

2015

# The Development and Application of a Measure to Assess the Interpersonal Qualities of Self-Talk

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THE DEVELOPMENT AND APPLICATION OF A MEASURE TO ASSESS THE  
INTERPERSONAL QUALITIES OF SELF-TALK

by

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Bachelor of Arts, Wilfrid Laurier University, 2013

THESIS

Submitted to the Department of Psychology  
in partial fulfillment of the requirements for

Master of Arts

Wilfrid Laurier University

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**Abstract**

In three studies, this research describes the development and potential application of a new self-report measure, the Interpersonal Self-Talk Scale (IPSTS). Based on Kiesler's (1983) *Interpersonal Circle: Acts Version*, and the Revised *Interpersonal Adjective Scales* (IAS-R; Wiggins et al., 1988) the IPSTS was designed to measure the distinct interpersonal qualities of self-talk. In Study 1 ( $N=316$ ), a principal components analysis of the IPSTS items yielded two underlying dimensions of dominance and affiliation. The preliminary octant subscales displayed good internal consistency reliability and circumplex structure, and the IPSTS was shown to measure a construct that is reasonably distinct from interpersonal style, interpersonal behaviors, values, efficacies, and problems. In addition, the moderate correlations between the affiliative dimension of the IPSTS and measures of self-compassion (Neff, 2003) and self-criticism (Gilbert et al., 2004) suggest that affiliative self-talk is common to these self-relationships. In Study 2 ( $N=300$ ), the psychometric properties of the IPSTS, along with its relationships with other measures, replicated well, resulting in the final, 49-item measure. Given that self-talk is a vital aspect of people's ability to cope with challenges (Rogelberg et al., 2012), Study 3 ( $N=33$ ) assessed how well people's typical trait self-talk (as measured by the IPSTS) predicted their self-talk style and their mood in a challenging situation. Although the results suggested limited relationships between trait self-talk and state self-talk, trait self-talk style may contribute to maintaining positive affect and preventing negative affect when coping with challenges. Limitations of the research and implications for the IPSTS are discussed.

*Keywords:* Self-Talk, Interpersonal Theory, individual differences.

### **Acknowledgements**

I would first like to thank my advisor, Dr. Pamela Sadler, for her dedication and guidance throughout this journey. Thank you for helping me develop as a researcher, and for providing unwavering encouragement and support throughout from the very start.

I would also like to express my sincere appreciation to Dr. Erik Woody for his invaluable input and ongoing assistance. I am so grateful for the time you dedicated and the wisdom you shared, as both have greatly helped me achieve my goals.

To Dr. Buehler, thank you for your invaluable feedback, your encouragement, and for the countless hours you have spent reading on my behalf.

Finally, I'd like to thank my friends and family, whose support and encouragement have helped keep me inspired and focused. I couldn't have made it to this point without you.

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The Development and Application of a Measure to Assess the  
Interpersonal Qualities of Self-Talk

*"Life does not consist mainly -- or even largely -- of facts and happenings. It consists mainly of the storm of thoughts that is forever blowing through one's head."* – Mark Twain.

### **Self-Talk**

The quotation above alludes to the prominence of self-talk in our daily lives. Indeed, 96% of adults report that this “storm of thoughts” occurs constantly throughout their daily activities (Winsler et al., 2009). During self-talk, an inner voice addresses the self, usually silently but sometimes aloud, with content that is self-relevant. This phenomenon helps individuals to interpret feelings and perceptions, regulate thoughts, and provide instruction and reinforcement (Hatzigeorgiadis, Zourbanos, & Theodorakis, 2007). Past evidence suggests that the way in which people talk to themselves has a vital impact on their ability to respond effectively to challenges (Rogelberg et al., 2012).

The study of self-talk has attracted a significant amount of research interest in a breadth of domains. One such domain is sport psychology, where research examining the impact of self-talk on task performance suggests that motivational and instructional self-talk differentially impact the performance of athletes (for a review, see Hardy, 2006). For instance, instructional self-talk (e.g., “slow down and focus”) tends to be more effective than motivational self-talk (e.g., “you can do this!”) in tests of athletic precision and accuracy, and motivational self-talk tends to be more useful in tests of power and effort (Hatzigeorgiadis, Theodorakis, & Zourbanos, 2004; Hatzigeorgiadis et al., 2007; Theodorakis, Weinberg, Natsis, Douma, & Kazakas, 2000).

Self-talk has also attracted the attention of researchers in organizational science and leadership. For example, Rogelberg et al. (2012) studied how the self-talk of business executives

contributes to their leadership success. They argued that self-talk tends to be either constructive (e.g., positive, motivational) or dysfunctional (e.g., negative, discouraging). The results of their work connect constructive self-talk to more effective leadership of others, and dysfunctional self-talk with decreased leader creativity.

Research on self-talk has also found application in psychotherapy and counseling, in which it is often identified as a target for therapeutic change. For example, clinical and counseling psychologists espouse the positive benefits of such constructive self-talk to improve the psychological health and well-being of their clients (e.g., Burnett, 1994; Treadwell & Kendall, 1996). It has been known for some time that dysfunctional thinking, which involves negative, maladaptive self-talk, can lead people to view problems as obstacles rather than opportunities, decrease their willingness to persist, and undermine their self-efficacy (Beck, 1963). Altering self-statements has been at the forefront of Cognitive Behavior Therapy in treating psychological conditions including, but not limited to, depression, anxiety, low self-esteem, and eating disorders (Beck, 1996; Kelly & Carter, 2013; Meichenbaum, 1977).

Although there is wide acknowledgement that self-talk is important, researchers have pointed to a need for further empirical work to examine individual differences in the nature of self-talk and its effects (Hardy, 2006; Noordenbos, Aliakbari, & Campbell, 2014; Rogelberg et al., 2012). Indeed, it seems that it is not simply the semantic content of the self-talk that matters, it is also the tone of the inner voice and the implied relationship with the self. Moreover, there are many styles of relating to the self that may have differential effects. One particularly important distinction in the literature seems to be whether self-talk is reassuring and compassionate, or more harsh and critical. Neff's (2003) research on self-compassion suggests that in comparison to those who lack self-compassion, self-compassionate individuals have better mental health outcomes, such as a lower incidence of anxiety and depression. In contrast,

individuals who are critical of themselves tend to fixate on experiences of failure and engage in harsh self-condemnation (Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982). Research has demonstrated that depression is more likely when individuals do not defend themselves against their own criticisms, feel beaten down and defeated by them, and submissively accept their self-criticisms (Gilbert & Irons, 2005; Greenberg, Elliott, & Foerster, 1990; Whelton & Greenberg, 2005). Thus, research strongly suggests that the tone or style of a person's inner voice can produce diverse outcomes.

\* \* \*

*"The way we talk to our children becomes their inner voice." - Peggy O'Mara.*

### **Origins of Self-Talk**

The above quotation illustrates the hypothesis advanced by developmental and personality theorists that self-talk forms when children internalize the interactions they have had with important others, such as parents or educators (Benjamin, 1996; Vygotsky, 1934/1987). Indeed, according to Vygotsky's verbal theory of self-regulation (1934/1987), the communicative language transferred from parent to child is reflected in the regulatory, overt, and self-directed speech (known as private speech) readily observed in children from about age 3 to age 8. As children develop, this private speech is largely internalized to self-talk, which reflects a more sophisticated level of cognitive functioning. Likewise, Benjamin (1974, 1996) hypothesizes that one's intrapsychic experiences are shaped by caregiver behavior. Her model of personality (see Benjamin, 1974) focuses on the resulting intrapsychic experience of introjection, or a person's way of treating the self.

A related viewpoint is that the relational schemas, or interpersonal scripts, which crucially guide people's processing of (and responses to) social cues, are established and heavily influenced by early-life interpersonal experiences (Gilbert, 2000, 2009). For example, several

theorists assert that it is through warmth from a parent (from signals such as touch, holding, facial expressions and soft voice), that children develop a warm/affiliative relational schema, and use self-reassurance in the face of adversity (Bowlby, 1980; Trevarthen & Aitken, 2001). In contrast, children who are fearful of either abuse or the withdrawal of love and support (as a consequence of parental shame or neglect) develop quite different relational schemas, and therefore possess a different self-relationship.

Given that self-talk can be viewed as the internalization of interpersonal interactions with important others in early life, one promising way to characterize individual differences in self-talk is in terms of the interpersonal style of one's inner voice. Thus, we propose to assess the different ways in which people talk to themselves using an interpersonal framework.

### **Interpersonal Theory and the Interpersonal Circumplex**

A particularly intriguing framework within which to study the different ways that people talk to themselves is provided by Interpersonal Theory. This framework has a long history of being used to understand personality within an interpersonal or relational context (e.g., Carson, 1969; Kiesler, 1983; Leary, 1957; Wiggins, 1979, 1982), and uses a specific hypothesized structure to characterize how a person behaves during interpersonal interactions. Known as the interpersonal circle or interpersonal circumplex (IPC; Kiesler, 1983; Wiggins, 2003), this structure is defined by two bipolar dimensions which are orthogonal to one another. The vertical dimension represents how dominant a person is, and the behavior it captures ranges from dominant to submissive. The horizontal dimension represents how friendly a person's behavior is, which ranges from friendly to hostile.

The various types of interpersonal behavior form a continuous circular structure anchored by these two basic dimensions. For convenience, this circular spectrum can be partitioned into quadrants (e.g., Carson, 1969), octants (e.g., Wiggins, 2003), or sixteenths (e.g., Kiesler, 1996).

Figure 1 shows the circumplex partitioned into octants. By convention, each octant has a generic two-letter code which starts at the top of the circle with PA, and progresses alphabetically in a counterclockwise fashion (PA, BC, DE, etc.). In addition, each octant reflects a progressive blend of the two dimensions. For example, the upper right octant of the circle (NO) represents an interpersonal style defined as a blend of dominance and affiliation. Thus, the interpersonal circumplex provides locations for interpersonal characteristics reflecting all combinations of the different possible levels of dominance and affiliation. It also provides a unifying conceptual space in which to organize and connect findings from diverse approaches to studying interpersonal relations (Wiggins, 2003). For example, people in the “low dominance and low affiliation” (lower left) region of the circumplex tend to be socially anxious, tend to report attachment avoidance and avoidant personality disorder symptoms, and tend to evoke controlling or dismissive reactions from others (Locke, 2014).

To the extent that self-talk stems from internalized interactions with others, the interpersonal circumplex may provide a helpful framework for organizing, interpreting, and assessing how individuals talk to themselves and the implications of these different self-talk styles. In other words, a person’s internalized self-talk may tend to be characterized by the tone and content of a particular interpersonal style, reflecting a specific, recurring manner of addressing oneself.

Furthermore, people’s self-talk styles and responses may be a form of relating to the self that mimics the theoretical principle of interpersonal complementarity (Carson, 1969; Kiesler, 1983, 1996). Interpersonal complementarity suggests that one person’s behaviors tend to invite or evoke predictable responses which are similar in terms of affiliation and opposing in terms of dominance. In other words, friendly behavior invites friendly responses, and unfriendly behavior

invites similarly unfriendly responses. In contrast, dominant behavior invites submissive responses, and submissive behavior invites dominant responses.

Interpersonal complementarity can be seen during the interpersonal transaction cycle, (Carson, 1969; Kiesler, 1983) a model of the functional relationship between two or more interactants' overt interpersonal behavior and covert intrapsychic experiences. This model says that the interpersonal behavior of each interactant is simultaneously a cause and an effect of the behavior of the other interactant. Hence, during an interpersonal transaction, the overt behavior of person A evokes a particular covert reaction in person B. This covert reaction then influences and even constrains the overt behavioral reaction of person B. The resulting cycle creates stable interaction patterns which continually reaffirm the *self-system* of both person A and person B. Self-systems are complexes of cognitive schemas and characteristic emotional responses learned through past interpersonal interactions (Sullivan, 1953).

Importantly, the nature of person B's covert processes and overt behaviors is, in a sense, predetermined by the notion of interpersonal complementarity. That is, during an interpersonal interaction, the behavior of person A is said to carry with it an *impact message* (Perkins et al., 1976), which functions to evoke a specific response from person B. Accordingly, friendly-dominant behavior exhibited by person A would evoke friendly-submissive responses from person B and vice versa. Further, hostile-dominant behavior exhibited by person A would evoke hostile-submissive responses from person B and vice versa.

The relationship between one's self-talk and one's responses to self-talk may function in a similar way. Indeed, just as the impact message of person A's behavior influences the particular reactions of person B, self-talk might have certain evoking messages which constrain how a person responds to their own self-talk, perhaps in ways that are similar to the notion of interpersonal complementarity (i.e., between two people). Accordingly, identifying different

styles of self-talk may help clarify and explain the nature of one's *intrapersonal* relationship, or self-system, by identifying people's responses to their inner voice. Perhaps self-systems can develop from past *intrapersonal* relations; that is, the interplay between self-talk and one's responses to their self-talk. Therefore, assessing the interpersonal qualities of self-talk may be important for understanding how people relate to themselves.

To our knowledge, no measures currently assess the different styles one could adopt when engaging in self-talk. For example, the Self-Talk Scale (Brinthaupt, Hein, & Kramer, 2009) characterizes differences in the frequency of self-talk in four main contexts. Items capture the frequency of self-talk when negative events occur, when positive events occur, when people are trying to stay focused, or when people wonder how others view them. However, this scale does not assess the style or tone of the inner voice; instead, it assesses how often self-talk occurs in these four situations.

Somewhat similarly, the Functions of Self-Talk Scale (FSTS; Theodorakis, Hatzigeorgiadis, & Chroni, 2008) was developed to assess the multiple functions of self-talk in sport (i.e., the mechanisms through which self-talk may be beneficial to performance). Respondents rate various outcomes of engaging in self-talk, such as "I try harder", "I concentrate better", and "psych myself up". Although interesting, this scale does not capture people's natural styles of talking to themselves. A further example is the Self-Verbalization Questionnaire (SVQ; Duncan & Cheyne, 1999), which characterizes *when* self-talk occurs, rather than its tone or style.

Finally, the characterizations of self-criticism and self-compassion describe self-relationships and allude to an inner voice with particular interpersonal qualities. Gilbert and Irons (2005) describe self-criticism as "a form of self-to-self relationship where one part of the self finds fault with, accuses, condemns, or even hates the self" (p. 265). They connect self-criticism to an "inner hostile self-to-self relationship" (p. 264), and assert that self-criticism is an internal

hostile signal — people with negative self-attacking thoughts often feel harassed by them and seek to escape. The authors compare the stress triggered by this “inner harassment” to the stress activated when subordinated animals are harassed by dominants. This characterization of self-criticism alludes to a hostile and dominant style of internal communication with the self, and possibly a hostile-submissive response. However, instead of focusing on the interpersonal qualities of self-criticism, Gilbert’s research assesses the degree to which self-criticism occurs as a response to negative life events. Indeed, the Forms of Self-Criticizing and Self-Reassuring Scale (Gilbert, Clarke, Hempel, Miles, & Irons, 2004), which is the self-report measure used for this research, assesses emotional states and specific behaviors or coping strategies that may occur in response to such adverse events. Thus, Gilbert and colleagues measure the extent to which self-criticism occurs as a response to negative circumstances, however their empirical work does not explicitly assess the tone or style of self-criticism.

In contrast to self-criticism, self-compassion, as described by Neff (2003), involves three main components: (1) extending kindness and understanding to the self rather than harsh self-criticism and judgment; (2) seeing one’s experiences as part of the larger human experience rather than as separating and isolating; (3) holding one’s painful feelings and cognitions in balanced awareness rather than over-identifying with them. From this description it seems reasonable that self-compassion implies the presence of an inner voice with particular qualities. However, the exact qualities or interpersonal style of such a voice are not explicitly assessed by Neff’s Self-Compassion Scale (SCS; 2003). This scale describes ways of expressing compassion, but does not assess self-talk or the tone of compassionate self-talk.

Furthermore, although self-criticism and self-compassion imply that specific styles of self-talk occur, it is not yet clear whether a variety of styles of self-talk would represent these constructs. For example, there are likely multiple ways a person could talk to himself or herself

compassionately. For instance, one could speak to the self compassionately with a friendly, submissive tone, akin to how a parent would soothe and comfort a frightened child. A person could also show compassion towards the self through a friendly, but more dominant style of voice. Unlike soothing a frightened child, this self-talk might sound more like a coach trying to motivate and encourage players before an important event. Similarly, there are likely a variety of ways to speak to the self critically. One could criticize the self in a hostile and dominant manner, and sound similar to how an angry drill sergeant lectures subordinates. However, speaking to the self critically could also sound warmer and more constructive, like when a teacher patiently guides a student. Thus, just as there are a variety of ways to show compassion and criticism interpersonally, there may be differences in how individuals engage in compassionate and critical self-talk. Accordingly, it would be interesting to see how measures of self-criticism and self-compassion relate to how one's inner voice sounds and what it says.

### **Research Objectives**

This research sought to develop and apply a new self-report scale to assess individual differences in the interpersonal qualities of self-talk. After some initial scale development, responses were collected from a large sample of participants to select the final set of items and evaluate the scale's psychometric properties (Study 1). The properties were verified with a second sample, and a final version of the scale was formulated (Study 2). Subsequently, the new scale was used to assess individual differences in self-talk and to study the degree to which interpersonal self-talk style predicts self-talk in a challenging situation (Study 3).

### **Study 1**

The purpose of Study 1 was threefold. First, we sought to develop the new measure by constructing octant subscales and evaluating their reliabilities. Second, we sought to evaluate the circumplex properties of the scale, which we describe in detail shortly. For example, circumplex

octants are expected to show a particular internal pattern of correlations which we formally tested. A third objective of this study was to explore the relationship between the interpersonal style of the inner voice and other interpersonal constructs, including people's interpersonal style toward others, and their interpersonal values, efficacies, and difficulties. We sought to show that self-talk style represents a construct that is reasonably distinct from these interpersonal constructs.

In addition to investigating the connection between the interpersonal style of the inner voice and other interpersonal constructs, this study explored the relationship of self-talk to self-criticism and self-compassion, which are two concepts that are purported to influence and be influenced by the manner of addressing the self. To the extent that self-kindness and self-judgment reflect friendly and hostile styles of self-talk, respectively, we would expect self-compassion to correlate positively, and self-criticism to correlate negatively, with how affiliative self-talk is. However, as alluded to in the introduction, there may also be multiple styles of being self-critical and self-compassionate.

## Method

### Participants

A total of 579 American adults participated in this study. The data from 263 of these participants were considered invalid, and hence discarded. Data were considered to be invalid for the following reasons: Exhibiting excessively repetitive response patterns (e.g., endorsing all items on a particular scale, or scales, with one number); failing to complete a section of at least 10 consecutive items in length; failing to correctly answer one or more of the four quality check items that were distributed throughout the entire study; and finally, completing the study too

quickly or too slowly for the data to be considered credible<sup>1</sup>. The final sample consisted of 316 participants (mean age = 34.9 years,  $SD = 11.97$ , ranging from 18-72 years), including 116 men (36.7%) and 199 women (63.0%). One person did not indicate gender. Participants were recruited using Mechanical Turk (MTurk; [www.mturk.com](http://www.mturk.com)), an online platform owned by Amazon.com. MTurk is a crowdsourcing labor market in which American adults complete online studies in exchange for monetary compensation. MTurk samples are more diverse than college student samples (Paolacci, Chandler, & Ipeirotis, 2010), and the quality of data provided by MTurk samples and samples drawn from college populations has been reported to be equivalent (Buhrmester, Kwang, & Gosling, 2011). On average, it took participants 37 minutes and 11 seconds ( $SD = 12.80$ ) to complete the study, and they received \$1.00 US in compensation. The participants self-identified as Caucasian (60.2%), Asian (24.1%), African American (6.6%), Hispanic (4.7%), and other (4.4%; primarily biracial).

## Materials

Participants completed a total of eight scales. The first scale was the newly developed Interpersonal Self-Talk Scale (IPSTS). The seven remaining measures consisted of five interpersonal measures of interpersonal traits, values, efficacies, and problems, and two measures of self-compassion and self-criticism.

### Materials assessing self-talk.

*Interpersonal Self-Talk Scale (IPSTS; see Appendix A)*. Our initial scale development resulted in a provisional 64-item scale comprised of eight subscales which corresponded to the eight interpersonal styles distributed around the IPC (see Figure 1). The scale items were based on Kiesler's (1983) *Interpersonal Circle: Acts Version* and the Revised Interpersonal Adjective

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<sup>1</sup> From the total sample ( $N=579$ ), response times that were too long were greater than 84 min, 23 s (i.e., mean +3SD). To determine the cut off for response times that were "too short", five volunteers completed the scale in a quick, yet conscientious manner. The mean time was 25 min, 35 s ( $SD = 7.02$ ) and the mean time - 1  $SD$  was the cut off. Thus, response times less than 18 min, 32 s were discarded.

Scales (IAS-R; Wiggins, Trapnell, & Phillips, 1988), with particular attention to deriving descriptors that would apply well to the phenomenon of self-talk. The analyses of the 64 items from this preliminary work yielded promising subscale reliabilities and circumplex structure. To ensure that the final versions of the subscales would each have enough items, some further candidate items were added, yielding a measure of 91 items.

The resulting 91-item scale, as administered in this study, consisted of two components: a free response component and self-report, adjective-rating component. The free response component asked respondents to think of two occasions within the last month when they engaged in self-talk, to provide the context, and to report verbatim what they said to themselves in each circumstance. The main purpose of this section was to encourage a mental set of considering one's self-talk in particular, rather than other aspects of interpersonal style. In the adjective-rating component, respondents indicated how often their self-talk overall could be described by each of the 91 adjectives (e.g., warm, decisive, cocky), which were each devised to correspond to one of the eight interpersonal styles on the interpersonal circumplex. A 6-point Likert response scale was used, ranging from 1 (Never) to 6 (Almost Always).<sup>2</sup>

### **Materials assessing interpersonal traits and behaviors.**

#### ***Revised Interpersonal Adjective Scales (IAS-R; Wiggins et al., 1988; see Appendix B).***

The IAS-R is a self-report measure consisting of 64 adjectives that are descriptive of people's trait interpersonal styles (e.g., assertive, cheerful, shy). Using an 8-point Likert scale, participants rated how accurately each adjective described them as individuals, ranging from Extremely Inaccurate (1) to Extremely Accurate (8). The 64 adjectives divide evenly into eight octant scales, which are obtained by averaging the eight relevant items for each subscale. Reliability

<sup>2</sup> We opted to use a frequency-based rather than an accuracy-based response scale to allow for the endorsement of opposing styles of self-talk. For example, respondents could endorse that their self-talk could be described as both friendly and hostile; one's self-talk could be "Rarely" hostile and "Almost Always" friendly. In contrast, with an accuracy-based response scale, respondents are more likely to feel pressured to endorse a consistent style of self-talk, which may or may not be representative of their self-talk.

estimates for these octant subscales in a college sample ranged from .73 to .86, and extensive validity data are presented in the IAS manual (Wiggins, 1995). Comparable reliability estimates were obtained with the current sample, with Cronbach's alphas ranging from .77 to .89.

***Social Behavior Inventory (SBI; Moskowitz, 1994; see Appendix C).*** The Social Behavior Inventory is a measure of interpersonal behavior that can be used to assess how often a person has performed various interpersonal behaviors over the past month. Participants indicated the frequency with which they performed 46 behaviors using a 6-point Likert scale, which ranged from 1 (Never) to 6 (Almost Always). The 46 items are arranged in four subscales that correspond to the four poles of the interpersonal circumplex: dominance, submissiveness, agreeableness and quarrelsomeness (which correspond to octants labeled PA, HI, LM and DE, respectively in Figure 1). Each subscale consisted of 12 items (with two items each counted twice as part of two scales). Some sample items are "I expressed an opinion" (dominance), "I spoke softly" (submissiveness), "I listened attentively to others" (agreeableness), and "I made a sarcastic comment" (quarrelsomeness). The SBI has demonstrated strong reliabilities when applied as a measure of interpersonal style (Sadler & Woody, 2003). In the current study, all four poles demonstrated very good internal consistency, with Cronbach's alphas ranging from .80 to .86.

#### **Materials assessing interpersonal values and efficacy.**

***Circumplex Scales of Interpersonal Values (CSIV; Locke, 2000; see Appendix D).*** The 32-item CSIV assesses the value individuals place on interpersonal experiences associated with each octant of the interpersonal circumplex. Each item uses the same stem: "When I am with him/her/they, it is important that..." and proceeds to describe an interpersonal experience. A sample agentic (PA) item is "They acknowledge when I am right", and a sample communal (LM) item is "I feel connected to them". For each item, respondents indicated how important that

type of interpersonal experience is for them on a 5-point Likert scale ranging from 0 (Not Important) to 4 (Extremely Important). The CSIV contains four items for each octant, and has demonstrated acceptable circumplex structure and internal consistency (Locke, 2000; Locke & Adamic, 2012; Locke, Craig, Baik, & Gohil, 2012; Locke & Sadler, 2007). For example, Locke (2000) reported Cronbach's alphas for the octants ranging from .76 to .86. In the current study the reliabilities ranged from .60 to .78.

*Circumplex Scales of Interpersonal Efficacy (CSIE; Locke & Sadler, 2007; see Appendix E).* This 32-item inventory is designed to measure individuals' interpersonal self-efficacy, that is, their confidence in their ability to perform interpersonal behaviors associated with each octant of the interpersonal circumplex. The CSIE is composed of eight 4-item scales. Each item begins with the stem "When I am with other people, I am confident that..." and ends with different interpersonal behaviors. A sample dominant (PA) item is "I can be assertive", and a sample friendly (LM) item is "I can be helpful". For each item, respondents indicate on a 0 (I am not at all confident) to 5 (I am moderately confident) to 10 (I am absolutely confident) scale how sure they are that they could act that way with other people. Thus, higher scores indicate greater interpersonal self-efficacy. The CSIE has shown good circumplex properties and internal consistency, with Cronbach's alpha coefficients for the eight scales ranging from .66 to .83 (Locke & Sadler, 2007). In the present study, the alphas ranged from .50 to .83.

#### **Materials assessing interpersonal problems.**

*Inventory of Interpersonal Problems - Short Circumplex (IIP-SC; Hopwood, Pincus, DeMoor, & Koonce, 2008; see Appendix F).* The 32-item IIP-SC consists of eight scales reflecting dysfunctional interpersonal behavior that is associated with each octant of the interpersonal circumplex. Items consist either of behavior that a person finds hard to do with other people (e.g., "It is hard for me to show affection to other people") or behavior that a person

does too much (e.g., “I try to please other people too much”). Respondents indicated how distressing they find each problem on a 5-point Likert scale ranging from 0 (Not at all) to 4 (Extremely). The eight scales are as follows, followed by the associated interpersonal circumplex octant designation in parentheses: Domineering (PA), Vindictive (BC), Cold (DE), Socially Avoidant (FG), Nonassertive (HI), Exploitable (JK), Overly Nurturant (LM), and Intrusive (NO). The IIP-SC has been widely used and has demonstrated acceptable internal consistency across numerous studies. For example, Hopwood et al. (2008) reported internal consistency values ranging from .73 (Domineering) to .87 (Nonassertive). In the present study, the reliabilities ranged from .67 (Exploitable) to .87 (Socially Avoidant).

#### **Materials assessing self-compassion and self-criticism.**

*Self-Compassion Scale (SCS; Neff, 2003; see Appendix G).* The SCS is comprised of 26 items and measures six components of self-compassion, three of which are positive and three of which are negative. The three positive self-compassion subscales are as follows: Self-Kindness (e.g., “When I’m going through a very hard time, I give myself the caring and tenderness I need”), Common Humanity (e.g., “I try to see my failings as part of the human condition”), Mindfulness (e.g., “When something upsets me I try to keep my emotions in balance”). The three negative self-compassion subscales are as follows: Self-Judgment (e.g., “I’m disapproving and judgmental about my own flaws and inadequacies”), Isolation (e.g., “When I fail at something that’s important to me, I tend to feel alone in my failure”), and Over-Identification (e.g., “When I’m feeling down I tend to obsess and fixate on everything that’s wrong”). Respondents rated each item using a 5-point response scale ranging from 1 (Almost Never) to 5 (Almost Always). The SCS demonstrated good internal consistency, with Cronbach’s alpha coefficients ranging from .75 for the Mindfulness subscale to .81 for the Over-Identification subscale (Neff, 2003). In

the present study, the reliabilities ranged from .82 for the Common Humanity subscale to .88 for the Self-Kindness subscale.

*Forms of Self-Criticizing and Self-Reassuring Scale (FSCRS; Gilbert et al., 2004; see Appendix H).* The 22-item FSCRS asks participants to rate how they typically react when things go wrong for them using a 5-point Likert scale ranging from 0 (Not at all like me) to 4 (Extremely like me). This inventory is comprised of three subscales, one of which assesses self-reassurance and two of which assess self-criticism. Of the latter two subscales, the first describes self-criticism characterized by a sense of inadequacy (Inadequate Self) and the second describes self-criticism characterized by a sense of self-hatred (Hated Self). Sample items include “I am gentle and supportive with myself” (Reassured Self), “I am easily disappointed with myself” (Inadequate Self), and “I have a sense of disgust with myself” (Hated Self). Consistent with good internal consistency reported in previous studies (Gilbert, Durrant, & McEwen, 2006; Gilbert et al., 2004), in the present study the reliabilities were .91 for Reassured Self, .93 for Inadequate Self, and .89 for Hated Self.

### **Procedure**

All participants accessed the study online using a secured website link, where they completed a brief demographic survey, the Interpersonal Self-Talk Scale (IPSTS), and the seven other measures described in the previous section. All participants completed the measures in the same order: demographic survey, IPSTS, SBI, IAS-R, SCS, CSIV, FSCRS, CSIE, IIP-SC. We had participants fill out our Interpersonal Self-Talk Scale (IPSTS) first to ensure that their responses on our scale were not influenced by the content presented by any of the other scales. Also, to avoid biasing participants' responses to questions about their interpersonal behavior (SBI) and general personality, we assessed the presence of interpersonal problems last.

## Results

### Overview of Analyses

The data analyses for our new measure took place in phases. Following the example of other researchers who have evaluated and refined new interpersonal scales (e.g., Alden, Wiggins, & Pincus, 1990; Wiggins et al., 1988), the first phase consisted of performing a principal components analysis (PCA) of the items, plotting the items in the two-dimensional interpersonal space, and selecting items for subscales based on their position in the interpersonal circumplex. Next, the internal consistency reliabilities of these subscales were computed and the circumplex structure of the subscales was evaluated. In the final phase, we evaluated the relations of the new scale with interpersonal measures and measures of self-compassion and self-criticism.

### Principal Components Analysis

When examining the circumplex structure of data, exploratory methods, such as principal components analysis (PCA; e.g., Wiggins, 1979), are typically employed. As others have argued (i.e., Gurtman & Pincus, 2003; Tracey, 2000), exploratory methods function to provide a spatial representation of the data that can be evaluated informally for fit to a circular structure (Gurtman, 2009). Within the framework of interpersonal theory, applying a PCA should ideally yield two orthogonal principal components, with one representing dominance and the other representing affiliation. When the scale items are then plotted in the space defined by these two dimensions, they should conform to an equally spaced circular arrangement, representing the interpersonal circumplex (see Figure 1).

All analyses were carried out using IBM SPSS software (version 22.0), unless otherwise specified. For the first phase of analysis, we performed a principal components analysis on the 91 IPSTS items. The first three factors accounted for 26.04%, 14.70% and 9.64% of the variance, with the remaining factors accounting for less than 3% of the variance. Thus, three

principal components were extracted and the unrotated solution was examined. The first factor was characterized by high positive loadings. The second and third factors resembled the familiar dimensions of dominance and affiliation, respectively. The uniformly positive loadings of the items on the first factor were indicative of a general factor. A general factor is a commonly faced issue when conducting a PCA on interpersonal scales. It can mask or confound the expected two-dimensional structure predicted by interpersonal theory (e.g., Tracey, 2000) because it can occur even when the circular structure is present in the data (Rounds & Tracey, 1993; Wiggins, Steiger, & Gaelick, 1981). Therefore, the general factor must be treated separately from the circumplex components in interpreting a given solution (Alden et al., 1990).

A general factor is thought to reflect individual differences in response style, rather than differences in substantive interpersonal constructs. For example, in interpersonal measures, the general factor could represent a response bias: the tendency to agree with all of the items, or think all of the items are personally relevant. Such a response bias is likely to be present when frequency-based response scales are used for self-report measures, as people may differ in how they interpret different frequencies. For example, what may seem to occur “very often” for one respondent may not seem to occur “very often” for another respondent. Given that the IPSTS uses a frequency-based response scale, we were not surprised to find a general factor.

To remove the potential biasing effect of the general factor, Tracey (2000) outlines two possible methods. Either (a) ignore the first unrotated general factor and inspect the unrotated second and third factors for the presence of the circular structure (e.g., Rounds & Tracey, 1993), or (b) ipsatize the data prior to analysis, thereby removing any variance attributable to the general factor.

In the present dataset an examination of the unrotated second and third factors revealed a somewhat flattened oval structure that was rather oddly displaced from the center of the

circumplex. Therefore, following the second approach from Tracey (2000), we ipsatized the IPSTS items. Ipsatizing is a frequently used technique among interpersonal researchers, and has been used on measures with accuracy-based (e.g., Alden et al., 1988; Locke, 2000, 2014; Locke & Sadler, 2007) and frequency-based response scales (Moskowitz, 1994). The effect of ipsatizing is to remove a general factor, which is useful when this factor is not relevant to what the items are intended to measure. Ipsatizing is additionally useful when examining octant scores, but is not needed when only looking at dimensions, as they are essentially self-ipsatizing.

We performed a PCA on the 91 ipsatized items of the IPSTS. To investigate the number of factors to retain, we performed a Parallel Analysis (O'Connor, 2000). This is an exploratory factor analytic procedure which involves comparing the eigenvalues extracted from the actual dataset to the eigenvalues extracted from randomly generated data matrices. These random data matrices parallel the actual dataset in terms of the number of observations and the univariate distributions of the variables. The eigenvalues derived from the actual data are compared to the eigenvalues that correspond to the 95<sup>th</sup> percentile of the distribution of random data eigenvalues. Factors or components are retained as long as the  $i$ th eigenvalue from the actual data is greater than the  $i$ th eigenvalue from the random data.

The scree plot yielded by this analysis can be seen in Figure 2. Looking at the scree plot, it is clear that the first four eigenvalues from the actual data are larger than the corresponding first four 95<sup>th</sup> percentile random data eigenvalues. However, the fifth eigenvalue from the actual data was less than the fifth 95<sup>th</sup> percentile of the random data eigenvalue. This indicated that four components should be retained. The first two factors were substantive, representing 29.32% and 11.42% of the variance. In contrast, the third and fourth factors appeared to be quite minor, accounting for only about 3% and 2% of the variance, respectively.

Given the results of the parallel analysis, we examined the loadings of each item on the

third and fourth factors. We found that both of these factors were trivial. For example, the third factor was a doublet, meaning that only two items (item 31 “Boastful” and item 37 “Meek”) loaded uniquely onto it. The fourth factor was also trivial: item 1 “Competitive” and 2 “Uninhibited” were the only items loading uniquely onto it. Thus, we favored the two-factor solution.

Next, the factor loadings of each individual item were plotted in two-dimensional space defined by the first two principal components. This plot is displayed in Figure 3. The factor loadings of the individual ipsatized items indicated that the components yielded by the analysis reflected the hypothesized interpersonal dimensions of dominance and affiliation.

The unrotated factors were clearly interpretable as dominance and affiliation. As can be seen in Figure 3, the vertical factor was anchored between the items “Leading” and “Decisive” on one end and anchored between the items “Meek” and “Timid” on the opposite end. The second factor, positioned horizontally 90 degrees from the vertical factor, was anchored by the item “Friendly” on one end and “Hostile” on the other end. These items are very representative of the dominance and affiliation dimensions, respectively. Thus, we concluded that the vertical axis of the plot represented the dominance dimension, and the horizontal axis represented the affiliation dimension. In addition, we concluded that rotation was not necessary.

The boundaries of all eight octants were formed by dividing the two dimensional space into eight equal-sized sectors with theoretical midpoints of 0 (360), 45, 90, 135, 180, 225, and 270 degrees (see Figure 3).<sup>3</sup> Note that all subsequent analyses in Study 1 refer to and involve ipsatized items.

### **Subscale Refinement**

Items that were selected for an octant subscale met five main criteria:

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<sup>3</sup> These sectors also corresponded to the interpersonal variables defined in Figure 1.

1. For any particular subscale, the included item was located within the visually determined boundaries of the octant for that subscale.
2. Within each octant, the strongest interpersonal items were favored. Thus, items with the longest vector lengths (i.e., greatest communalities) were chosen over items that fell closer to the origin.
3. Of the remaining strong interpersonal items, those which had performed well already in preliminary scale development, those which also appear in previously established measures of interpersonal traits (IAS-R), or those which had been identified as being theoretically sound (see Kiesler, 1996) were preferred over other items.
4. The selected items for each subscale were reviewed to make sure they described what appeared to be a coherent style of self-talk. For example, although “Reserved” fell squarely in the JK octant, it was not selected because it did not conceptually fit with the other JK items (“Serene”, “Tolerant”, “Lenient”, “Nonjudgmental”, and “Undemanding”).
5. We attempted to select strong interpersonal items that were dispersed evenly across the width of the octant, rather than selecting items whose positions were superimposed on each other in the plot. This allowed the full spread of the octant to be sampled, and ensured that the position of the subscale (i.e., the average of the selected items for that octant) was close to the middle of the octant range.

The resulting scale consisted of 40 items (eight subscales with five items per subscale). The internal consistency of the 5-item subscales was evaluated. Table 1 displays the items, item-total correlations, and reliability coefficients for each subscale. The Cronbach’s alphas ranged from adequate (.65 for the HI subscale) to very high (.90 for the LM subscale). The item-total correlations for the items in seven of the eight subscales were reasonably high, ranging from .42 to .81. However, the HI subscale contained four items with the lowest item-total correlations of

the entire scale, ranging from .34 to .42. Although the item-total correlations in the HI subscale are acceptable, the fact that they are the lowest of all the item-total correlations accounts for the somewhat lower alpha coefficient obtained for the HI subscale.

Octant subscale scores were computed by averaging the relevant five ipsatized items. To informally examine how well these eight subscales conformed to circumplex structure, they were then subjected to a principal components analysis. The resulting two components reflected the hypothesized interpersonal dimensions of dominance and affiliation, and accounted for 34.57% and 43.07% of the variance, respectively (eigenvalues of 2.77 for dominance and 3.45 for affiliation). This factor plot can be seen in Figure 4 (A), suggesting visually that the subscales conform very well to a circumplex structure.

To explore if a larger set of items for each subscale would yield substantially better psychometric properties, we also created and evaluated 6-item subscales by including eight additional items (i.e., an additional item was added to each of the 5-item subscales). For two of the subscales, an appropriate sixth item was not available within the drawn in boundaries of the corresponding octant (see Figure 3 for these boundaries). Therefore, in each case, an item from an immediately adjacent octant was selected instead. Such items were located only very slightly beyond the edge of the relevant octant.

Table 2 displays the items, item-total correlations and Cronbach's alpha coefficients for the 6-item subscales. The reliabilities ranged from .69 (for the HI subscale) to .92 (for the LM subscale), and, overall, demonstrate that the additional eight items did not substantially improve the internal consistency reliability of the subscales. The 6-item subscales were also subjected to a PCA and were plotted along the dominance and affiliation dimensions. Figure 4 (B) shows the factor plot of the 6-item subscales, which can be readily compared to the factor plot for the 5-item subscales above it. The high degree of similarity between the two plots demonstrates that

the 6-item subscales did not substantially improve the circumplex structure of the new scale. In sum, the need to deviate from our first criterion for item inclusion, along with the similarity in circumplex structure and internal consistency of the subscales in the 40-item versus the 48-item version of the scale, supported our choice to use the shorter, more parsimonious, 5-item subscales.

### **Formal Evaluation of Circumplex Structure**

Using the program RANDALL (Tracey, 1997), we conducted a randomization test of hypothesized order relations (Hubert & Arabie, 1987) to formally test how well the eight (5-item) subscales conformed to a circumplex model. RANDALL tests for structure by examining the expected circular order relations among subscale intercorrelations. In a circumplex arrangement, the magnitudes of the correlations between pairs of variables should be ordered according to the variables' proximity on the circle (see Table 3). As seen in the table, perfect fit to a circular model requires that correlations of adjacent subscales on the circle (e.g., PA and BC) exceed correlations of subscales two octants apart (e.g., PA and DE), which in turn exceed those of subscales three octants apart (e.g., PA and FG), which in turn exceed those of subscales opposite on the circle (e.g., PA and HI). In total, a circular model makes 288 predictions about the relative magnitudes of correlations among eight subscales. Correlations assumed to be equal (e.g., the relations of PA and HI vs. LM and DE) are not compared. RANDALL computes the number of these 288 predictions met in a particular sample. It yields an exact significance level of the number of predictions met by the data versus the null (chance). RANDALL also provides a correspondence index (CI; Hubert & Arabie, 1987) which is equal to the proportion of predictions met minus the proportion violated. It can range from  $-1.0$  (all predictions violated) to  $0.0$  (chance or 50% of predictions met) to  $1.0$  (perfect fit). Table 4 displays the intercorrelation matrix used for this analysis. In the present study, the program revealed that 287 of the 288

predictions were met ( $CI > .99, p < .001$ ), indicating nearly perfect conformity to a circumplex structure.

Another component of the circumplex structure of a scale involves the correlations between the two main dimensions. According to interpersonal theory, a person's interpersonal tendencies will vary along the orthogonal dimensions of dominance and affiliation. Therefore, in order to establish the validity of our new interpersonal measure of self-talk, the relationship between dimension scores calculated from its eight subscales ought to be close to zero and comparable to the relation between the orthogonal dimensions for established interpersonal measures. Dimension scores were constructed based on the standardized formula (see Ayearst, Sellbom, Trobst, & Bagby, 2012). In the standardized formula, the dominance and affiliation dimensions are in standardized (zscore) form, and expressed as a weighted linear sum of IPSTS octant zscores. Since each dimension is composed of standardized octants, each octant is weighted equally. The standardized formulae are as follows:

$$\text{Dominance dimension} = .303[(\text{PA-HI}) + .707(\text{BC+NO-JK-FG})] \quad (1)$$

$$\text{Affiliation dimension} = .303[(\text{LM-DE}) + .707(\text{JK+NO-BC-FG})] \quad (2)$$

We subsequently correlated the dominance and affiliation dimensions, and found that they were orthogonal ( $r = .00$ ) and comparable to those obtained for the other established interpersonal measures administered in this study: IAS ( $r = .14$ ) and the SBI ( $r = -.05$ ).

### Relations with Other Constructs

**Interpersonal constructs.** We assessed the extent to which the dimensions of the new scale correlated with the dimensions of established measures of a person's interpersonal characteristics (that is, how they behave when interacting with other people). Table 5 displays the correlations for the dimension scores of the new self-talk scale with the dimension scores for the measures of trait interpersonal style (i.e., IAS-R and SBI), interpersonal values and efficacy

(CSIV and CSIE) and interpersonal problems (IIP-SC). The correlations are relatively modest in size, providing support for our prediction that the interpersonal qualities of an individual's self-talk are reasonably distinct from his or her interpersonal qualities as shown in interactions with others. Somewhat surprising were the positive correlations between affiliative self-talk style and measures of dominant interpersonal style, especially those with the IAS-R and the SBI. These positive correlations suggest that people with more dominant interpersonal styles tend to have warmer internal self-talk.

**Self-compassion and self-criticism.** We also sought to explore how our new scale related to measures of self-compassion and self-criticism. Although these constructs allude to aspects of an inner voice with certain interpersonal styles, these constructs also seem to involve a particular attitude toward the self, which is separate from what our new measure assesses. Table 6 displays the correlations between the subscales of the Self-Compassion Scale (SCS; Neff, 2003) and the Forms of Self-Criticizing and Self-Reassuring Scale (FSCRS; Gilbert et al., 2004). As can be seen in Table 6, the SCS and FSCRS subscales are strongly intercorrelated, such that Gilbert et al. (2004) and Neff (2003) are measuring closely related constructs (even though they label these constructs somewhat differently). In particular, the positive self-compassion subscales had substantial correlations with the FSCRS Reassured Self subscale, ranging from .47 to .75; likewise, the negative self-compassion subscales correlated substantially with the two self-critical FSCRS subscales (Hated Self and Inadequate Self), ranging from .34 to .78.

Table 7 displays a breakdown of the correlations of the subscales of our new, Interpersonal Self-Talk Scale (IPSTS) with the SCS and the FSCRS. As can be seen in the table, affiliative self-talk (dimension scores) is consistently positively related to the positive self-compassion subscales and the Reassured Self FSCRS subscale, and negatively related to the negative self-compassion subscales and the Hated Self and Inadequate Self FSCRS subscales.

Indeed, overall, affiliative self-talk relates well to all of the SCS and FSCRS subscales. However, dominant self-talk (dimension scores) is not related to any of the SCS and FSCRS subscales. Arguably, then, what all these SCS and FSCRS subscales have in common is the underlying tendency to engage in affiliative self-talk.

### **Discussion**

This study focused on the development of a new self-report measure of the interpersonal qualities of self-talk, the IPSTS. This scale was designed to assess individual differences in the various ways one could engage in self-talk. The subscales of the IPSTS were shown to have good internal consistency and circumplex structure. This study also demonstrated that the interpersonal style of the inner voice is reasonably distinct from interpersonal traits, behaviors, values, efficacies, and problems. The IPSTS shares the advantages of other circumplex measures, as it is able to assess the full range of traits (in this case, styles of self-talk) associated with differing levels of dominance and affiliation. However, the IPSTS assesses a unique individual difference, beyond what these other established interpersonal measures evaluate.

In addition to establishing a measure of the interpersonal style of self-talk, this study investigated the relationship of self-talk style to the constructs of self-compassion and self-criticism. Recall that the existing measures of self-compassion and self-criticism do not explicitly assess the particular interpersonal style of self-talk or the inner voice, and instead concentrate on how people typically react when things go wrong for them. Nonetheless, affiliative self-talk was consistently related to all the self-compassion and self-criticism subscales. The moderately sized correlations might suggest that what the self-compassion and self-criticism scales seem to share is the tendency to engage in affiliative self-talk. Consider that the items of the self-compassion and self-criticism scales seem to focus largely on emotional reactions to negative circumstances, but not agentic or solution-oriented responses. For example,

items in the Self-Kindness subscale of the Self-Compassion Scale are about tolerating, caring for, and showing love and tenderness to the self, which seem more consistent with affiliative self-talk (i.e., an inner voice that would sound friendly, supportive, and accepting). The Self-Kindness subscale items are not about engaging in behaviors or making plans to remedy negative situations, which would be more consistent with a dominant style of self-talk (i.e., an inner voice that would sound assertive, decisive, and leading).

Interestingly, no appreciable relationship was found between the dominant dimension of the IPSTS, the Self-Compassion Scale, and the Forms of Self-Criticizing and Self-Reassuring Scale. The negligible correlations seem to suggest that engaging in dominant self-talk does not underlie the constructs of self-compassion and self-criticism as they are currently measured by Neff (2003) and Gilbert et al. (2004).

Indeed, it is important to consider the way self-criticism and self-compassion are characterized. Currently, when researchers of self-criticism and self-compassion discuss these constructs, they seem to be describing particular attitudes toward the self: self-criticism being an exclusively negative, maladaptive self-attitude, and self-compassion being an exclusively positive, adaptive self-attitude. However, one can engage in self-critical self-talk without being mean, negative, or harmful to the self. In other words, it is possible to criticize the self without seeing the self as inadequate, without hating the self, and without feeling attacked by a hostile inner voice, as Gilbert and colleagues (2004, 2005) describe. To illustrate, consider that the late physicist Richard Feynman was often highly critical of his own research. He advocated self-criticism through quotations like: “I’m smart enough to know that I’m dumb”, and “The first principle is that you must not fool yourself and you are the easiest person to fool.” Finally, Feynman stressed the importance of critically assessing our own ideas: “We are trying to prove ourselves wrong as quickly as possible, because only in that can we find progress”. Feynman

was adamant about the value of being your own worst self-critic, but there is no hint that his self-criticism resulted in feelings of inadequacy or self-hatred.

Likewise, individuals can have a compassionate self-attitude, but this does not necessarily mean they engage in warm, kind self-talk. For example, making healthier lifestyle choices (i.e., quitting smoking, exercising regularly) often requires people to give the self “tough-love”, or to engage in self-talk that is strict and directive. Although such self-talk is not particularly warm or kind, it need not be the result of self-hatred. Instead, this self-talk is likely motivated by a compassionate or respecting self-attitude — it functions to help people achieve their goals. Thus, the tone of the inner voice is particularly important to assess, and there may be many ways to effectively express self-criticism and self-compassion that may not be fully appreciated by current characterizations or by the measures used to assess these constructs.

In Study 1, the data used to test the properties of the IPSTS was the same data used in developing its subscales. Although the data were obtained from a large sample ( $N = 316$ ), it is not clear how well the items selected for each subscale will perform in a second sample. Thus, Study 2 involved testing if the circumplex properties of the IPSTS replicated with a different sample, in addition to assessing the relationships of the subscales with other constructs.

### **Study 2**

The purpose of Study 2 was to assess the properties of the new self-talk measure with a distinct, second sample. It was expected that the psychometric properties of the five items chosen for each subscale of the Interpersonal Self-Talk Scale (IPSTS) in Study 1 would remain constant across samples, resulting in comparable circumplex structure and a comparable level of internal consistency. The second purpose of Study 2 was to investigate the correlates of the IPSTS with a second sample. It was expected that similar relationships between the IPSTS and existing measures of interpersonal constructs, self-compassion and self-criticism would be obtained.

## Method

### Participants

Data were collected from a total of 573 undergraduate students using the Wilfrid Laurier University Psychology Research Experience Program (PREP), an online research database available to undergraduate students. This sample size is comparable to the initial sample from MTurk ( $N = 579$ ) before the data was screened for inadmissible responses. The data from 273 of the PREP participants were considered invalid, and hence discarded. Data were considered to be invalid for the following reasons: Exhibiting excessively repetitive response patterns (e.g., endorsing all items on a particular scale, or scales, with one number); failing to complete a section of at least 10 consecutive items in length; failing to correctly answer one or more of the four quality check items that were distributed throughout the entire study; and finally, completing the study too quickly or too slowly for the data to be considered credible<sup>4</sup>. The large amount of invalid data is likely a function of a combination of factors outlined by Meade and Craig (2012), including the use of multiple types of checks for invalid response patterns as well as characteristics of the study itself (i.e., the long, repetitive format of the self-report measures).

The final sample consisted of 300 participants (mean age = 19.53 years,  $SD = 3.25$ , ranging from 17-61 years), including 62 men (20.6%) and 236 women (78.4%), with two participants not indicating gender. On average, it took participants 46 minutes and 23 seconds ( $SD = 23.17$ ) to complete the study, and they received half of a course credit in compensation. The participants self-identified as Caucasian (74.7%), Asian (17.3%), African American (1.7%), Hispanic (0.3%), and other (6.0%; primarily biracial).

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<sup>4</sup> From the total sample ( $N=573$ ), response times that were too long were greater than 148 min, 51 s (i.e., mean +3SD). To determine the cut off for response times that were “too short” we applied the same approach that we used in Study 1 — namely, five volunteers completed the scale in a quick, yet conscientious manner. As mentioned previously (see footnote 1) the mean time was 25 min, 35 s. ( $SD = 7.02$ ) and the mean time - 1  $SD$  was the cut off. Thus, response times less than 18 min, 32 s were discarded.

## Materials

All participants received the same measures that were administered in Study 1: The 91-item IPSTS<sup>5</sup> and seven other measures, five of which assessed interpersonal constructs (IAS-R, SBI, CSIV, CSIE, IIP-SC), and two of which measured self-compassion (SCS), and self-criticism (FSCRS).

## Procedure

All participants accessed the study online using a secured website link, where they completed a brief demographic survey, the 91-item IPSTS, and the seven other measures described previously. All participants completed the measures in the same order: demographic survey, IPSTS, SBI, IAS-R, SCS, CSIV, FSCRS, CSIE, IIP-SC. As in Study 1, we had participants fill out the Interpersonal Self-Talk Scale first to ensure that their responses were not influenced by the content presented by any of the other scales. Also, to avoid biasing participants' responses to questions about their interpersonal behavior (SBI) and general personality, we assessed the presence of interpersonal problems last.

## Results

We performed the same analyses that were applied to the data from Study 1, which consisted of (a) a factor analysis of the items, (b) item analyses of the subscales, (c) an evaluation of the circumplex structure, and (d) assessing the relations of the IPSTS with other constructs. Since the study design was identical to that of Study 1, but just applied to a second sample, all of the hypotheses and rationales for the data analyses for Study 1 applied for Study 2.

## Principal Components Analysis

First, all 91<sup>6</sup> items were subjected to a PCA to test for the presence of a general factor.

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<sup>5</sup> At the time of data collection, the 40-item IPSTS had not been created. Thus, the 91-item IPSTS was administered to participants.

<sup>6</sup> We included all 91 items in the analysis to verify that items we had discarded and retained in Study 1 would also be eligible for exclusion and inclusion when administered to a new sample.

The first three factors accounted for 23.18%, 12.86% and 8.91% of the variance, with the remaining factors accounting for less than 3% of the variance. Thus, the unrotated solution of the first three principal components was examined. The second factor was characterized by high positive loadings. The first and third factors resembled the familiar dimensions of affiliation (Factor 1) and dominance (Factor 3). The uniformly positive loadings of the items on the second factor were indicative of a general factor. Thus, as in Study 1, we ipsatized the IPSTS items and performed a parallel analysis (O'Connor, 2000) to investigate the number of factors to retain. The scree plot yielded by this analysis can be seen in Figure 5. It is clear from the plot that the first five components should be retained. Of these five factors, the first two were substantive, representing 25.71% and 10.34% of the variance. However, the third, fourth, and fifth factors seemed like they could be trivial, accounting for only 3.86%, 2.66%, and 2.41% of the variance, respectively.

Given the results of the parallel analysis, we ran a PCA of the 91 ipsatized IPSTS items and forced a five-factor solution to examine the third, fourth, and fifth components in greater detail. Examination of the unrotated component matrix revealed that the fifth factor was trivial: the greatest factor loading was -.41 by item 89 "Merciful", which was not even retained in the 40-item version of the scale. For Factor 4, four items had loadings greater than  $\pm .40$ : Item 62 "Ruminative" (.53), item 14 "Reserved" (-.45), item 15 "Hostile" (-.52), and item 61 "Wavering" (.42). Only the latter two items were retained in the 40-item version of the scale, making the fourth factor a doublet and not interesting. For the third factor, four items displayed loadings greater than  $\pm .40$ : item 12 "Undemanding" (.43), item 32 "Boastful" (.45), item 33 "Decisive" (.44), and item 69 "Undecided" (-.44). Again, only the latter three items were retained in the 40-item version of the scale, and the cluster of these items did not seem interesting. Accordingly, we concluded that the third, fourth, and fifth factors were trivial. Close inspection of the factor

loadings of the items indicated that the first two factors reflected the hypothesized interpersonal dimensions of affiliation and dominance, respectively. Note that for all subsequent analyses we used the ipsatized self-talk items.

Subsequently, the factor loadings of all 91 items were plotted in two-dimensional space defined by the two principal components. Unlike in Study 1, the plotted unrotated factors were not as clearly interpretable as the dominance and affiliation dimensions. Recall that in Study 1 the dominance dimension was represented by the vertical factor: It was anchored between the items “Leading” and “Decisive” on one end, and passed through items “Meek” and “Timid” on the other end. The affiliation dimension was represented by the orthogonal horizontal factor, and was anchored at the items “Friendly” and “Hostile”. In Study 2, the dominance and affiliation dimensions were still represented by the vertical and horizontal factors, respectively. However, the dominance dimension did not pass through “Meek” and “Timid” as it did in Study 1, and the affiliation dimension did not pass through the item “Friendly”. To make the positions of the factors as comparable as possible to their positions in Study 1, we manually rotated the factors clockwise by 9 degrees (see Figure 6). As a result, the affiliation factor was anchored more closely to items “Friendly” and “Hostile”, and the dominance dimension was placed between the items “Meek” and “Timid”. This 9 degree rotation thus made the factor plots as comparable as possible between the two studies.

As in Study 1, the boundaries of all eight octants were formed by dividing the two-dimensional space into eight equal-sized sectors with theoretical midpoints spaced 45 degrees apart. At 0 degrees was the (rotated) positive end of the affiliation dimension, which corresponds to the interpersonal variable LM defined in Figure 1. The subsequent segments were displaced 45, 90, 135, 180, 225, and 270 degrees from that point (see Figure 6), and those sectors also corresponded to the interpersonal variables defined in Figure 1.

### **Subscale Refinement**

Once all 91 items were plotted, the items belonging to each 5-item subscale in the 40-item IPSTS were located to determine whether they fell in similar positions with the replication sample. Overall, the placement of the 40 items chosen in Study 1 was similar in Study 2. Only a few minor discrepancies were noted. First, we visually checked whether the 40 items met the first criterion for subscale inclusion that was used in Study 1 (i.e., for any particular subscale, the included item was located within the visually determined boundaries of the octant for that subscale). As seen in Figure 6, only five items fell outside the drawn boundaries of the factor plot, which are represented by shaded dots. However, all of these items fell in an immediately adjacent octant space and were still very close to the appropriate octant. For example, two BC items, (49 “Bold” and 79 “Insistent”) fell in the adjacent PA and DE octant spaces, respectively, but were still positioned close to the BC octant borders. In addition, for all five items, the other four criteria for subscale inclusion were met, rendering the failure of the first criterion a relatively minor issue.

Subsequently, we checked Figure 6 to ensure that all of the 40 items also had high factor loadings in the Study 2 sample, therefore meeting the second criterion for subscale inclusion. All except one item met this criterion. The JK item 70 “Serene” fell too close to the origin of the plot relative to the other 90 items. In addition, the position of 70 “Serene” caused the JK subscale to fail the fifth criterion. That is, the JK items were not dispersed over the entire JK octant space. Thus, we opted to replace 70 “Serene” with 13 “Apologetic”, which was a much stronger interpersonal item (i.e., with higher factor loadings), and which allowed a greater portion of the JK octant space to be sampled by the subscale items.

To evaluate the replication of the subscales in greater detail, and to evaluate the change made to the JK subscale, we computed the internal consistency of the 5-item octant subscales.

Table 8 displays the items, item-total correlations, and reliability coefficients for each 5-item subscale. The alpha coefficients ranged from .53 (for the HI subscale) to .86 (for the LM subscale), which, for all eight subscales, were lower than those obtained in Study 1. In addition, the internal consistency of the HI subscale was lower than the acceptable cut off of .60. Hence, we computed the reliabilities of the 6-item subscales to test whether the additional items would provide substantial improvement. Table 9 displays the items, item-total correlations, and reliability coefficients for each 6-item subscale. As seen in the table, the internal consistency of the HI subscale increased from .53 to .59. The internal consistencies of the 6-item subscales thus ranged from .59 (HI) to .88 (LM), making them more comparable to the alpha coefficients obtained in Study 1.

Given the improvement in internal consistency, we next examined the item-total correlations for the 6-item subscales. As seen in Table 9, the item-total correlations for five items were quite low (i.e., less than .30): From the PA octant subscale, item 25 “Persuasive” (.20) and item 33 “Decisive” (.21), and from the HI octant subscale, item 21 “Passive” (.23), item 37 “Meek” (.25), and item 61 “Wavering” (.29). Further, the items in the HI octant subscale had the lowest item-total correlations, which could account for the somewhat lower alpha coefficient obtained for this subscale.

Given the low item-total correlation of the PA item 25 “Persuasive”, we examined its position on the factor plot (see Figure 6), and found that it failed the first two criteria for subscale inclusion. It not only fell in the NO (i.e., incorrect) octant; its vector length was much shorter than the other 48 items in Table 9. Thus, we opted to replace item 25 “Persuasive” with the next best item, that is, an item located in the PA octant space with a longer vector length. Item 1 “Competitive” was selected as the next best item, as it fell in the appropriate (PA) octant space and it was a stronger interpersonal item relative to item 25. As can be seen in Table 10, the item-

total correlation of item 1 “Competitive“ was .25, and it met all of the five criteria with data from Study 1. Therefore, we replaced item 25 “Persuasive” with item 1 “Competitive” in the final version of the scale.

The final adjustment to the new scale involved the addition of a seventh item (87 “Unsure”) to the HI subscale. Looking at Figure 6, item 87 “Unsure” met all criteria for inclusion in a subscale, and including it increased the reliability of the 6-item subscale from .59 to a more acceptable .66. Accordingly, item 87 “Unsure” was included in the final version of the Interpersonal Self-Talk Scale.

The final version of the Interpersonal Self-Talk Scale contains 49 items: seven octants contain 6 items, and the HI octant contains 7 items. Table 10 displays the subscale items, item-total correlations, and internal consistency coefficients for the final scale. To verify that the adjustments were beneficial and thus comparable across both studies, we re-computed the internal consistency and item-total correlations of the 49-item scale with the data from Study 1. No substantial decrements to the internal consistencies were found: The alpha coefficients ranged from .67 (PA) to .92 (LM), and the HI subscale alpha increased from .69 (6-item subscale – see Table 2) to .74 with the addition of the seventh item.

Octant subscale scores were computed by averaging the relevant six (and seven) ipsatized items. To informally examine how well these eight subscales conformed to a circumplex structure, they were then subjected to a principal components analysis. The two components reflected the hypothesized interpersonal dimensions of dominance and affiliation, and accounted for 34.55% and 44.53% the variance, respectively (eigenvalues of 2.76 for dominance and 3.56 for affiliation). This factor plot can be seen in Figure 7, suggesting visually that the subscales conform well to a circumplex structure.

### Formal Evaluation of Circumplex Structure

As in Study 1, we used the RANDALL program (Tracey, 1997) to subject the final eight subscales to a randomization test of hypothesized order relations (Hubert & Arabie, 1987) to formally evaluate how well they conformed to a circumplex model. Table 11 displays the intercorrelation matrix used for this analysis. The program revealed that 285 of the 288 predictions were met ( $CI = .98, p < .001$ ), indicating near perfect conformity.

In addition to formally testing the circumplex structure of the final subscales with data from Study 2, we also used RANDALL to verify that the final IPSTS subscales displayed excellent circumplex structure with data from Study 1. Table 12 displays the intercorrelation matrix used for this analysis. The results of the test revealed that 281 of the 288 predictions were met ( $CI = .95, p = .004$ ), indicating a high level of conformity to a circumplex structure that is comparable to the level obtained with data from Study 2, and to other established circumplex inventories (e.g., Locke, 2000, 2014). Therefore, the circumplex structure of the 49-item IPSTS subscales is strong across two independent samples.

The dimension scores for the new scale were formed using the same formulae as in Study 1. We correlated the dominance and affiliation dimensions and found that they were orthogonal ( $r = .06$ ) and comparable to those correlations obtained for the other established interpersonal measures administered in this study: IAS ( $r = .03$ ) and the SBI ( $r = -.09$ ).

Table 13 displays the means and standard deviations of participant ratings for the eight subscales for the final, 49-item IPSTS across Study 1 and Study 2. As seen in the table, in both studies, people tended to report engaging in self-talk styles located on the right side of the circumplex the most often (see Figure 1). That is, people reported engaging in friendly-dominant (NO) self-talk the most often, followed by friendly (LM), dominant (PA), and friendly-submissive (JK) self-talk styles, respectively. Further, in both studies people reported engaging

in self-talk styles located on the left side of the circumplex the least often. That is, people reported engaging in hostile-dominant (BC), dominant (DE), hostile submissive (FG), and submissive (HI) styles of self-talk the least often (although not in that order). The standard deviations ranged from .89 – 1.24 in Study 1, and from .74 – .99 in Study 2.

### **Relations with Other Constructs**

**Interpersonal constructs.** As in Study 1, we assessed the extent to which the dimensions of the new scale correlated with the dimensions of established measures of the individuals' interpersonal characteristics. Table 14 displays the correlations between the dimension scores for the new self-talk scale with the dimension scores for the measures of trait interpersonal style (i.e., IAS-R and SBI), interpersonal values and efficacy (CSIV and CSIE, respectively) and interpersonal problems (IIP-SC). The correlations are relatively modest in size and therefore offer support for our prediction that the interpersonal qualities of an individual's self-talk are reasonably distinct from his or her interpersonal qualities as shown in interactions with others. As in Study 1, the obtained relationships between the IPSTS affiliation dimension and the dominance dimension of the IAS-R and the SBI were significant and positive. These correlations suggest that people who engage in a warmer style of self-talk tend to be more dominant toward other people.

**Self-compassion and self-criticism.** Finally, we explored how our new scale related to measures of self-compassion and self-criticism (see Table 15). Just like in Study 1 (see Table 6), the SCS and FSCRS subscales are strongly intercorrelated. Table 16 displays a breakdown of the correlations between the IPSTS, the SCS, and the FSCRS. As can be seen in the table, affiliative self-talk (dimensions scores) is once again moderately related to all of the SCS and FSCRS subscales, but dominant self-talk is not. A similar pattern emerges at the subscale level. The LM and DE subscales of the IPSTS (representing friendly and hostile self-talk, respectively) correlate

moderately with all of the SCS and FSCRS subscales, but the PA and HI subscales (representing dominant and submissive self-talk, respectively) do not show substantial relations with any of the SCS and FSCRS subscales. Therefore, as was found in Study 1, the tendency to engage in affiliative versus hostile self-talk seems to be a common aspect of Neff's (2003) and Gilbert et al.'s (2004) characterizations of self-compassion and self-criticism, respectively.

### **Discussion**

The purpose of Study 2 was to cross-validate the psychometric and circumplex properties of the 40-item Interpersonal Self-Talk Scale (IPSTS) with an undergraduate student sample. The analyses from this study resulted in a slightly longer, 49-item version of the scale that was psychometrically strong across the two independent samples. The placement of the final 49 IPSTS items on the circumplex was similar when evaluated with the samples from Study 1 and Study 2. The internal consistency reliabilities of this final scale's octant subscales were also strong and comparable across both studies. Further, when subjected to a formal evaluation of circumplex structure, the final IPSTS subscales showed excellent conformity with data from both Study 1 and Study 2. Therefore, it is clear that the 49-item Interpersonal Self-Talk Scale is a psychometrically strong, self-report inventory for assessing the interpersonal style of the inner voice. Verifying that the psychometric properties and circumplex structure of the final IPSTS replicated across two independent samples provided a more convincing case that the final scale characterizes individual differences in interpersonal self-talk style, rather than (for example) simply capitalizing on the chance characteristics of either sample.

One may wonder about how well the scale from Study 1 cross-validated in Study 2 because in Study 2 we added an additional item to the HI subscale, and we replaced an item in two other subscales (PA and JK). However, the nature of scale development is somewhat iterative and thus some degree of "tinkering" in this manner is acceptable.

## Limitations

**Discarded data.** An issue that occurred in both Study 1 and Study 2 involves the large proportion of data classified as invalid, and therefore discarded. These invalid data represented careless responding, or the result of responding to a survey without consideration of item content (Ward & Pond, 2015). In comparison to most other internet-based, self-report social psychology research, removing almost 50 percent of the data from each of Study 1 and Study 2 may have seemed excessive. Indeed, the base rate of careless responding or nonresponsivity has historically been assumed to be low (Johnson, 2005), and has generally been presented as random error variance, and therefore not something worth addressing actively (Maniaci & Rogge, 2014). However, estimated rates of careless responding have varied depending on the screening method used; rates have ranged from 3% to as high as 60% of respondents (e.g., Berry et al., 1992; Curran, Kotrba, & Denison, 2010; Johnson, 2005; Meade & Craig, 2012). In addition, careless responding can introduce error into a dataset and potentially obscure results (see Johnson, 2005; Maniaci & Rogge, 2014; Meade & Craig, 2012). Thus, in Study 1 and Study 2 we actively worked to eliminate careless responses, and we were not overly alarmed by the fact that almost half of the data was unfit in Study 1 and Study 2.

Meade and Craig (2012) assert that because careless responding is a multidimensional construct, adequately identifying careless responding necessitates using more than one screening method. They recommend using two ad-hoc screening methods, and two post-hoc screening methods. The ad-hoc screening methods include (1) nonsensical or instructed response items, and (2) an end-of-survey response quality item. The post-hoc methods include (1) checking for invariable responses across different items and surveys, and (2) inspection of response time. In both Study 1 and Study 2 of this thesis all four screening methods were used.

For example, in both studies, instructed response items said, “If you are paying attention, answer ‘Very Much’ for this item”, and the end-of-survey self-report response quality item said “In your honest opinion, should we use your data from this survey?” Invariable responses were identified when strings of responses did not vary across different items (e.g., endorsing a “3” for every item), and when there were incomplete sections of the survey. Finally, the response time was monitored and responses with abnormally short or long completion times were omitted. Therefore, although the proportions of data rendered invalid in Study 1 and Study 2 are high, they are the result of objective, evidence-based recommendations.

Despite the sound reasons for removing the large proportion of the data, future researchers may wish to prevent the high rates of careless responding seen in Study 1 and Study 2. We now suggest factors that may have contributed to the large amount of invalid data.

First, each study included a rather large number of questionnaires, all of which were presented in succession. Indeed, Study 1 and Study 2 included eight self-report inventories, which required participants to answer 347 items. Further, all of the inventories were structured in very similar ways (i.e., all involved reading an item and responding using specific rating scales). Answering such a large number of items may have been tiring for participants. In addition, the lack of diversity among the formatting of the different scales may have made the experience relatively uninteresting, especially near the end of the study.

In addition to the length of the two studies, their online format likely contributed to the large proportion of invalid data. Indeed, despite the advantages of collecting data online, researchers sacrifice much of the control they have when administering paper-and-pencil surveys in a laboratory setting. The lack of interaction between researcher and respondent, the potential environmental distractions, and participant multi-tasking have all been documented as eliciting careless responding and factors which increase the likelihood of participants rushing through the

surveys (Berry et al., 1992; Hardré, Crowson, & Xie, 2012; Johnson, 2005). Accordingly, apart from administering future studies in lab, internet-based studies could benefit from decreased survey length, or inserting breaks in between multiple scales of the same format to retain respondent interest.

### **Implications**

The IPSTS has the advantage of assessing the tone of the inner voice by measuring self-talk styles from all around the circumplex. However what is not yet known is the nature of the relationship between the style of people's self-talk and their ability to overcome challenges. Consequently, a fruitful next step could involve testing its usefulness as a measure of the individual differences in self-talk style in an applied, challenging situation. Everyone faces obstacles, challenges, and failure circumstances in their everyday lives, during which their self-talk may be particularly relevant. Indeed, according to Rogelberg et al. (2012), a major function of self-talk is overcoming challenges and failure experiences. Additionally, what people think influences their behavior; indeed, what people say to themselves is a vital component of Cognitive-Behavioral therapeutic approaches to overcoming mental health difficulties (Michenbaum, 1977). Thus, a challenging circumstance is an inherently interesting and relevant context in which to assess the potential utility of the IPSTS. Accordingly, Study 3 exposed participants to a challenging situation in the lab, and examined the degree to which their state-self talk was predicted by their overall self-talk style.

### **Study 3**

The first purpose of this study was to assess how well people's typical *trait* self-talk (as measured by the IPSTS) predicted their self-talk style in a challenging situation. To assess this relationship, participants first completed the trait IPSTS outside of the lab. Subsequently, in the lab, participants engaged in an impossible task (i.e., the challenging situation), during which they

vocalized their self-talk, which was audio-recorded. Afterwards, participants completed a state version of the IPSTS (see Appendix K), on which they provided written examples of their self-talk during the failure experience, and reported their state self-talk style. Both the self-talk vocalized during the task and the written examples on the first part of the state IPSTS were coded by trained raters. Thus, these in-lab activities resulted in three measures of state self-talk: (1) rater-coded vocalizations, (2) rater-coded written examples of self-talk from the first section of the state IPSTS, and (3) participants' scores from the state IPSTS adjective ratings. As a consequence, we could assess the degree to which third-party raters agreed with each other about participants' vocalized self-talk and their written self-talk, as well as how well these features of state self-talk correlate with self-reported self-talk on the state version of the IPSTS.

Accordingly, the second purpose of the study was to assess a state version of the IPSTS in terms of the degree to which self-reported state self-talk style aligns with third-party ratings of self-talk during a challenging situation.

A third purpose of Study 3 was to investigate the relationship between trait self-talk style and mood, with mood as an outcome of enduring a challenge in lab. Presumably, a person who handles a challenge more effectively will experience less negative affect than a person who handles a challenge less effectively. Thus, mood was treated as an indicator of one's ability to effectively cope with an in-lab challenge, with less negative affect indicating more effective coping.

Consistent with the first goal of the study, we expected self-reported trait affiliative self-talk to correlate positively with all three state measures of affiliative self-talk. Similarly, self-reported trait dominant self-talk was expected to correlate positively with the three state measures of dominant self-talk.

In accordance with the second goal of the study, we expected third-party raters to agree

with each other about participants' vocalized and written state self-talk. Third-party ratings were also expected to correlate with participants' scores on the state IPSTS. More specifically, we expected rater-coded dominant self-talk to correlate positively with self-reported dominant self-talk, and rater-coded affiliative self-talk to correlate positively with self-reported affiliative self-talk.

Finally, in line with the third goal of the study, we expected participants' trait self-talk style to correlate with their mood while enduring a challenging situation, such that people who engage in more dominant and affiliative self-talk at the trait level will also report less negative affect after facing a challenge in the lab, compared to those with less trait affiliative self-talk.

## Method

### Participants

Data was collected from a total of 56 undergraduate students using the Wilfrid Laurier University Psychology Research Experience Program (PREP). A total of 23 participants were excluded from the sample, as 11 participants suspected the true purpose of the study, and an additional 12 participants failed to comply with study instructions (see procedure for further details). The final sample consisted of 33 participants, including 18 men (54.5%) and 15 women (45.5%). On average, participants were 19.67 years old ( $SD = 3.23$ , ranging from 18-37 years). On average, it took participants 38 minutes and 31 seconds ( $SD = 11.50$ ) to complete the study, and they received 1 course credit in compensation. The participants self-identified as Caucasian (78.8%), Asian (12.2%), African American (3.0%), Hispanic (3.0%), and other (3.0%; primarily biracial).

Of the final 33 participants, a subsample of 23 participants had previously completed the

48-item<sup>7</sup> trait IPSTS from Study 1 (see Table 2 for the items) among other measures during online pre-testing (see Materials). All 33 participants were invited to participate in the study, which was advertised as an investigation of the processes underlying problem solving ability.<sup>8</sup>

### Materials and Measures

**Premeasures.** Participants completed three questionnaires as part of a battery of questionnaires online, in a completely different context than the lab. The three questionnaires were (1) the 48-item trait Interpersonal Self-Talk Scale (see Appendix I), (2) The Self-Compassion Scale (SCS; Neff, 2003), and (3) the Forms of Self-Criticizing and Self-Reassurance Scale (FSCRS; Gilbert et al., 2004). For details about all three questionnaires, refer to Study 1 Materials.

#### **In-lab materials and measures.**

**Raven's Standard Progressive Matrices (SPM; Raven, Raven, & Court, 2000, see Appendix J).** Three items from the Raven's matrices were chosen as problems participants could use to practice talking aloud while solving a problem. The Raven's matrices were chosen because they do not require writing or reading. Thus, the format of the practice problems was similar to the format of the main in-lab task (see the next heading "*Concept formation task*"). The three items chosen were part of 10 Raven's matrices items that were pilot tested for ratings of difficulty and solvability.<sup>9</sup> We wanted the items to be hard enough to elicit self-talk, but not too hard as to discourage participants before the real experimental task had even started. Thus,

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<sup>7</sup> At the time of data collection, the final 49-item version of the IPSTS had not been determined, and thus the 48-item version was administered.

<sup>8</sup> Due to time constraints when recruiting, all participants were invited to take part in the study even if they had not completed the online premeasures.

<sup>9</sup> From the second half of the SPM (i.e., from the 30 harder matrices), 10 were chosen and presented to graduate students ( $N=7$ ) in a short pilot study. In the study, graduate students were asked to solve the matrices. After each matrix, they indicated their level of agreement with four items: "I found this matrix to be [easy/difficult] to solve (i.e., the correct option [was/was not] readily apparent to me)", and "I think first year undergrads would find this matrix to be [too easy /too challenging] (i.e., they would [immediately/not be able to] figure out the answer).

the three matrices chosen were those deemed to be challenging enough to require self-talk, but still solvable for undergraduate university students.

**Concept formation task.** This task consisted of a series of four problems adapted from those used in previous research on a wide range of topics, including locus of control (Reed & Antonova, 2007) self-deception (Johnson, 1995) and learned helplessness (Abramson, Seligman, & Teasdale, 1978; Hiroto & Seligman, 1975). During the concept formation task, participants were presented with four problems. Each problem consisted of 10 pairs of stimulus patterns (or 10 trials). Each stimulus pattern was approximately 6.5 x 4.5 cm in size, and during a trial, a pair of stimulus patterns was simultaneously presented on a computer screen. Each pattern was constructed from four dimensions, which encompassed two values: (a) letter (“T” vs. “A”) (b) letter font size (uppercase vs. lowercase), (c) border surrounding the letter (square vs. circle), and (d) background color (grey vs. white). See Figure 8 for an example of a pair of stimulus patterns. As seen in the figure, pairs of patterns were composed of complementary features. Before each problem began, participants were instructed that the computer had preselected one of the eight *values* (e.g., circle border) to be the “target value”. The objective for participants was to figure out this target value – on each trial they were to select the pattern they thought contained the value. Immediately after each trial, participants received feedback about whether their selection contained the target value by having the word “correct” or “incorrect” come on the computer screen. Participants used this feedback to subsequently figure out the target value and choose the correct pattern as often as possible. At the end of each problem (i.e., after 10 trials), participants indicated what they thought the target value was by choosing from a list of the possible options (i.e., a list of the eight possible values). After making their selection, participants received immediate feedback via the computer as to whether their guess was correct or incorrect and

whether they had solved that problem. Identifying the correct value at the end of the problem counted as solving the problem.

In most versions of the concept formation task (see Hiroto & Seligman, 1975; Johnson, 1995) two conditions are present: a success condition and a failure condition. In the success condition, the nature of the feedback given to participants is contingent on their responding. In other words, the feedback allows them to eventually figure out the target value. In contrast, all participants in the failure condition receive predetermined (non-contingent) feedback after each trial that is based upon the following pattern (where C = correct and I = incorrect): C-I-I-C-C-I-I-C-C-I for the first problem; I-C-I-C-C-I-C-I-C-I for the second; I-C-I-C-I-C-C-I-C-I for the third problem, and C-I-I-C-C-I-I-C-C-I for the final problem. In other words, the feedback does not allow participants to eventually figure out the target value. Additionally, at the end of each problem, participants in the failure condition always read the following message on the computer screen: "I'm sorry, that is incorrect; you have not solved this problem." In this study, only the failure condition was used.

**Performance check.** Participants indicated their perceived level of performance on the concept formation task by responding to the following item: "Overall, how would you describe your performance on the concept formation task?" A response scale that ranged from 1 (Poor) to 5 (Excellent) was used. This performance check was included to ensure that participants understood that they had failed the task. Indeed, all participants endorsed a 1 or 2 on this item.

**State Interpersonal Self-Talk Scale (see Appendix K).** The 48-item version of the IPSTS was modified to capture participants' state (rather than trait) self-talk style during the concept formation task. The first part asked respondents to think of the sorts of things they said to themselves *during the concept formation task*, and to report verbatim that they said to themselves using five examples. For the second part, respondents indicated how often their self-talk could be

described during the concept formation task by each of 48 adjectives (e.g., kind, decisive, bossy). These 48 items and the response scale were the same ones used in the trait version of this scale that was administered as a premeasure (see Table 9 for the 48 adjectives).

***Self-talk check.*** After the state IPSTS, participants answered one item assessing the extent to which their vocalized and reported self-talk accurately represented what they were really thinking during the task: “How accurately did what you verbalized during the concept formation task reflect what you were actually thinking?” A 5-point response scale was used, and the options included 1 (Not at all), 2 (Slightly), 3 (Moderately), 4 (Very), and 5 (Extremely). The mean score for this item was 3.94 ( $SD = .75$ ), indicating that, overall, participants perceived their self-talk during the concept formation task to be “Very” similar to what they were actually thinking.

***Positive and Negative Affect Schedules (PANAS; Watson, Clark, & Tellegen, 1988; see Appendix L).*** The 20-item PANAS is a widely used self-report measure that assesses two broad domains of affect, termed Positive Affect (PA) and Negative Affect (NA). Ten items assess the PA subscale, and 10 assess the NA subscale. Participants rated all 20 adjectives with regards to how they felt *right now* on a 5-point scale from 1 (Slightly/Not At All) to 5 (Extremely). High PA scores suggest “high energy, full concentration, and pleasurable engagement”, whereas low PA scores reflect “sadness and lethargy”. High scores on NA reflect “subjective distress and unpleasurable engagement”, but low NA scores describe “a state of calmness and serenity” (Watson et al., 1988). The PANAS has shown good internal consistency reliability and convergent and discriminant validity (Watson et al., 1988). In the current study, the internal consistencies for the subscales were .88 for PA and .79 for NA, and the subscales correlated at -.18.

**Additional measures.** Additional measures were administered, but they are beyond the scope of this study. Therefore they will not be discussed further in this thesis. See Appendix M for details.

**Materials and measures for coding of state self-talk.**

*Training procedure for coders (see Appendix N).* Participants' vocalized self-talk (from the concept formation task reflection periods), and their self-reported self-talk (from the first part of the state IPSTS) were coded by five independent raters. One rater coded both the vocalized and written self-talk, hence, a total of three raters coded the vocalized self-talk, and a total of three raters coded the written self-talk statements. Before any coding took place, all five coders were introduced to the notion that eight different styles of self-talk emerge from differing levels of dominance and affiliation. To familiarize coders with the ways to characterize all eight styles of self-talk, they were introduced to the interpersonal circumplex. They also practiced identifying the style of self-talk best described by eight different lists of adjectives. The adjectives in the lists corresponded to the items in the octant subscales of the final 49-item IPSTS (see Table 10 for the adjectives). After coders successfully completed this exercise, background information about the study was revealed to provide coders with the information necessary for them to accurately code the style of the vocalized and written self-talk. Indeed, some of the statements were very specific to the concept formation task and were often incomplete sentences (e.g., "circle or square border?"). Thus, it was important to inform coders that participants were repeatedly failing to solve a series of problems that they believed to be solvable. It was also important for coders to learn about the stimuli relevant to these problems. Further, information about *when* the audio recordings and the written statements occurred in the study was revealed.

*Vocalized self-talk statements.* To prepare the audio recordings for coding, they were transcribed and the following information was identified: (1) When during the concept formation

task each reflection period occurred, and the length of each reflection. (2) Whether each reflection period was “active” or ignored. “Active” reflections involved vocalized self-talk, and they could also include moments of silence (i.e., pauses). In contrast to “active” reflections that included pauses or moments of silence, ignored reflections were skipped over. That is, participants would read the reflection period instructions, and then immediately continue to read the instructions that commenced the next problem.<sup>10</sup> (3) The number of active reflections. Only audio recordings with at least three active reflection periods were coded.<sup>11</sup> Consequently, recordings from 33 participants were eligible to be coded. The 33 recordings were spliced and arranged so that each recording began with the first and ended with the last “active” reflection. After editing, the average length of the 33 recordings was 1:35 (m:ss), ranging from 0:23 to 4:31. Finally, of the 33 recordings, 28 consisted of audio responses during all four reflection periods.

Four sample recordings were created for training purposes. All three coders listened to the recordings and individually rated the self-talk using the coding sheet in Appendix O. After each recording, the coders shared their ratings and discussed any issues or discrepancies. After training, the three coders rated the self-talk in each of the 33 recordings independently.

The coding sheet that was used (Appendix O) asked coders to rate the extent to which the vocalized self-talk could be described by the 49 descriptors from the final Interpersonal Self-Talk Scale (IPSTS). The descriptors were segregated into eight items, such that each item represented one octant subscale of the final IPSTS. Thus, for each item, coders rated the extent to which the self-talk displayed characteristics of one of the eight self-talk styles. A 5-point response scale was used, ranging from 1 (Not at all) to 5 (Extremely).

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<sup>10</sup> Only reflection periods were coded because the amount of self-talk vocalized when participants were solving the concept formation task itself was highly variable and, overall, rather uninteresting (i.e., mostly reading of instructions). Using the reflection periods allowed for each participant to have a comparable amount of self-talk to code.

<sup>11</sup> Recordings with less than three active reflection periods did not have enough content to code (i.e., they were too short). It was decided that ignoring more than one reflection indicated careless responding/inaccurate reading of instructions.

When coding, three issues were emphasized: First, when listening to the recordings, coders were instructed to pay attention to both the semantic content to the self-talk and the tone of the voice. Second, coders were allowed to assign the same rating on more than one item on the coding sheet. In other words, coders were not forced to “rank” the eight styles and only give one style the highest rating. Thus, the coding accurately reflected instances when the vocalized self-talk represented (to an equal extent) more than one style. Third, an item on the coding sheet could be rated as “Slightly”, “Moderately”, “Very”, or “Extremely” representative of participants’ self-talk even if some of the descriptors comprising that item were not heard/represented in the recording. Since the context in which the self-talk occurred was so specific (i.e., failing problems in a concept formation task), it was not all that surprising for some descriptors to apply more readily than others. For example, item 5 on the coding sheet (Appendix O) uses six descriptors which collectively characterize a friendly-submissive (JK) style of self-talk: Humble, Apologetic, Nonjudgmental, Lenient, Tolerant, Undemanding. In the context of failing a concept formation task, having humble self-talk seems rather irrelevant (i.e., humble self-talk would be more relevant after succeeding at a task or perhaps after outdoing others in a competition). Thus, it is unlikely that the audio-recorded self-talk would sound humble. Despite this, one’s self-talk could still sound “Slightly”, “Moderately”, “Very”, or even “Extremely” friendly-submissive after failing a concept formation task, for self-talk that is apologetic, nonjudgmental, lenient, tolerant, and/or undemanding is still relevant to this context.

**Written self-talk statements.** The written self-talk statements were from the same 33 participants who provided the vocalized self-talk.<sup>12</sup> Before coding commenced, statements with

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<sup>12</sup> To keep the coding consistent across vocalized and written self-talk, the written statements were initially coded using an intensity (rather than a frequency) rating scale. However, the nature of the written self-talk data was found to be better suited for frequency-based coding. Since the statements were written, coders were not able to assess tone of voice. Accordingly, accurately coding the *extent* to which each statement represented the eight self-talk styles proved to be complicated, and frequency-based ratings were chosen as a better alternative.

similar content were grouped together, and common themes among the statements were identified. Next, the themes were sorted according to the self-talk style they best reflected. For example, statements that comprised the themes “active planning” (e.g., “Next time I am going to go slower”) and “decision-making” (e.g., “I’ll choose this [answer] again as it has three of the qualities of the last answer”) best reflected a dominant style of self-talk. In contrast, statements comprising the themes of “indecision” (e.g., “Is lower case or upper case correct?”), and “task-related uncertainty” (e.g., “What is the target value here?”) were characterized best by a submissive style of self-talk. From this process, eight clusters of themes were formed — one cluster for each style of self-talk.

After the themes for the eight self-talk styles were identified, sample statements were formed to illustrate each theme for training purposes. During training, coders were introduced to the themes corresponding to each style of self-talk. Next, coders independently categorized each of the 165 self-talk statements (five statements for 33 participants) according to which of the eight self-talk styles they fit best.

Once classified, the number of times a self-talk style occurred was recorded for each participant, and a rating out of five was given for *each* of the eight self-talk styles. The ratings ranged from 0 (none of the five statements represent this style of self-talk) to 5 (all of the five statements represent this style of self-talk). For example, if four of the five self-talk statements were categorized as representing a dominant self-talk style, and one was categorized as representing a friendly self-talk style, a rating of 4 would be given for dominant self-talk, and a rating of 1 would be given for friendly-dominant self-talk. The remaining six self-talk styles would receive a rating of zero.

## Procedure

Participants were tested individually in a quiet room and completed the study on a computer. A small audio recording device (Olympus WS 300M) was placed on the desk beside the computer keyboard. Before the experiment began, the experimenter explained the ostensible purpose of the study (adapted from Johnson, 1995):

This study is about learning and problem solving, and you will be given some problems from the Concept Formation Task and you will be asked to "think aloud" while you work through them. Concept formation tasks like the one used in this study have been found to be excellent predictors of academic success in University. These tasks are such good predictors of academic success that a growing number of school guidance centers are using them to help high-school students make decisions about attending University. Given the growing interest in such tasks, we want to see how concept formation tasks relate to problem solving, and personality.

Next, participants were given an opportunity to practice thinking aloud while working on three warm-up problems (see Appendix P for the full script that was read to participants). These warm-up problems were three items from the Raven's Standard Progressive Matrices, and they varied in difficulty. The matrices were presented on the computer. After participants finished the three matrices, the experimenter provided feedback on the amount of self-talk they vocalized, with the goal being to vocalize as much self-talk as possible.

Next, the following instructions for the concept formation task appeared on the screen, with two example patterns (see Figure 8):

As you can see [from the example patterns], each pattern consists of a letter (A or T) that may be uppercase or lowercase. This letter is surrounded by a circular or square border, and the background color of each pattern is either grey or white. Each pattern is therefore composed of four different dimensions, and each dimension can vary along two associated values.

The dimensions and their values were then summarized.

Next, participants read that one value was arbitrarily chosen to be the target value, and read the next set of instructions:

Each time you see two patterns side by side, select which pattern contains this target value ... After you make your selection, you will be told by the computer if your choice was correct or incorrect. In a few trials you can learn what the correct value is by this feedback. The object for you is to figure out what the target value is so you can choose correctly as often as possible.

All participants were then given four concept formation task practice trials. Following Reed and Antonova (2007), the practice trials consisted of four pairs of patterns, displayed on the screen one pair at a time, with new patterns appearing after a selection was made, and the appropriate feedback given. "Correct" feedback was given for patterns with grey backgrounds, and all such stimuli also contained the letter "T", allowing for two possible concepts to operate during the practice trials. Participants were not informed of the target value.

Once the practice trials ended, participants read that they had 15 seconds to make a selection for each pair of patterns. They subsequently read the following instructions about voicing their self-talk:

Remember to voice all of the thoughts that you have while you work through these problems. No one else will hear you, and **no sort of thought is off-limits**. Please say everything that comes into your head **as soon as it occurs**.

At this point, the experimenter turned on the audio recorder and left the testing room, and the participants began the concept formation task on the computer. Immediately preceding the first problem (and all subsequent problems) participants received the following set of instructions:

We are now starting a new problem. Remember to say everything that enters your mind outloud while you complete this problem. When you are ready click the Next button to start.

After participants completed each problem, they were directed to a screen with instructions for a reflection period and read the following instructions:

Now take a moment to reflect outloud about how this is going and any thoughts about how you are doing. When you have finished click the Next button to continue.

The reflection periods served two purposes. First, to our knowledge, only one other study attempted to measure self-talk during a task using a dart-throwing task (see Coffee & Rees,

2011). Thus, the amount and quality of spontaneous vocalized statements that would be generated during the concept formation task problems was unknown. Accordingly, the reflection periods served as an *additional* opportunity for participants to voice their self-talk outloud. Second, during the actual concept formation task problems, participants may have vocalized other thoughts that are not necessarily self-talk (i.e., reading task instructions aloud). By including reflection periods, participants had the opportunity to engage in self-talk without interruption.

After participants finished reflecting and had clicked the Next button, they were directed to a screen with the instructions displayed immediately before all of the concept formation task problems.

When participants finished all four problems and reflection periods, the experimenter re-entered the testing room and turned off the audio recorder. The experimenter then exited the room again and participants completed the remaining self-report measures on the computer (i.e., the performance check, the state IPSTS, the self-talk check, the PANAS, and the additional measures). Finally, participants answered four items asking about various demographic variables (see Appendix Q).

Upon completion of these measures the participants were thoroughly debriefed (see Appendix R for debriefing script). The experimenter re-entered the room and explained the true purpose of the study, and reassured participants that their performance on the concept formation task did not relate to their abilities or future academic success. Participants were asked to refrain from sharing their experiences with potential participants to preserve the effectiveness of the study.

Participants were probed for suspicion on two separate occasions during the study. The first probe was a free-response question that participants responded to in written form. The probe

occurred as the very last question in the study before debriefing. The question asked “What is your understanding of the purpose of this study?”. The second probe for suspicion occurred at the beginning of the debriefing, and was facilitated by the experimenter. The experimenter asked each participant “Were you at any point suspicious that the main purpose of the study was not really to examine the processes underlying problem solving?”. If a participant indicated that he or she was suspicious, the experimenter asked why, and asked the participant to articulate what, specifically, led him or her to harbor suspicion. The experimenter also asked suspicious participants to explain what they felt the study was really about in their own words. Often undergraduate participants are suspicious of psychology studies even when no deception is used. We wanted to ensure that we were only discarding data from those people whose suspicions led them to identify the true purpose of the study. Accordingly, in order to be excluded, participants’ explanation of the study purpose had to include the term “self-talk” or any reasonable synonym of “self-talk” (e.g., talking to the self, what you say to yourself) ( $N = 5$ ). Participants’ data was also excluded if they suspected that the concept formation task was impossible. Specific phrases included “constant failure” or “always being incorrect” ( $N = 6$ ).

Participants were also excluded from the final sample for failing to comply with study instructions. Participants who failed to comply with study instructions either (1) did not voice any self-talk during the concept formation task (i.e., remained silent or vocalized very few words or phrases) ( $N = 1$ ), or (2) did not partake in two or more reflection periods (i.e., skipped the reflections and continued immediately to the next section of the study) ( $N = 11$ ).

## Results

### Inter-Rater Reliability of State Self-Talk Observer Ratings

For both the vocalized and written self-talk, the degree to which the coders agreed was assessed by computing the alpha coefficients of the dimension scores for the three coders. Table

17 displays these inter-rater reliabilities for the coders of the vocalized and written self-talk. As seen in the table, the inter-rater reliabilities for vocalized self-talk were .91 for dominance and .92 for affiliation, indicating excellent inter-rater agreement. Similarly, inter-rater reliabilities for the coded written self-talk statements were .95 for dominance and .97 for affiliation, again, indicating excellent agreement among coders. Note that the formulae used to compute the dimension scores were those used in Study 1 and Study 2.

### **Descriptive Statistics for the Trait and State IPSTS**

Table 18 displays the means and standard deviations of participant ratings for the eight subscales for the trait and state versions of the final IPSTS. For the trait IPSTS, the means and standard deviations ranged from 2.82 to 3.92 and from .60 to .82, respectively. For the state IPSTS, the means and standard deviations ranged from 2.51 to 3.57 and from .68 to 1.05, respectively. As seen in the table, for the trait IPSTS, people reported engaging in dominant (PA), friendly-dominant (NO), friendly (LM), and friendly-submissive (JK) styles of self-talk the most often (although not in that order). They also reported engaging in hostile-dominant (BC), hostile (DE), hostile-submissive (FG), and submissive (HI) self-talk styles the least often (although not in that order). This is comparable to the pattern of frequency ratings on the IPSTS in Study 1 and Study 2 (see Table 13). Looking again at Table 18, on the state IPSTS participants also reported engaging in friendly (LM), friendly-dominant (NO), and dominant (PA) self-talk styles more frequently than they reported engaging in submissive (HI), hostile-dominant (BC), and hostile (DE) self-talk. However, in contrast to the trait IPSTS, participants ratings on the state IPSTS indicate that hostile-submissive (FG) self-talk was engaged in the most often. That is, when participants experienced failure during the concept formation task, they tended to engage in hostile-submissive (i.e., disappointed, unassured, helpless, insecure, unconfident, and undecided) self-talk the most often.

### Relationship Between Trait and State Measures of Self-Talk

Recall that our first hypothesis was that trait self-talk, as measured by self-reported adjective ratings on the trait IPSTS, would correlate positively and consistently with all three state measures of self-talk: self-reported adjective ratings on the state IPSTS, third-party ratings of vocalized self-talk, and third-party ratings of written self-talk statements. To investigate these hypothesized relations, the dominance and affiliation dimension scores on the trait IPSTS were computed and correlated with the dominance and affiliation dimension scores for the three state measures.

Table 19 displays these correlation coefficients. Given the very small sample size, these correlations should be interpreted with caution. Overall, trait dominant and trait affiliative self-talk were only weakly to moderately correlated with the state self-talk measures. Indeed, the correlations between trait dominant self-talk and dominant state measures of self-talk ranged from  $-.24$  to  $.26$  and were not significantly different from zero. Likewise, with the exception of the positive correlation between trait affiliative self-talk and third-party ratings of written affiliative self-talk, the correlations among trait and state affiliative self-talk were negligible. Therefore, trait affiliative self-talk did not correlate with participants' coded vocalized self-talk or with their self-reported adjective ratings.

According to the obtained correlations, it is not clear whether people who report engaging in dominant self-talk *generally* also engage in dominant self-talk when they face a challenge in the lab. Thus, in contrast to our predictions, trait dominant self-talk does not appear to consistently relate to dominant self-talk during a challenging situation. In addition, trait affiliative self-talk did not consistently correlate with affiliative self-talk during a challenging situation. The absence of a relationship between trait and state *self-reported* self-talk for these two dimensions was unexpected, despite using two versions of the same scale to measure trait

and state self-talk.

Although a main facet of interpersonal theory is that trait dominance and affiliative interpersonal behaviors are relatively orthogonal, we had not hypothesized if this principle would extend to cross-dimension state versus trait self-talk. Nonetheless, it is interesting to note that with the exception of one correlation, these cross-dimension state-trait correlations were negligible, ranging from  $-.11$  to  $.10$ . The only statistically significant correlation in the entire table was between trait affiliative and state dominant self-talk, which was an unexpected finding. However, this obtained correlation suggests that people who report engaging in affiliative trait self-talk tend to also report engaging in dominant self-talk when faced with a challenging situation.

### **Relationship Between State Measures of Self-Talk**

Recall that our second hypothesis was that within each dimension, the state measures of self-talk would correlate positively with each other. Thus, we next examined the relations between the three state measures of self-talk. Comparing self-reported state self-talk style with third-party ratings of state self-talk would indicate the extent to which these methods measure similar constructs. We predicted a positive relationship between third-party ratings and participants' self-reported adjective ratings on the state IPSTS. More specifically, we expected rater-coded dominant self-talk to correlate positively with self-reported dominant self-talk, and rater-coded affiliative self-talk to correlate positively with self-reported affiliative self-talk.

The correlations between the state measures of self-talk are displayed in Table 20. In contrast to our predictions, we obtained negligible correlations between third-party ratings and self-reported adjective ratings for dominance and affiliation. For dominance, third-party ratings of vocalized and written self-talk did not correlate with participants' self-reported adjective ratings. Similarly, for affiliation, third-party ratings of participants' written self-talk statements

showed a negligible correlation with self-reported adjective ratings. The correlation between third-party ratings of vocalized self-talk and self-reported adjective ratings was relatively stronger, but did not reach statistical significance. In sum, these results suggest that third-party ratings of state self-talk are weakly related, at best, to self-report ratings of state self-talk.

We also expected that within each dimension, vocalized and written self-talk measures completed by observers would correlate positively. Although both of these correlations were positive, only the one for dominant self-talk was statistically significant. In addition, the cross-dimension correlations, ranging from  $-.22$  to  $.20$ , showed no consistent pattern, and none of them reached statistical significance.

### **Relationship Between Mood and Self-Talk**

The third hypothesis was that participants' levels of trait dominant and affiliative self-talk would correlate negatively with negative affect. The correlations among the self-reported trait dominant and affiliative self-talk with the positive and negative affect subscales are displayed in Table 21. Note that the very small sample size ( $N = 23$ ) requires these results to be interpreted with caution. Consistent with our predictions, both dominant and affiliative self-talk were inversely related to negative affect. A weak, negative correlation was also obtained between affiliative self-talk and positive affect. However, none of the correlations among self-talk and affect reached statistical significance.

### **Discussion**

In this study, the newly developed Interpersonal Self-Talk Scale was administered in an applied setting to assess how well people's typical *trait* self-talk predicted their self-talk style in a challenging situation. This study also assessed a state version of the new scale, in terms of the degree to which self-report ratings align with third-party ratings of self-talk during a challenging situation. Finally, we investigated to what extent trait self-talk style relates to mood as a result of

enduring a challenge in the lab.

Overall, the results indicated that trait self-talk only weakly to moderately correlated with the state self-talk measures for dominance and affiliation. Similarly, weak correlations were obtained among the different state self-talk measures, suggesting that self-reported ratings of self-talk style capture a construct that is distinct from third-party ratings of self-talk style.

One explanation for the weak correlations between self-report and third-party ratings of self-talk may relate to differences in how people view their own self-talk style in comparison to others' self-talk style. One's own self-talk may be hard to self-evaluate. In contrast to overt, observable behavior, one cannot readily observe demonstrations of "dominant" or "friendly" styles of self-talk in others. For example, without reference of how "commanding", "authoritative", or "loving" others' self-talk would sound, accurately evaluating the extent to which your own self-talk style displays these characteristics would be difficult.

In addition, the vocalized and written self-talk statements were both coded by third-party observers; however different coding methods were used. Recall that vocalized self-talk ratings were extremity-based, but the written self-talk statement ratings were frequency-based. Given this difference in measurement approach, one might not expect correlations across these different methods to be substantial. It could be interesting to see what the effect might be on the correlation of vocalized and written self-talk ratings obtained using the same measurement approach (e.g., both being extremity oriented).

In all three studies, the means and standard deviations of the IPSTS subscale scores were computed (see Table 13 and Table 18). Interestingly, the top four versus the bottom four frequently endorsed *trait* IPSTS subscales are placed in a particular pattern on the interpersonal circumplex (see Figure 1). That is, across all three studies, the top four frequently endorsed subscales (i.e., PA, NO, LM, and JK – although not necessarily in this order) are placed on the

right side of the circumplex, and the bottom four frequently endorsed subscales (i.e., BC, DE, FG, and HI – again, not necessarily in this order) are placed on the left side of the circumplex. This pattern is consistent with social desirability and related issues found by Ethier, Sadler, and Woody (2009) from their work with the Revised Interpersonal Adjective Scales (IAS-R; Wiggins et al., 1988). In Ethier et al. (2009), the dominant (PA) and friendly (LM) IAS-R subscales were rated by independent coders as being high in socially desirability, and they consist of mostly desirable items (e.g., self-assured, kind). In contrast, the submissive (HI) and hostile (DE) subscales had much lower social desirability ratings, and they consist of mostly undesirable items (e.g., forceless, cruel). Due to the disproportionately high number of socially desirable words on the right side of the circumplex compared to the left side, Ethier et al. (2009) suggested that the excellent circumplex structure of the IAS-R may, at least in part, be produced by social desirability rather than interpersonal style. Since the construction of the IPSTS was partly inspired by the IAS-R, verifying that the IPSTS subscales are not conflated with social desirability may be an issue to explore in the future.

In addition to the placement of the top four versus the bottom four frequently endorsed IPSTS subscales, one may have noticed that the standard deviations of the subscales were larger in Study 1 than in Study 2 and Study 3. Although no statistical comparisons of means and standard deviations were completed across the three studies, the standard deviations for all eight subscales were clearly larger in Study 1. The difference between the standard deviations in Study 1 versus Study 2 and 3 are likely due to the characteristics of the sample used in Study 1. Recall that in Study 1, participants were American adults recruited from MTurk. In contrast, the samples of Study 2 and 3 were both comprised of Canadian undergraduate students. Previous research has found that MTurk samples are more diverse than college student samples (Paolacci,

Chandler, & Ipeirotis, 2010). Thus, the greater diversity of the MTurk sample is likely the main cause of the larger standard deviations seen in Study 1.

### **Limitations and Future Directions**

There are several limitations in this study. The first limitation involves the high proportion of participants (20%) who did not find the study's circumstances believable, and the rather high proportion of participants (21%) who did not seem able to spontaneously report their self-talk (e.g., during the reflection periods). These high proportions suggest important limitations of the paradigm (i.e., the concept formation task, or how it was described or presented) as a way of sampling self-talk. The large amount of discarded data also suggests that the concept formation task was unsuccessful at inducing a believable failure condition. We did not explicitly ask participants if they found the study to be believable, nor did we receive feedback about the believability of the paradigm. However, the fact that participants had four opportunities to reflect on the concept formation task (i.e., one reflection period after each problem) could have contributed to the high proportion of suspicion in this study. In other words, each reflection period allowed participants to reflect on their performance, and possible reasons why they kept failing the concept formation task. Other research that used this paradigm (e.g., Hiroto & Seligman, 1975; Johnson, 1995; Reed & Antonova, 2007) did not provide participants with reflection periods. Interestingly, that research also did not document the believability of the concept formation task. That is, previous research does not report excluding participants on the basis of suspicion (e.g., Hiroto & Seligman, 1975; Johnson, 1995; Reed & Antonova, 2007). Thus, it is not known whether participants were suspicious of the concept formation task in previous research. Regardless, future work would likely benefit from modifying the present study to induce a more believable failure condition. One potential modification could involve reducing the number of reflection periods from four (i.e., one after each problem) to two (i.e.,

one after the first and fourth problem). This modification would still allow participants to vocalize their self-talk and reflect outloud on their performance, but it might reduce the amount of suspicion by limiting how often these reflections occur.

A second limitation of this study is that it did not include a control for the task failure condition. Traditionally, experiments utilizing the concept formation task include at least one other condition – either a “success condition”, where people receive solvable concept formation task problems, a traditional control condition, or both (see Hiroto & Seligman, 1975; Reed & Antonova, 2007). Indeed, including either of these controls in Study 3 would have allowed us to explore to what extent the relationship between trait and state self-talk differs as a function of situation. In other words, including a success condition would allow us to investigate differences in state self-talk across conditions (i.e., to what extent does state self-talk during a failure compare to state self-talk during a success?).

A third limitation of Study 3 is the lack of control over the length of the reflection periods. The study was set up such that participants were free to reflect for as long as they felt necessary, including skipping over the reflection period, and, as a result, we obtained reflections that varied greatly in terms of content (amount and quality) and length. Consequently, some audio recordings were so short (i.e., including comments from only one or two of the four reflection periods) and included so little content that coding of the self-talk style was not possible. Thus, in future, it is recommended that participants be required to reflect for at least 30 seconds after each problem of the concept formation task. Setting a minimum time should increase the consistency of the length of the vocalized self-talk reflection periods and provide more content for coding. Setting a minimum time will also prevent participants from skipping the reflection periods, as they would need to wait for 30 seconds before moving on in the study.

Note that setting a maximum time for reflection does not seem necessary, as most reflections stayed under 1:30 (m:ss). Indeed, the longest reflection period was 1:46.

A fourth limitation of the present study was the small sample size of 33 participants. Accordingly, all results should be interpreted with caution. Replication of this study with a larger sample would hopefully verify the obtained correlations and support our interpretations. In addition to the small sample size, the fact that only 70 percent of the sample completed the premeasures (i.e., the trait version of the IPSTS) presents another limitation. Consequently, the obtained correlations between trait and state self-talk were only based on a sample size of 23, making it difficult to interpret the relationship between trait and state levels of self-talk style.

Study 3 used participants' state levels of mood to indicate effective coping with the in-lab challenge, where lower levels of negative affect were presumed to indicate more effective coping. However, mood was not measured before the in-lab portion of the study. Consequently, we were not able to assess whether changes in mood occurred as a function of failing the concept formation task, and we also were not able to assess the nature of such a change. In future studies, including a baseline measure of mood would provide a stronger case for changes in mood as a function of failure, and would allow for the relationship between state self-talk style and mood after a failure experience to be verified.

In this study, all of the content in the reflection periods was considered to be self-talk and therefore relevant for coding. An interesting issue to consider would involve re-examining the extent to which the content in the reflection periods is entirely comprised of self-talk, or whether other kinds of cognitions are also involved (i.e., automatic self-statements, cognitions about the task that are not related to the self). According to our definition, self-talk occurs when an inner voice addresses the self, usually silently but sometimes aloud, with content that is self-relevant.

To avoid exposing the true purpose of the study, this definition was not provided to participants

until after the vocalizations from all the reflection periods were complete. Instead, more general instructions were given to participants for vocalizing their internal reflections during the task. For instance, instructions preceding the reflection periods read: “Now take a moment to reflect outloud about how [the concept formation task] is going, and any thoughts about how you are doing”. Given that we did not explicitly ask participants to reflect on their *self-talk* during the concept formation task, participants could have voiced other thoughts in addition to, or instead of their self-talk. Accordingly, future work involving third-party coding of self-talk could ask coders to rate how much of what they coded seemed to represent *self-talk*, specifically.

### General Discussion

Across three studies, this thesis has described the psychometric properties and the prospective function of the Interpersonal Self-Talk Scale (IPSTS) — a new, self-report measure of the interpersonal qualities of self-talk. The IPSTS complements existing self-talk measures and interpersonal circumplex inventories because it uniquely measures the different ways one could speak to the self. In addition, by using Interpersonal Theory (the interpersonal circumplex), the IPSTS assesses the tone of the inner voice and the implied relationship with the self. Thus, the IPSTS can provide valuable information about the unique qualities of self-to-self relationships that fits well in the framework of Interpersonal Theory.

The first two studies of this thesis demonstrated that the octant subscales of the IPSTS have good internal consistency reliability and excellent circumplex structure in two distinct samples. This research also demonstrated that self-talk style, as measured by the IPSTS, is reasonably distinct from existing interpersonal constructs (i.e., interpersonal traits, values, efficacy, behaviors and problems). Finally, self-talk style was shown to be distinct from self-compassion and self-criticism, two strongly related constructs which both seem to involve an underlying tendency to engage in affiliative self-talk.

Study 3 explored the potential utility of the IPSTS as a state measure of self-talk, and as a predictor of how well a person can respond effectively to challenges. Although the generalizations that can be made from this first attempt are probably limited, there are many exciting avenues for future exploration of self-talk and its relationship to coping with failure.

### **Implications and Future Directions**

First, this research contributes to interpersonal theory by allowing intrapersonal relationships to be studied from an interpersonal perspective. Since the IPSTS allows the tone and content of self-talk to be sampled, foundations regarding the relationship between intra- and inter-personal interactions can begin to be established theoretically and verified empirically. Systematic relations between one's self-talk style and one's overt interpersonal style could potentially be tested, and theorized relations between early life interactions and present-day self-talk style could be explored. In order to change self-talk, it is important to firmly establish how people do, in fact, speak to themselves, the individual differences between these styles of self-talk, and the circumstances in which self-talk styles tend to vary or remain constant. The IPSTS constitutes an important step in this process.

One direction for future research involves further investigation of individual differences in the frequency and content of people's spontaneous self-talk. Self-talk is assumed to be something that almost all adults engage in to some extent (see Winsler et al., 2009), but the frequency and content of self-talk has yet to be systematically tracked. Knowing both the frequency with which self-talk occurs, and the content of the self-talk across individuals and situations is an important foundation to lay down for future self-talk research.

Accordingly, future work could employ signal-contingent recording (Wheeler & Reis, 1991) to examine individual differences in both the frequency and content of self-talk. For instance, participants could carry a technological device, such as a smartphone, and report their

self-talk when signaled at various intervals of time. Such a method could allow for self-talk frequency and content to be evaluated across contexts over time.

Additionally, this method (i.e., signal-contingent recording) could be compared to other types of self-report ratings (such as responses on questionnaires like the IPSTS) to help facilitate comparisons between them. For instance, the amount of self-talk constituting a frequency rating of “most of the time” versus only “sometimes” is likely based on personal perceptions rather than empirical norms. Since self-talk is an important predictor of many different outcomes, including athletic performance (Hatzigeorgiadis et al., 2004), mental health outcomes (Burnett, 1994), and behavior (Meichenbaum, 1977), establishing its frequency experimentally is useful and important. In addition, the perceived style of self-talk during a particular moment or within a particular context (i.e., immediately after being signaled by a device) may differ in interesting ways from one’s own ratings of self-talk style on a self-report questionnaire (i.e., the IPSTS).

Self-talk style is likely an important predictor of one’s thoughts, behaviors, and well-being. Hence, another important question to investigate is whether people can effectively change their trait style of self-talk.

Research from Fixed Role Therapy suggests that such change is possible. Based on George Kelly’s theory of Personal Construct Psychology, in Fixed Role Therapy (Kelly, 1955) a client acts as a person he or she aspires to be more like, and the client is encouraged to “become” this new character. The goal of Fixed Role Therapy is to encourage flexibility in how clients define themselves and interpret situations. It has been effective for decreasing shyness, anxiety, fear of negative evaluation, and for improving trust, attendance, and sociality in a variety of different contexts with different clients (see Metcalfe, Winter, & Viney, 2007). Given the success of Fixed Role Therapy, it is plausible to propose that our new Interpersonal Self-talk Scale could be used to help people change the way they speak to themselves.

For instance, the trait IPSTS could be used to establish people's current, and therefore most familiar and natural style of self-talk. Subsequently, people could generate self-talk statements in a different style; that is, a style that they feel would be personally effective and adaptive. Consequently, individualized, personal self-talk statements could be programmed into smartphones which participants could carry with them and use to practice changing their style of self-talk.

### **Conclusion**

Overall, this research offers a unique and nuanced perspective of the interpersonal properties of self-talk, and provides insight into the specific qualities of the inner voice. With Interpersonal Theory as a framework, the Interpersonal Self-Talk Scale shares the advantages of other circumplex measures: It is able to assess the full range of traits (in this case, styles of self-talk) associated with differing levels of dominance and affiliation, and it organizes these styles as individual points in circumplex space. Such a conception allows for the IPSTS to capture nuances in self-talk style, and can pave the way for future investigations of the relationship between intra- and inter-personal processes.

Table 1

*Subscale items, item-total correlations and reliability for 5-item IPSTS subscales.*

Octant	Subscale items	Item-total correlation	Cronbach's $\alpha$
PA	17 Assertive	.42	.70
	33 Decisive	.42	
	65 Leading	.49	
	73 Authoritative	.52	
	84 Strong-willed	.46	
BC	48 Forceful	.67	.80
	49 Bold	.55	
	57 Commanding	.61	
	66 Bossy	.63	
	79 Insistent	.44	
DE	15 Hostile	.60	.86
	35 Harsh	.70	
	50 Disrespectful	.70	
	63 Fault-Finding	.70	
	80 Scolding	.70	
FG	45 Helpless	.52	.87
	76 Insecure	.75	
	77 Unassured	.78	
	88 Disappointed	.63	
	89 Unconfident	.78	
HI	21 Passive	.42	.65
	29 Timid	.51	
	37 Meek	.39	
	53 Hesitant	.35	
	61 Wavering	.34	
JK	12 Undemanding	.46	.73
	22 Non-judgmental	.53	
	44 Lenient	.48	
	54 Tolerant	.50	
	70 Serene	.49	
LM	43 Friendly	.73	.90
	59 Supportive	.74	
	60 Accepting	.81	
	86 Loving	.78	

	90 Approving	.74	
NO	26 Confident	.55	.81
	41 Ambitious	.54	
	56 Energizing	.59	
	72 Determined	.61	
	91 Motivating	.69	

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*Note.*  $N = 316$ .

Table 2

*Subscale items, item-total correlations and reliability for 6-item IPSTS subscales*

Octant	Subscale items	Item-total correlation	Cronbach's $\alpha$
PA	17 Assertive	.42	.68
	33 Decisive	.42	
	65 Leading	.50	
	73 Authoritative	.50	
	84 Strong-willed	.43	
	*25 Persuasive	.23	
BC	48 Forceful	.69	.81
	49 Bold	.53	
	57 Commanding	.61	
	66 Bossy	.63	
	79 Insistent	.46	
	*16 Strict	.48	
DE	15 Hostile	.61	.88
	35 Harsh	.71	
	50 Disrespectful	.71	
	63 Fault-Finding	.72	
	80 Scolding	.70	
	*64 Cynical	.67	
FG	45 Helpless	.53	.89
	76 Insecure	.76	
	77 Unassured	.80	
	88 Disappointed	.62	
	89 Unconfident	.80	
	*69 Undecided	.69	
HI	21 Passive	.42	.69
	29 Timid	.54	
	37 Meek	.36	
	53 Hesitant	.44	
	61 Wavering	.34	
	*30 Indecisive	.42	
JK	12 Undemanding	.46	.73
	22 Non-judgmental	.50	
	44 Lenient	.48	
	54 Tolerant	.53	
	70 Serene	.50	
	*5 Humble	.33	

## INTERPERSONAL QUALITIES OF SELF-TALK

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LM	43 Friendly	.73	.92
	59 Supportive	.75	
	60 Accepting	.81	
	86 Loving	.80	
	90 Approving	.75	
	*75 Kind	.82	
NO	26 Confident	.54	.84
	41 Ambitious	.57	
	56 Energizing	.64	
	72 Determined	.59	
	91 Motivating	.73	
	*74 Inspiring	.64	

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*Note.*  $N = 316$ . The 6<sup>th</sup> item in each subscale is indicated with an asterisk (\*).

Table 3

*Expected order of correlations among subscales in a circumplex structure.*

	PA	BC	DE	FG	HI	JK	LM	NO
PA	1							
BC	$\rho_1$	1						
DE	$\rho_2$	$\rho_1$	1					
FG	$\rho_3$	$\rho_2$	$\rho_1$	1				
HI	$\rho_4$	$\rho_3$	$\rho_2$	$\rho_1$	1			
JK	$\rho_3$	$\rho_4$	$\rho_3$	$\rho_2$	$\rho_1$	1		
LM	$\rho_2$	$\rho_3$	$\rho_4$	$\rho_3$	$\rho_2$	$\rho_1$	1	
NO	$\rho_1$	$\rho_2$	$\rho_3$	$\rho_4$	$\rho_3$	$\rho_2$	$\rho_1$	1

*Note.*  $\rho_1 > \rho_2 > \rho_3 > \rho_4$  (adapted from Pincus & Gurtman, 2000).

Table 4

*Correlations among the 5-item IPSTS subscales*

	PA	BC	DE	FG	HI	JK	LM	NO
PA	(.70)							
BC	.58	(.80)						
DE	.09	.57	(.86)					
FG	-.47	-.04	.49	(.87)				
HI	-.62	-.40	-.02	.39	(.65)			
JK	-.36	-.66	-.66	-.19	.16	(.73)		
LM	-.08	-.56	-.85	-.56	-.09	.58	(.90)	
NO	.45	-.03	-.55	-.70	-.45	.11	.57	(.81)

$N = 316$ . All  $|r| \geq .12$ ,  $p < .05$ . All  $|r| \geq .15$ ,  $p < .01$

*Note.* Reliabilities of the ipsatized subscales are indicated in parentheses along the diagonal.

Table 5

*Correlations among the IPSTS, IAS-R, SBI, CSIV, CSIE, IIP-SC – Study 1*

	Self-Talk Dimension Scores	
	IPSTS Dominance	IPSTS Affiliation
<b>Dominance</b>		
IAS-R	.34	.26
SBI	.36	.24
CSIV	.06	.15
CSIE	.13	.12
IIP-SC	.14	.16
<b>Affiliation</b>		
IAS-R	.10	.41
SBI	.18	.41
CSIV	-.02	.28
CSIE	.06	.34
IIP-SC	-.02	.05

$N = 316$ . All  $|r| \geq .12$ ,  $p < .05$ . All  $|r| \geq .15$ ,  $p < .01$

*Note.* All correlations are based on dimension scores. *IPSTS Dominance* = Interpersonal Self-Talk Scale dominance dimension score; *IPSTS Affiliation* = Interpersonal Self-Talk Scale affiliation dimension score; *IAS-R* = Revised Interpersonal Adjective Scales; *SBI* = Social Behavior Inventory; *CSIV* = Circumplex Scales of Interpersonal Values; *CSIE* = Circumplex Scales of Interpersonal Efficacy; *IIP-SC* = Inventory of Interpersonal Problems – Short Circumplex.

Table 6

*Correlations among the Self-Compassion Scale and the Forms of Self-Criticizing and Self-Reassuring Scale – Study 1.*

	Self-Compassion Scale						FSCRS Subscales		
	Self-Kind	Common H	Mindfulness	Self-Judge	Isolation	Over ID	Reassured	Inadequate	Hated
Self-Kind	--								
Common H	.56	--							
Mindfulness	.75	.56	--						
Self-Judge	-.59	-.25	-.40	--					
Isolation	-.34	-.23	-.33	.60	--				
Over ID	-.30	-.10	-.35	.52	.51	--			
Reassured	.75	.47	.65	-.59	-.43	-.29	--		
Inadequate	-.56	-.28	-.45	.78	.57	.52	-.60	--	
Hated	-.36	-.19	-.35	.54	.34	.34	-.46	.72	--

$N = 316$ . All  $|r| \geq .12$ ,  $p < .05$ ,  $|r| \geq .15$ ,  $p < .01$

*Note.* *Self-Kind* = Self-Kindness subscale; *Common H* = Common Humanity subscale; *Mindfulness* = Mindfulness subscale; *Self-Judge* = Self-Judgment subscale; *Isolation* = Isolation subscale; *Over ID* = Over-Identification subscale; *FSCRS* = Forms of Self-Criticizing and Self-Reassuring Scale; *Reassured* = Reassured Self subscale; *Inadequate* = Inadequate Self subscale; *Hated* = Hated Self subscale.

Table 7

*Correlations among the IPSTS, the Self-Compassion Scale and the Forms of Self-Criticizing and Self-Reassuring Scale*

	Positive SCS subscales			Negative SCS subscales			FSCRS subscales		
	Self-Kind	Common H	Mindfulness	Self-Judge	Isolation	Over ID	Reassured	Inadequate	Hated
<b>IPSTS</b>									
<b>Dimensions</b>									
Dominance	-.05	-.07	.03	.01	-.15	-.10	-.06	-.03	-.02
Affiliation	.53	.38	.43	-.53	-.45	-.43	.54	-.52	-.46
<b>IPSTS</b>									
<b>Subscales</b>									
PA	-.07	-.12	.01	.00	-.12	-.09	-.05	-.01	.01
BC	-.31	-.23	-.22	.32	.21	.19	-.27	.26	.28
DE	-.51	-.35	-.39	.52	.42	.40	-.52	.49	.45
FG	-.34	-.25	-.31	.33	.38	.37	-.42	.37	.27
HI	-.02	-.01	-.09	.02	.16	.01	-.07	.05	.13
JK	.43	.34	.33	-.38	-.23	-.30	.32	-.40	-.37
LM	.50	.37	.41	-.47	-.40	-.36	.51	-.44	-.39
NO	.27	.17	.28	-.31	-.37	-.29	.35	-.33	-.29

$N = 316$ . All  $|r| \geq .12, p < .05, |r| \geq .15, p < .01$

*Note.* IPSTS = Interpersonal Self-Talk Scale; SCS = Self-Compassion Scale; *Self-Kind* = Self-Kindness subscale; *Common H* = Common Humanity subscale; *Mindfulness* = Mindfulness subscale; *Self-Judge* = Self-Judgment subscale; *Isolation* = Isolation subscale; *Over ID* =

Over-Identification subscale; *FSCRS* = Forms of Self-Criticizing and Self-Reassuring Scale; *Reassured* = Reassured Self subscale; *Inadequate* = Inadequate Self subscale; *Hated* = Hated Self subscale.

Table 8

*Subscale items, item-total correlations and reliability for each 5-item IPSTS subscale - Study 2*

Octant	Subscale items	Item-total correlation	Cronbach's $\alpha$
PA	17 Assertive	.44	.65
	33 Decisive	.25	
	65 Leading	.45	
	73 Authoritative	.49	
	84 Strong-willed	.43	
BC	48 Forceful	.53	.68
	49 Bold	.35	
	57 Commanding	.43	
	66 Bossy	.56	
	79 Insistent	.31	
DE	15 Hostile	.48	.80
	35 Harsh	.69	
	50 Disrespectful	.61	
	63 Fault-Finding	.52	
	80 Scolding	.64	
FG	45 Helpless	.46	.81
	76 Insecure	.73	
	77 Unassured	.59	
	88 Disappointed	.53	
	89 Unconfident	.71	
HI	21 Passive	.23	.53
	29 Timid	.39	
	37 Meek	.29	
	53 Hesitant	.31	
	61 Wavering	.24	
JK	12 Undemanding	.56	.68
	22 Non-judgmental	.46	
	44 Lenient	.38	
	54 Tolerant	.46	
	70 Apologetic	.33	
LM	43 Friendly	.63	.86
	59 Supportive	.67	
	60 Accepting	.72	
	86 Loving	.70	
	90 Approving	.68	

NO	26 Confident	.47	.79
	41 Ambitious	.60	
	56 Energizing	.55	
	72 Determined	.61	
	91 Motivating	.63	

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*Note.*  $N = 300$ .

Table 9

*Subscale items, item-total correlations and reliability for each 6-item IPSTS subscale - Study 2*

Octant	Subscale items	Item-total correlation	Cronbach's $\alpha$
PA	17 Assertive	.47	.64
	33 Decisive	.21	
	65 Leading	.45	
	73 Authoritative	.50	
	84 Strong-willed	.42	
	*25 Persuasive	.20	
BC	48 Forceful	.59	.70
	49 Bold	.32	
	57 Commanding	.45	
	66 Bossy	.55	
	79 Insistent	.31	
	*16 Strict	.38	
DE	15 Hostile	.47	.84
	35 Harsh	.68	
	50 Disrespectful	.61	
	63 Fault-Finding	.59	
	80 Scolding	.67	
	*64 Cynical	.68	
FG	45 Helpless	.48	.83
	76 Insecure	.74	
	77 Unassured	.62	
	88 Disappointed	.52	
	89 Unconfident	.69	
	*69 Undecided	.52	
HI	21 Passive	.23	.59
	29 Timid	.39	
	37 Meek	.25	
	53 Hesitant	.42	
	61 Wavering	.29	
	*30 Indecisive	.38	
JK	12 Undemanding	.56	.71
	22 Nonjudgmental	.49	
	44 Lenient	.40	
	54 Tolerant	.43	
	13 Apologetic	.38	
	*5 Humble	.42	

LM	43 Friendly	.68	.88
	59 Supportive	.65	
	60 Accepting	.72	
	86 Loving	.73	
	90 Approving	.69	
	*75 Kind	.72	
NO	26 Confident	.51	.83
	41 Ambitious	.62	
	56 Energizing	.55	
	72 Determined	.63	
	91 Motivating	.66	
	*74 Inspiring	.63	

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*Note.*  $N = 300$ . The 6<sup>th</sup> item in each subscale is indicated with an asterisk (\*).

Table 10

*Subscale items, item-total correlations, and reliability for the final, 49-item IPSTS*

Octant	Subscale items	Study 1		Study 2	
		ITC	Cronbach's $\alpha$	ITC	Cronbach's $\alpha$
PA	(1) 17 Assertive	.41	.67	.42	.65
	(25) 33 Decisive	.38		.25	
	(17) 65 Leading	.49		.45	
	(33) 73 Authoritative	.52		.50	
	(41) 84 Strong-willed	.45		.44	
	(9) 25 Competitive	.19		.25	
BC	(16) 48 Forceful	.69	.81	.59	.70
	(32) 49 Bold	.53		.32	
	(34) 57 Commanding	.61		.45	
	(48) 66 Bossy	.63		.55	
	(18) 79 Insistent	.46		.31	
	(2) 16 Strict	.48		.38	
DE	(3) 15 Hostile	.61	.88	.47	.84
	(31) 35 Harsh	.71		.68	
	(35) 50 Disrespectful	.71		.61	
	(47) 63 Fault-Finding	.72		.59	
	(19) 80 Scolding	.70		.67	
	(15) 64 Cynical	.67		.68	
FG	(4) 45 Helpless	.53	.89	.48	.83
	(20) 76 Insecure	.76		.74	
	(36) 77 Unassured	.80		.62	
	(45) 88 Disappointed	.62		.52	
	(30) 89 Unconfident	.80		.69	
	(14) 69 Undecided	.69		.52	
HI	(13) 21 Passive	.37	.74	.24	.66
	(21) 29 Timid	.55		.39	
	(5) 37 Meek	.33		.24	
	(37) 53 Hesitant	.51		.50	
	(46) 61 Wavering	.36		.31	
	(29) 30 Indecisive	.52		.44	
	(49) 87 Unsure	.54		.48	
JK	(44) 12 Undemanding	.47	.69	.56	.71
	(22) 22 Nonjudgmental	.44		.49	
	(28) 44 Lenient	.48		.40	
	(38) 54 Tolerant	.49		.43	
	(12) 13 Apologetic	.32		.38	

	(6) 5 Humble	.35		.42	
LM	(11) 43 Friendly	.73	.92	.68	.88
	(27) 59 Supportive	.75		.65	
	(7) 60 Accepting	.81		.72	
	(43) 86 Loving	.80		.73	
	(39) 90 Approving	.75		.69	
	(23) 75 Kind	.82		.72	
NO	(10) 26 Confident	.54	.84	.51	.83
	(8) 41 Ambitious	.57		.62	
	(24) 56 Energizing	.64		.55	
	(40) 72 Determined	.59		.63	
	(26) 91 Motivating	.73		.66	
	(42) 74 Inspiring	.64		.63	

*Note.* Numbers in parentheses represent item numbers for the final, 49-item scale.

Table 11

*Correlations among the final IPSTS subscales*

	PA	BC	DE	FG	HI	JK	LM	NO
PA	(.65)							
BC	.47	(.70)						
DE	-.02	.58	(.84)					
FG	-.54	-.01	.46	(.83)				
HI	-.62	-.28	.14	.59	(.66)			
JK	-.36	-.73	-.65	-.15	.12	(.71)		
LM	-.04	-.60	-.84	-.46	-.22	.62	(.88)	
NO	.45	-.09	-.57	-.73	-.58	.13	.56	(.83)

$N = 300$ . All  $|r| \geq .12, p < .05$ ,  $|r| \geq .15, p < .01$

*Note.* All correlations were computed with ipsatized subscale scores. The reliabilities of the ipsatized subscales are indicated in parentheses along the diagonal.

Table 12

*Correlations among the final IPSTS subscales with Study 1 data*

	PA	BC	DE	FG	HI	JK	LM	NO
PA	(.67)							
BC	.67	(.81)						
DE	.23	.67	(.88)					
FG	-.20	.13	.50	(.89)				
HI	-.13	.01	.24	.68	(.74)			
JK	-.02	-.29	-.36	.12	.45	(.69)		
LM	.23	-.24	-.53	-.20	.20	.72	(.92)	
NO	.61	.17	-.28	-.29	.01	.43	.73	(.84)

$N = 316$ . All  $|r| \geq .12$ ,  $p < .05$ ,  $|r| \geq .15$ ,  $p < .01$

*Note.* All correlations were computed with ipsatized subscale scores. The reliabilities of the ipsatized subscales are indicated in parentheses along the diagonal.

Table 13

*Means and standard deviations of the final IPSTS subscale scores – Study 1 and 2*

IPSTS Section	Study 1 (N = 316)		Study 2 (N = 300)	
	Mean	SD	Mean	SD
<b>Octant Subscales</b>				
PA	3.86	.91	3.72	.83
BC	2.95	1.03	2.68	.82
DE	3.03	1.16	2.89	.94
FG	2.63	1.07	3.00	.90
HI	2.57	.89	2.96	.74
JK	3.19	.97	3.40	.84
LM	3.91	1.24	4.02	.99
NO	4.15	1.06	4.13	.92
<b>Dimension Scores</b>				
Dominance	.00	.09	.00	.09
Affiliation	.00	.10	.00	.10

*Note.* SD = standard deviation. Each subscale has 6 items with the exception of HI, which has 7 items.

Table 14

*Correlations among the IPSTS, IAS-R, SBI, CSIV, CSIE, IIP-SC – Study 2*

	Self-Talk Dimension Scores	
	IPSTS Dominance	IPSTS Affiliation
<b>Dominance</b>		
IAS-R	.45	.28
SBI	.35	.30
CSIV	.27	.14
CSIE	.28	.15
IIP-SC	.25	.01
<b>Affiliation</b>		
IAS-R	-.09	.42
SBI	-.01	.30
CSIV	-.05	.38
CSIE	-.03	.36
IIP-SC	-.11	.18

$N = 300$ . All  $|r| \geq .12$ ,  $p < .05$ ,  $|r| \geq .15$ ,  $p < .01$

*Note.* All correlations are based on dimension scores. *IPSTS Dominance* = Interpersonal Self-Talk Scale dominance dimension score; *IPSTS Affiliation* = Interpersonal Self-Talk Scale affiliation dimension score; *IAS-R* = Revised Interpersonal Adjective Scales; *SBI* = Social Behavior Inventory; *CSIV* = Circumplex Scales of Interpersonal Values; *CSIE* = Circumplex Scales of Interpersonal Efficacy; *IIP-SC* = Inventory of Interpersonal Problems – Short Circumplex.

Table 15

*Correlations among the Self-Compassion Scale and the Forms of Self-Criticizing and Self-Reassuring Scale – Study 2*

	Self-Compassion Scale						FSCRS		
	Self-Kind	Common H	Mindfulness	Self-Judge	Isolation	Over ID	Reassured	Inadequate	Hated
Self-Kind	--								
Common H	.60	--							
Mindfulness	.72	.61	--						
Self-Judge	-.57	-.29	-.38	--					
Isolation	-.45	-.40	-.39	.64	--				
Over ID	-.38	-.27	-.37	.72	.71	--			
Reassured	.73	.52	.63	-.56	-.53	-.41	--		
Inadequate	-.55	-.35	-.41	.74	.70	.70	-.58	--	
Hated	-.48	-.26	-.32	.47	.47	.40	-.62	.63	--

$N = 300$ . All  $|r| \geq .12$ ,  $p < .05$ . All  $|r| \geq .15$ ,  $p < .01$

*Note.* *IPSTS* = Interpersonal Self-Talk Scale; *Self-Kind* = Self-Kindness subscale; *Common H* = Common Humanity subscale; *Mindfulness* = Mindfulness subscale; *Self-Judge* = Self-Judgment subscale; *Isolation* = Isolation subscale; *Over ID* = Over-Identification subscale; *FSCRS* = Forms of Self-Criticizing and Self-Reassuring Scale; *Reassured* = Reassured Self subscale; *Inadequate* = Inadequate Self subscale; *Hated* = Hated Self subscale.

Table 16

*Correlations among the IPSTS, Self-Compassion Scale and Forms of Self-Criticism and Self-Reassuring Scale – Study 2*

	Positive SCS subscales			Negative SCS subscales			FSCRS subscales		
	Self-Kind	Common H	Mindfulness	Self-Judge	Isolation	Over ID	Reassured	Inadequate	Hated
<b>IPSTS</b>									
<b>Dimension</b>									
Dominance	.12	-.05	.21	-.09	-.08	-.11	.19	-.15	-.16
Affiliation	.51	.32	.45	-.44	-.37	-.28	.53	-.42	-.39
<b>IPSTS Subscales</b>									
PA	.04	-.00	.14	-.02	-.03	-.08	.10	-.09	-.09
BC	-.27	-.17	-.18	.25	.22	.13	-.26	.19	.20
DE	-.45	-.27	-.38	.37	.29	.21	-.47	.36	.32
FG	-.43	-.29	-.44	.40	.33	.31	-.46	.41	.35
HI	-.15	-.06	-.23	.11	.09	.08	-.21	.16	.12
JK	.26	.19	.20	-.27	-.23	-.15	.22	-.20	-.15
LM	.44	.28	.39	-.30	-.28	-.16	.47	-.28	-.29
NO	.38	.22	.42	-.32	-.31	-.22	.47	-.33	-.36

$N = 300$ . All  $|r| \geq .12$ ,  $p < .05$ . All  $|r| \geq .15$ ,  $p < .01$

*Note.* All IPSTS subscales contain six items with the exception of the HI subscale, which contains seven items. *IPSTS* = Interpersonal Self-Talk Scale; *SCS* = Self-Compassion Scale; *Self-Kind* = Self-Kindness subscale; *Common H* = Common Humanity subscale;

*Mindfulness* = Mindfulness subscale; *Self-Judge* = Self-Judgment subscale; *Isolation* = Isolation subscale; *Over ID* = Over-Identification subscale; *FSCRS* = Forms of Self-Criticizing and Self-Reassuring Scale; *Reassured* = Reassured Self subscale; *Inadequate* = Inadequate Self subscale; *Hated* = Hated Self subscale.

Table 17

*Inter-rater agreement for coded vocalized self-talk and written self-talk statements*

IPSTS Dimension	Inter-rater reliability ( $\alpha$ )	
	Vocalized self-talk	Written self-talk
Dominance	.91	.95
Affiliation	.92	.97

*Note.*  $N = 33$ . Inter-rater reliabilities were computed for dominance and affiliation dimension scores. *IPSTS* = Interpersonal Self-Talk Scale; *Vocalized self-talk* = observer-coded vocalized self-talk; *Written self-talk* = observer-coded written examples of self-talk.

Table 18

*Means and standard deviations of the trait and state IPSTS subscale scores – Study 3*

IPSTS Section	Trait IPSTS (N = 23)		State IPSTS (N = 33)	
	Mean	SD	Mean	SD
<b>Octant Subscales</b>				
PA	3.54	.68	3.23	.79
BC	3.30	.68	2.69	1.05
DE	2.82	.81	2.51	1.03
FG	2.97	.82	3.57	.97
HI	3.04	.69	3.22	.68
JK	3.51	.60	3.04	.71
LM	3.92	.80	3.45	.92
NO	3.75	.68	3.38	.93
<b>Dimension Scores</b>				
Dominance	.00	.08	.00	.08
Affiliation	.00	.10	.00	.10

*Note.* Only 23 participants completed the trait IPSTS as it was a premeasure. *SD* = standard deviation.

Table 19

*Correlations among trait and state dominant and affiliative self-talk*

State Self-Talk	Trait Self-Talk	
	Dominance	Affiliation
<b>Dominance</b>		
Adjective ratings	.26	.42
Vocalized	-.24	-.08
Written	-.17	-.11
<b>Affiliation</b>		
Adjective ratings	.06	.02
Vocalized	.02	.05
Written	.10	.23

$N = 23$ . All  $|r| \geq .42$ ,  $p < .05$

*Note.* All correlations were computed using dimension scores. *Trait Self-Talk* refers to the dimension scores computed from the trait Interpersonal Self-Talk Scale. *State Self-Talk* refers to the dimension scores for the three different state measures of self-talk style: (1) *Adjective ratings* = self-reported adjective ratings on the state Interpersonal Self-Talk Scale; (2) *Vocalized* = observer-coded vocalized self-talk; (3) *Written* = observer-coded written examples of self-talk.

Table 20

*Correlations among state measures of dominant and affiliative self-talk*

	Dominance			Affiliation		
	Adjective ratings	Vocalized	Written	Adjective ratings	Vocalized	Written
<b>Dominance</b>						
Adjective ratings	--					
Vocalized	-.03	--				
Written	.01	.40	--			
<b>Affiliation</b>						
Adjective ratings	.08	-.22	-.18	--		
Vocalized	-.20	.20	.12	.27	--	
Written	-.16	-.18	.06	.10	.24	--

$N = 33$ .  $|r| \geq .35$ ,  $p < .05$

*Note.* All correlations were computed using dimension scores. *Adjective ratings* = self-reported adjective ratings on the state Interpersonal Self-Talk Scale; *Vocalized* = dimension scores computed from observer-coded vocalized self-talk; *Written* = dimension scores computed from observer-coded written examples of self-talk.

Table 21

*Correlations among trait self-reported self-talk, positive affect, and negative affect*

	DOM trait adjective ratings	AFF trait adjective ratings	Positive Affect	Negative Affect
DOM trait adjective ratings	--			
AFF trait adjective ratings	.35	--		
Positive Affect	-.05	-.17	--	
Negative Affect	-.20	-.16	-.18	--

$N = 33$ .  $|r| \geq .35$ ,  $p < .05$

*Note.* All correlations were computed using dimension scores. *DOM trait adjective ratings* = dominance dimension score for self-report adjective ratings on the trait IPSTS; *AFF trait adjective ratings* = affiliation dimension score for self-report adjective ratings on the trait IPSTS; *Positive Affect* = positive affect subscale of the Positive and Negative Affect Schedules (PANAS); *Negative Affect* = negative affect subscale of the PANAS.

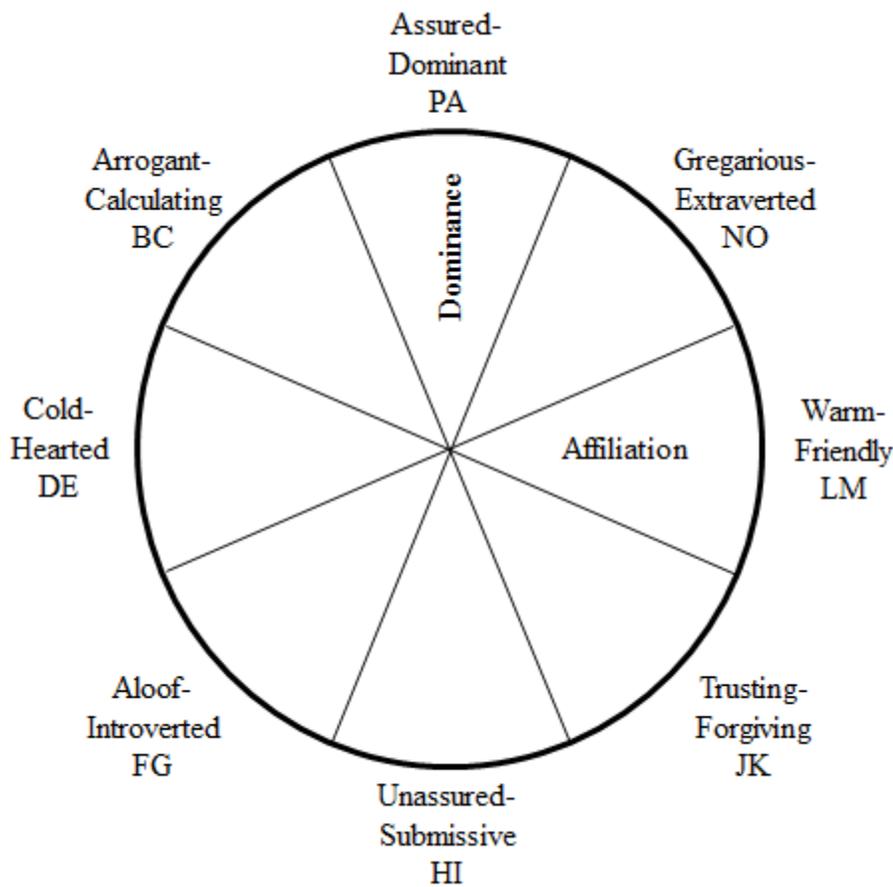


Figure 1. The Interpersonal Circumplex (adapted from Pincus & Gurtman, 1995). This figure illustrates the circumplex arrangement of the eight interpersonal styles from the Revised Interpersonal Adjective Scales (IAS-R; Wiggins et al., 1988), along with the two principal dimensions of Interpersonal Theory: dominance and affiliation.

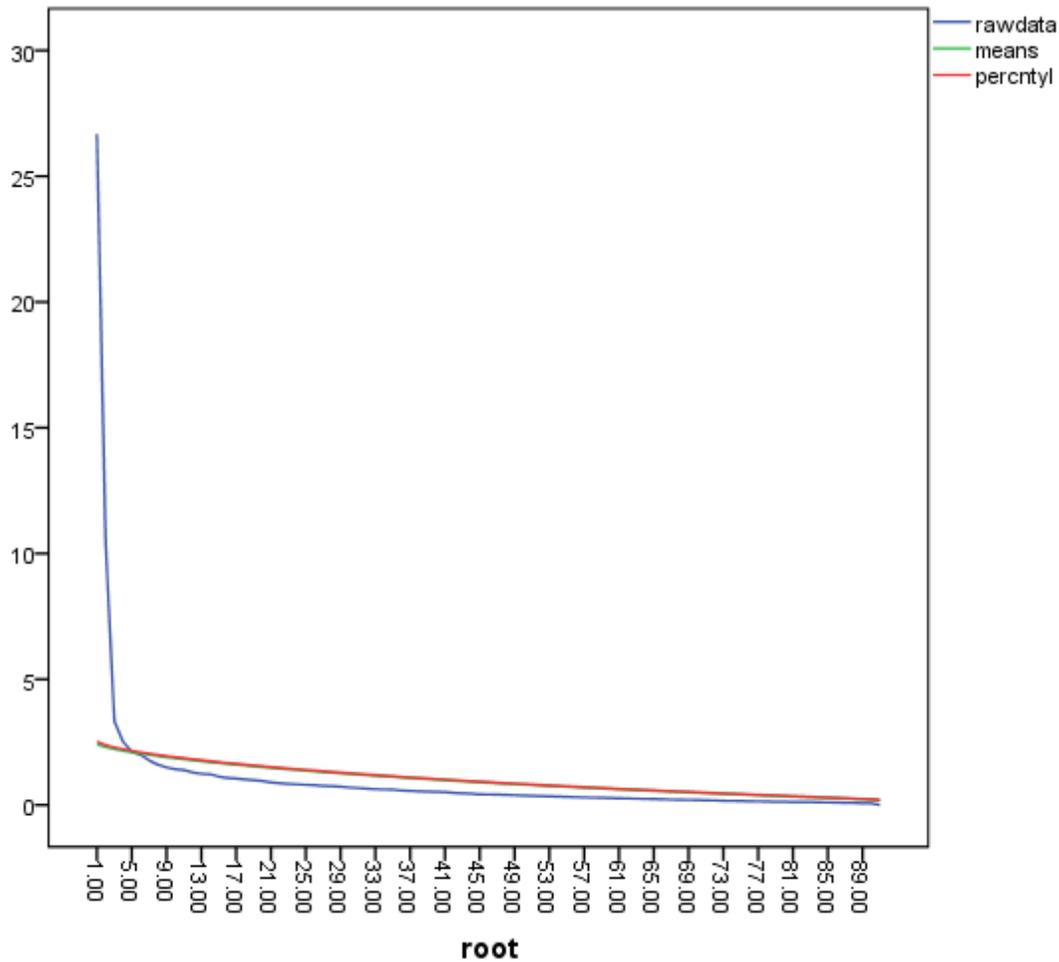


Figure 2. IPSTS factor analysis scree plot and parallel analysis plot – Study 1. This figure shows the observed eigenvalues (blue line), estimated eigenvalues (red line) and the mean of the random data eigenvalues (green line). The point at which the blue and red lines intersect indicates the number of factors to be retained, which is indicated by the root value along the x axis, (i.e., 4). Note that the red line superimposes the green line.



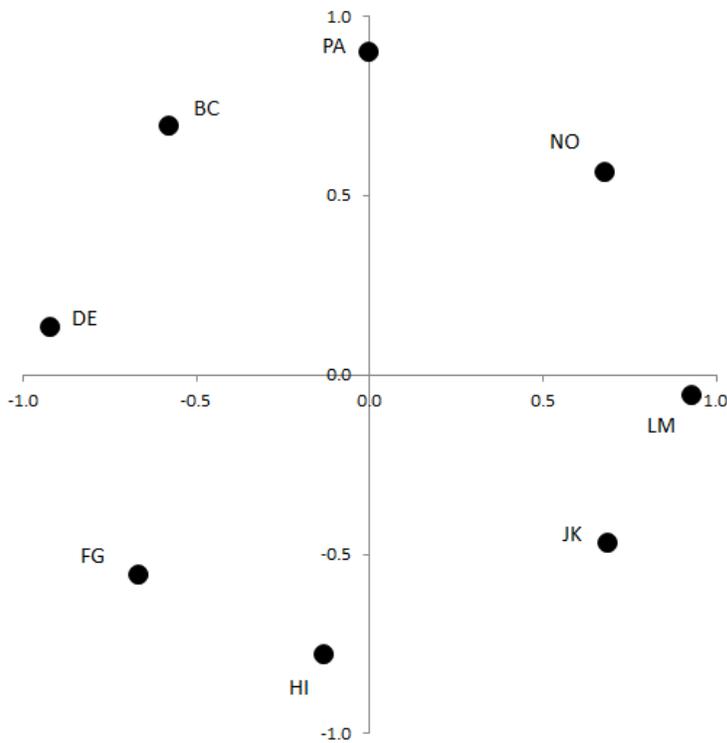


Figure 4 A. IPSTS 5-item subscale plot

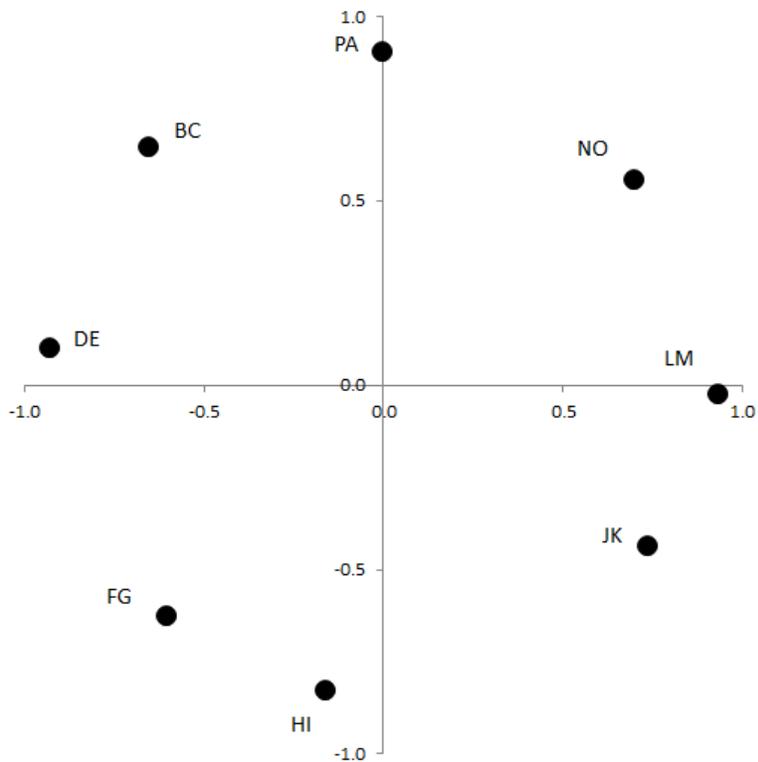


Figure 4 B. IPSTS ipsatized 6-item subscale plot

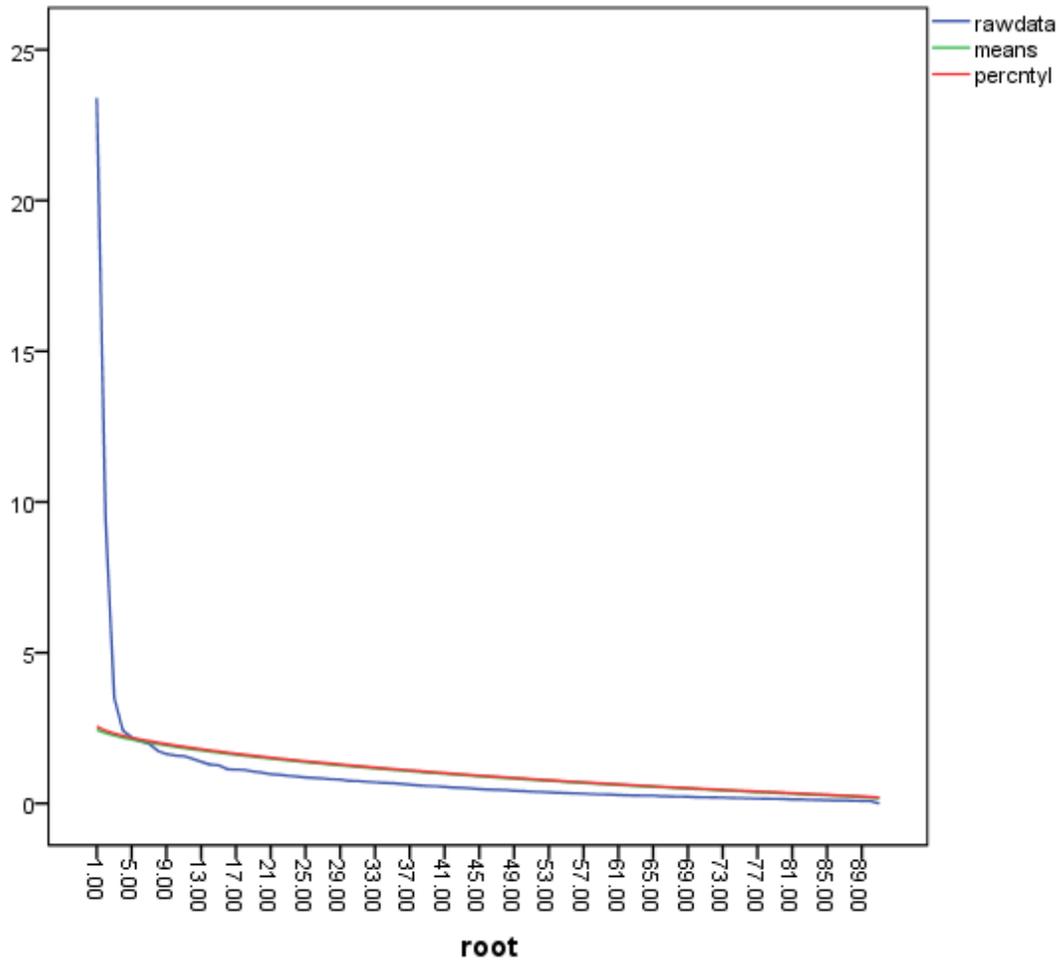


Figure 5. IPSTS factor analysis scree plot and parallel analysis plot – Study 2. This figure shows the observed eigenvalues (blue line), estimated eigenvalues (red line), and the mean of the random data eigenvalues (green line). The point at which the blue and red lines intersect indicates the number of factors to be retained, which is indicated by the root value along the x axis (i.e. 5). Note that the red line superimposes the green line.



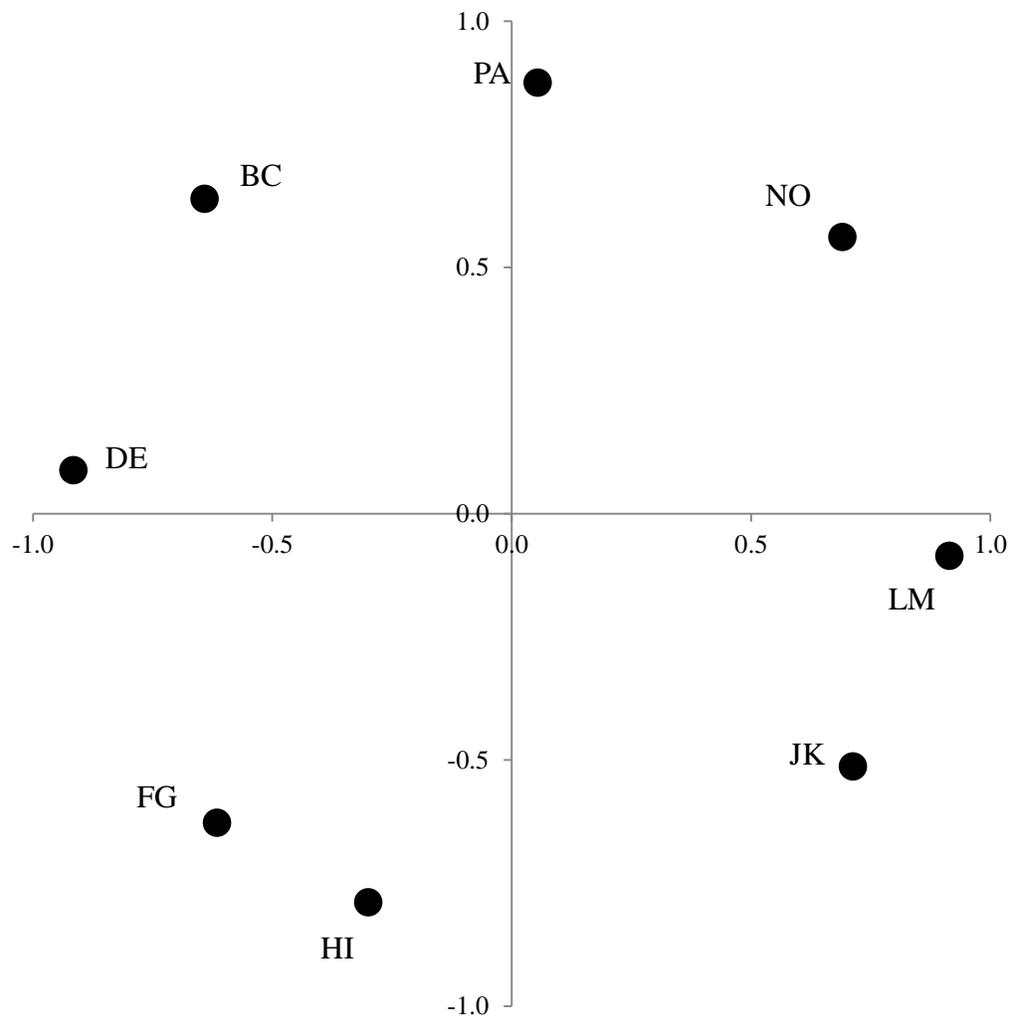
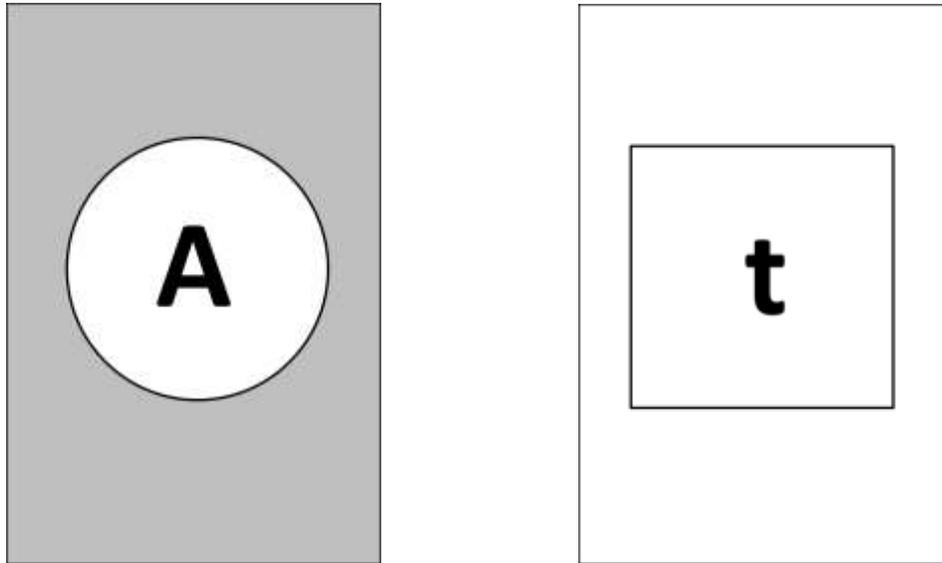


Figure 7. Plot of IPSTS subscales – Study 2.



*Figure 8.* Stimulus patterns in the concept formation task – Study 3. Each pattern displays one of two values from four possible dimensions: (a) letter (“A” vs. “T”) (b) letter font size (uppercase vs. lowercase), (c) border surrounding the letter (circle vs. square), and (d) background color (grey vs. white). Each pattern was composed of complementary features.

**Appendix A**  
**Interpersonal Self-Talk Scale (IPSTS)**

Virtually everybody engages in self-talk. During self-talk, an inner voice addresses the self, usually silently but sometimes aloud, with content that is self-relevant. Self-talk can occur in many different situations, and it can serve a variety of purposes. For example, it can encourage and motivate like an inner coach, or reassure and support like an inner counselor, or evaluate and correct like an inner critic, or raise doubts and questions like an inner skeptic. There may be other roles for self-talk, as well.

- 1a. Think of a time within the last month when you engaged in self-talk. Please take a minute to write down what was happening. (E.g., where were you and what were you doing?)

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- 1b. Write down what you actually said to yourself in this situation. Be as specific as possible.

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- 2a. Think of another time within the last month when you engaged in self-talk. Please write down what was happening. (E.g., where were you and what were you doing?)

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- 2b. Write down what you actually said to yourself in this situation. Be as specific as possible.

---

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More **generally**, please reflect on how your inner voice sounds and what it says. Indicate how often your self-talk can be described by each of the following terms. *Please make sure to rate how often each term describes your self-talk, and not your general personality.* Be sure to write a number for each adjective.

1 Never	2 Rarely	3 Occasionally	4 Often	5 Very Often	6 Almost Always
---------	----------	----------------	---------	--------------	-----------------

- |                   |       |                   |       |                   |       |
|-------------------|-------|-------------------|-------|-------------------|-------|
| 1. Competitive    | _____ | 27. Trusting      | _____ | 53. Hesitant      | _____ |
| 2. Uninhibited    | _____ | 28. Compassionate | _____ | 54. Tolerant      | _____ |
| 3. Cold           | _____ | 29. Timid         | _____ | 55. Complimentary | _____ |
| 4. Indifferent    | _____ | 30. Indecisive    | _____ | 56. Energizing    | _____ |
| 5. Humble         | _____ | 31. Unsympathetic | _____ | 57. Commanding    | _____ |
| 6. Forgiving      | _____ | 32. Boastful      | _____ | 58. Reassuring    | _____ |
| 7. Content        | _____ | 33. Decisive      | _____ | 59. Supportive    | _____ |
| 8. Assured        | _____ | 34. Cunning       | _____ | 60. Accepting     | _____ |
| 9. Dominant       | _____ | 35. Harsh         | _____ | 61. Wavering      | _____ |
| 10. Dramatic      | _____ | 36. Inhibited     | _____ | 62. Ruminative    | _____ |
| 11. Warm          | _____ | 37. Meek          | _____ | 63. Fault-Finding | _____ |
| 12. Undemanding   | _____ | 38. Understanding | _____ | 64. Cynical       | _____ |
| 13. Apologetic    | _____ | 39. Affectionate  | _____ | 65. Leading       | _____ |
| 14. Reserved      | _____ | 40. Enthusiastic  | _____ | 66. Bossy         | _____ |
| 15. Hostile       | _____ | 41. Ambitious     | _____ | 67. Critical      | _____ |
| 16. Strict        | _____ | 42. Flamboyant    | _____ | 68. Doubting      | _____ |
| 17. Assertive     | _____ | 43. Friendly      | _____ | 69. Undecided     | _____ |
| 18. Cocky         | _____ | 44. Lenient       | _____ | 70. Serene        | _____ |
| 19. Irritable     | _____ | 45. Helpless      | _____ | 71. Cheerful      | _____ |
| 20. Aloof         | _____ | 46. Distant       | _____ | 72. Determined    | _____ |
| 21. Passive       | _____ | 47. Accusatory    | _____ | 73. Authoritative | _____ |
| 22. Nonjudgmental | _____ | 48. Forceful      | _____ | 74. Inspiring     | _____ |
| 23. Sympathetic   | _____ | 49. Bold          | _____ | 75. Kind          | _____ |
| 24. Aspiring      | _____ | 50. Disrespectful | _____ | 76. Insecure      | _____ |
| 25. Persuasive    | _____ | 51. Judgmental    | _____ | 77. Unassured     | _____ |
| 26. Confident     | _____ | 52. Uncheery      | _____ | 78. Overreacting  | _____ |

- |                 |       |                   |       |                 |       |
|-----------------|-------|-------------------|-------|-----------------|-------|
| 79. Insistent   | _____ | 84. Strong-Willed | _____ | 89. Unconfident | _____ |
| 80. Scolding    | _____ | 85. Encouraging   | _____ | 90. Approving   | _____ |
| 81. Acquiescent | _____ | 86. Loving        | _____ | 91. Motivating  | _____ |
| 82. Merciful    | _____ | 87. Unsure        | _____ |                 |       |
| 83. Optimistic  | _____ | 88. Disapproving  | _____ |                 |       |

**Appendix B**  
**Revised Interpersonal Adjective Scales (IAS-R; Wiggins et al., 1988)**

On this page, you will find a list of words that are used to describe people's personal characteristics. For each word in the list, indicate how accurately the word describes you. The accuracy with which a word describes you is to be judged on the following scale. Write the number of the description that best fits in the space to the left of the item in the word list. Please answer every item.

1	2	3	4	5	6	7	8
Extremely Inaccurate	Very Inaccurate	Quite Inaccurate	Slightly Inaccurate	Slightly Accurate	Quite Accurate	Very Accurate	Extremely Accurate
1. ___ introverted			23. ___ unsparkling			46. ___ self-confident	
2. ___ undemanding			24. ___ cunning			47. ___ outgoing	
3. ___ assertive			25. ___ meek			48. ___ boastful	
4. ___ unauthoritative			26. ___ uncharitable			49. ___ bashful	
5. ___ unwily			27. ___ uncalculating			50. ___ firm	
6. ___ charitable			28. ___ unaggressive			51. ___ unsly	
7. ___ kind			29. ___ jovial			52. ___ unsociable	
8. ___ soft-hearted			30. ___ crafty			53. ___ hard-hearted	
9. ___ shy			31. ___ boastless			54. ___ wily	
10. ___ uncunning			32. ___ domineering			55. ___ calculating	
11. ___ unsympathetic			33. ___ persistent			56. ___ uncheery	
12. ___ ruthless			34. ___ unargumentative			57. ___ sly	
13. ___ dissocial			35. ___ tender			58. ___ neighbourly	
14. ___ accommodating			36. ___ warmthless			59. ___ cold-hearted	
15. ___ tender-hearted			37. ___ timid			60. ___ distant	
16. ___ cheerful			38. ___ unbold			61. ___ cocky	
17. ___ dominant			39. ___ forceful			62. ___ sympathetic	
18. ___ antisocial			40. ___ uncrafty			63. ___ forceless	
19. ___ iron-hearted			41. ___ extroverted			64. ___ tricky	
20. ___ enthusiastic			42. ___ gentle-hearted				
21. ___ self-assured			43. ___ perky				
22. ___ cruel			44. ___ friendly				
			45. ___ unneighbourly				

**Appendix C**  
**Social Behavior Inventory (SBI; Moskowitz, 1994)**

Over the last 1 month, please indicate how often you engaged in the behaviors described by using the following scale:

1 = never 2 = rarely 3 = occasionally 4 = often 5 = very often 6 = almost always

1. I set goals for others.	1	2	3	4	5	6
2. I waited for another person to act or talk first.	1	2	3	4	5	6
3. I listened attentively to others.	1	2	3	4	5	6
4. I did not respond to another's questions or comments.	1	2	3	4	5	6
5. I gave information.	1	2	3	4	5	6
6. I went along with the views or wishes of another person.	1	2	3	4	5	6
7. I criticized others.	1	2	3	4	5	6
8. I expressed an opinion.	1	2	3	4	5	6
9. I did not express disagreement when I thought it.	1	2	3	4	5	6
10. I spoke favorably of someone who was not present.	1	2	3	4	5	6
11. I raised my voice.	1	2	3	4	5	6
12. I spoke softly.	1	2	3	4	5	6
13. I compromised about a decision.	1	2	3	4	5	6
14. I made a sarcastic comment.	1	2	3	4	5	6
15. I took the lead in planning/organizing a project or activity.	1	2	3	4	5	6
16. I let others make plans or decisions.	1	2	3	4	5	6
17. I complimented or praised others.	1	2	3	4	5	6
18. I demanded that others do what I wanted.	1	2	3	4	5	6
19. I asked for a volunteer.	1	2	3	4	5	6
20. I gave in.	1	2	3	4	5	6

21. I smiled and laughed with others.	1	2	3	4	5	6
22. I discredited what someone said.	1	2	3	4	5	6
23. I spoke in a clear firm voice.	1	2	3	4	5	6
24. I spoke only when I was spoken to.	1	2	3	4	5	6
25. I showed sympathy.	1	2	3	4	5	6
26. I confronted others about something I did not like.	1	2	3	4	5	6
27. I asked others to do something.	1	2	3	4	5	6
28. I did not say what I wanted directly.	1	2	3	4	5	6
29. I exchanged pleasantries.	1	2	3	4	5	6
30. I gave incorrect information.	1	2	3	4	5	6
31. I got immediately to the point.	1	2	3	4	5	6
32. I did not state my own views.	1	2	3	4	5	6
33. I pointed out to others where there was agreement.	1	2	3	4	5	6
34. I stated strongly that I did not like or that I would not do something	1	2	3	4	5	6
35. I tried to get others to do something else.	1	2	3	4	5	6
36. I did not say how I felt.	1	2	3	4	5	6
37. I expressed affection with words or gestures.	1	2	3	4	5	6
38. I ignored another's comments.	1	2	3	4	5	6
39. I made suggestions.	1	2	3	4	5	6
40. I avoided taking the lead or being responsible.	1	2	3	4	5	6
41. I made a concession to avoid unpleasantness.	1	2	3	4	5	6
42. I withheld useful information.	1	2	3	4	5	6
43. I assigned someone to a task.	1	2	3	4	5	6
44. I did not say what was on my mind.	1	2	3	4	5	6

45. I expressed reassurance.

1 2 3 4 5 6

46. I showed impatience.

1 2 3 4 5 6

**Appendix D**  
**Circumplex Scales of Interpersonal Values (CSIV; Locke, 2000)**

For each item below, answer the following question: “When I am in interpersonal situations (such as with close friends, with strangers, at work, at social gatherings, and so on), in general how important is it to me that I act or appear or am treated this way?” **Please circle the most appropriate response for each question using the following rating scale:**

0	1	2	3	4
Not at all	Mildly	Moderately	Very	Extremely

When I am with other people, it is important to me that

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. I appear confident                               | 0 | 1 | 2 | 3 | 4 |
| 2. I feel connected to them                         | 0 | 1 | 2 | 3 | 4 |
| 3. I appear forceful                                | 0 | 1 | 2 | 3 | 4 |
| 4. I keep my guard up                               | 0 | 1 | 2 | 3 | 4 |
| 5. they acknowledge when I am right                 | 0 | 1 | 2 | 3 | 4 |
| 6. they not know what I am thinking or feeling      | 0 | 1 | 2 | 3 | 4 |
| 7. I appear aloof                                   | 0 | 1 | 2 | 3 | 4 |
| 8. they support me when I am having problems        | 0 | 1 | 2 | 3 | 4 |
| 9. I keep the upper hand                            | 0 | 1 | 2 | 3 | 4 |
| 10. I get along with them                           | 0 | 1 | 2 | 3 | 4 |
| 11. I not make mistakes in front of them            | 0 | 1 | 2 | 3 | 4 |
| 12. I live up to their expectations                 | 0 | 1 | 2 | 3 | 4 |
| 13. they respect what I have to say                 | 0 | 1 | 2 | 3 | 4 |
| 14. they keep their distance from me                | 0 | 1 | 2 | 3 | 4 |
| 15. I <u>not</u> back down when disagreements arise | 0 | 1 | 2 | 3 | 4 |
| 16. I <u>not</u> say something stupid               | 0 | 1 | 2 | 3 | 4 |
| 17. they come to me with their problems             | 0 | 1 | 2 | 3 | 4 |
| 18. I am the one in charge                          | 0 | 1 | 2 | 3 | 4 |

When I am with other people, **it is important to me** that

19. I <u>not</u> make them angry	0	1	2	3	4
20. I have an impact on them	0	1	2	3	4
21. I do better than them	0	1	2	3	4
22. I make them feel happy	0	1	2	3	4
23. they not tell me what to do	0	1	2	3	4
24. I go along with what they want to do	0	1	2	3	4
25. they approve of me	0	1	2	3	4
26. I <u>not</u> expose myself to ridicule	0	1	2	3	4
27. they show concern for how I am feeling	0	1	2	3	4
28. they mind their own business	0	1	2	3	4
29. they listen to what I have to say	0	1	2	3	4
30. they not get their feelings hurt	0	1	2	3	4
31. I express myself openly	0	1	2	3	4
32. I get the upper hand	0	1	2	3	4

**Appendix E**  
**Circumplex Scales of Interpersonal Efficacy (CSIE; Locke & Sadler, 2007)**

For each of the following behaviors, rate how sure you are that you can act that way with other people. Please circle the most appropriate response for each question using the rating scale:

0   1   2   3   4   5   6   7   8   9   10  
 Not at all   Mildly   Moderately   Very   Absolutely

*Sample item: When I am with other people, I am confident that I can express myself clearly.*  
 If you are absolutely confident that you can express yourself clearly, you would circle 10.  
 If you feel not at all confident, you would circle 0. If you feel moderately confident that you can express yourself clearly, you would circle 5, and so on.

When I am with other people, **I am confident** that

- |  |   |   |   |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|---|---|---|----|
| 1. I can express myself openly                     | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2. I can be tough                                  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 3. I can follow the rules                          | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 4. I can be assertive                              | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 5. I can hide my thoughts and feelings             | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 6. I can fit in                                    | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 7. I can keep the upper hand                       | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 8. I can avoid getting into arguments              | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 9. I can smooth over any difficulties              | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 10. I can be cold and unfriendly when I want to    | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11. I can get along with them                      | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 12. I can speak up when I have something to say    | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 13. I can be submissive                            | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 14. I can understand their feelings                | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 15. I can win any arguments or competitions        | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 16. I can be a follower                            | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17. I can get them to listen to what I have to say | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

When I am with other people, **I am confident** that

- |  |   |   |   |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|---|---|---|----|
| 18. I can get them to leave me alone                 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 19. I can be nice                                    | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 20. I can take charge                                | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 21. I can disappear in to the background when I want | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 22. I can soothe hurt feelings                       | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 23. I can be aggressive if I need to                 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 24. I can avoid making them angry                    | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 25. I can be a leader                                | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 26. I can be cruel when the situation calls for it   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 27. I can be giving                                  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 28. I can be forceful                                | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 29. I can be quiet                                   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 30. I can be helpful                                 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 31. I can tell them when I am annoyed                | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 32. I can let others take charge                     | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**Appendix F****Inventory of Interpersonal Problems-Short Circumplex (IIP-SC; Hopwood et al., 2008)**

Listed below are a variety of common problems that people report in relating to other people. Please read each one and consider whether that problem has been a problem for you with respect to any significant person in your life. Then select the number that describes how distressing that problem has been, and circle that number.

<b>It's hard for me to...</b>	<b>Not at all</b>	<b>A little bit</b>	<b>Moderately</b>	<b>Quite a bit</b>	<b>Extremely</b>
1. join in on groups	0	1	2	3	4
2. keep things private from other people	0	1	2	3	4
3. tell a person to stop bothering me	0	1	2	3	4
4. introduce myself to new people	0	1	2	3	4
5. confront people with problems that come up	0	1	2	3	4
6. be assertive with another person	0	1	2	3	4
7. let other people know when I'm angry	0	1	2	3	4
8. socialize with other people	0	1	2	3	4
9. show affection to people	0	1	2	3	4
10. understand another person's point of view	0	1	2	3	4
11. be firm when I need to be	0	1	2	3	4
12. experience a feeling of love for another person	0	1	2	3	4
13. be supportive of another person's goals in life	0	1	2	3	4
14. feel close to other people	0	1	2	3	4
15. feel good about another person's happiness	0	1	2	3	4
16. ask other people to get together socially with me	0	1	2	3	4

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17. attend to my own welfare when somebody else is needy	0	1	2	3	4
18. be assertive without worrying about hurting others' feelings.	0	1	2	3	4

**Part II. The following are things that you do too much**

	<b>Not at all</b>	<b>A little bit</b>	<b>Moderately</b>	<b>Quite a bit</b>	<b>Extremely</b>
20. I open up to people too much	0	1	2	3	4
21. I am too aggressive toward other people	0	1	2	3	4
22. I try to please other people too much	0	1	2	3	4
23. I want to be noticed too much	0	1	2	3	4
24. I try to control other people too much	0	1	2	3	4
25. I put other people's needs before my own too much	0	1	2	3	4
26. I am too suspicious of other people	0	1	2	3	4
27. I tell personal things to other people too much	0	1	2	3	4
28. I argue with other people too much	0	1	2	3	4
29. I keep other people at a distance too much	0	1	2	3	4
30. I let other people take advantage of me too much	0	1	2	3	4
31. I am affected by another person's misery too much	0	1	2	3	4
32. I want to get revenge against people too much	0	1	2	3	4

**Appendix G**  
**Self-Compassion Scale (SCS; Neff, 2003)**

Please read each statement carefully before answering. To the left of each item, indicate how often you behave in the stated manner, using the following scale:

Almost never					Almost always
1	2	3	4	5	

1. \_\_\_\_\_ I'm disapproving and judgmental about my own flaws and inadequacies.
2. \_\_\_\_\_ When I'm feeling down I tend to obsess and fixate on everything that's wrong.
3. \_\_\_\_\_ When things are going badly for me, I see the difficulties as part of life that everyone goes through.
4. \_\_\_\_\_ When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.
5. \_\_\_\_\_ I try to be loving towards myself when I'm feeling emotional pain.
6. \_\_\_\_\_ When I fail at something important to me I become consumed by feelings of inadequacy.
7. \_\_\_\_\_ When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.
8. \_\_\_\_\_ When times are really difficult, I tend to be tough on myself.
9. \_\_\_\_\_ When something upsets me I try to keep my emotions in balance.
10. \_\_\_\_\_ When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
11. \_\_\_\_\_ I'm intolerant and impatient towards those aspects of my personality I don't like.
12. \_\_\_\_\_ When I'm going through a very hard time, I give myself the caring and tenderness I need.
13. \_\_\_\_\_ When I'm feeling down, I tend to feel like most other people are probably happier than I am.
14. \_\_\_\_\_ When something painful happens I try to take a balanced view of the situation.

15. \_\_\_\_\_ I try to see my failings as part of the human condition.
16. \_\_\_\_\_ When I see aspects of myself that I don't like, I get down on myself.
17. \_\_\_\_\_ When I fail at something important to me I try to keep things in perspective.
18. \_\_\_\_\_ When I'm really struggling, I tend to feel like other people must be having an easier time of it.
19. \_\_\_\_\_ I'm kind to myself when I'm experiencing suffering.
20. \_\_\_\_\_ When something upsets me I get carried away with my feelings.
21. \_\_\_\_\_ I can be a bit cold-hearted towards myself when I'm experiencing suffering.
22. \_\_\_\_\_ When I'm feeling down I try to approach my feelings with curiosity and openness.
23. \_\_\_\_\_ I'm tolerant of my own flaws and inadequacies.
24. \_\_\_\_\_ When something painful happens I tend to blow the incident out of proportion.
25. \_\_\_\_\_ When I fail at something that's important to me, I tend to feel alone in my failure.
26. \_\_\_\_\_ I try to be understanding and patient towards those aspects of my personality I don't like.

**Appendix H**  
**Forms of Self-Criticizing and Self-Reassuring Scale (FSCRS; Gilbert et al., 2004)**

When things go wrong in our lives or don't work out as we hoped, and we feel we could have done better, we sometimes have *negative and self-critical thoughts and feelings*. These may take the form of feeling worthless, useless or inferior etc. However, people can also try to be supportive of themselves. Below are a series of thoughts and feelings that people sometimes have. Read each statement carefully and circle the number that best describes how much each statement is true for you.

Not at all like me 0	A little bit like me 1	Moderately like me 2	Quite a bit like me 3	Extremely like me 4
-------------------------	---------------------------	-------------------------	--------------------------	------------------------

**When things go wrong for me:**

1. \_\_\_\_ I am easily disappointed with myself.
2. \_\_\_\_ There is a part of me that puts me down.
3. \_\_\_\_ I am able to remind myself of positive things about myself.
4. \_\_\_\_ I find it difficult to control my anger and frustration at myself.
5. \_\_\_\_ I find it easy to forgive myself.
6. \_\_\_\_ There is a part of me that feels I am not good enough.
7. \_\_\_\_ I feel beaten down by my own self-critical thoughts.
8. \_\_\_\_ I still like being me.
9. \_\_\_\_ I have become so angry with myself that I want to hurt or injure myself.
10. \_\_\_\_ I have a sense of disgust with myself.
11. \_\_\_\_ I can still feel lovable and acceptable.
12. \_\_\_\_ I stop caring about myself.
13. \_\_\_\_ I find it easy to like myself.
14. \_\_\_\_ I remember and dwell on my failings.
15. \_\_\_\_ I call myself names.
16. \_\_\_\_ I am gentle and supportive with myself.
17. \_\_\_\_ I can't accept failures and setbacks without feeling inadequate.
18. \_\_\_\_ I think I deserve my self-criticism.
19. \_\_\_\_ I am able to care and look after myself.
20. \_\_\_\_ There is a part of me that wants to get rid of the bits I don't like.
21. \_\_\_\_ I encourage myself for the future.
22. \_\_\_\_ I do not like being me.

**Appendix I**  
**Interpersonal Self-Talk Scale** (48-item version)

Virtually everybody engages in self-talk. During self-talk, an inner voice addresses the self, usually silently but sometimes aloud, with content that is self-relevant. Self-talk can occur in many different situations, and it can serve a variety of purposes. For example, it can encourage and motivate like an inner coach, or reassure and support like an inner counselor, or evaluate and correct like an inner critic, or raise doubts and questions like an inner skeptic. There may be other roles for self-talk, as well.

1a. Think of a time within the last month when you engaged in self-talk. Please take a minute to write down what was happening. (E.g., where were you and what were you doing?)

---



---



---



---

1b. Write down what you actually said to yourself in this situation. Be as specific as possible.

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2a. Think of another time within the last month when you engaged in self-talk. Please write down what was happening. (E.g., where were you and what were you doing?)

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---



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2b. Write down what you actually said to yourself in this situation. Be as specific as possible.

---



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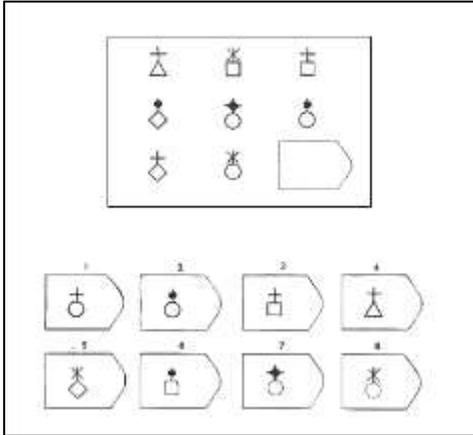
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More **generally**, please reflect on how your inner voice sounds and what it says. Indicate how often your self-talk can be described by each of the following terms. *Please make sure to rate how often each term describes your self-talk, and not your general personality.* Be sure to write a number for each adjective.

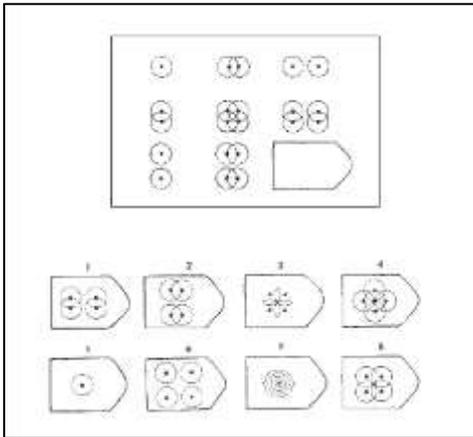
1 Never	2 Rarely	3 Occasionally	4 Often	5 Very Often	6 Almost Always
------------	-------------	-------------------	------------	-----------------	--------------------

1. Assertive	_____	17. Leading	_____	33. Authoritative	_____
2. Strict	_____	18. Insistent	_____	34. Commanding	_____
3. Hostile	_____	19. Scolding	_____	34. Disrespectful	_____
4. Helpless	_____	20. Insecure	_____	36. Unassured	_____
5. Meek	_____	21. Timid	_____	37. Hesitant	_____
6. Humble	_____	22. Nonjudgmental	_____	38. Tolerant	_____
7. Accepting	_____	23. Kind	_____	39. Approving	_____
8. Ambitious	_____	24. Energizing	_____	40. Determined	_____
9. Persuasive	_____	25. Decisive	_____	41. Strong-Willed	_____
10. Confident	_____	26. Motivating	_____	42. Inspiring	_____
11. Friendly	_____	27. Supportive	_____	43. Loving	_____
12. Serene	_____	28. Lenient	_____	33. Undemanding	_____
13. Passive	_____	29. Indecisive	_____	45. Disappointed	_____
14. Undecided	_____	30. Unconfident	_____	46. Wavering	_____
15. Cynical	_____	31. Harsh	_____	47. Fault-Finding	_____
16. Forceful	_____	32. Bold	_____	48. Bossy	_____

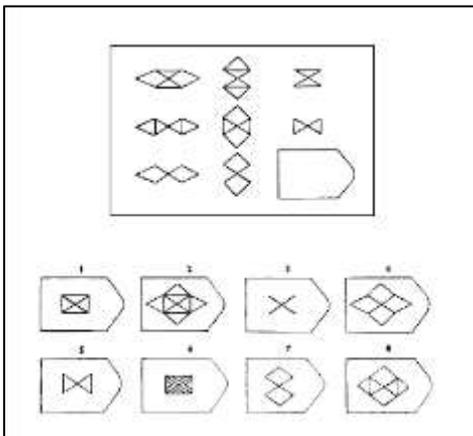
**Appendix J**  
**Raven's Standard Progressive Matrices (SPM)**



Matrix 1. (RPM item 57)



Matrix 2. (RPM item 34)



Matrix 3. (RPM item 59)

**Appendix K**  
**State Interpersonal Self-Talk Scale (IPSTS)**

Virtually everybody engages in self-talk. During self-talk, an inner voice addresses the self, usually silently but sometimes aloud, with content that is self-relevant. Self-talk can occur in many different situations, and it can serve a variety of purposes. For example, it can encourage and motivate like an inner coach, or reassure and support like an inner counselor, or evaluate and correct like an inner critic, or raise doubts and questions like an inner skeptic. There may be other roles for self-talk, as well.

In the space below, please provide **5 examples** of your self-talk, that is, things that you said to yourself during the Concept Formation Task, and try to **be as specific as possible**. Please answer as honestly as you can.

1) \_\_\_\_\_

2) \_\_\_\_\_

3) \_\_\_\_\_

4) \_\_\_\_\_

5) \_\_\_\_\_

Now, to reflect on how your inner voice sounded during the Concept Formation Task.

Indicate how often your self-talk could be described by each of the following terms. *Please make sure to rate how often each term describes your self-talk **during the task**.* Be sure to write a number for each adjective.

For example, if you feel that during the task your self-talk sounded Assertive almost all of the time, you would put a 6 “Almost always” next to the first item, “Assertive”. If, however you feel that your self-talk rarely sounded assertive during the task, you would put a 2 “Rarely” next to the item “Assertive”.

1 Never	2 Rarely	3 Occasionally	4 Often	5 Very Often	6 Almost Always
------------	-------------	-------------------	------------	-----------------	-----------------------

1. Assertive	_____	17. Leading	_____	33. Authoritative	_____
2. Strict	_____	18. Insistent	_____	34. Commanding	_____
3. Hostile	_____	19. Scolding	_____	34. Disrespectful	_____
4. Helpless	_____	20. Insecure	_____	36. Unassured	_____
5. Meek	_____	21. Timid	_____	37. Hesitant	_____
6. Humble	_____	22. Nonjudgmental	_____	38. Tolerant	_____
7. Accepting	_____	23. Kind	_____	39. Approving	_____
8. Ambitious	_____	24. Energizing	_____	40. Determined	_____
9. Persuasive	_____	25. Decisive	_____	41. Strong-Willed	_____
10. Confident	_____	26. Motivating	_____	42. Inspiring	_____
11. Friendly	_____	27. Supportive	_____	43. Loving	_____
12. Serene	_____	28. Lenient	_____	33. Undemanding	_____
13. Passive	_____	29. Indecisive	_____	45. Disappointed	_____
14. Undecided	_____	30. Unconfident	_____	46. Wavering	_____
15. Cynical	_____	31. Harsh	_____	47. Fault-Finding	_____
16. Forceful	_____	32. Bold	_____	48. Bossy	_____

**Appendix L**  
**Positive and Negative Affect Schedules (PANAS; Watson et al., 1988)**

This scale consists of a number of words that describe different feelings and emotions. Read each item and then select the appropriate bubble next to that word. Indicate to what extent you feel like this **RIGHT NOW**. Use the scale below to record your answers.

1	2	3	4	5
Very slightly/Not at all	A little	Moderately	Quite a bit	Extremely

Interested	_____	Active	_____
Distressed	_____	Afraid	_____
Excited	_____	Uneasy	_____
Upset	_____	Tense	_____
Strong	_____	Calm	_____
Guilty	_____	Relaxed	_____
Scared	_____	Happy	_____
Hostile	_____	Depressed	_____
Enthusiastic	_____	Sad	_____
Proud	_____	Helpless	_____
Irritable	_____	Discouraged	_____
Alert	_____	On Edge	_____
Ashamed	_____	Disappointed	_____
Inspired	_____	Hopeless	_____
Nervous	_____	Satisfied	_____
Determined	_____	Low	_____
Attentive	_____	Agitated	_____
Jittery	_____	Frustrated	_____

### Appendix M Additional Measures

The following additional standardized measures were administered in Study 3: (1) The Emotional Frequency Questionnaire (EFQ; Higgins et al., 1997), and (2) the Implicit Theories of Intelligence and Personality (Dweck, 1999). Additional items assessing frustration and hopelessness were administered along with the EFQ, and a measure assessing participants' future expectations was also created and administered. A description of each measure and the associated items are described below:

#### Emotional Frequency Questionnaire (EFQ; Higgins et al., 1997).

This scale consists of a number of words that describe different feelings and emotions. Read each item and then select the appropriate bubble next to that word. Indicate to what extent you feel like this **RIGHT NOW**. Use the scale below to record your answers.

1 Very slightly/Not at all	2 A little	3 Moderately	4 Quite a bit	5 Extremely
----------------------------------	---------------	-----------------	------------------	----------------

Disappointed	_____	Low	_____
On Edge	_____	Calm	_____
Tense	_____	Relaxed	_____
Discouraged	_____	Sad	_____
Satisfied	_____	Uneasy	_____
Happy	_____	Agitated	_____

**Implicit Theories of Intelligence and Personality** (Dweck, 1999)

Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements, as they apply to yourself, by writing the number that corresponds to your opinion in the space next to each statement.

1 Strongly Disagree	2	3	4	5 Strongly Agree
---------------------------	---	---	---	---------------------

\_\_\_\_\_ I can always change my personality.

\_\_\_\_\_ My intelligence is something very basic about me that I can't change very much.

\_\_\_\_\_ I can significantly change my basic characteristics, no matter who I am.

\_\_\_\_\_ I can learn new things, but I can't really change how intelligent I am.

\_\_\_\_\_ I can do things differently, but the important parts of who I am can't really be changed.

\_\_\_\_\_ I can always substantially change how intelligent I am.

\_\_\_\_\_ I am a certain kind of person, and there is not much that can be done to really change that.

\_\_\_\_\_ No matter how much intelligence I have, I can always change it quite a bit.

**Future Expectations**

1) IF you had the time right now, how interested would you be in doing more problems like the ones from the Concept Formation Task?

Not at all      Slightly      Moderately      Very      Extremely

2) IF you had the chance to complete the Concept Formation Task again, how **motivated** would you be to do it?

Not at all      Slightly      Moderately      Very      Extremely

3) With more practice on the Concept Formation Task, what do you think your level of performance would be?

Poor      Adequate      Good      Very Good      Excellent

4) We are running additional experiments to better understand the processes involved in problem solving with the Concept Formation Task. How interested would you be in participating in one of our future studies (assuming you had the time and needed more PREP credits)?

Not at all      Slightly      Moderately      Very      Extremely

5) These additional experiments vary in length from 15 minutes to 120 minutes. Please indicate the length of study (in minutes) that you'd be willing to participate in.

___ 0 (not at all interested)	___ 45	___ 90
___ 15	___ 60	___ 105
___ 30	___ 75	___ 120

## Appendix N Training Protocol for Coding

### Learning the IPC

Two important ways that a person's self-talk can vary relates to the friendliness of the inner voice and the dominance of the inner voice. In other words, the style of the self-talk can sound different depending on how friendly it sounds and also how dominant it sounds. I'm going to ask you to use this information to evaluate how friendly and how dominant you think a person's self-talk sounds when you [listen to some audio clips / read some written self-talk statements]. But first, I want to show you a diagram explaining the different styles in which a person could talk to him or herself. There are eight styles of self-talk that occupy a space on a Cartesian plane, shown in Figure 1. The vertical axis describes the dominance of the self-talk; dominant self-talk is at the top (represented by "PA"), and submissive self-talk is at the bottom (represented by "HI"). The horizontal axis characterizes the friendliness of the self-talk, with friendly self-talk on the right ("LM"), and unfriendly self-talk on the left ("DE"). The other four points on the diagram represent self-talk styles that are blends of the four styles formed from the dominance and friendliness axes. So, self-talk that is friendly and slightly dominant (NO) is represented by the top right corner of the diagram; self-talk that is unfriendly and slightly dominant (BC) is represented in the top left corner. Self-talk that is submissive and slightly friendly (JK) is in the bottom right corner, and self-talk that sounds submissive and slightly unfriendly (FG) is represented in the bottom left corner.

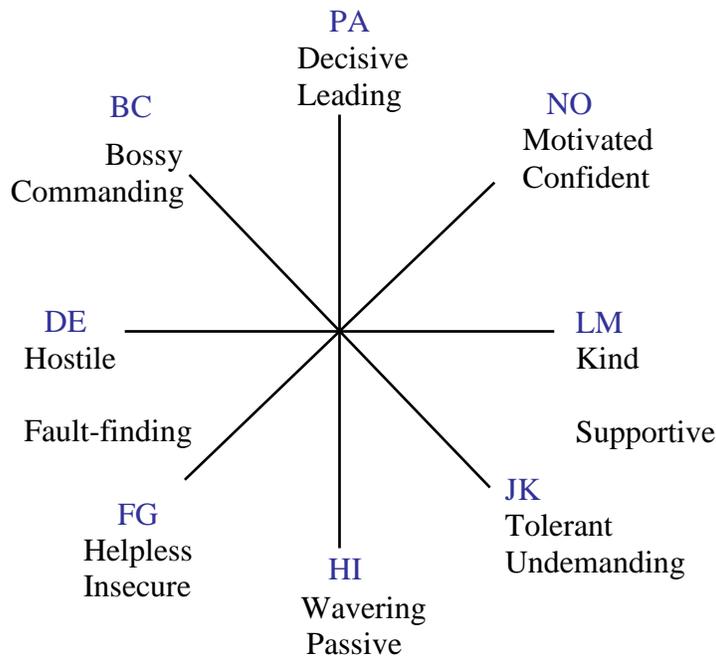


Figure 1. The Interpersonal Circumplex

Each of the eight different styles of self-talk can be described using descriptors other than the main four I have used: dominant; submissive; friendly; unfriendly. Let's talk more about these descriptors. Take a look at your coding sheet. You will notice eight questions, each containing a list of descriptors. Each descriptor is stated only once within and across questions. This is because each question on the coding sheet is describing one of the eight styles of self-talk in Figure 1. For example, the first question asks "To what extent does the self-talk sound assertive, competitive, leading, decisive, authoritative, strong-willed?" These descriptors probably sound very similar to you, and this is because they all are describing a dominant style of self-talk (see "PA" in Figure 1). The second question asks "To what extent does the self-talk sound strict, forceful, insistent, bold, commanding, bossy?" These descriptors are also very similar in meaning, as they are characterizing a style of self-talk that is dominant but also unfriendly ("BC" in Figure 1).

Okay, to make sure you have a solid understanding of the different ways to characterize all eight styles of self-talk, I'd like you to practice with some lists of descriptors. Each list of descriptors will correspond with one of eight self-talk styles in Figure 1. For this practice session, after each list, see if you can identify which style of self-talk the list best describes. After you have finished we will see how many you have correctly identified.

1. Kind, Loving, Friendly, Supportive, Accepting, Approving
2. Passive, Timid, Meek, Hesitant, Indecisive, Wavering
3. Harsh, Fault-finding, Hostile, Scolding, Cynical, Disrespectful
4. Ambitious, Energizing, Motivating, Confident, Inspiring, Determined
5. Disappointed, Unconfident, Undecided, Helpless, Insecure, Unassured
6. Undemanding, Lenient, Tolerant, Apologetic, Non-judgmental, Humble
7. Assertive, Competitive, Leading, Decisive, Authoritative, Strong-Willed
8. Strict, Insistent, Bold, Commanding, Bossy, Forceful

**Notes to trainer** (these bullet points are not included in the copy given to coders):

- If all lists were correct, then indicate "Good job."
- If one or more lists were incorrect, then indicate "Good job, you got XX correct. For <incorrect list 1> you said <incorrect octant>. <incorrect list 1> describes <correct octant>. Does that make sense? Okay, now we're going to go through the lists again. Take your time." [Record their answers below and do this until they get all the word sequences correct, and then indicate "Good job.""]>

<b>List</b>	<b>Trial 1</b>	<b>Trial 2</b>	<b>Trial 3</b>
1			
2			
3			
4			
5			
6			
7			
8			

#### Script for Introducing Practice Coding

In a minute you are going to [listen to your first audio clip/read some sample self-talk statements], but first, I am going to describe the circumstances in which these [clips were recorded/statements were documented]:

*If coders are being trained to rate audio clips:*

In the study, all participants were audio-recorded while trying to solve four problems. After each problem they were asked to “Take a moment to reflect on how this is going, and any thoughts on how you are doing.” The clips you will listen to are composed of only these four reflection periods, which occur in-between problems. Now to give you some context about these problems: Participants were led to believe that each problem could be solved by identifying a ‘target value’. The target value was supposedly one of eight possible choices, which included a letter (an A or a T), that is a certain size (uppercase or lowercase) that is surrounded by a circle or square border, and that is either grey or white. So, you will likely hear reference to this content during the recordings. It is also important for you to know that each problem was impossible to solve, but participants did not know this.

*If coders are being trained to rate the written self-talk statements:*

In the study, all participants were audio-recorded while trying to solve four problems. They were led to believe that each problem could be solved by identifying a ‘target value’. The target value was supposedly one of eight possible choices, which included a letter (an A or a T), that is a certain size (uppercase or lowercase) that is surrounded by a circle or square border, and that is either grey or white. It is also important for you to know that each problem was impossible to solve, but participants did not know this. After the four problems, participants were asked to ‘Please provide five examples of your self-talk, that is, things you said to yourself during the [problems], and try to be as specific as possible. Please answer as honestly as you can.’ You will be coding these five statements.

### Appendix O Coding Sheet for Vocalized Self-Talk

During self-talk, an inner voice addresses the self, usually silently but sometimes aloud, with content that is self-relevant. Here are some examples of a person's self-talk. Using the scale provided, please rate the extent to which the self-talk showed the following characteristics.

#### To what extent was the self-talk:

1. Assertive, Competitive, Leading, Decisive, Authoritative, Strong-willed?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

2. Strict, Forceful, Insistent, Bold, Commanding, Bossy?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

3. Hostile, Cynical, Scolding, Harsh, Fault-Finding?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

4. Helpless, Undecided, Insecure, Unassured, Unconfident, Disappointed?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

5. Meek, Passive, Timid, Indecisive, Hesitant, Wavering, Unsure?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

6. Humble, Apologetic, Nonjudgmental, Lenient, Tolerant, Undemanding?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

7. Accepting, Friendly, Kind, Supportive, Approving, Loving?

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

8. Ambitious, Confident, Energizing, Determined, Motivating, Inspiring?

INTERPERSONAL QUALITIES OF SELF-TALK

135

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely

### Appendix P Script for Study 3

We are interested in investigating processes underlying problem solving. So, in this study you will be given some problems from the Concept Formation Task and you will be asked to "think outloud" while you work through them. Concept formation tasks like the one used in this study have been found to be excellent predictors of academic success in University. These tasks are such good predictors of academic success that a growing number of school guidance centers are using them to help high-school students make decisions about attending University. Given the growing interest in such tasks, we want to see how concept formation tasks relate to problem solving, and personality.

I will introduce you to the Concept Formation Task in a minute, but first I want to talk to you about this notion of "thinking outloud". When people solve problems/work on tasks, it is likely that there are things that they say to themselves, or thoughts that float into their heads. Our lab is very interested in studying this. So during this study, please **voice all of the thoughts you have outloud** as you work through some problems. It is very important that you say everything that comes into your head **as soon as it occurs**. **No sort of thought is off-limits**.

This might seem a bit unnatural to do, as most of us are not used to voicing our inner thoughts outloud. So, you have the chance to practice doing this with a short warm-up task. On the computer you will see a total of three patterns, one pattern at a time. Each pattern has a missing element. Your job is to choose which element completes the pattern. While you do this, I want you to **voice all of the thoughts you have outloud**. Please also read the instructions outloud. When you are ready, click the Next button.

*Stay in the room while the participant completes the warm-up (Raven's Progressive Matrices). If they have trouble, encourage them to voice what they are thinking outloud – no*

*thought is off limits.*

How did that go? Did anything occur to you that you didn't say outloud, because you thought it was irrelevant or didn't matter?

*If they say NO, then say:* Okay, good. For these next problems, do just as you have been doing; don't screen anything; say **\*everything\*** outloud that you would normally say internally.

*If they say YES, then encourage them to tell you what they didn't voice outloud, then say:* For these next problems, don't screen anything; say **\*everything\*** outloud that you would normally say internally.

Now that you have practiced voicing your thoughts outloud, you are going to solve problems from the Concept Formation Task. I will stay in the room for now in case any of the instructions are unclear. When you are ready, please click the next button and be sure to read the instructions outloud.

*After participants read instructions and complete practice trials, they reach a bolded line that says: "Please call over the experimenter when you reach this line."*

Is everything clear?

*If YES, then say:* Okay, good. I am going to start recording and leave the room. When you are finished the Concept Formation Task you will be prompted to open the door. Please do so I know you are finished this part of the study.

*If NO, then ask what part(s) is (are) unclear. Reiterate the instructions for participants. Then say:* I am going to start recording and leave the room. When you are finished the Concept Formation Task you will be prompted to open the door. Please do so I know you are finished this part of the study.

**Appendix Q**  
**Demographic Information**

1) What is your gender?

\_\_\_\_\_ Male

\_\_\_\_\_ Female

\_\_\_\_\_ Other

2) What is your age, in years? \_\_\_\_\_

3) What is your ethnicity? \_\_\_\_\_

4) What is your year of study (e.g., first year undergrad)? \_\_\_\_\_

### Appendix R Debriefing Script for Study 3

Thank you for participating. You are now finished the study. I would be very interested in hearing about how you found it.

How did you find solving the problems? Specifically, how did you find talking outloud and reflecting on how you were doing after each problem?

How did you find answering the questions that came after the concept formation task?

Were you at any time suspicious that the main point of the study was not really to examine the processes underlying problem solving? *If yes, ask: Why? What led you to believe that? What do you think this study is really about?*

When you agreed to participate you were told that this study was concerned with investigating processes contributing to problem-solving. This description was correct, but we left out some very important details which I will explain to you now.

We are indeed very interested in what people say to themselves as they are solving problems. The purpose of this study was to find out what styles of self-talk occur while people are unsuccessful at the task they are working on.

To answer this question well, we needed to have everyone fail at a task consistently. Thus, it was necessary for us to give you an impossible task, that is, a task where there was no solvable answer for any of the problems. This means that the feedback you received after each trial was totally random, and the task was set up so you were destined to fail no matter how capable you are and how hard you tried. Thus, it is very important for you to understand that how you did during the task was purely the result of the fact that the task had no solution, and no reflection at all on your abilities or effort.

One other thing we told you was that the Concept Formation Task is an “excellent predictor of success in university” and “school guidance centers are using them to help high-school students make decisions about attending University.” It is very important for you to understand that this information is completely false. This story was made up to make sure you took the task seriously and were motivated to perform well. After all, what you were saying to yourself wouldn’t be very interesting if you had been thinking the task was unimportant. What this means is that the Concept Formation Task isn’t a real task – it therefore can’t assess problem solving ability, and it can’t predict academic success. It is completely made up for this study.

Did you have any questions or comments about the study?

Lastly, please DO NOT discuss this study with ANYONE else, such as friends or classmates who may be potential future participants. Also, please do not share your debriefing form with anyone else. Keep it in a safe place.

Thank you for your participation and thank you for coming.

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