5.34 (1.32)</td>
</tr>
</tbody>
</table>
Table 3

**Mean Irony Ratings for the Four Irony Conditions for Items Selected During the Second Pilot Study (Standard Deviations in Parentheses).**

<table>
<thead>
<tr>
<th></th>
<th>Personal Condition</th>
<th>Non-Personal Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Literal Praise</td>
<td>Ironic Praise</td>
</tr>
<tr>
<td>Literal Praise</td>
<td>1.52 (1.22)</td>
<td>5.70 (1.85)</td>
</tr>
<tr>
<td>Ironic Praise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Literal Criticism</td>
<td>1.51 (1.23)</td>
<td>5.72 (1.74)</td>
</tr>
<tr>
<td>Ironic Criticism</td>
<td>1.51 (1.23)</td>
<td>5.72 (1.74)</td>
</tr>
</tbody>
</table>
Table 4

Intercorrelations between the Personal Composite Scales used in the Factor Analysis.

<table>
<thead>
<tr>
<th>Scale Title</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Polite</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Teasing</td>
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<td>.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>3. Negative</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. Critical</td>
<td></td>
<td></td>
<td></td>
<td>-.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Ironic</td>
<td></td>
<td>-.03</td>
<td></td>
<td></td>
<td>.59</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Upsetting</td>
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<td>-.42</td>
<td></td>
<td></td>
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<td>.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Likely</td>
<td></td>
<td>.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.26</td>
<td>-.06</td>
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<td>-.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Praising</td>
<td></td>
<td>.54</td>
<td></td>
<td></td>
<td></td>
<td>-.31</td>
<td>-.10</td>
<td>-.26</td>
<td>-.33</td>
<td>.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Close</td>
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<td></td>
<td></td>
<td></td>
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<td>-.37</td>
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<td>.64</td>
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<td>10. React</td>
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<td>.49</td>
<td>.57</td>
<td>.73</td>
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</tr>
<tr>
<td>11. Time</td>
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<td>.49</td>
<td></td>
<td></td>
<td></td>
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<td>-.16</td>
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<td>-.34</td>
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<td>.91</td>
<td>.74</td>
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<td>12. Frequent</td>
<td></td>
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<td>-.03</td>
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<td>-.24</td>
<td>.86</td>
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<td>.55</td>
<td>.51</td>
<td>.50</td>
<td></td>
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<td>13. Positive</td>
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<td>.63</td>
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<td>-.27</td>
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<td>-.50</td>
<td>.53</td>
<td>.76</td>
<td>.62</td>
<td>.67</td>
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<td>.51</td>
</tr>
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<td>14. Better</td>
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<td></td>
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<td>.75</td>
<td>.73</td>
<td>.63</td>
<td>.64</td>
<td>.52</td>
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<tr>
<td>15. Humorous</td>
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<td></td>
<td></td>
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<td>-.07</td>
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<td>-.24</td>
<td>.38</td>
<td>.48</td>
<td>.58</td>
<td>.50</td>
<td>.56</td>
<td>.45</td>
</tr>
</tbody>
</table>


### Table 5

**Eigenvalues of the Personal Correlation Matrix.**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.81</td>
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<td>2</td>
<td>2.52</td>
</tr>
<tr>
<td>3</td>
<td>1.34</td>
</tr>
<tr>
<td>4</td>
<td>0.96</td>
</tr>
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<td>5</td>
<td>0.69</td>
</tr>
<tr>
<td>6</td>
<td>0.49</td>
</tr>
<tr>
<td>7</td>
<td>0.47</td>
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<tr>
<td>8</td>
<td>0.40</td>
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<tr>
<td>9</td>
<td>0.35</td>
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<tr>
<td>10</td>
<td>0.26</td>
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<tr>
<td>11</td>
<td>0.23</td>
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<tr>
<td>12</td>
<td>0.17</td>
</tr>
<tr>
<td>13</td>
<td>0.14</td>
</tr>
<tr>
<td>14</td>
<td>0.11</td>
</tr>
<tr>
<td>15</td>
<td>0.06</td>
</tr>
</tbody>
</table>
Table 6

Primary Factor Pattern Coefficients for the Optimal Personal Four Factor Solution.

<table>
<thead>
<tr>
<th>Scale Title</th>
<th>Ip(1)</th>
<th>In(2)</th>
<th>Ft(3)</th>
<th>Pl(4)</th>
<th>h²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polite</td>
<td>0.75</td>
<td>-0.05</td>
<td>-0.16</td>
<td>-0.07</td>
<td>0.49</td>
</tr>
<tr>
<td>Teasing</td>
<td>0.08</td>
<td>0.18</td>
<td>0.70</td>
<td>-0.00</td>
<td>0.57</td>
</tr>
<tr>
<td>Negative</td>
<td>-0.07</td>
<td>0.86</td>
<td>0.01</td>
<td>-0.03</td>
<td>0.80</td>
</tr>
<tr>
<td>Critical</td>
<td>0.01</td>
<td>0.68</td>
<td>0.10</td>
<td>0.06</td>
<td>0.47</td>
</tr>
<tr>
<td>Ironic</td>
<td>-0.06</td>
<td>0.05</td>
<td>0.80</td>
<td>-0.06</td>
<td>0.60</td>
</tr>
<tr>
<td>Upsetting</td>
<td>-0.11</td>
<td>0.88</td>
<td>-0.03</td>
<td>-0.03</td>
<td>0.88</td>
</tr>
<tr>
<td>Likely</td>
<td>0.10</td>
<td>-0.01</td>
<td>-0.05</td>
<td>0.95</td>
<td>0.98</td>
</tr>
<tr>
<td>Praising</td>
<td>0.79</td>
<td>0.04</td>
<td>0.06</td>
<td>0.01</td>
<td>0.65</td>
</tr>
<tr>
<td>Close</td>
<td>0.70</td>
<td>-0.03</td>
<td>0.22</td>
<td>0.10</td>
<td>0.75</td>
</tr>
<tr>
<td>React</td>
<td>0.57</td>
<td>-0.26</td>
<td>0.17</td>
<td>0.08</td>
<td>0.67</td>
</tr>
<tr>
<td>Time</td>
<td>0.64</td>
<td>-0.07</td>
<td>0.23</td>
<td>0.07</td>
<td>0.67</td>
</tr>
<tr>
<td>Frequent</td>
<td>0.15</td>
<td>0.01</td>
<td>0.07</td>
<td>0.77</td>
<td>0.77</td>
</tr>
<tr>
<td>Positive</td>
<td>0.87</td>
<td>-0.10</td>
<td>-0.19</td>
<td>0.04</td>
<td>0.78</td>
</tr>
<tr>
<td>Better</td>
<td>0.85</td>
<td>0.09</td>
<td>0.04</td>
<td>0.07</td>
<td>0.77</td>
</tr>
<tr>
<td>Humorous</td>
<td>0.18</td>
<td>-0.14</td>
<td>0.69</td>
<td>0.10</td>
<td>0.70</td>
</tr>
</tbody>
</table>

Note. Salient primary-factor pattern coefficients (coefficients ≥ 0.30), or loadings used to interpret a particular factor, appear in boldface. Ip = Interaction Positivity, In = Interaction Negativity, Ft = Figurative Teasing, and Pl = Production Likelihood.

a Numbers in parentheses are factor numbers.
Table 7

Intercorrelations between the Factors Obtained in the Personal Condition (Φ).

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interaction Positivity (Ip)</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Interaction Negativity (In)</td>
<td>-0.37</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Figurative Teasing (Ft)</td>
<td>0.37</td>
<td>0.05</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>4. Production Likelihood (Pl)</td>
<td>0.53</td>
<td>-0.18</td>
<td>0.23</td>
<td>1.00</td>
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</tbody>
</table>
Table 8

Intercorrelations between the Composite Scales used in the Non-Personal Factor Analysis.

<table>
<thead>
<tr>
<th>Scale Title</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Polite</td>
<td>1</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2. Negative</td>
<td>.02</td>
<td>1</td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. Ironic</td>
<td>.08</td>
<td>.14</td>
<td>.21</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Likely</td>
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<td>-.28</td>
<td>.14</td>
<td>.19</td>
<td>1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6. Close</td>
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<td>-.02</td>
<td>.11</td>
<td>.24</td>
<td>.38</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>7. React</td>
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<td>.00</td>
<td>.24</td>
<td>.42</td>
<td>.52</td>
<td>1</td>
<td></td>
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</tr>
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<td>8. Time</td>
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<td>-.05</td>
<td>.07</td>
<td>.22</td>
<td>.34</td>
<td>.84</td>
<td>.52</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Frequent</td>
<td>.06</td>
<td>-.22</td>
<td>.08</td>
<td>.26</td>
<td>.74</td>
<td>.38</td>
<td>.49</td>
<td>.33</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10. Positive</td>
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<td>-.16</td>
<td>.19</td>
<td>.23</td>
<td>.34</td>
<td>.59</td>
<td>.38</td>
<td>.33</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Humorous</td>
<td>.21</td>
<td>.02</td>
<td>.20</td>
<td>.63</td>
<td>.36</td>
<td>.43</td>
<td>.40</td>
<td>.36</td>
<td>.38</td>
<td>.37</td>
<td>1</td>
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<tr>
<td>12. Upsetting$^a$</td>
<td>.02</td>
<td>.87</td>
<td>.36</td>
<td>.12</td>
<td>-.29</td>
<td>.03</td>
<td>-.26</td>
<td>-.02</td>
<td>-.24</td>
<td>-.04</td>
<td>-.01</td>
<td>1</td>
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</tbody>
</table>

$^a$ The natural log transformation of Upsetting was used.
Table 9

Eigenvalues of the Non-Personal Correlation Matrix.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
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<tbody>
<tr>
<td>1</td>
<td>4.05</td>
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<tr>
<td>2</td>
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</tr>
<tr>
<td>3</td>
<td>1.48</td>
</tr>
<tr>
<td>4</td>
<td>1.05</td>
</tr>
<tr>
<td>5</td>
<td>.84</td>
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<tr>
<td>6</td>
<td>.63</td>
</tr>
<tr>
<td>7</td>
<td>.51</td>
</tr>
<tr>
<td>8</td>
<td>.36</td>
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<tr>
<td>9</td>
<td>.25</td>
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<td>10</td>
<td>.24</td>
</tr>
<tr>
<td>11</td>
<td>.14</td>
</tr>
<tr>
<td>12</td>
<td>.12</td>
</tr>
<tr>
<td>Scale Title</td>
<td>Sp(1)</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------</td>
</tr>
<tr>
<td>Polite</td>
<td>0.55</td>
</tr>
<tr>
<td>Negative</td>
<td>0.05</td>
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<tr>
<td>Critical</td>
<td>-0.28</td>
</tr>
<tr>
<td>Ironic</td>
<td>-0.04</td>
</tr>
<tr>
<td>Upsetting*</td>
<td>0.04</td>
</tr>
<tr>
<td>Likely</td>
<td>-0.08</td>
</tr>
<tr>
<td>Close</td>
<td>0.01</td>
</tr>
<tr>
<td>React</td>
<td>0.39</td>
</tr>
<tr>
<td>Time</td>
<td>0.08</td>
</tr>
<tr>
<td>Frequent</td>
<td>0.06</td>
</tr>
<tr>
<td>Positive</td>
<td>1.07</td>
</tr>
<tr>
<td>Humorous</td>
<td>0.07</td>
</tr>
</tbody>
</table>

*Note.* Salient primary-factor pattern coefficients (coefficients ≥ 0.30), or loadings used to interpret a particular factor, appear in boldface. Sp = Statement Positivity, In = Interaction Negativity, Pl = Production Likelihood, Ir = Interpersonal Reaction, and Ft = Figurative Teasing.  
*Numbers in parentheses are factor numbers.  
*The natural log transformation of Upsetting was used for this analysis.
Table 11

Intercorrelations between the Factors Obtained in the Non-Personal Condition (Φ).

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Statement Positivity (Sp)</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Interaction Negativity (In)</td>
<td>-0.13</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Production Likelihood (Pl)</td>
<td>0.36</td>
<td>-0.27</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Interpersonal Reaction (Ir)</td>
<td>0.49</td>
<td>-0.02</td>
<td>0.48</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>5. Figurative Teasing (Ft)</td>
<td>0.36</td>
<td>0.12</td>
<td>0.47</td>
<td>0.43</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Table 12

Cronbach's Alpha Values Averaged Across the Four Irony Conditions for the Factor Analytically Derived Scales.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Number of Items</th>
<th>Average Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production Likelihood</td>
<td>2</td>
<td>0.89</td>
</tr>
<tr>
<td>Interaction Negativity</td>
<td>3</td>
<td>0.74</td>
</tr>
<tr>
<td>Figurative Teasing</td>
<td>3</td>
<td>0.69</td>
</tr>
<tr>
<td>Interaction Positivity</td>
<td>7</td>
<td>0.92</td>
</tr>
<tr>
<td>Non-Personal Condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statement Positivity</td>
<td>3</td>
<td>0.66</td>
</tr>
<tr>
<td>Interaction Negativity</td>
<td>3</td>
<td>0.62</td>
</tr>
<tr>
<td>Production Likelihood</td>
<td>2</td>
<td>0.82</td>
</tr>
<tr>
<td>Interpersonal Reaction</td>
<td>2</td>
<td>0.89</td>
</tr>
<tr>
<td>Figurative Teasing</td>
<td>2</td>
<td>0.65</td>
</tr>
</tbody>
</table>
Table 13

Intercorrelations between the Factor Analytically Derived Scales Averaged Across the Four Irony Conditions.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Personal</th>
<th>Non-Personal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1. Interaction Positivity (Ip)</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>2. Interaction Negativity (In)</td>
<td>-0.39</td>
<td>1.00</td>
</tr>
<tr>
<td>3. Figurative Teasing (Ft)</td>
<td>0.17</td>
<td>-0.04</td>
</tr>
<tr>
<td>4. Production Likelihood (Pl)</td>
<td>0.62</td>
<td>-0.57</td>
</tr>
<tr>
<td>1. Statement Positivity (Sp)</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>2. Interaction Negativity (In)</td>
<td>-0.31</td>
<td>1.00</td>
</tr>
<tr>
<td>3. Production Likelihood (Pl)</td>
<td>0.30</td>
<td>-0.20</td>
</tr>
<tr>
<td>4. Interpersonal Reaction (Ir)</td>
<td>0.47</td>
<td>-0.15</td>
</tr>
<tr>
<td>5. Figurative Teasing (Ft)</td>
<td>0.20</td>
<td>-0.00</td>
</tr>
</tbody>
</table>
Table 14

Mean Responses to the Factor Analytically Derived Scales from the Main Study by Social Anxiety Group and Irony Condition (Standard Deviations in Parentheses).

<table>
<thead>
<tr>
<th></th>
<th>Personal</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Literal Praise</td>
<td>Ironic Praise</td>
<td>Literal Criticism</td>
<td>Ironic Criticism</td>
</tr>
<tr>
<td></td>
<td>Production Likelihood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Anxious</td>
<td>5.93(0.68)</td>
<td>3.34(1.39)</td>
<td>2.72(1.11)</td>
<td>3.52(1.12)</td>
</tr>
<tr>
<td>Anxious</td>
<td>5.67(0.76)</td>
<td>2.98(1.17)</td>
<td>2.81(1.05)</td>
<td>3.60(1.17)</td>
</tr>
<tr>
<td></td>
<td>Interaction Negativity</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Non-Anxious</td>
<td>1.48(0.53)</td>
<td>2.99(1.22)</td>
<td>4.88(1.19)</td>
<td>3.94(1.23)</td>
</tr>
<tr>
<td>Anxious</td>
<td>1.58(0.65)</td>
<td>3.27(1.09)</td>
<td>4.87(1.04)</td>
<td>3.86(0.93)</td>
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<tr>
<td></td>
<td>Figurative Teasing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Anxious</td>
<td>1.47(0.66)</td>
<td>4.81(1.25)</td>
<td>2.58(1.01)</td>
<td>4.72(0.86)</td>
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<tr>
<td>Anxious</td>
<td>1.55(0.64)</td>
<td>5.04(1.07)</td>
<td>2.61(0.84)</td>
<td>4.73(0.92)</td>
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<tr>
<td></td>
<td>Interaction Positivity</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Non-Anxious</td>
<td>6.09(0.57)</td>
<td>3.74(1.31)</td>
<td>2.01(0.66)</td>
<td>3.00(1.04)</td>
</tr>
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<td>2.10(0.63)</td>
<td>3.15(1.01)</td>
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</tr>
<tr>
<td></td>
<td>Statement Positivity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Anxious</td>
<td>6.05(0.61)</td>
<td>3.06(0.96)</td>
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<td>3.55(1.00)</td>
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<td>Literal Praise</td>
<td>Ironic Praise</td>
<td>Literal Criticism</td>
<td>Ironic Criticism</td>
</tr>
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<td>----------------</td>
<td>---------------</td>
<td>-------------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>Interaction Negativity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Anxious</td>
<td>1.57(0.60)</td>
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</tr>
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<td>Production Likelihood</td>
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<tr>
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<td>5.95(0.75)</td>
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<td>4.91(0.85)</td>
<td>4.95(1.28)</td>
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<td>5.14(0.82)</td>
<td>4.75(1.15)</td>
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<td>Interpersonal Reaction</td>
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<tr>
<td>Non-Anxious</td>
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<td>4.20(0.89)</td>
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<td>3.56(0.87)</td>
<td>4.20(0.81)</td>
<td>4.39(0.96)</td>
</tr>
<tr>
<td></td>
<td>Figurative Teasing</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Non-Anxious</td>
<td>1.52(0.61)</td>
<td>4.10(1.29)</td>
<td>1.94(0.83)</td>
<td>5.87(0.85)</td>
</tr>
<tr>
<td>Anxious</td>
<td>1.68(0.71)</td>
<td>4.59(1.36)</td>
<td>2.13(0.94)</td>
<td>5.85(0.85)</td>
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</table>
Table 15
Mean Responses to the Factor Analytically Derived Scales from the Main Study by Irony Condition (Standard Errors in Parentheses).

<table>
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<th></th>
<th>Personal</th>
<th>Non-Personal</th>
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<th>Anxious</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Literal Praise</td>
<td>Ironic Praise</td>
<td>Literal Criticism</td>
<td>Ironic Criticism</td>
</tr>
<tr>
<td>Production Likelihood</td>
<td>5.80 (0.06)</td>
<td>3.16 (0.11)</td>
<td>2.77 (0.10)</td>
<td>3.56 (0.10)</td>
</tr>
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<td>1.53 (0.05)</td>
<td>3.13 (0.10)</td>
<td>4.87 (0.10)</td>
<td>3.90 (0.10)</td>
</tr>
<tr>
<td>Figurative Teasing</td>
<td>1.51 (0.06)</td>
<td>4.92 (0.10)</td>
<td>2.60 (0.08)</td>
<td>4.73 (0.08)</td>
</tr>
<tr>
<td>Interaction Positivity</td>
<td>6.09 (0.05)</td>
<td>3.64 (0.11)</td>
<td>2.06 (0.06)</td>
<td>3.08 (0.09)</td>
</tr>
<tr>
<td>Statement Positivity</td>
<td>6.05 (0.05)</td>
<td>3.10 (0.09)</td>
<td>3.08 (0.07)</td>
<td>3.65 (0.08)</td>
</tr>
<tr>
<td>Interaction Negativity</td>
<td>1.56 (0.05)</td>
<td>3.21 (0.10)</td>
<td>2.62 (0.07)</td>
<td>2.52 (0.08)</td>
</tr>
<tr>
<td>Interpersonal Reaction</td>
<td>4.85 (0.07)</td>
<td>3.48 (0.08)</td>
<td>4.04 (0.07)</td>
<td>4.30 (0.08)</td>
</tr>
<tr>
<td>Figurative Teasing</td>
<td>1.60 (0.06)</td>
<td>4.34 (0.12)</td>
<td>2.04 (0.08)</td>
<td>5.86 (0.08)</td>
</tr>
<tr>
<td>Production Likelihood</td>
<td>5.95 (0.09)</td>
<td>2.83 (0.14)</td>
<td>4.91 (0.11)</td>
<td>4.95 (0.15)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 1. Mean personal Production Likelihood ratings as a function of irony and intent.
Figure 2. Mean personal Interaction Negativity ratings as a function of irony and intent.
Figure 3. Mean personal Figurative Teasing ratings as a function of irony and intent.
Figure 4. Mean personal Interaction Positivity ratings as a function of irony and intent.
Figure 5. Mean non-personal Statement Positivity ratings as a function of irony and intent.
Figure 6. Mean non-personal Interaction Negativity ratings as a function of irony and intent.
Figure 7. Mean non-personal Production Likelihood ratings as a function of irony, intent, and social anxiety group.

Non-Anxious Participants

Anxious Participants
Figure 8. Mean non-personal Interpersonal Reaction ratings as a function of irony and intent.
Figure 9. Mean non-personal Figurative Teasing ratings as a function of irony and intent.
Footnotes

1 Each variables skew was divided by its standard error of the skew and its kurtosis was divided by its standard error of kurtosis. These values were then evaluated with reference to the normal distribution. Skewness or kurtosis ratios above 3.2905 (corresponding to $\alpha = .001$) were flagged for further examination. Note that the skewness and kurtosis values reported in the text are skewness and kurtosis ratios rather than raw skewness and kurtosis values.

2 Note that the degrees of freedom reported here are for the Pillai’s trace results. The significance of the effect does not change when Wilk’s Lambda is used.

3 The ULS approach was selected for this analysis for three reasons: 1. there did not appear to be a very compelling reason to weight the variables; 2. the best solution obtained using the maximum likelihood (ML) approach (not reported) revealed the same factors; and 3. the best ULS solution had a better simple structure than the best ML solution, with a higher hyperplane count, fewer ambiguous loadings between 0.20 and 0.30, and smaller correlations between the factors.

4 Although, arguably, this could also increase situational disparity and potentially enhance irony detection.

5 Although Interpersonal Reaction only emerged as a fully independent factor in the non-personal condition.
Bibliography


fear of negative evaluation scale in patients with social anxiety disorder. Psychological Assessment, 17, 179-190.


Appendix I

Sample Item for Each of the Irony Conditions

Literal Praise:

You are studying for a math exam that is scheduled for tomorrow. You say to your sister Jill, “I’ll be glad when this midterm is over!” You receive 94% on your math exam, and Jill says to you “You are great at math.”

Ironic Praise:

You are telling your friend Andrew about a new restaurant you love and you decide to meet there for lunch the next day. Andrew finds the food excellent and the service above average and he compliments the restaurant. He says to you “You have horrible taste in restaurants.”

Literal Criticism:

You are out for a walk with your close friend Brian. The day has been cloudy but the forecast was for sun. When you are about six blocks from your car, it starts to rain and you both get drenched. Brian says to you “This is bad weather.”

Ironic Criticism:

You and your friends Nick and Lisa are sitting outside of your house having a conversation. While you are sitting there, someone drives by in an old rusty beat up car that spews black exhaust everywhere. Nick says to you “That is a great car.”
Appendix II
Statements and Contexts Used in the Irony Interpretation Task

**Personal Items**

You are studying for a math exam that is scheduled for tomorrow. You say to your sister Jill, “I’ll be glad when this midterm is over!” You receive 94% on your math exam, and Jill says to you...

You are studying for a math exam that is scheduled for tomorrow. You say to your sister Jill, “I’ll be glad when this midterm is over!” You receive 34% on your math exam, and Jill says to you...

“You are great at math.”
“You are awful at math.”

You are telling your friend Andrew about a new restaurant you love and you decide to meet there for lunch the next day. Andrew finds the food excellent and the service above average and he compliments the restaurant. He says to you...

You are telling your friend Andrew about a new restaurant you love and you decide to meet there for lunch the next day. Andrew finds the food tasteless and the service below average and he complains about the restaurant. He says to you...

“You have excellent taste in restaurants.”
“You have horrible taste in restaurants.”

You and Jennifer have worked the same shift together at the restaurant for years. The restaurant is very busy tonight and you have a very difficult group in your section. You handle them well and they leave you a big tip. Jennifer says to you...

You and Jennifer have worked the same shift together at the restaurant for years. The restaurant is very busy tonight and you have a very difficult group in your section. You don’t handle them well and they don’t leave a tip. Jennifer says to you...

“You’re a good server.”
“You’re an awful server.”

You and the rest of your band are excited about your first gig. Your brother Darrel is there to support you. The concert is great and everyone seems to love the music. After, Darrel says to you...

You and the rest of your band are excited about your first gig. Your brother Darrel is there to support you. The concert is horrible and nobody seems to like the music. After, Darrel says to you...
“You guys sound great.”
“You guys sound bad.”

You have enrolled in a debate class with your friend Andy. At your first big debate, you make some excellent points and end up leaving your opponent speechless. Andy says to you...

You have enrolled in a debate class with your friend Andy. At your first big debate, you get confused, mix up your words, and end up not knowing what to say. Andy says to you...

“You’re a great debater.”
“You’re a bad debater.”

You are taking a photography class with your friend Jim. For your class project, you decided to take pictures of a local courthouse. When you develop your pictures, the focus is perfect and they all look great. Jim says to you...

You are taking a photography class with your friend Jim. For your class project, you decided to take pictures of a local courthouse. When you develop your pictures, they are out of focus and overexposed. Jim says to you...

“You are a great photographer.”
“You are a poor photographer.”

You are going to your Aunt’s dinner party and decide to bring her a gift. You pick out some lilies and head to the party. When you arrive, your aunt takes the lilies and tells you that they are her favorite flowers. Your cousin Christie says to you...

You are going to your Aunt’s dinner party and decide to bring her a gift. You pick out some lilies and head to the party. When you arrive, your aunt starts sneezing and you remember that she is allergic to lilies. Your cousin Christie says to you...

“You picked a great gift.”
“You picked an awful gift.”

You decide to try cooking a new recipe for your roommate Carl. You don’t have one of the ingredients, so you decide to improvise. The recipe turns out great and you both have seconds. Carl says to you...

You decide to try cooking a new recipe for your roommate Carl. You don’t have one of the ingredients, so you decide to improvise. The recipe is awful and you end up throwing most of it out. Carl says to you...

“You are a great cook.”
“You are a bad cook.”
You decide to wear a complicated costume to a Halloween party your best friend Emma is hosting. Your costume involves a lot of makeup, but everything works out and it looks great. Emma says to you...

You decide to wear a complicated costume to a Halloween party your best friend Emma is hosting. Your costume involves a lot of makeup and at the last minute it smears and looks awful. Emma says to you...

"That is a great costume."
"That is a terrible costume."

You have been trying to grow a bonsai tree for a couple of months. Currently the tree looks great, has a nice shape, and has a bunch of new leaves. Your friend Jodie says to you...

You have been trying to grow a bonsai tree for a couple of months. Currently the tree looks pretty sick, it is lopsided, and the leaves are falling off. Your friend Jodie says to you...

"You are a great gardener."
"You are a terrible gardener."

You have been working on a term paper all week. The day before it is due, you talk to your friend Kelly and realize that you need to reorganize everything. When you get it back, you have received an “A+”. Kelly says to you...

You have been working on a term paper all week. The day before it is due, you talk to your friend Kelly and realize that you need to reorganize everything. When you get it back, you have received a “D”. Kelly says to you...

"That must have been a great paper."
"That must have been a bad paper."

You have been asked to tutor your friend Carrie. You try your hardest and spend a lot of time on it and it seems like you explain everything very well. In the end, Carrie gets a good grade in the class. Carrie says to you...

You have been asked to tutor your friend Carrie. You try your hardest and spend a lot of time on it but you have trouble explaining things and can’t seem to get anything across. In the end, Carrie gets a bad grade in the class. Carrie says to you...

"You’re a great teacher."
"You’re an awful teacher."

You are planning a barbeque in the park for a few of your friends. On the day of the barbeque, the sun is shining and it is warm out. Your friend Joey says to you...
You are planning a barbeque in the park for a few of your friends. On the day of the barbeque, it starts to rain and it gets very cold out. Your friend Joey says to you...

“You picked a great day for a barbeque.”
“You picked a horrible day for a barbeque.”

Your friend Ian has convinced you to go to a karaoke bar. You get up to sing and hit every one of the notes, sounding great. Ian says to you...

Your friend Ian has convinced you to go to a karaoke bar. You get up to sing and don’t hit any of the notes, sounding awful. Ian says to you...

“You’re a great singer.”
“You’re a bad singer.”

You are trying to sell chocolate bars with your friend Tyler to help raise money for an organization you volunteer for. After an hour, you have sold all of your chocolate bars. Tyler says to you...

You are trying to sell chocolate bars with your friend Tyler to help raise money for an organization you volunteer for. After an hour, you have only sold one chocolate bar. Tyler says to you...

“You are a good salesman.”
“You are a bad salesman.”

You are at your cousin Lauren’s birthday party. Everyone seems to be enjoying the party and you are having a great conversation with a friend. Lauren comes over and says to you...

You are at your cousin Lauren’s birthday party. Everyone seems to be enjoying the party, but you are tired and sit by yourself watching TV. Lauren comes over and says to you...

“You look like you’re having a good time.”
“You look like you’re having a lousy time.”

Non-Personal Items

You are out for a walk with your close friend Brian. The day has been cloudy but the forecast was for sun. When you are about six blocks from your car, the sun comes out and it starts to warm up. Brian says to you...

You are out for a walk with your close friend Brian. The day has been cloudy but the forecast was for sun. When you are about six blocks from your car, it starts to rain and you both get drenched. Brian says to you...

“This is great weather.”
“This is bad weather.”
You and your friends Nick and Lisa are sitting outside of your house having a conversation. While you are sitting there, someone drives by in a classic car that has been freshly waxed and is in great condition. Nick says to you...

You and your friends Nick and Lisa are sitting outside of your house having a conversation. While you are sitting there, someone drives by in an old rusty beat up car that spews black exhaust everywhere. Nick says to you...

“That is a great car.”
“That is an ugly car.”

You and your friend Anisha are invited to a luncheon at work. When you arrive, you find a full buffet lunch with a great selection and tons of tasty food. Anisha says to you...

You and your friend Anisha are invited to a luncheon at work. When you arrive, you find a tray of dried out sandwiches that won’t feed everyone who came. Anisha says to you...

“This is a great lunch.”
“This is a bad lunch.”

You are at a flower shop with your friend Kim shopping for a birthday gift. The shop has a lot of orchids, and they are all in great condition with lots of flowers and vibrant colors. Kim says to you...

You are at a flower shop with your friend Kim shopping for a birthday gift. The shop has a lot of orchids, but they are pretty faded and wilted and the flowers are all falling off. Kim says to you...

“These are great flowers.”
“These are bad flowers.”

You make plans with your family to go to the beach. When you get there, your brother Stan decides that he wants to go for a swim. The water is a great temperature and he ends up swimming for almost an hour. When he gets back to his chair, Stan says to you...

You make plans with your family to go to the beach. When you get there, your brother Stan decides that he wants to go for a swim. The water is freezing cold and he barely gets his feet wet before he turns around. When he gets back to his chair, Stan says to you...

“That was a great swim.”
“That was a terrible swim.”

You are on a hike with your best friend Erin. After you have walked for about an hour, the trail opens up and you can see an amazing view of the valley below. The trail is very easy to walk on. Erin says to you...
You are on a hike with your best friend Erin. After you have walked for about an hour, the trail starts to get muddy and steep. It is really hard to walk on and the view is hidden by the trees. Erin says to you...

“This trail is awesome.”
“This trail is horrible.”

You are enjoying the last day of your vacation with three of your best friends. You all decide that you should watch the sunset. You head out a few minutes before it starts and it is amazing, with tons of color. Afterwards, your friend Andrea says to you...

You are enjoying the last day of your vacation with three of your best friends. You all decide that you should watch the sunset. You head out a few minutes before it starts, but the clouds are too thick and it starts to rain. Afterwards, your friend Andrea says to you...

“That was a nice sunset.”
“That was a bad sunset.”

You are at a movie theatre with your sister Emma. The movie is great and the theatre is really nice, with no garbage underneath the seats and clean bathrooms. After the movie, Emma says to you...

You are at a movie theatre with your sister Emma. The movie is great but the theatre is dirty, with a sticky floor, garbage everywhere, and filthy bathrooms. After the movie, Emma says to you...

“That theatre was really nice.”
“That theatre was pretty bad.”

You are sitting in a lecture with your friend Rose. The class is usually alright, but today it is particularly good. The topic is really interesting and the professor is presenting it very well. After the lecture, Rose says to you...

You are sitting in a lecture with your friend Rose. The class is usually alright, but today it is really boring. The professor is disorganized, the topic is dull, and half the class falls asleep. After the lecture, Rose says to you...

“That was a good lecture.”
“That was a bad lecture.”

You and your friend Adam have been working on an important paper together for a class you are both taking. You head to the library to print it off. The printer is loaded with good quality paper and it looks great when it is done. Adam says to you...
You and your friend Adam have been working on an important paper together for a class you are both taking. You head to the library to print it off. The printer is loaded with flimsy paper and the ink smears on most of the pages. Adam says to you...

“That was a great print job.”
“That was a bad print job.”

You are planning to meet your friend Bonny after class to head out for a run. You both get ready and the weather is perfect. You end up having more endurance than usual and you both run an extra kilometer. After you change, Bonny says to you...

You are planning to meet your friend Bonny after class to head out for a run. You both get ready, but just as you head out to start running, it starts to hail. You barely make it back inside before you get drenched. After you change, Bonny says to you...

“That was a great run.”
“That was a terrible run.”

You are out canoeing with your best friend Debbie. It is a beautiful day and the view in the cove is amazing. You end up canoeing all afternoon and don’t want to head back to the shore. Afterwards, Debbie says to you...

You are out canoeing with your best friend Debbie. Shortly after you set out, the canoe starts to leak. You try to stay out a bit longer, but the canoe nearly sinks before you get back to shore. Afterwards, Debbie says to you...

“That was an awesome canoe trip.”
“That was a bad canoe trip.”

Your friend Dan just moved into a new apartment. When you get there to check the place out, the sun is shining, the apartment is bright, and you can see an awesome view of the city. Dan says to you...

Your friend Dan just moved into a new apartment. When you get there to check the place out, you see that there are only a couple of windows and they all look out onto the dumpsters. Dan says to you...

“As you can see, it has a great view.”
“As you can see, it has a terrible view.”

You are heading to the island with your roommate Jenna. The ferry ride over is very smooth and you both see killer whales on the way. When you get to the other side, Jenna says to you...

You are heading to the island with your roommate Jenna. The ferry ride over is very choppy and you both get really sea sick on the way. When you get to the other side, Jenna says to you...

“That was a good ferry ride.”
“That was a bad ferry ride.”

You and your friend Corinne are heading to a new store that just opened in your neighborhood. The ads for the store looked very interesting and when you get there you find that they have a great selection and excellent prices. Corinne says to you...

You and your friend Corinne are heading to a new store that just opened in your neighborhood. The ads for the store looked very interesting but when you get there you find that they have a very poor selection and really high prices. Corinne says to you...

“This is a great store.”
“This is a bad store.”

You are at a restaurant with your brother Pete. The server you have is great. She smiles a lot, stops to chat a bit, gives very prompt service, and seems to know just when you need a refill. After dinner, Pete says to you...

You are at a restaurant with your brother Pete. The server you have is terrible. She scowls at you the whole time, is very slow, and is never around, leaving you pretty much on your own. After dinner, Pete says to you...

“She’s a great server.”
“She’s a bad server.”
### Appendix III

**Wording of the Rating Scales Used for the Irony Interpretation Task**

<table>
<thead>
<tr>
<th>Scale Title</th>
<th>Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polite</td>
<td>Is the speaker saying something polite?</td>
</tr>
<tr>
<td>Teasing</td>
<td>Is the speaker teasing you (the addressee)?</td>
</tr>
<tr>
<td>Negative</td>
<td>Would you feel negative about the speaker after hearing this comment?</td>
</tr>
<tr>
<td>Critical</td>
<td>How critical is the speaker being?</td>
</tr>
<tr>
<td>Ironic</td>
<td>Is the speaker being ironic?</td>
</tr>
<tr>
<td>Upsetting</td>
<td>Would this comment be upsetting to you?</td>
</tr>
<tr>
<td>Likely</td>
<td>Imagine yourself in the speaker’s position. How likely are you to make the same statement?</td>
</tr>
<tr>
<td>Praising</td>
<td>Is the speaker praising you (the addressee)?</td>
</tr>
<tr>
<td>Close</td>
<td>Would you feel close to the speaker after hearing this comment?</td>
</tr>
<tr>
<td>React</td>
<td>Would you react to this comment in a positive way?</td>
</tr>
<tr>
<td>Time</td>
<td>Would you want to spend more time with the speaker?</td>
</tr>
<tr>
<td>Frequent</td>
<td>How frequently do you make statements like this in your daily life?</td>
</tr>
<tr>
<td>Positive</td>
<td>Is the speaker saying something positive?</td>
</tr>
<tr>
<td>Better</td>
<td>Would this comment make you feel better about yourself?</td>
</tr>
<tr>
<td>Humorous</td>
<td>Is the speaker being humorous?</td>
</tr>
</tbody>
</table>