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# Further Analysis of the Competitive Prosocial/Aggression Continuum Task

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# FURTHER ANALYSIS OF THE

# COMPETITIVE PROSOCIAL/AGGRESSION CONTINUUM TASK

by

Alexander Mark Biondolillo

Abstract of a Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

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ABSTRACT

FURTHER ANALYSIS OF THE

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The Competitive Prosocial/Aggression Continuum Task (COMPACT) (Biondolillo, 2010) was developed in order to create an improved reaction time paradigm for aggression that reduces demand characteristics and increases the scope of research applications available in previous designs by using a behavioral response palette of both aversive and pleasant auditory stimuli to model both aggressive and prosocial behaviors. Initial validation research on the COMPACT demonstrated significant correlations between aggressive responding and several scales of interest; however, such correlations demonstrated smaller effects than the medium-sized effects predicted based on the literature available on similar reaction time paradigms, and pleasant response options on the COMPACT had not been shown to function as a valid measure of prosocial tendency. Thus, the primary goal of this project was to further develop the construct validity of the COMPACT, with particular emphasis on the impact of recent program modifications, including different opponent stimuli sets (aggressive vs. prosocial opponent) and the addition of *extreme* response options. This study establishes significant evidence justifying the use of the COMPACT as a behavioral measure of aggressive and prosocial behavior, and it demonstrates significant differences in responding and patterns of convergent and discriminant validity based on manipulation of the opponent behavior.

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LIST OF ABBREVIATIONS

| | |
|---|---|
| %A | COMPACT Percentage of Aversive Responses Across Trials |
| %A5 | COMPACT Percentage of Level 5 Aversive Sound Responses |
| %A9 | COMPACT Frequency of Level 9 Aversive Sound Responses |
| %P | COMPACT Percentage of Pleasant Responses Across Trials |
| %P5 | COMPACT Percentage of Level 5 Pleasant Sound Responses |
| %P9 | COMPACT Frequency of Level 9 Pleasant Sound Responses |
| %0 | COMPACT Percentage of No Sound Responses Across Trials |
| ΣA | COMPACT Sum Value of Aversive Responses |
| ΣP | COMPACT Sum Value of Pleasant Responses |
| AT | Aggressive Temperament |
| BDHI | Buss-Durkee Hostility Inventory |
| BPAQ | Buss-Perry Aggression Questionnaire |
| BPAQ-P | Buss-Perry Aggression Questionnaire – Physical Aggression |
| BPAQ-V | Buss-Perry Aggression Questionnaire – Verbal Aggression |
| BPAQ-A | Buss-Perry Aggression Questionnaire – Anger |
| BPAQ-H | Buss-Perry Aggression Questionnaire – Hostility |
| COMPACT | Competitive Prosocial/Aggression Continuum Task |
| EAS | Extreme Aggression/Self-harm |
| $fA_{MAX}$ | COMPACT Frequency of Maximum Aversive Sound Selections |
| $fP_{MAX}$ | COMPACT Frequency of Maximum Pleasant Sound Selections |
| IADS-2 | International Affective Digitized Sounds – 2nd Edition |
| IPT | Instrumental Prosocial Tendencies |

| | |
|---|---|
| LHA | Life History of Aggression |
| LHA-A | Life History of Aggression – Aggression |
| LHA-C | Life History of Aggression – Consequences/Antisocial Behavior |
| LHA-S | Life History of Aggression – Self-Directed Aggression |
| $M_A$ | COMPACT Mean Sound Level Selected Across Aversive Responses |
| $M_C$ | COMPACT Mean Sound Level Selected Across Trials |
| $M_P$ | COMPACT Mean Sound Level Selected Across Pleasant Responses |
| $M_{SL}$ | COMPACT Mean Sound Level Selected Across Trials |
| NOBAGS | Normative Beliefs about Aggression Scale |
| PTM | Prosocial Tendencies Measure |
| PTM-P | Prosocial Tendencies Measure – Public |
| PTM-An | Prosocial Tendencies Measure – Anonymous |
| PTM-D | Prosocial Tendencies Measure – Dire |
| PTM-E | Prosocial Tendencies Measure – Emotional |
| PTM-C | Prosocial Tendencies Measure – Compliant |
| PTM-Al | Prosocial Tendencies Measure – Altruism |
| RBB | Retaliation Beliefs and Behaviors |
| RPT | Reactive Prosocial Tendencies |
| S1 | COMPACT Sound Level Selected on Trial 1 |
| SDA | Self-Destructive Aggression |
| $T1_{SL}$ | COMPACT Sound Level Selected on Trial 1 |
| TAP | Taylor Aggression Paradigm |
| VS | Vengeance Scale |

# CHAPTER I

## INTRODUCTION

The competitive reaction time paradigm has been used to behaviorally investigate aggression in laboratory settings for nearly 50 years. This paradigm, first implemented by Stuart Taylor in 1967, modeled aggression via participants' use of different intensity shocks to deliver to a fictitious opponent following rounds of a competitive reaction time game. Taylor was able to demonstrate that participants responded more aggressively following both physical and intended physical provocation by the opponent. Nearly two decades later, Bond and Lader (1986a) developed a similar reaction time paradigm that utilized an aversive sound with intensity varied by volume level in order to produce similar effects. One commonly cited criticism of reaction time aggression paradigms is experimenter demand, as these methods provide participants with an array of aggressive options, with declining to respond as the only behavioral alternative to aggression (Tedeschi & Quigley, 1996). Thus, the Competitive Prosocial/Aggression Continuum Task (COMPACT) (Biondolillo, 2010) was recently developed to directly address this critique by using a behavioral response palette of both aversive and pleasant auditory stimuli with the intent of removing the experimenter demand inherent to previous implementations of the paradigm. This modification may also potentially expand the scope of research applications the paradigm will be able to address.

The COMPACT is a portable competitive reaction time paradigm that utilizes aversive and pleasant auditory stimuli as behavioral measures of aggressive and prosocial responding, respectively. In theory, delivery of the aversive auditory stimuli functions as a measure of aggressive responding in that participants willfully choose responses that

they believe their opponents have defined as aversive, whereas delivery of the pleasant auditory stimuli functions as a measure of prosocial responding. Prosocial behaviors are operationally defined as an action that directly benefits another person and does not directly benefit the individual (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). Unlike previous sound based aggression paradigms which modeled levels of aggression by manipulating the volume of a single noxious sound (Bond & Lader, 1986a; Bond & Lader, 1986b; Bushman, 1995), the COMPACT utilizes different sounds, normatively rated as pleasant and unpleasant, with volume set at a constant level. Additionally, the sounds are rated individually by participants before reaction time trials begin in order to form a scale of normatively aversive and pleasant stimuli that are also personally relevant to the participant. This method was used because volume manipulation of a single sound could not be reasonably operationalized as a measure of prosocial responding.

## Problem Statement

Several questions regarding the construct validity of the COMPACT remain unanswered. Previous validation research on the COMPACT has indicated that significant correlations exist between the COMPACT and several scales of interest; however, such correlations demonstrated smaller effects than the medium-sized effects predicted based on the literature available on similar reaction time paradigms (Biondolillo, 2010). Biondolillo (2010) suggested that this may be due to the lack of extreme responses on both sides of the spectrum, a feature which is commonly included in reaction time paradigms. Furthermore, robust effects were observed for participants' aggressive responses but not for their prosocial responses. A behavioral measure on the COMPACT which includes only prosocial responses in its calculation failed to exhibited

significant, positive correlations with any of the six scales measuring facets of prosocial behavior. In fact, a small but significant negative correlation was observed with one of the six scales despite prediction of a positive correlation. Additionally, COMPACT measures that were expected to tap equally into aggressive and prosocial responding were in fact correlated only with self-report measures of aggression; predicted negative correlations between these COMPACT measures and self-report measures of prosocial tendencies were not observed. These issues must be addressed before the COMPACT can be considered a reliable and valid measure of prosocial behaviors in addition to its already established function as a measure of aggressive behaviors.

## Significance of the Study

The primary goal of this project was to further develop the construct validity of the COMPACT, with particular emphasis on the impact of recent program modifications on previously obtained effect sizes, construct validity differences based on opponent stimuli set (e.g. aggressive vs. prosocial computer behaviors), and analysis of both quantitative and qualitative feedback regarding participants' perceptions of the strength of the deception used in the study as well as participants' emotional responses to their fictitious opponent. To address the problems outlined above, several modifications were made to the COMPACT based on the recommendations for future research by Biondolillo (2010). On both the prosocial and the aggressive sides of the spectrum, extreme response options were added both to increase the potential provocation capabilities of the computer opponent and to provide participants with a visual cue that emphasizes the extreme nature of these options (the available intensity options are numbered 1-5, with the extreme option numbered 9 and located far to the right of the

other options). This modification was expected to increase effect sizes for relationships between COMPACT measures and self-report validation measures. In addition to the computer opponent from the previous version of the COMPACT that only used aggressive response options (Biondolillo, 2010), a computer opponent that uses only prosocial response options was added. Other opponent behavior types will be considered based on the effectiveness of the prosocial opponent in comparison with the classic aggressive opponent. Additionally, a debriefing measure was added to the COMPACT procedure to obtain immediate quantitative and qualitative feedback from participants regarding their experience with the program and with their opponent in order to detect and neutralize any systemic problems with the deception as well as to analyze the emotional relevance of the competitive task and opponent feedback.

## Review of Related Literature

### *Taylor Aggression Paradigm (TAP)*

The TAP is a method of studying behavioral aggression in a laboratory setting by placing participants in a competitive context via a reaction time task with a fictitious opponent. Participants choose levels of electric shock to administer to their opponent when they win the task and receive a preset level of shock when they lose the task, with task outcomes preset by the experimenter. The average level of shock chosen by the participant for the fictitious opponent to receive functions as the TAP measure of physical aggression (Taylor, 1967). Since its initial development, other behavioral measures of physical aggression have been added to the TAP, with a recent validation study reporting three TAP indices of direct aggression – first trial shock intensity (S1), mean shock intensity (MS), and proportion of highest shock (HS) (Giancola & Parrott,

2008). According to Giancola and Parrott (2008), these three indices represent unprovoked aggression, aggression in response to provocation, and exhibition of extreme levels of aggression in response to provocation, respectively. As all TAP dependent variables are based on acts which model physical aggression in a laboratory setting, these indices each exhibited stronger correlations with self-reported levels of physical aggression (MS: $r = 0.29$, S1: $r = 0.38$, HS: $r = 0.33$) than with self-reported levels of verbal aggression (MS: $r = 0.15$, S1: $r = 0.24$, HS: $r = 0.18$), anger (MS: $r = 0.15$, S1: $r = 0.23$, HS: $r = 0.14$), and hostility (MS: $r = 0.14$, S1: $r = 0.20$, HS: $r = 0.11$) (Giancola & Parrott, 2008). Although p-values were not listed individually for each of these main effects, all overall regression equations from which they were obtained were significant at the $p < 0.001$ level. Additionally, for every effect above, correlations were significantly higher for men than they were for women (Giancola & Parrott, 2008). According to a meta-analysis of 64 studies exhibiting 107 significant gender difference effects on aggression, whereas men are more physically aggressive than women under normal conditions (Cohen's $d = 0.33$), the difference significantly diminishes under provocation by either physical attack or verbal insult ($d = 0.17$) (Bettencourt & Miller, 1996). Research has also shown that the TAP sufficiently discriminates between participants with a history of aggression versus non-aggressive controls (Hartmann, 1969 and Wolfe & Baron, 1971; as cited in Giancola & Chermack, 1998).

The TAP has been modified to utilize levels of noxious sound rather than shock as provocation stimuli and behavioral response set (Bond & Lader, 1986a; Bushman, 1995). Bushman (1995) detected a medium effect distinguishing the level of noise blasts set between high and low trait aggressive individuals, with high trait aggressive individuals

administering more intense noise blasts than low trait aggressive individuals ($d$ = .57). In the same study, it was found that participants who were primed for aggression by watching a violent videotape responded more aggressively than participants who watched a nonviolent videotape ($d$ = .38), and it was found that men responded more aggressively than women ($d$ = .27). Each of these effects are consistent with the literature available on shock-based versions of the TAP. Recent research on the validity of sound-based TAP procedures indicated average sound intensity as the best predictor of trait aggression ($r$ = 0.39, $p < 0.01$) (Ferguson, Smith, Miller-Stratton, Fritz, & Heinrich, 2008). Although frequency count of high intensity sound also functioned as a significant predictor of trait aggression ($r$ = 0.32, $p < 0.05$), Ferguson et al. (2008) argued that average sound intensity should be emphasized as the primary measure of modified TAP procedures because it exhibits more robust correlations with trait aggressiveness than frequency of high intensity sound, and the high intercorrelation of the two measures ($r$ = 0.92, $p < 0.01$) suggests that they are variants of a single construct. Ferguson et al. also suggested that future research on sound-based TAP procedures should include criterion measures that address aggression history of participants in order to further establish external validity.

The TAP has been criticized by researchers who argue that demand characteristics of the experimental setting reduce its internal validity. Participants are provided with a range of potential aggressive responses to choose from, but typically no other behavioral options are available. In some modifications of the TAP, the option to choose no response is available to the participant; however, the available range of responses still appears to validate the use of aggressive behavior. Without alternative response options, it is unclear whether participants would choose to aggress against their opponent at all,

even if provoked (Tedeschi & Quigley, 1996). Thus, the TAP is limited in its ability to examine the methods that persons often use to defuse situations in which they are confronted by an aggressive other. Furthermore, Tedeschi and Quigley (1996) argue that "the focus [of the TAP] appears to be on defensive reactions to unprovoked attacks by another person" (p. 169), as the majority of TAP participants adjust the intensity of their responses in response to feedback that their opponent intended to deliver higher intensity feedback. Additionally, Tedeschi and Quigley (1996) point out that the TAP does not provide information on participants' motivations for escalating or de-escalating response intensity. Whereas some participants may choose higher intensity aversive feedback for their opponents as a reciprocal punishment, others may be intending to influence their opponents to de-escalate by showing that they are willing to deliver at that intensity, as well. Although both of these motivations may correlate to some degree with measures of physical aggression, they would likely present differently in a face-to-face encounter with an aggressive other. One would predict that a person acting on a motive of reciprocal punishment would likely engage immediately in an aggressive act on par with the act committed by the aggressive other, whereas one would predict that the person acting on a motive of social deterrence would not necessarily behave aggressively if the use of some other means can cause the desired change of behavior in the aggressive other. The TAP procedure, however, does not allow participants to engage in behaviors reflective of the latter motive.

Due to gender differences in the expression of aggression, the TAP has also exhibited smaller relationships with trait aggression for women than for men. Whereas research has consistently shown that males exhibit more direct, physical aggression than

females (Bettencourt & Miller, 1996; Conway, Irannejad, & Giannopoulos, 2005; Hyde, 1984), it has also been established that women are more likely to use indirect forms of aggression, in which confrontation with the target does not occur. Björkqvist (1994) summarized the explanation for this effect:

> There is no reason to believe that females should be less hostile and less prone to get into conflicts than males. But being physically weaker, they simply have to develop other means than physical ones in order to reach successful results. Accordingly, one should not expect women to develop and use exactly the same strategies for attaining their goals as men do. If strategies for aggression and conflict resolution are learned, not innate, then women are likely to learn different methods than men. (pp. 178-9)

In these paradigms, as aggressive behavior is operationalized as the choice to deliver a noxious stimulus to an opponent during a confrontation, studies using this method have predictably exhibited more robust effects for male participants than for female participants (Biondolillo, 2010; Bushman, 1995; Giancola & Parrott, 2008). In fact, Taylor's (1967) first validation study of the TAP excluded females entirely with the intent of maximizing effect sizes. Along these lines, it was initially anticipated that the COMPACT would account for these differences via correlations with public prosocial behavior, which is considered a socially appropriate manifestation of aggression (Boxer, Tisak, & Goldstein, 2004); however, this hypothesis was not supported in previous research (Biondolillo, 2010).

*The Relationship Between Prosocial and Aggressive Behavior*

According to Eron and Huesmann (1984), "prosocial behavior and aggression seem to represent opposite ends of a single dimension of behavior since they are consistently negatively related to each other and relate in opposite ways to correlated variables both synchronously and over time" (p. 201). According to this model, aggressive and prosocial behaviors are considered to be interpersonal styles that are adapted very early in life and tend to be exclusive to some degree, suggesting that children who learn to successfully engage in aggressive behaviors tend not to learn prosocial behaviors very well, whereas children who learn to successfully engage in prosocial behaviors tend not to learn aggressive behaviors very well (Eron et al., 1974, as cited in Eron & Huesmann, 1984). In this manner, prosocial behaviors are conceptualized as a buffer to the development of aggressive behaviors as the primary interpersonal tool for eliciting desired changes in the behavior of others. However, more recent research suggests that the relationship between aggressive and prosocial behaviors are more complicated due to the problems that arise from measuring prosocial behavior as a unitary construct (McGinley & Carlo, 2007).

Carlo and Randall (2002) identified and described six subtypes of prosocial behaviors that differ based on the underlying motivation for engaging in the behavior: altruism (sympathetic understanding of and attempt to relieve another person's distress which may come at a high cost to self), compliant (helping others in response to a verbal or nonverbal request), emotional (helping others in situations with emotionally evocative cues), public (helping in front of an audience to improve social status), anonymous (helping without the recipient knowing the helper's identity), and dire (helping in a crisis

or emergency situation). The public prosocial behavior subtype was unique from the other five subtypes in that it exhibited a negative correlation (altruism: $r = -0.64$, $p < 0.001$; compliant: $r = -0.23$, $p < 0.001$; anonymous: $r = -0.19$, $p < 0.01$) or no correlation (dire, emotional) with each of the other prosocial subtypes. All other correlations between subtypes were positive (ranging from $r = 0.25$ to $r = 0.50$, with all $p$ values $< 0.001$), with the exception that altruism was not correlated with anonymous or dire prosocial behavior (Carlo & Randall, 2002). Carlo and Randall (2002) reported that public prosocial behaviors were also uniquely positively related to measures of hedonistic reasoning ($r = 0.22$, $p < 0.001$) and approval-oriented reasoning ($r = 0.22$, $p < 0.001$) and uniquely negatively related to measures of sympathy ($r = -0.23$, $p < 0.001$) and perspective taking ($r = -0.25$, $p < 0.001$). A study directly examining the relationship between measures of prosocial and aggressive behaviors found significant negative correlations on physical aggression with altruism ($r = -0.35$, $p < 0.01$) and compliant ($r = -0.15$, $p < 0.05$) prosocial behaviors, opposed to a significant positive correlation between physical aggression and public ($r = 0.28$, $p < 0.01$) prosocial behaviors (McGinley & Carlo, 2007). Emotional, anonymous, and dire prosocial behaviors exhibited no significant correlations with physical aggression. Boxer et al. (2004) summarized the complex relationship between prosocial and aggressive behaviors:

> Endorsing high levels of public prosocial behavior may [be] out of self-interest. It thus is possible that seemingly altruistic behaviors such as helping and complimenting others can be emitted as the function of self-interest. This behavioral style may not look like aggression on the surface. However, it might

be a socially functional manifestation of a social-cognitive style in which others are devalued, self-interest is paramount, and aggression is acceptable. (p. 93)

Given the gender-based differences in aggression discussed above, it would be expected that women may more readily rely on such methods in lieu of direct aggression if given the option to do so.

*Reliability and Validity of the COMPACT*

In the initial validation study of the COMPACT, Biondolillo (2010) reported that three of the measures provided by the COMPACT demonstrated sufficient test-retest reliability to be considered consistent measures: the mean sound level selected across trials ($M_{SL}$: $r = .768$, $p < .001$), the frequency that the maximum level aversive response was selected ($fA_{MAX}$: $r = .624$, $p < .001$), and the frequency that the maximum level pleasant response was selected ($fP_{MAX}$: $r = .609$, $p < .001$). $M_{SL}$ was derived by averaging the participant's choices of sounds to deliver to the opponent across each trial, with pleasant sounds coded as negative values ranged -1 to -5 indicating lowest to highest level of pleasantness, aversive sounds coded as positive values ranged 1 to 5 indicating lowest to highest level of aversion, and no sound coded as 0. Note that sound level values refer to ten unique affectively rated sounds sampled from the International Affective Digitized Sounds (IADS-2) (Bradley & Lang, 2007) collection; sound volume is held constant throughout the COMPACT procedure. The sound level selected on the first trial ($T1_{SL}$) was predicted by Biondolillo (2010) to be an important measure of baseline aggression based on its function in that capacity in previous reaction time aggression paradigms (Giancola & Parrott, 2008); however, the methodology of the study did not allow for test-retest reliability of this measure to be determined.

Biondolillo (2010) examined correlations between scores on these four COMPACT measures and a variety of self-report measures tapping into different domains of aggressive and prosocial behavior. Consistent with predictions, $T1_{SL}$ scores were significantly correlated with self-report measures of physical aggression ($r = .173$, $p = .032$) and verbal aggression ($r = .213$, $p = .008$) and were not significantly correlated with other aspects of aggressive behaviors such as anger, hostility, or vengeance seeking. The two COMPACT measures designed to tap into aggressive behavior across trials were both significantly correlated with self-report measures of physical aggression ($M_{SL}$: $r = .234$, $p = .004$; $fA_{MAX}$: $r = .218$, $p = .007$), normalizing beliefs about aggression ($M_{SL}$: $r = .222$, $p = .006$; $fA_{MAX}$: $r = .194$, $p = .016$), and vengeance seeking behaviors ($M_{SL}$: $r = .235$, $p = .003$; $fA_{MAX}$: $r = .175$, $p = .031$). This pattern of correlations supports the argument for the $M_{SL}$, $fA_{MAX}$, and $T1_{SL}$ as valid behavioral measures of aggressiveness as predicted; however, it is worth mentioning that the demonstrated effects are smaller than those predicted based on effect sizes from previous reaction time aggression paradigms (Biondolillo, 2010). The COMPACT measures did not significantly correlate with the six self-report scales measuring facets of prosocial tendencies except for $fP_{MAX}$, which exhibited a small but significant negative correlation with anonymous prosocial tendencies ($r = -.165$, $p = .042$) where a positive correlation was predicted. These data suggest that although selection of aversive stimuli on the COMPACT appeared to be a valid measure of aggressive behavior, selection of pleasant sound choices on the COMPACT did not appear to be a valid measure of prosocial responding.

Using a principal component factor analysis with Varimax rotation, Biondolillo (2010) revealed a five factor structure of the underlying validation measures, with only

one of the five factors – retaliation beliefs and behaviors (RBB) – correlating significantly with COMPACT behavioral measures ($M_{SL}$: $r = .265$, $p = .001$; $fA_{MAX}$: $r = .219$, $p = .006$). No significant correlations were observed between COMPACT measures and the remaining four factors – aggressive temperament (AT), reactive prosocial tendencies (RPT), extreme aggression/self-harm (EAS), and instrumental prosocial tendencies (IPT) (Biondolillo, 2010). In order to address potential explanations for the differences between predicted correlations and observed correlations, Biondolillo (2010) examined participant sex and participant ethnicity as potential moderators for the observed relationships between the COMPACT behavioral measures and the five factors derived from the self-report validation measures. The effect of IPT on $M_{SL}$ was moderated by sex ($R^2 = .036$, $\Delta R^2 = .033$, $p = .027$) and by ethnicity ($R^2 = .065$, $\Delta R^2 = .026$, $p = .049$). The relation between RPT and $fA_{MAX}$ ($R^2 = .041$, $\Delta R^2 = .031$, $p = .034$) and between IPT and $fA_{MAX}$ ($R^2 = .055$, $\Delta R^2 = .045$, $p = .010$) was moderated by sex. No moderation effects were observed between any of the five factors and $fP_{MAX}$.

Comparisons of separate correlation coefficients obtained for male and female participants between the four COMPACT behavioral measures and the five validation factors reveals a pattern of correlation for males that better matched the predicted results for the COMPACT on $M_{SL}$ (RBB: $r = .410$, $p = .016$; IPT: $r = .342$, $p = .048$) and $fA_{MAX}$ (IPT: $r = .341$, $p = .048$). However, $fP_{MAX}$ exhibited a negative correlation with RPT ($r = -.423$, $p = .013$) for males despite predictions of a positive correlation, indicating that this behavioral scale is measuring the opposite of what it was designed to measure. The correlation pattern for women was similar to the obtained overall results, exhibiting a significant correlation between $M_{SL}$ and RBB ($r = .262$, $p = .004$). A comparison

between correlations obtained separately for Caucasian and African American participants revealed no significant differences from the total sample results for either group. Overall, the obtained correlations between COMPACT aggression measures and self-report aggression measures are consistent with the correlations reported by Giancola and Parrott (2008) for the TAP, indicating acceptable validity for the COMPACT as a behavioral measure of aggression. The primary obstacle to establishing the overall validity of the COMPACT is the need to establish reliable and valid measures of prosocial behavior.

## Research Hypotheses

It was hypothesized that scores on COMPACT measures obtained by participants assigned to the prosocial opponent condition would significantly differ from participants assigned to the aggressive opponent condition. It was also hypothesized that obtained effect sizes between COMPACT measures and self-report measures would increase significantly as a result of the program modifications. Notably, this applies to numerous difficulties outlined above with the $fP_{MAX}$ measure, which now reflects a new program parameter due to procedural modifications as explained below. Furthermore, it is predicted that effect sizes for relationships between COMPACT measures and self-report measures will be significantly higher for male participants than for female participants in keeping with previous aggression research, including Biondolillo (2010). Further investigation regarding participants' qualitative experiences using the COMPACT provided necessary information to continue development of this paradigm; however, as such investigation was purely exploratory, no a priori hypotheses regarding the nature of these experiential data were made. Exploratory analyses were also conducted to examine

whether other variables extracted from COMPACT trials may better function measures of prosocial responding than $fP_{MAX}$, as the validity of this measure has yet to be established. Construct validity may be established by positive correlation with altruism (indicating use of pleasant responses in a truly prosocial manner) or by positive correlation with public prosocial behaviors (indicating use of pleasant responses in a self-serving manner consistent with aggression). Any new COMPACT measure that significantly correlates with public prosocial behaviors was predicted to also correlate with aggression, providing further evidence for the COMPACT's validity across the theorized prosocial-aggression continuum.

# CHAPTER II

# METHODS

This study utilized data that was collected between July 2010 and April 2011 under approval of the Institutional Review Board for the Protection of Human Subjects at The University of Southern Mississippi (Appendix A), in addition to the data from the initial COMPACT validation study (Biondolillo, 2010) collected between July 2009 and February 2010. These data sets were combined for use in this study. Following is a detailed description of the participants, measures, and procedures involved in the collection and analysis of the data.

## Participants

A sample of N = 336 undergraduate college students participated in the study. Participants were sampled using either Experimetrix in the initial study (n = 153) (Biondolillo, 2010) or Sona in the second study (n = 183), both of which are online participant pools of undergraduate college students. The sample contained more women (n = 243, 72%) than men (n = 93, 28%) and more African American participants (n = 186, 55%) than Caucasian (n = 138, 41%), with very few participants of any other races (n = 12, 4%). As the sample differences in ethnicity were not as extreme in the combined sample as they were in Biondolillo (2010), ethnicity effects were not examined as extensively in this study. The study was listed as a national study designed to test concentration skills and reaction speed in human participants through the use of a competitive, one-on-one online game. The initial study included only the vs. aversive opponent condition, which all participants played against. In the second study, participants were assigned to one of two groups, which differed only on the opponent

response type. About half of the participants played against an opponent who used only aversive feedback (n = 94) whereas the rest of the participants played against an opponent who used only pleasant feedback (n = 89). After the data sets were combined, the number of participants who played against an aversive-only opponent (n = 247) was more than double the number of participants who played against a pleasant-only opponent (n = 89). All participants were required to read and electronically sign an informed consent form before participating in the study (Appendix B).

## Measures

### *Competitive Prosocial/Aggression Continuum Task (COMPACT)*

In the initial study, participant data collected by the COMPACT was coded into three composite measures of behavior: the mean sound level selected across trials ($M_{SL}$; a combined pleasant/aversive scale accounting for both sound type and participant rated affective intensity), the frequency of choosing the maximum aversive response for delivery to the opponent ($fA_{MAX}$), and the frequency of choosing the maximum pleasant response for delivery to the opponent ($fP_{MAX}$). Additionally, the study included a baseline measure of the sound selected on the first trial ($T1_{SL}$) before the participant receives any information regarding the opponent's sound selections. Each of these scales were retained, but were renamed and/or modified for the purpose of maintaining parallelism with several new COMPACT scales. $M_{SL}$ was not modified, but was renamed the combined mean of all responses ($M_C$). Two other mean scores were added as measures of the intensity with which participants using pleasant or aversive responses: mean selected aversive responses ($M_A$) and mean selected pleasant responses ($M_P$). Furthermore, two sum scores were added to provide additional measures of separate

aversive and pleasant response intensity: sum of aversive responses (ΣA) and sum of prosocial responses (ΣP). Note that for the purpose of calculating mean and sum values, extreme responses of nine were recoded as values of six – a value one greater than the next highest value in both scales – to reduce arbitrary inflation by these scores. The scale $T1_{SL}$ was not modified, but was renamed to S1.

Given that the current version of the COMPACT was reduced to 20 trials from the prior 28 trial version used in initial study (Biondolillo, 2010), frequency scores ($fA_{MAX}$ and $fP_{MAX}$) were modified and renamed to reflect percentages of type selection rather than a raw frequency count so that direct comparison could be made between relative scores on the older and newer versions of the COMPACT. Thus, $fA_{MAX}$ was changed to percentage of Aversive #5 selections (%A5) and $fP_{MAX}$ was changed to percentage of Pleasant #5 selections (%P5). Furthermore, the newer version of the COMPACT was modified to include extreme pleasant and extreme aversive response options, labeled "9 – Extreme." Percentage scores were created for these two responses as well: percentage of Extreme Aversive selections (%A9) and percentage of Extreme Pleasant selections (%P9). Note that as the extreme sound options were not available in the COMPACT version used in the initial study, these scores are not available from the Biondolillo (2010) data, resulting in a notably smaller sample size for these two COMPACT scales (n = 183). Finally, scores were also added to account for participants patterns of response types across trials: percentage of aversive sound selections (%A), percentage of pleasant sound selections (%P), and percentage of no sound selections (%0).

Additionally, the second study included an 11-item debriefing questionnaire (Appendix C) to be answered by each participant immediately after completion of the

COMPACT trials. This questionnaire included seven Likert five-point scale items regarding the participants' response choices, their level of suspicion about the study, and their understanding of the task. The questionnaire also included four short answer items asking the participants to generate responses about their qualitative experience with their opponents and their best guesses about the purpose of the study.

*Prosocial Tendencies Measure (PTM)*

The PTM (Appendix D) consists of subscales for six different prosocial response factors: public, anonymous, dire, emotional, compliant, and altruism (Carlo & Randall, 2002). Although the PTM was developed for use with late adolescents, the two psychometric studies that initially provided evidence for the reliability and validity of the measure's scores were conducted on college student samples with mean ages of $M = 19.9$ years ($SD = 2.76$) and $M = 22.9$ ($SD = 4.47$) years respectively (Carlo & Randall, 2002). Thus, the reliability and validity research available for the PTM is considered to be applicable to the sample used in the current study. Test-retest reliability and Cronbach's α for the six subscales of the PTM was reported: public ($r = 0.61$, $\alpha = 0.80$), anonymous ($r = 0.75$, $\alpha = 0.88$), dire ($r = 0.72$, $\alpha = 0.54$), emotional ($r = 0.80$, $\alpha = 0.77$), compliant ($r = 0.73$, $\alpha = 0.87$), and altruism ($r = 0.60$, $\alpha = 0.62$; Carlo & Randall, 2002). While several gender differences were found within subscale scores, there were no gender differences observed on the PTM composite score (Carlo & Randall, 2002). It is worth noting that scores on the public prosocial behaviors subscale were significantly inversely related with scores on the anonymous ($r = -0.19$, $p < 0.01$), compliant ($r = -0.23$, $p < 0.001$), and altruism ($r = -0.64$, $p < 0.001$) subscales and were not significantly correlated with the dire and emotional subscales (Carlo & Randall, 2002), indicating that the public

prosocial subscale may be tapping into proactive prosocial behavior, which correlates with aggression rather than other types of prosocial behaviors (Boxer et al., 2004).

*Buss-Perry Aggression Questionnaire (BPAQ)*

Designed as a successor to the widely popular BDHI, the BPAQ (Appendix E) is a 29-item questionnaire that assesses four aggression factors: Physical Aggression, Verbal Aggression, Anger, and Hostility (Buss & Perry, 1992). According to Buss and Perry (1992), the behavioral, affective, and cognitive dimensions of aggression are measured by physical/verbal aggression, anger, and hostility, respectively. Buss and Perry (1992) reported the internal consistency of the BPAQ to be $\alpha = 0.89$, and the alpha coefficients of the four factors to be Physical Aggression = .85; Verbal Aggression = 0.72; Anger = 0.83; and Hostility = 0.77. These alpha coefficients were obtained using the total sample of 1,253 subjects. A replication using 70 female college students across three administrations found the following alpha coefficients for each of the four factors: Physical Aggression = 0.75; Verbal Aggression = 0.70; Anger = 0.82; and Hostility = 0.80 (Harris, 1997). Another study using 556 college students also found good reliability estimates for Physical Aggression ($\alpha = 0.79$, $\omega = 0.80$); Verbal Aggression ($\alpha = 0.70$, $\omega = 0.71$); Anger ($\alpha = 0.75$, $\omega = 0.73$); and Hostility ($\alpha = 0.73$, $\omega = 0.74$) (Becker, 2007). Buss and Perry (1992) reported test-retest correlations based on a sample of 372 subjects with a 9 week interval between administrations: Physical Aggression = 0.80; Verbal Aggression = 0.76; Anger = 0.72; and Hostility = 0.72; with composite = 0.80.

*Vengeance Scale (VS)*

The VS (Appendix F) is a 20-item scale designed to assess respondents' attitudes toward pursuing vengeful behaviors when they feel they have been wronged in some way

(Stuckless & Goranson, 1992). Stuckless and Goranson (1992) found the test-retest reliability for the VS to be $r = .90$. In a study exploring the dimensionality and internal consistency of the VS in a nonstudent population using principle component factor analysis, it was found that a one-dimensional model provided the best fit with an internal consistency of $r = 0.93$ (Carraher & Michael, 1999). In 1995, Holbrook, White, and Hutt assessed the external validity of the VS by comparing scores across three groups of participants: college students, police officers, and prison inmates. As predicted, inmates reported significantly higher scores on the VS ($M = 93.64$, $SD = 19.74$) than police officers ($M = 84.31$, $SD = 8.78$) and college students ($M = 82.95$, $SD = 10.76$). Men reported significantly higher scores ($M = 91.00$, $SD = 15.56$) than women ($M = 80.58$, $SD = 10.44$) (Holbrook et al., 1995). Another study established convergent validity of the VS in an undergraduate sample, demonstrating that men's VS scores correlated with the Macho Scale ($r = 0.25$, $p < 0.05$), the Hypermasculinity Inventory ($r = 0.63$, $p < 0.005$), and the Kindness scale ($r = -0.56$, $p < 0.005$); this study failed to find any predicted relationships for women's scores (Hutt, Iverson, Bass, & Gayton, 1997). Further research on convergent validity of the VS for women is not currently available. Scores on the VS had previously been shown to correlate negatively with scores on the Empathy Scale ($r = -0.38$, $p < 0.001$) and positively with scores on Trait Anger ($r = 0.56$, $p < 0.001$), exhibiting no gender differences (Stuckless & Goranson, 1992).

*Life History of Aggression (LHA)*

The LHA (Appendix G) is a rating measure of trait aggressive behavior based on self-report frequency of aggressive behaviors and events in the individual's life history, producing an LHA Total score, as well three subscales – Aggression, Self-Directed

Aggression, and Consequences/Antisocial Behavior (Coccaro, Berman, & Kavoussi, 1997). Test-retest reliabilities as well as internal consistencies were observed: LHA Total ($r = 0.91$, $\alpha = 0.88$), Aggression ($r = 0.80$, $\alpha = 0.87$), Consequences/Antisocial Behavior ($r = 0.89$, $\alpha = 0.74$), and Self-Directed Aggression ($r = 0.97$, $\alpha = 0.48$; Coccaro et al., 1997). LHA scores all demonstrated significant correlations ($r = 0.68$, $p < 0.001$; $r = 0.69$, $p < 0.001$; $r = 0.52$, $p < 0.001$; $r = 0.25$, $p < 0.001$, respectively) with scores on the BDHI in addition to significant correlations between scores on the Overt Aggression Scale-Modified for Out-patients with the LHA Total ($r = 0.45$, $p < 0.001$) and the LHA Aggression subscale ($r = 0.52$, $p < 0.001$), indicating concurrent validity with other measures of aggression (Coccaro et al., 1997). Additionally, LHA Total scores were significantly different between diagnostic categories, able to distinguish persons with personality disorders from nonclinical controls, dramatic cluster personality disorder patients from non-dramatic cluster personality disorder patients, Borderline from non-Borderline personality disorder patients, and Antisocial from non-Antisocial personality disorder patients (Coccaro et al., 1997).

*Normative Beliefs about Aggression Scale (NOBAGS)*

The NOBAGS (Appendix H) is designed to tap into the respondent's beliefs about what situations or events sanction the use of aggression, providing a picture of what the respondent believes is the norm for aggression (Huesmann & Guerra, 1997). Although the NOBAGS is primarily used for children and adolescents, the authors state that the measure is designed for use with participants ages 6 to 30 (Huesmann, Guerra, Miller, & Zelli, 1992). Available psychometric data, however, was obtained from a sample of first and fourth grade children and is not considered directly applicable to the current study;

thus, NOBAGS scores in the current study will be analyzed for convergent validity with the other included aggression measures, and will be interpreted with caution.

## Procedure

### *Data Collection*

Participants were each seated at a computer with headphones running the COMPACT software and were informed by an oral presentation (Appendix I) that they would play a game with an opponent via the internet for a national study designed to test concentration skills and reaction speed in human participants. After completing forms containing demographic information and a battery of items consisting of each of the self-report validation measures listed above, participants were presented with a series of paired auditory stimuli that they were asked to rate iteratively until an established scale of sounds ranging from most pleasant to most aversive had been set. Each participant's rankings determined the sounds that participant received upon losing a trial; participants were told that their opponent had also rated the sounds to establish their own stimulus feedback set. Thus, the participants were led to believe that the sounds they selected for the opponent during the task trials were what the opponent had rated as pleasant or aversive and that their opponent was willingly delivering sounds that the participant rated as either aversive or pleasant. Participants either played against a computer opponent that used only aversive sounds or one that used only pleasant sounds. Prior to initiating the reaction time task, the computer screen displayed a message informing the user to wait until an online opponent was found, forcing the participant to wait for a randomized short period of time before starting the reaction time task. The online opponent deception

allowed for administration to multiple participants on multiple computers in a single setting as it established opponent anonymity by design.

For each of the trials of the reaction time task (28 in the initial study, 20 in the second study), participants were required to select a sound type [pleasant, unpleasant, no sound] and intensity level [1, 2, 3, 4, 5, or 9 (intensity 9 was not available in the initial study) for pleasant and unpleasant sounds, with selection to not deliver a sound automatically set to a level of 0] to deliver to their opponent contingent upon winning the trial. Note that sound intensity levels refer to unique affectively rated sounds that were matched on volume and were rank ordered by the participant, as discussed above. After choosing the sound to deliver, participants were required to press the space bar in response to a red "X" stimulus appearing on the screen and were told that they must press the space bar more quickly than the opponent in order to win the trial. If a participant pressed the space bar before the stimulus appeared, a message informed the participant that this is not allowed, and the trial was repeated. After completion of a trial, participants received one of two feedback screens determined by whether they had won or lost that trial. The win trial feedback screen read: "You win the round! Your opponent received [mildly, moderately, highly, extremely] [unpleasant, pleasant] sound of [1, 2, 3, 4, 5, 9] that you set. You avoided your opponent's [mildly, moderately, highly, extremely] [unpleasant, pleasant] sound of [1, 2, 3, 4, 5, 9]. Press any key to continue." On win trials in which the participant chose not to deliver a sound to the opponent, the second sentence of the feedback was changed to read: "Your opponent was informed that you chose not to deliver a sound on this trial." The lose trial feedback screen read: "You lost the round. You will now receive the [mildly, moderately, highly,

extremely] [unpleasant, pleasant] sound of [1, 2, 3, 4, 5, 9] that your opponent set for you." After the sound for the trial was played for the opponent, the instructions "Press any key to continue" appeared on the feedback screen. All trial outcomes and opponent sound levels were predetermined by the experimenter. On both win and lose outcome screens, the label "extremely" referred to a sound intensity of 9 ("9" responses are recoded as "6" for data analysis purposes), "highly" referred to a sound intensity of 4 or 5, "moderately" referred to a sound intensity of 3, and "mildly" referred to a sound intensity of 1 or 2. COMPACT sound choice scores are scaled from -6 to +6, with the selection of the maximum prosocial response recorded as -6, the selection of the maximum aggressive response recorded as +6, and the selection of no sound as 0. Also, both outcome screens provided feedback on the participant's reaction time and the opponent's reaction time – calculated as a variable function of the participant's reaction time – in order to emphasize to the participant that the opponent was about evenly matched on the task.

*Analyses*

Scores for each of the validation factors were regressed onto the COMPACT scales ($M_C$, $M_A$, $M_P$, %A, %P, %0, %A5, %P5, %A9, %P9, S1, ΣA, ΣP) with participant sex and opponent behavior condition (all pleasant opponent or all aversive opponent) entered as moderators. This procedure tested the hypotheses that: 1) old COMPACT scales would exhibit correlational patterns similar to Biondolillo (2010), 2) new COMPACT scales would exhibit patterns similar to other scales of their type, 3) gender differences in aggression would be reflected in COMPACT scores and in their correlational patterns with validation measures, and 4) COMPACT scales correlations

would vary based on opponent condition. To test the hypothesis that the addition of extreme responses %A9 and %P9 would increase the construct validity of maximum level response selections as extremely aggressive or prosocial options, correlations between validation factors and the COMPACT measures %A5 and %P5 obtained in the initial study were compared with correlations obtained between validation factors and the COMPACT measures %A9 and %P9 obtained in the aversive opponent condition of the second study. Additionally, though no a priori hypotheses regarding the debriefing measure data were made, detailed investigation regarding participants' qualitative experiences using the COMPACT was expected to provide valuable information for the continuing development of this paradigm. Participants' short answer responses were analyzed based on percentage of endorsement, and Likert scale responses were analyzed by comparing agree/strongly agree responses against disagree/strongly disagree responses using Pearson's $\chi^2$ or Fisher's exact $p$ value depending on which of these two techniques was more appropriate for the data in question. These were used to determine if significant differences existed between opponent behavior groups on responses to the short answer items.

# CHAPTER III

## RESULTS

For reference, means and standard deviations of each included study variable are shown split by gender (Table 1a), by opponent condition (Table 1b), and by gender with opponent condition (Table 1c). Correlations between included study variables are shown

Table 1a

*Means and Standard Deviations of Measures – By Gender*

| | Female (n = 243)[1] | | Male (n = 93)[1] | | Mean Differences | |
|---|---|---|---|---|---|---|
| Measure | M | SD | M | SD | *t* | *p* |
| $M_C$ | 0.35 | 2.24 | 0.39 | 2.43 | -.15 | .88 |
| $M_A$ | 3.60 | 1.56 | 3.90 | 1.68 | -1.52 | .13 |
| $M_P$ | 3.56 | 1.33 | 3.86 | 1.27 | -1.89 | .06 |
| S1 | -0.60 | 3.90 | 1.01 | 4.15 | -3.32* | <.01* |
| %A | 46.34 | 27.90 | 44.51 | 27.81 | .54 | .59 |
| %P | 44.98 | 26.79 | 46.00 | 28.33 | -.31 | .76 |
| %0 | 8.68 | 14.89 | 9.49 | 16.19 | -.44 | .66 |
| %A5 | 14.16 | 17.81 | 13.76 | 19.13 | .18 | .86 |
| %P5 | 12.34 | 17.04 | 14.85 | 20.50 | -1.14 | .25 |
| %A9 | 18.19 | 22.19 | 24.49 | 23.45 | -1.76 | .08 |
| %P9 | 14.60 | 16.85 | 16.44 | 17.02 | -.69 | .49 |
| ΣA | 44.91 | 31.55 | 45.60 | 33.36 | -.18 | .86 |
| ΣP | 39.19 | 27.60 | 42.15 | 31.03 | -.85 | .40 |
| BPAQ-P | 19.84 | 7.25 | 22.84 | 6.75 | -3.45* | <.01* |

Table 1a (continued).

| Measure | Female (n = 243)[1] | | Male (n = 93)[1] | | Mean Differences | |
|---|---|---|---|---|---|---|
| | M | SD | M | Measure | M | SD |
| BPAQ-V | 13.09 | 4.44 | 13.86 | 4.55 | -1.41 | .16 |
| BPAQ-A | 14.85 | 5.39 | 14.65 | 5.25 | .31 | .76 |
| BPAQ-H | 17.47 | 6.98 | 18.34 | 7.22 | -1.02 | .31 |
| VS | 58.19 | 17.49 | 62.96 | 21.45 | -1.92 | .06 |
| NOBAGS | 34.69 | 7.90 | 37.39 | 8.61 | -2.73* | <.01* |
| PTM-P | 6.92 | 2.82 | 7.62 | 3.47 | -1.75 | .08 |
| PTM-An | 13.81 | 4.72 | 14.31 | 4.66 | -.87 | .39 |
| PTM-D | 10.02 | 2.67 | 10.16 | 2.57 | -.42 | .67 |
| PTM-E | 14.21 | 3.50 | 13.28 | 3.76 | 2.14* | .03* |
| PTM-C | 7.83 | 1.71 | 7.57 | 1.85 | 1.21 | .23 |
| PTM-Al | 21.35 | 3.37 | 20.73 | 3.65 | 1.47 | .14 |
| LHA-A | 8.11 | 4.87 | 9.25 | 4.48 | -1.96* | .05* |
| LHA-C | 1.58 | 2.24 | 2.42 | 3.00 | -2.44* | .02* |
| LHA-S | 0.47 | 1.20 | 0.95 | 1.69 | -2.49* | .01* |

[1] %A9 and %P9 were not included in prior version of COMPACT. For these measures: Total N = 183; Female n = 124; Male n = 59.

* denotes significant mean difference

in various groupings: intercorrelations among COMPACT measures (Table 2a), intercorrelations among validation measures (Table 2b), and correlations of COMPACT measures with validation measures shown for the total sample (Table 2c), for the aversive opponent condition (Table 2d), and for the pleasant opponent condition (Table 2e).

Table 1b

*Means and Standard Deviations of Measures – By Opponent Behavior*

| | vs. Aversive (n = 247)[1] | | vs. Pleasant (n = 89) | | Mean Differences | |
|---|---|---|---|---|---|---|
| Measure | M | SD | M | SD | *t* | *p* |
| $M_C$ | 0.74 | 2.11 | -0.70 | 2.44 | -5.29* | <.01* |
| $M_A$ | 3.69 | 1.49 | 3.68 | 1.87 | -.06 | .96 |
| $M_P$ | 3.50 | 1.34 | 4.04 | 1.18 | 3.59* | <.01* |
| S1 | -0.10 | 3.81 | -0.29 | 4.62 | -.35 | .73 |
| %A | 49.46 | 27.87 | 35.79 | 25.34 | -4.06* | <.01* |
| %P | 41.91 | 26.39 | 54.55 | 27.34 | 3.84* | <.01* |
| %0 | 8.63 | 14.57 | 9.66 | 17.04 | .55 | .59 |
| %A5 | 16.99 | 19.92 | 5.90 | 7.41 | -7.44* | <.01* |
| %P5 | 12.91 | 18.18 | 13.37 | 17.85 | .21 | .84 |
| %A9 | 24.95 | 23.54 | 15.22 | 20.83 | -2.95* | <.01* |
| %P9 | 14.26 | 17.64 | 16.18 | 16.08 | .77 | .44 |
| ΣA | 49.78 | 32.39 | 32.10 | 27.13 | -5.00* | <.01* |
| ΣP | 37.83 | 29.09 | 46.04 | 26.31 | 2.34* | .02* |
| BPAQ-P | 20.91 | 7.50 | 20.02 | 6.42 | -1.06 | .29 |
| BPAQ-V | 13.40 | 4.52 | 13.03 | 4.36 | -.68 | .50 |
| BPAQ-A | 15.05 | 5.54 | 14.08 | 4.72 | -1.58 | .12 |
| BPAQ-H | 17.58 | 7.13 | 18.07 | 6.86 | .57 | .75 |
| LHA-A | 8.69 | 4.89 | 7.67 | 4.45 | -1.73 | .09 |
| LHA-C | 1.98 | 2.65 | 1.37 | 1.93 | -1.97* | .05* |
| LHA-S | 0.60 | 1.42 | 0.62 | 1.19 | .14 | .89 |
| VS | 59.28 | 19.11 | 60.13 | 17.83 | .37 | .71 |

Table 1b (continued).

| | vs. Aversive (n = 247)[1] | | vs. Pleasant (n = 89) | | Mean Differences | |
|---|---|---|---|---|---|---|
| Measure | M | SD | M | SD | *t* | *p* |
| NOBAGS | 35.43 | 8.38 | 35.46 | 7.62 | .03 | .98 |
| PTM-P | 6.93 | 2.90 | 7.63 | 3.32 | 1.77 | .08 |
| PTM-An | 14.38 | 4.68 | 12.78 | 4.58 | -2.78* | <.01* |
| PTM-D | 10.09 | 2.66 | 10.00 | 2.59 | -.26 | .80 |
| PTM-E | 14.21 | 3.56 | 13.26 | 3.63 | -2.14* | .03* |
| PTM-C | 7.83 | 1.78 | 7.56 | 1.66 | -1.22 | .22 |
| PTM-Al | 21.31 | 3.45 | 20.81 | 3.47 | -1.18 | .24 |

[1] %A9 and %P9 were not included in prior version of COMPACT. For these measures vs. Aversive n = 94.

* denotes significant mean difference

Table 1c

*Means and Standard Deviations of Measures – By Gender x Opponent*

| | F v. A (n = 185)[1] | | M v. A (n = 62)[1] | | F v.P (n = 58) | | M v. P (n = 31) | |
|---|---|---|---|---|---|---|---|---|
| Measure | M | SD | M | SD | M | SD | M | SD |
| $M_C$ | 0.73 | 2.03 | 0.80 | 2.36 | -0.85 | 2.47 | -0.42 | 2.40 |
| $M_A$ | 3.63 | 1.45 | 3.85 | 1.62 | 3.50 | 1.89 | 4.00 | 1.80 |
| $M_P$ | 3.43 | 1.35 | 3.68 | 1.31 | 3.94 | 1.20 | 4.22 | 1.14 |
| S1 | -0.43 | 3.70 | 0.89 | 3.97 | -1.12 | 4.47 | 1.26 | 4.55 |
| %A | 50.25 | 27.34 | 47.09 | 29.48 | 33.88 | 26.16 | 39.35 | 23.73 |
| %P | 41.51 | 25.58 | 43.11 | 28.85 | 56.03 | 27.75 | 51.77 | 26.79 |
| %0 | 8.24 | 14.52 | 9.80 | 14.78 | 10.09 | 16.07 | 8.87 | 18.96 |

Table 1c (continued).

| | F v. A (n = 185)[1] | | M v. A (n = 62)[1] | | F v.P (n = 58) | | M v. P (n = 31) | |
|---|---|---|---|---|---|---|---|---|
| Measure | M | SD | M | SD | M | SD | M | SD |
| %A5 | 16.71 | 19.25 | 17.82 | 21.94 | 6.03 | 7.93 | 5.65 | 6.42 |
| %P5 | 12.10 | 17.02 | 15.35 | 21.24 | 13.10 | 17.24 | 13.87 | 19.22 |
| %A9 | 23.33 | 22.78 | 28.75 | 25.26 | 12.33 | 20.14 | 20.65 | 21.36 |
| %P9 | 14.32 | 17.56 | 14.11 | 18.16 | 14.91 | 16.15 | 18.55 | 15.93 |
| ΣA | 49.89 | 31.29 | 49.47 | 35.76 | 29.02 | 27.01 | 37.87 | 26.83 |
| ΣP | 37.07 | 27.66 | 40.11 | 33.15 | 45.95 | 26.54 | 46.23 | 26.32 |
| BPAQ-P | 20.17 | 7.55 | 23.10 | 6.94 | 18.79 | 6.13 | 22.32 | 6.42 |
| BPAQ-V | 13.30 | 4.46 | 13.73 | 4.70 | 12.45 | 4.33 | 14.13 | 4.29 |
| BPAQ-A | 15.23 | 5.64 | 14.52 | 5.22 | 13.64 | 4.32 | 14.90 | 5.38 |
| BPAQ-H | 17.54 | 7.22 | 17.73 | 6.89 | 17.26 | 6.22 | 19.58 | 7.80 |
| VS | 58.29 | 18.17 | 62.24 | 21.57 | 57.86 | 15.26 | 64.39 | 21.48 |
| NOBAGS | 34.82 | 8.18 | 37.24 | 8.79 | 34.28 | 6.98 | 37.68 | 8.36 |
| PTM-P | 6.79 | 2.77 | 7.32 | 3.24 | 7.31 | 2.97 | 8.23 | 3.87 |
| PTM-An | 14.09 | 4.76 | 15.24 | 4.37 | 12.95 | 4.53 | 12.45 | 4.73 |
| PTM-D | 10.09 | 2.74 | 10.08 | 2.42 | 9.83 | 2.44 | 10.32 | 2.87 |
| PTM-E | 14.45 | 3.53 | 13.48 | 3.57 | 13.47 | 3.34 | 12.87 | 4.15 |
| PTM-C | 7.86 | 1.75 | 7.73 | 1.86 | 7.72 | 1.56 | 7.26 | 1.83 |
| PTM-Al | 21.42 | 3.38 | 20.98 | 3.65 | 21.12 | 3.37 | 20.23 | 3.65 |
| LHA-A | 8.31 | 4.91 | 9.82 | 4.68 | 7.45 | 4.74 | 8.10 | 3.87 |
| LHA-C | 1.74 | 2.38 | 2.69 | 3.27 | 1.10 | 1.65 | 1.87 | 2.32 |
| LHA-S | 0.46 | 1.27 | 0.98 | 1.77 | 0.48 | 0.94 | 0.87 | 1.54 |

[1] %A9 and %P9 were not included in prior version of COMPACT. For these measures, vs. A: Female n = 66; Male n = 28.

Table 2a

*Intercorrelations of COMPACT Measures*

| Measure | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1)$M_A$ | *r* | 1.00 | *0.63* | *0.55* | *0.35* | *0.63* | 0.04 | *-0.42* | *-0.46* | *-0.31* | -0.13 | *0.59* | *0.23* | *-0.18* |
| | *p* | | *<.00* | *<.00* | *<.00* | *<.00* | 0.49 | *<.00* | *<.00* | *<.00* | 0.09 | *<.00* | *<.00* | *<.00* |
| 2)ΣA | *r* | | 1.00 | *0.93* | *0.68* | *0.85* | *-0.19* | *-0.67* | *-0.80* | *-0.35* | *-0.32* | *0.92* | *0.42* | *-0.29* |
| | *p* | | | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* |
| 3)%A | *r* | | | 1.00 | *0.53* | *0.68* | *-0.26* | *-0.76* | *-0.85* | *-0.44* | *-0.40* | *0.91* | *0.41* | *-0.32* |
| | *p* | | | | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* |
| 4)%A5 | *r* | | | | 1.00 | 0.00 | -0.02 | *-0.33* | *-0.45* | -0.08 | *-0.20* | *0.55* | *0.28* | *-0.16* |
| | *p* | | | | | 0.99 | 0.68 | *<.00* | *<.00* | 0.17 | *0.01* | *<.00* | *<.00* | *<.00* |
| 5)%A9 | *r* | | | | | 1.00 | *-0.19* | *-0.46* | *-0.56* | *-0.28* | *-0.15* | *0.73* | *0.32* | *-0.23* |
| | *p* | | | | | | *0.01* | *<.00* | *<.00* | *<.00* | *0.05* | *<.00* | *<.00* | *<.00* |
| 6)$M_P$ | *r* | | | | | | 1.00 | *0.46* | *0.22* | *0.34* | *0.57* | *-0.25* | *-0.12* | 0.07 |
| | *p* | | | | | | | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *0.02* | 0.18 |
| 7)ΣP | *r* | | | | | | | 1.00 | *0.89* | *0.73* | *0.67* | *-0.75* | *-0.32* | *-0.20* |
| | *p* | | | | | | | | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* |
| 8)%P | *r* | | | | | | | | 1.00 | *0.53* | *0.45* | *-0.88* | *-0.38* | *-0.24* |
| | *p* | | | | | | | | | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* |
| 9)%P5 | *r* | | | | | | | | | 1.00 | -0.08 | *-0.34* | -0.10 | *-0.13* |
| | *p* | | | | | | | | | | 0.30 | *<.00* | 0.06 | *0.02* |
| 10)%P9 | *r* | | | | | | | | | | 1.00 | *-0.53* | *-0.30* | -0.05 |
| | *p* | | | | | | | | | | | *<.00* | *<.00* | 0.48 |
| 11)$M_C$ | *r* | | | | | | | | | | | 1.00 | *0.45* | -0.09 |
| | *p* | | | | | | | | | | | | *<.00* | 0.11 |
| 12)S1 | *r* | | | | | | | | | | | | 1.00 | -0.07 |
| | *p* | | | | | | | | | | | | | 0.18 |
| 13)%0 | *r* | | | | | | | | | | | | | 1.00 |
| | *p* | | | | | | | | | | | | | |

Note. *Italics* denote significant correlations.

Table 2b

*Intercorrelations of Self-Report Validation Measures*

| Measure | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | *r* | 1.00 | *0.50* | *0.47* | *0.31* | *0.47* | *0.50* | *0.64* | *0.15* | *0.32* | 0.08 | *-0.16* | 0.04 | 0.03 | -0.08 | -0.04 |
| | *p* | | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *0.01* | *<.00* | 0.13 | *<.00* | 0.50 | 0.61 | 0.13 | 0.51 |
| 2 | *r* | | 1.00 | *0.52* | *0.37* | *0.30* | *0.33* | *0.39* | 0.05 | *0.24* | *0.17* | *-0.20* | *0.13* | 0.07 | -0.02 | 0.03 |
| | *p* | | | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | 0.36 | *<.00* | *<.00* | *<.00* | *0.02* | 0.22 | 0.72 | 0.65 |
| 3 | *r* | | | 1.00 | *0.51* | *0.35* | *0.30* | *0.48* | *0.16* | *0.27* | *0.21* | *-0.22* | -0.02 | 0.04 | *-0.20* | *-0.13* |
| | *p* | | | | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | 0.67 | 0.46 | *<.00* | *0.02* |
| 4 | *r* | | | | 1.00 | *0.32* | *0.26* | *0.30* | *0.27* | *0.22* | *0.17* | *-0.17* | -0.02 | 0.05 | *-0.18* | *-0.13* |
| | *p* | | | | | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | *<.00* | 0.77 | 0.42 | *<.00* | *0.02* |
| 5 | *r* | | | | | 1.00 | *0.54* | *0.28* | 0.07 | *0.19* | *0.21* | *-0.32* | *-0.12* | *-0.18* | *-0.27* | *-0.17* |
| | *p* | | | | | | *<.00* | *<.00* | 0.22 | *<.00* | *<.00* | *<.00* | *0.02* | *<.00* | *<.00* | *<.00* |
| 6 | *r* | | | | | | 1.00 | *0.30* | 0.06 | *0.19* | *0.18* | *-0.22* | -0.02 | -0.07 | *-0.16* | -0.09 |
| | *p* | | | | | | | *<.00* | 0.28 | *<.00* | *<.00* | *<.00* | 0.74 | 0.17 | *<.00* | 0.10 |
| 7 | *r* | | | | | | | 1.00 | *0.29* | *0.42* | 0.05 | -0.08 | 0.03 | 0.10 | -0.08 | -0.09 |
| | *p* | | | | | | | | *<.00* | *<.00* | 0.37 | 0.17 | 0.61 | 0.08 | 0.16 | 0.10 |
| 8 | *r* | | | | | | | | 1.00 | *0.37* | 0.02 | -0.07 | 0.01 | 0.09 | -0.01 | -0.05 |
| | *p* | | | | | | | | | *<.00* | 0.76 | 0.22 | 0.86 | 0.11 | 0.93 | 0.38 |
| 9 | *r* | | | | | | | | | 1.00 | 0.06 | *-0.14* | 0.00 | -0.06 | -0.09 | 0.01 |
| | *p* | | | | | | | | | | 0.24 | *<.00* | 0.99 | 0.24 | 0.09 | 0.80 |
| 10 | *r* | | | | | | | | | | 1.00 | *-0.54* | 0.08 | 0.08 | -0.04 | 0.02 |
| | *p* | | | | | | | | | | | *<.00* | 0.14 | 0.16 | 0.52 | 0.77 |
| 11 | *r* | | | | | | | | | | | 1.00 | *-0.12* | *-0.11* | *0.12* | 0.02 |
| | *p* | | | | | | | | | | | | *0.03* | *0.04* | *0.03* | 0.67 |
| 12 | *r* | | | | | | | | | | | | 1.00 | *0.59* | *0.40* | *0.42* |
| | *p* | | | | | | | | | | | | | *<.00* | *<.00* | *<.00* |
| 13 | *r* | | | | | | | | | | | | | 1.00 | *0.35* | *0.34* |
| | *p* | | | | | | | | | | | | | | *<.00* | *<.00* |
| 14 | *r* | | | | | | | | | | | | | | 1.00 | *0.26* |
| | *p* | | | | | | | | | | | | | | | *<.00* |
| 15 | *r* | | | | | | | | | | | | | | | 1.00 |
| | *p* | | | | | | | | | | | | | | | |

Note. *Italics* denote significant correlations. 1) BPAQ-P, 2) BPAQ-V, 3) BPAQ-A, 4) BPAQ-H, 5) VS, 6) NOBAGS, 7) LHA-A, 8) LHA-S, 9) LHA-C, 10) PTM-P, 11) PTM-Al, 12) PTM-D, 13) PTM-E, 14) PTM-C, 15) PTM-An

Table 2c

*Correlations of COMPACT Measures with Self-Report Validation Measures – Total Sample*

| | | Measures of Aggression | | | | | | | | | Measures of Prosocial Tendency | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measure | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| $M_A$ | *r* | *.20* | *.11* | .07 | .04 | *.15* | *.12* | .04 | .08 | .07 | .00 | -.02 | -.05 | -.04 | -.05 | -.03 |
| | *p* | *<.00* | *.04* | .19 | .52 | *.01* | *.02* | .45 | .14 | .17 | .94 | .73 | .33 | .49 | .38 | .64 |
| ΣA | *r* | *.21* | *.12* | *.11* | .05 | *.14* | *.13* | .06 | .06 | .08 | .00 | -.01 | -.07 | -.06 | -.04 | .01 |
| | *p* | *<.00* | *.03* | *.04* | .33 | *.01* | *.02* | .24 | .26 | .14 | .95 | .86 | .19 | .31 | .46 | .93 |
| %A | *r* | *.18* | *.12* | *.12* | .07 | *.14* | *.11* | .05 | .05 | .04 | .00 | -.03 | -.08 | -.07 | -.06 | -.02 |
| | *p* | *<.00* | *.04* | *.03* | .21 | .01 | .05 | .37 | .39 | .42 | .98 | .62 | .12 | .20 | .29 | .67 |
| %A5 | *r* | *.15* | -.01 | .02 | .08 | .10 | .07 | .06 | .07 | .07 | -.03 | -.02 | -.03 | -.03 | .02 | -.02 |
| | *p* | *.01* | .89 | .73 | .13 | .07 | .18 | .31 | .21 | .22 | .60 | .71 | .64 | .60 | .71 | .70 |
| %A9 | *r* | *.21* | *.19* | *.19* | -.04 | .04 | .10 | .06 | .07 | .14 | -.01 | .09 | -.10 | -.03 | -.07 | .05 |
| | *p* | *.01* | *.01* | *.01* | .61 | .63 | .19 | .44 | .33 | .06 | .86 | .24 | .20 | .67 | .38 | .50 |
| $M_P$ | *r* | -.05 | -.05 | *-.13* | -.07 | -.06 | -.04 | -.01 | .09 | .00 | -.07 | .07 | .09 | -.02 | .03 | .02 |
| | *p* | .41 | .32 | *.02* | .18 | .24 | .49 | .89 | .12 | .96 | .21 | .20 | .12 | .78 | .65 | .66 |
| ΣP | *r* | *-.21* | *-.14* | *-.19* | *-.11* | *-.18* | *-.13* | -.06 | -.01 | -.06 | -.07 | .10 | *.13* | .08 | .06 | .05 |
| | *p* | *<.00* | *.01* | *<.00* | *.04* | *<.00* | *.01* | .26 | .85 | .32 | .21 | .08 | *.02* | .14 | .26 | .40 |
| %P | *r* | *-.25* | *-.17* | *-.21* | *-.11* | *-.20* | *-.16* | -.10 | -.04 | -.10 | -.03 | .06 | .10 | .07 | .06 | .02 |
| | *p* | *<.00* | *<.00* | *<.00* | *.04* | *<.00* | *<.00* | .07 | .49 | .06 | .60 | .28 | .07 | .19 | .27 | .67 |
| %P5 | *r* | -.10 | -.03 | -.10 | -.05 | *-.13* | -.06 | .00 | .03 | .00 | -.05 | .10 | *.16* | *.12* | .09 | .05 |
| | *p* | .08 | .59 | .08 | .33 | *.02* | .28 | 1.00 | .55 | .99 | .38 | .06 | *<.00* | *.03* | .09 | .41 |
| %P9 | *r* | -.05 | -.05 | -.09 | .02 | .01 | -.03 | .01 | -.05 | .03 | -.07 | .05 | .03 | -.07 | -.08 | .04 |
| | *p* | .49 | .54 | .21 | .75 | .95 | .65 | .87 | .55 | .71 | .33 | .52 | .65 | .37 | .26 | .59 |
| $M_C$ | *r* | *.23* | *.15* | *.16* | .04 | *.15* | *.13* | .08 | .06 | .10 | .02 | -.03 | -.04 | -.02 | -.01 | .02 |
| | *p* | *<.00* | *.01* | *<.00* | .50 | *.01* | *.02* | .13 | .28 | .06 | .71 | .57 | .43 | .75 | .83 | .74 |
| S1 | *r* | *.15* | *.14* | .09 | .08 | .06 | .03 | *.11* | .01 | .09 | .10 | .02 | .01 | .02 | -.02 | .00 |
| | *p* | *.01* | *.01* | .11 | .15 | .31 | .55 | *.05* | .90 | .11 | .06 | .73 | .90 | .74 | .70 | .98 |
| %0 | *r* | *.12* | .09 | *.16* | .08 | .10 | .09 | .08 | -.02 | .10 | .05 | -.06 | -.03 | .00 | .00 | .00 |
| | *p* | *.03* | .09 | *<.00* | .17 | .07 | .09 | .12 | .73 | .07 | .32 | .29 | .64 | .98 | .98 | .99 |

Note. *Italics* denote significant correlations. 1) BPAQ-P, 2) BPAQ-V, 3) BPAQ-A, 4) BPAQ-H, 5) VS, 6) NOBAGS, 7) LHA-A, 8) LHA-S, 9) LHA-C, 10) PTM-P, 11) PTM-Al, 12) PTM-D, 13) PTM-E, 14) PTM-C, 15) PTM-An

Table 2d

*Correlations of COMPACT Measures with Self-Report Validation Measures – vs. Aversive*

| | | Measures of Aggression | | | | | | | | | Measures of Prosocial Tendency | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measure | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| $M_A$ | *r* | *.19* | .12 | .04 | .03 | *.15* | .12 | .06 | .09 | .04 | .01 | -.04 | -.06 | -.04 | -.01 | -.03 |
| | *p* | *<.00* | .07 | .50 | .70 | *.02* | .06 | .36 | .15 | .58 | .90 | .52 | .31 | .58 | .94 | .64 |
| ΣA | *r* | *.20* | .05 | .07 | .07 | *.16* | *.15* | .05 | .04 | .04 | .07 | -.06 | -.10 | -.09 | -.05 | -.03 |
| | *p* | *<.00* | .40 | .25 | .31 | *.01* | *.02* | .42 | .54 | .58 | .29 | .36 | .11 | .15 | .41 | .67 |
| %A | *r* | *.17* | .06 | .08 | .08 | *.17* | *.13* | .05 | .02 | .00 | .07 | -.08 | -.11 | -.09 | -.08 | -.05 |
| | *p* | *.01* | .35 | .21 | .19 | *.01* | *.04* | .43 | .71 | .98 | .29 | .23 | .07 | .17 | .24 | .48 |
| %A5 | *r* | *.14* | -.04 | -.01 | .09 | .10 | .08 | .02 | .09 | .03 | -.02 | -.06 | -.04 | -.06 | .03 | -.05 |
| | *p* | *.03* | .53 | .87 | .16 | .10 | .24 | .80 | .14 | .69 | .82 | .38 | .56 | .32 | .67 | .45 |
| %A9 | *r* | .17 | .09 | .17 | -.04 | .02 | .14 | .07 | -.03 | .10 | .15 | .04 | *-.20* | -.09 | -.13 | -.02 |
| | *p* | .10 | .41 | .09 | .72 | .85 | .19 | .53 | .80 | .34 | .16 | .68 | *.05* | .38 | .20 | .84 |
| $M_P$ | *r* | -.06 | -.05 | -.11 | -.09 | -.11 | -.06 | -.03 | .10 | .00 | -.11 | .10 | .08 | .02 | .09 | .05 |
| | *p* | .37 | .41 | .09 | .16 | .09 | .39 | .62 | .10 | .96 | .08 | .13 | .24 | .77 | .17 | .41 |
| ΣP | *r* | *-.20* | -.12 | *-.16* | -.12 | *-.20* | *-.15* | -.08 | .00 | -.05 | -.10 | .11 | *.16* | .10 | .08 | .04 |
| | *p* | *<.00* | .05 | *.01* | .05 | *<.00* | *.02* | .21 | .96 | .46 | .13 | .09 | *.01* | .10 | .20 | .54 |
| %P | *r* | *-.25* | *-.16* | *-.18* | *-.13* | *-.21* | *-.19* | -.11 | -.02 | -.07 | -.07 | .07 | *.14* | .10 | .07 | .03 |
| | *p* | *<.00* | *.01* | *.01* | *.05* | *<.00* | *<.00* | .10 | .74 | .26 | .29 | .26 | *.03* | .11 | .29 | .63 |
| %P5 | *r* | -.06 | -.03 | -.11 | -.07 | -.11 | -.05 | .00 | .02 | .00 | -.07 | .11 | *.20* | *.15* | .10 | .01 |
| | *p* | .36 | .61 | .09 | .27 | .07 | .44 | .95 | .71 | 1.00 | .30 | .08 | *<.00* | *.02* | .13 | .83 |
| %P9 | *r* | -.11 | -.03 | -.03 | .02 | -.03 | -.06 | -.04 | -.04 | -.02 | -.12 | .09 | .00 | -.14 | -.04 | .01 |
| | *p* | .30 | .76 | .80 | .86 | .75 | .56 | .68 | .73 | .84 | .26 | .40 | .98 | .19 | .70 | .91 |
| $M_C$ | *r* | *.23* | .10 | .10 | .04 | *.17* | *.15* | .09 | .05 | .07 | .09 | -.07 | -.06 | -.04 | -.02 | .01 |
| | *p* | *<.00* | .11 | .10 | .58 | *.01* | *.02* | .15 | .46 | .27 | .14 | .28 | .35 | .54 | .75 | .88 |
| S1 | *r* | *.15* | *.14* | .11 | .11 | .07 | .05 | *.15* | .07 | .11 | *.13* | .00 | -.04 | .04 | -.02 | .04 |
| | *p* | *.02* | *.03* | .08 | .09 | .25 | .41 | *.02* | .31 | .09 | *.04* | .97 | .54 | .51 | .70 | .57 |
| %0 | *r* | .12 | *.17* | *.16* | .07 | .07 | .09 | .09 | -.01 | *.13* | -.01 | .02 | -.03 | -.02 | .02 | .03 |
| | *p* | .06 | *.01* | *.01* | .30 | .27 | .17 | .15 | .92 | *.05* | .92 | .79 | .63 | .80 | .73 | .64 |

Note. *Italics* denote significant correlations. 1) BPAQ-P, 2) BPAQ-V, 3) BPAQ-A, 4) BPAQ-H, 5) VS, 6) NOBAGS, 7) LHA-A, 8) LHA-S, 9) LHA-C, 10) PTM-P, 11) PTM-Al, 12) PTM-D, 13) PTM-E, 14) PTM-C, 15) PTM-An

Table 2e

*Correlations of COMPACT Measures with Self-Report Validation Measures – vs. Pleasant*

| | | Measures of Aggression | | | | | | | | | Measures of Prosocial Tendency | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measure | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| $M_A$ | *r* | *.23* | .11 | .15 | .06 | .13 | .13 | .00 | .05 | .20 | .00 | .03 | -.03 | -.05 | -.16 | -.02 |
| | *p* | *.03* | .30 | .17 | .57 | .21 | .21 | .99 | .64 | .06 | .98 | .77 | .80 | .66 | .15 | .86 |
| ΣA | *r* | *.22* | *.31* | .19 | .06 | .10 | .08 | .01 | .17 | .16 | -.11 | .08 | .01 | -.07 | -.08 | -.05 |
| | *p* | *.04* | *<.00* | .07 | .61 | .34 | .47 | .95 | .11 | .14 | .31 | .45 | .95 | .49 | .46 | .62 |
| %A | *r* | .17 | *.27* | .19 | .06 | .09 | .04 | -.04 | .15 | .11 | -.10 | .06 | -.01 | -.13 | -.07 | -.10 |
| | *p* | .10 | *.01* | .07 | .59 | .41 | .68 | .71 | .17 | .32 | .34 | .55 | .91 | .24 | .50 | .36 |
| %A5 | *r* | .17 | .15 | .06 | .17 | .19 | .11 | .18 | -.09 | .19 | .09 | .06 | .01 | -.09 | -.19 | *-.22* |
| | *p* | .10 | .17 | .56 | .10 | .07 | .32 | .10 | .41 | .08 | .43 | .56 | .93 | .39 | .07 | *.04* |
| %A9 | *r* | *.23* | *.30* | .19 | .01 | .07 | .07 | .00 | *.21* | .16 | -.13 | .11 | .04 | -.02 | -.02 | .04 |
| | *p* | *.03* | *<.00* | .07 | .90 | .53 | .53 | .99 | *.05* | .13 | .23 | .33 | .75 | .88 | .88 | .74 |
| $M_P$ | *r* | .05 | -.04 | -.15 | -.06 | .06 | .02 | .15 | .02 | .11 | -.04 | .04 | .13 | -.03 | -.14 | .06 |
| | *p* | .67 | .73 | .16 | .61 | .57 | .86 | .15 | .86 | .32 | .74 | .69 | .22 | .76 | .21 | .60 |
| ΣP | *r* | -.21 | -.16 | *-.27* | -.09 | -.16 | -.09 | .05 | -.04 | -.02 | -.04 | .10 | .05 | .08 | .03 | .15 |
| | *p* | .05 | .13 | *.01* | .41 | .14 | .42 | .63 | .70 | .85 | .70 | .36 | .66 | .46 | .76 | .15 |
| %P | *r* | *-.24* | -.19 | *-.27* | -.12 | -.19 | -.11 | -.01 | -.10 | -.12 | -.01 | .08 | .02 | .09 | .10 | .13 |
| | *p* | *.02* | .07 | *.01* | .28 | .08 | .32 | .93 | .35 | .27 | .90 | .44 | .87 | .41 | .34 | .24 |
| %P5 | *r* | *-.23* | -.02 | -.05 | .00 | -.18 | -.09 | .02 | .06 | .01 | -.01 | .08 | .05 | .03 | .08 | .15 |
| | *p* | *.03* | .87 | .64 | .98 | .10 | .40 | .87 | .55 | .94 | .95 | .46 | .62 | .76 | .46 | .17 |
| %P9 | *r* | .03 | -.06 | -.17 | .02 | .05 | .00 | .09 | -.05 | .13 | -.04 | .01 | .07 | .02 | -.13 | .11 |
| | *p* | .78 | .61 | .11 | .88 | .64 | .98 | .39 | .62 | .22 | .70 | .90 | .51 | .83 | .24 | .32 |
| $M_C$ | *r* | *.24* | *.26* | *.25* | .08 | .14 | .09 | -.02 | .12 | .10 | -.04 | -.01 | -.02 | -.08 | -.06 | -.11 |
| | *p* | *.03* | *.02* | *.02* | .47 | .18 | .40 | .82 | .28 | .36 | .72 | .94 | .84 | .44 | .57 | .30 |
| S1 | *r* | .16 | .15 | .02 | .02 | .02 | -.02 | .00 | -.15 | .03 | .05 | .05 | .12 | -.04 | -.02 | -.10 |
| | *p* | .14 | .16 | .84 | .88 | .88 | .87 | .98 | .15 | .79 | .64 | .63 | .28 | .69 | .85 | .34 |
| %0 | *r* | .13 | -.09 | .15 | .10 | .17 | .11 | .08 | -.06 | .03 | .17 | *-.23* | -.01 | .05 | -.06 | -.06 |
| | *p* | .22 | .39 | .17 | .36 | .11 | .32 | .49 | .60 | .77 | .11 | *.03* | .92 | .68 | .61 | .60 |

Note. *Italics* denote significant correlations. 1) BPAQ-P, 2) BPAQ-V, 3) BPAQ-A, 4) BPAQ-H, 5) VS, 6) NOBAGS, 7) LHA-A, 8) LHA-S, 9) LHA-C, 10) PTM-P, 11) PTM-Al, 12) PTM-D, 13) PTM-E, 14) PTM-C, 15) PTM-An

In Biondolillo (2010), it was predicted that aversive COMPACT scores would correlate positively with aggression measures and with public prosocial tendency while correlating negatively with the other five prosocial tendency measures. The inverse was predicted for the one available measure of only pleasant responding, $fP_{MAX}$ (%P5 in the current study). It was also predicted that $T1_{SL}$ (S1 in the current study) would not be associated with vengeance seeking. These predictions were applied to the current study as well, though it is worth noting that in Biondolillo (2010) correlations were strongest with physical aggression, normative beliefs about aggression, and vengeance seeking. Additionally, the neutral response scale (%0) was not expected to correlate with other validation measures in this study. Though each COMPACT scale is not expected to correlate with every subscale, these represent the most logical predictions. Furthermore, opponent condition was expected to impact COMPACT scale correlations, though the direction and magnitude of the changes was not hypothesized.

## Further Analysis of COMPACT Measures from Biondolillo (2010)

Expected and observed relationships for each of the COMPACT scales with each of the self-report validation measure subscales are shown for the aversive opponent condition (Table 3a) and the pleasant opponent condition (Table 3b). In Table 3a, significant correlations obtained in Biondolillo (2010) are indicated for reference. $M_C$ demonstrates the same pattern of correlations as was obtained in Biondolillo (2010), correlating positively with physical aggression ($r = 0.23$, $p < .01$), vengeance seeking ($r = 0.17$, $p = .01$), and normalizing beliefs regarding aggression ($r = 0.15$, $p = .02$), while failing to correlate with any other measures of aggression or prosocial behavior. High scores on this measure reflect the overall pattern of behavioral choices; thus, its utility is

Table 3a

*Convergent/Divergent Validity of COMPACT Scales – vs. Aversive*

| | | Measures of Aggression | | | | | | | | | Measures of Prosocial Tendency | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measure | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| $M_A$ | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | +* | + | + | + | +* | + | + | + | + | + | – | – | – | – | – |
| ΣA | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | +* | + | + | + | +* | +* | + | + | + | + | – | – | – | – | – |
| %A | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | +* | + | + | + | +* | +* | + | + | + | + | – | – | – | – | – |
| %A5 | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | +*p | – | – | + | +p | +p | + | + | + | – | – | – | – | + | – |
| %A9 | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | + | + | + | – | + | + | + | – | + | + | + | –* | – | – | – |
| $M_P$ | E | – | – | – | – | – | – | – | – | – | – | + | + | + | + | + |
| | O | – | – | – | – | – | – | – | + | + | – | + | + | + | + | + |
| ΣP | E | – | – | – | – | – | – | – | – | – | – | + | + | + | + | + |
| | O | –* | – | –* | – | –* | –* | – | 0 | – | – | + | +* | + | + | + |
| %P | E | – | – | – | – | – | – | – | – | – | – | + | + | + | + | + |
| | O | –* | –* | –* | –* | –* | –* | – | – | – | – | + | +* | + | + | + |
| %P5 | E | – | – | – | – | – | – | – | – | – | – | + | + | + | + | + |
| | O | – | – | – | – | – | – | + | + | + | – | + | +* | +* | + | +x |
| %P9 | E | – | – | – | – | – | – | – | – | – | – | + | + | + | + | + |
| | O | – | – | – | + | – | – | – | – | – | – | + | + | – | – | + |
| $M_C$ | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | +*p | + | + | + | +*p | +*p | + | + | + | + | – | – | – | – | + |
| S1 | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | +*p | +*p | + | + | + | + | +* | + | + | +* | + | – | + | – | + |
| %0 | E | | | | | | | | | | | | | | | |
| | O | + | +* | +* | + | + | + | + | – | +* | – | + | – | – | + | + |

Note. E = Expected, O = Observed, "+" = Pos. Corr., "-" = Neg. Corr., "0" = No correlation, "*" = Sig. in combined study, "p" = Sig. in initial study, "x" = Sig. in opposite direction in initial study; 1) BPAQ-P, 2) BPAQ-V, 3) BPAQ-A, 4) BPAQ-H, 5) VS, 6) NOBAGS, 7) LHA-A, 8) LHA-S, 9) LHA-C, 10) PTM-P, 11) PTM-Al, 12) PTM-D, 13) PTM-E, 14) PTM-C, 15) PTM-An. Measures in italics were in initial study.

Table 3b

*Convergent/Divergent Validity of COMPACT Scales – vs. Pleasant*

| | | Measures of Aggression | | | | | | | | | Measures of Prosocial Tendency | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measure | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| $M_A$ | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | +* | + | + | + | + | + | + | + | + | + | + | – | – | – | – |
| ΣA | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | +* | +* | + | + | + | + | + | + | + | – | + | + | – | – | – |
| %A | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | + | +* | + | + | + | + | – | + | + | – | + | – | – | – | – |
| %A5 | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | + | + | + | + | + | + | + | – | + | + | + | + | – | – | –* |
| %A9 | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | +* | +* | + | + | + | + | + | +* | + | – | + | + | – | – | + |
| $M_P$ | E | – | – | – | – | – | – | – | – | – | – | + | + | + | + | + |
| | O | + | – | – | – | + | + | + | + | + | – | + | + | – | – | + |
| ΣP | E | – | – | – | – | – | – | – | – | – | – | + | + | + | + | + |
| | O | – | – | –* | – | – | – | + | – | – | – | + | + | + | + | + |
| %P | E | – | – | – | – | – | – | – | – | – | – | + | + | + | + | + |
| | O | –* | – | –* | – | – | – | – | – | – | – | + | + | + | + | + |
| %P5 | E | – | – | – | – | – | – | – | – | – | – | + | + | + | + | + |
| | O | –* | – | – | 0 | – | – | + | + | + | – | + | + | + | + | + |
| %P9 | E | – | – | – | – | – | – | – | – | – | – | + | + | + | + | + |
| | O | + | – | – | + | + | 0 | + | – | + | – | + | + | + | – | + |
| $M_C$ | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | +* | +* | +* | + | + | + | – | + | + | – | – | – | – | – | – |
| S1 | E | + | + | + | + | + | + | + | + | + | + | – | – | – | – | – |
| | O | + | + | + | + | + | – | + | – | + | + | + | + | – | – | – |
| %0 | E | | | | | | | | | | | | | | | |
| | O | + | – | + | + | + | + | + | – | + | + | –* | – | + | – | – |

Note. E = Expected, O = Observed, "+" = Pos. Corr., "-" = Neg. Corr., "0" = No correlation, "*" = Sig. correlation; 1) BPAQ-P, 2) BPAQ-V, 3) BPAQ-A, 4) BPAQ-H, 5) VS, 6) NOBAGS, 7) LHA-A, 8) LHA-S, 9) LHA-C, 10) PTM-P, 11) PTM-Al, 12) PTM-D, 13) PTM-E, 14) PTM-C, 15) PTM-An.

still hindered by its lack of negative correlation with prosocial responding. Additional measures were designed to partition the information contained in this variable in hopes of deriving scales with stronger psychometric properties. These scales will be discussed below.

The COMPACT measure S1 was also similar to its correlational pattern from the initial study, relating positively to physical ($r = 0.15$, $p = .02$) and verbal ($r = 0.14$, $p = .03$) aggression; however, S1 differed from its previous pattern in that it now also demonstrated significant positive correlations with having a history of aggressive behavior ($r = 0.15$, $p = .02$) and with public prosocial behaviors ($r = 0.13$, $p = .04$), but not with vengeance, history of extreme forms of aggression, temper, or other forms of prosocial responding. As high scores on this COMPACT measure reflect the participant's tendency to strike without any knowledge of the opponent's behaviors, this pattern of correlations provides good evidence for its validity.

The COMPACT scales %A5 and %P5 were designed to indicate a participant's rate of selecting maximally aversive or pleasant sounds, respectively, to send to their opponent. These were hypothesized to represent clear examples of either aggressive or prosocial action, respectively. In Biondolillo (2010), %A5 appeared to be suitable as a measure of aggressive responding; however, its correlational pattern was the same as that of $M_C$, rendering its incremental validity somewhat questionable. In the current study, %A5 appears to be less robust than before, correlating positively only with physical aggression ($r = 0.14$, $p = .03$). This reduction of convergent validity may be due to the introduction of %A9, which was designed to potentially replace %A5. On the other hand, %P5 previously demonstrated a negative correlation with anonymous prosocial

behaviors when it was predicted to exhibit a positive correlation in the initial study. In the current study, however, %P5 demonstrated no relationship with anonymous prosocial behaviors, and it was positively correlated with dire ($r = 0.20$, $p < .01$) and emotional ($r = 0.15$, $p < .02$) prosocial behaviors, as initially predicted, despite the new option of P9 being available. This suggests that the functionality of highest response options on the aversive and pleasant spectrums are not reflexive, as was assumed in the design of the COMPACT.

## Validation Factor Model

Each of the self-report validation measures included in the study was entered into a principle components analysis, as shown in Table 4. Two of the measures that were initially loaded onto Aggressive Temperament (AT) (Biondolillo, 2010) – BPAQ-Hostility and LHA-Aggression – exhibited complex factor loadings and were subsequently excluded from the model in the current study. Removal of these two measures produced the four factor structure shown in Table 5, which was free of cross-loadings. This factor structure differed slightly from the five factor structure obtained by Biondolillo (2010), with no change on three of the previous five factors: Reactive Prosocial Tendencies (RPT: PTM-Dire, PTM-Emotional, PTM-Compliant, and PTM-Anonymous), Instrumental Prosocial Tendencies (IPT: PTM-Altruism and PTM-Public), and Self-destructive Aggression (SDA: LHA-Self-directed and LHA-Consequences; SDA was termed "Extreme Aggression/Self-Harm" in Biondolillo, 2010). The new AT factor includes the two remaining scales from the initial study's AT (BPAQ-Anger and BPAQ-Verbal Aggression) (Biondolillo, 2010) as well as all three scales from the initial

Table 4

*Varimax Rotated Component Matrix of All Validation Measures*

| Measure | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|---|---|---|---|---|
| BPAQ-Physical Agg. | *.84** | .03 | .18 | -.06 |
| BPAQ-Verbal Agg. | *.71** | .15 | .10 | .10 |
| NOBAGS | *.70** | -.13 | -.09 | .17 |
| VS | *.64** | -.31 | -.04 | .30 |
| BPAQ-Anger | *.64** | -.07 | .33 | .18 |
| LHA-Aggression | .64* | .05 | .48* | -.15 |
| BPAQ-Hostility | .43* | -.10 | .42* | .23 |
| PTM-Dire | .07 | *.83** | -.01 | .12 |
| PTM-Emotional | .01 | *.79** | .12 | .12 |
| PTM-Compliant | -.14 | *.66** | -.06 | -.16 |
| PTM-Anonymous | -.04 | *.65** | -.10 | -.02 |
| LHA-Self-Directed | -.04 | .01 | *.84** | .04 |
| LHA-Consequences | .26 | -.04 | *.66** | .01 |
| PTM-Altruism | -.16 | -.03 | -.07 | *-.84** |
| PTM-Public | .10 | .05 | .02 | *.84** |

Notes. Asterisks (*) denote significant factor loading. *Italics* denote factor membership.

study's Retaliation Beliefs/Behaviors factor (BPAQ-Physical Aggression, VS, NOBAGS) (Biondolillo, 2010).

For reference, correlations between each of the four validation factors with each of the COMPACT measures are provided for each of the following groups – total sample (Table 6a), sample split by gender (Table 6b), vs. Aversive group (Table 6c), vs. Aversive group split by gender (Table 6d), vs. Pleasant group (Table 6e), vs. Pleasant

Table 5

*Varimax Rotated Component Matrix of Validation Measures – Simple Structures Only*

| Measure | Fac1:AT | Fac2:RPT | Fac3:IPT | Fac4:SDA |
|---|---|---|---|---|
| BPAQ-Physical Agg. | *.82** | .03 | -.05 | .17 |
| BPAQ-Verbal Agg. | *.74** | .16 | .05 | .07 |
| NOBAGS | *.71** | -.13 | .14 | -.05 |
| VS | *.66** | -.30 | .26 | -.02 |
| BPAQ-Anger | *.66** | -.06 | .15 | .24 |
| PTM-Dire | .07 | *.83** | .12 | -.01 |
| PTM-Emotional | -.01 | *.78** | .13 | .07 |
| PTM-Compliant | -.15 | *.66** | -.15 | -.04 |
| PTM-Anonymous | -.04 | *.65** | -.03 | -.04 |
| PTM-Public | .11 | .04 | *.85** | -.01 |
| PTM-Altruism | -.19 | -.02 | *-.85** | -.07 |
| LHA-Self-directed | -.00 | .01 | .04 | *.86** |
| LHA-Consequences | .29 | -.04 | .02 | *.74** |

Note. Factor 1 – "Aggressive Temperament"; Factor 2 – "Reactive Prosocial Tendencies"; Factor 3 – "Instrumental Prosocial Tendencies"; Factor 4 – "Self-destructive Aggression". Asterisks (*) denote significant factor loading. *Italics* denote factor membership.

group split by gender (Table 6f). In the combined sample, positive correlations with AT were demonstrated with COMPACT scales $M_C$ ($r = .22$, $p < .01$) and S1 ($r = .13$, $p = .02$). Additionally, %P5 was significantly correlated with RPT ($r = .15$, $p < .01$). No COMPACT measures correlated with IPT or SDA.

Table 6a

*Correlations between Validation Factors and COMPACT – Total Sample*

| Measure | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| Combined Mean ($M_C$) | .22 (< .01)* | -.01 (.83) | -.02 (.70) | .067(.23) |
| Mean Aversive ($M_A$) | .17 (< .01)* | -.05 (.35) | -.02 (.68) | .06 (.26) |
| Mean Pleasant ($M_P$) | -.08 (.13) | .04 (.47) | -.07 (.22) | .06 (.28) |
| 1st Trial Sound (S1) | 0.13 (.02)* | 0.02 (.75) | 0.01 (.80) | 0.04 (.47) |
| % Aversive (%A) | .17 (< .01)* | -.07 (.17) | -.02 (.71) | .03 (.57) |
| % Pleasant (%P) | -.26 (< .01)* | .08 (.14) | .00 (.97) | -.05 (.40) |
| % No Response (%0) | .15 (< .01)* | -.01 (.88) | .03 (.54) | .03 (.64) |
| % Aversive 5 (%A5) | .09 (.11) | -.03 (.64) | -.03 (.60) | .06 (.24) |
| % Pleasant 5 (%P5) | -.09 (.09) | .15 (< .01)* | -.07 (.22) | .03 (.54) |
| % Aversive 9 (%A9) | .20 (< .01)* | -.03 (.74) | -.11 (.15) | .12 (.12) |
| % Pleasant 9 (%P9) | -.04 (.58) | -.03 (.70) | -.05 (.48) | -.02 (.79) |
| Sum of Aversive (ΣA) | .19 (< .01)* | -.05 (.35) | -.04 (.47) | .06 (.31) |
| Sum of Pleasant (ΣP) | -.22 (< .01)* | .10 (.06) | -.05 (.36) | -.01 (.84) |

Notes. Values represent Pearson's correlation coefficients with corresponding *p* values in parentheses. Asterisks (*) denote significant correlations. n = 336 (n = 183 for %A9 and %P9).

## Validity of Extreme Responses

The COMPACT extreme responses – measured by the new variables %A9 and %P9 – were designed after the initial validation study (Biondolillo, 2010) to replace the variables %A5 and %P5 in order to address their limited utility. In Biondolillo (2010),

Table 6b

*Correlations between Validation Factors and COMPACT – Total Sample by Gender*

| Measure | | Females (n = 243) | | | | Males (n = 93) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | AT | RPT | IPT | SDA | AT | RPT | IPT | SDA |
| $M_C$ | *r* | .25* | 0.03 | -0.07 | 0.06 | 0.14 | -0.10 | 0.07 | 0.07 |
| | *p* | <.00 | 0.65 | 0.29 | 0.32 | 0.17 | 0.32 | 0.48 | 0.50 |
| $M_A$ | *r* | .18* | -0.01 | -0.07 | 0.11 | 0.12 | -0.13 | 0.05 | -0.06 |
| | *p* | <.00 | 0.82 | 0.31 | 0.08 | 0.24 | 0.23 | 0.64 | 0.57 |
| $M_P$ | *r* | -.13* | -0.01 | -0.07 | 0.03 | -0.02 | 0.18 | -0.10 | 0.08 |
| | *p* | 0.05 | 0.91 | 0.31 | 0.64 | 0.88 | 0.09 | 0.35 | 0.47 |
| S1 | *r* | .14* | 0.08 | -0.07 | 0.03 | .042 | -0.11 | 0.14 | -0.01 |
| | *p* | 0.03 | 0.20 | 0.30 | 0.69 | 0.69 | 0.28 | 0.17 | 0.96 |
| %A | *r* | .21* | -0.04 | -0.07 | 0.01 | 0.10 | -0.17 | 0.09 | 0.09 |
| | *p* | <.00 | 0.56 | 0.31 | 0.86 | 0.33 | 0.10 | 0.41 | 0.42 |
| %P | *r* | -.30* | 0.04 | 0.06 | -0.03 | -0.19 | 0.17 | -0.11 | -0.09 |
| | *p* | <.00 | 0.49 | 0.38 | 0.65 | 0.07 | 0.10 | 0.27 | 0.40 |
| %0 | *r* | .14* | -0.01 | 0.02 | 0.03 | 0.16 | 0.00 | 0.05 | 0.01 |
| | *p* | 0.03 | 0.89 | 0.74 | 0.63 | 0.14 | 0.97 | 0.61 | 0.94 |
| %A5 | *r* | 0.10 | 0.02 | -0.10 | 0.05 | 0.08 | -0.13 | 0.13 | 0.09 |
| | *p* | 0.14 | 0.78 | 0.11 | 0.41 | 0.47 | 0.22 | 0.23 | 0.39 |
| %P5 | *r* | -0.12 | 0.12 | -0.07 | 0.03 | -0.07 | .21* | -0.08 | 0.02 |
| | *p* | 0.07 | 0.07 | 0.29 | 0.65 | 0.49 | 0.04 | 0.45 | 0.85 |
| %A9 | *r* | .25* | -0.01 | -0.14 | .20* | 0.09 | -0.06 | -0.08 | -0.02 |
| | *p* | 0.01 | 0.93 | 0.12 | 0.02 | 0.48 | 0.63 | 0.54 | 0.86 |
| %P9 | *r* | -0.09 | -0.06 | -0.07 | 0.02 | 0.02 | 0.03 | -0.03 | -0.10 |
| | *p* | 0.34 | 0.51 | 0.41 | 0.78 | 0.88 | 0.81 | 0.85 | 0.46 |
| ΣA | *r* | .22* | 0.00 | -0.10 | 0.06 | 0.13 | -0.16 | 0.09 | 0.05 |
| | *p* | <.00 | 0.94 | 0.11 | 0.39 | 0.22 | 0.12 | 0.39 | 0.60 |
| ΣP | *r* | -.26* | 0.05 | -0.01 | 0.01 | -0.14 | .23* | -0.13 | -0.06 |
| | *p* | <.00 | 0.43 | 0.84 | 0.90 | 0.19 | 0.03 | 0.21 | 0.55 |

Notes. Asterisks (*) denote significant correlations. Females n = 124, Males n = 59 for %A9 and %P9.

Table 6c

*Correlations between Validation Factors and COMPACT – vs. Aversive*

| Measure | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| Combined Mean ($M_C$) | .19 (< .01)* | -.04 (.56) | .05 (.48) | .03 (.60) |
| Mean Aversive ($M_A$) | .16 (.01)* | -.04 (.50) | -.01 (.87) | .05 (.46) |
| Mean Pleasant ($M_P$) | -.09 (.14) | .08 (.22) | -.11 (.08) | .08 (.22) |
| 1st Trial Sound (S1) | .13 (.04)* | .02 (.82) | .04 (.56) | .09 (.18) |
| % Aversive (%A) | .15 (.02)* | -.11 (.08) | .05 (.40) | -.01 (.85) |
| % Pleasant (%P) | -.26 (< .01)* | .11 (.08) | -.02 (.70) | -.01 (.83) |
| % No Response (%0) | .18 (< .01)* | .01 (.86) | -.06 (.35) | .05 (.45) |
| % Aversive 5 (%A5) | .06 (.34) | -.05 (.43) | .00 (.97) | .06 (.37) |
| % Pleasant 5 (%P5) | -.07 (.25) | .16 (.01)* | -.09 (.18) | .03 (.70) |
| % Aversive 9 (%A9) | .15 (.14) | -.13 (.20) | .01 (.89) | .03 (.79) |
| % Pleasant 9 (%P9) | -.06 (.58) | -.05 (.61) | -.10 (.32) | -.03 (.77) |
| Sum of Aversive (ΣA) | .16 (.01)* | -.10 (.13) | .04 (.59) | .01 (.85) |
| Sum of Pleasant (ΣP) | -.21 (< .01)* | .13 (.04)* | -.07 (.25) | .00 (.97) |

Notes. Values represent Pearson's correlation coefficients with corresponding *p* values in parentheses. Asterisks (*) denote significant correlations. n = 247 (n = 94 for %A9 and %P9).

the COMPACT scale $fA_{MAX}$ (recoded as %A5) was significantly correlated with the Retaliation Beliefs and Behaviors factor (now incorporated into AT), whereas the COMPACT scale $fP_{MAX}$ (recoded as %P5) was not significantly correlated with any of the factors and, as previously mentioned, demonstrated a negative correlation with one of

Table 6d

*Correlations between Validation Factors and COMPACT – vs. Aversive by Gender*

| Measure | | Females (n = 185) | | | | Males (n = 62) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | AT | RPT | IPT | SDA | AT | RPT | IPT | SDA |
| $M_C$ | *r* | .22* | 0.01 | -0.04 | 0.03 | 0.13 | -0.16 | 0.22 | 0.04 |
| | *p* | <.00 | 0.91 | 0.63 | 0.69 | 0.33 | 0.22 | 0.08 | 0.77 |
| $M_A$ | *r* | .16* | -0.02 | -0.09 | 0.12 | 0.14 | -0.09 | 0.18 | -0.11 |
| | *p* | 0.03 | 0.76 | 0.20 | 0.11 | 0.29 | 0.47 | 0.17 | 0.38 |
| $M_P$ | *r* | -0.12 | 0.03 | -0.12 | 0.04 | -0.04 | 0.24 | -0.10 | 0.13 |
| | *p* | 0.10 | 0.70 | 0.10 | 0.56 | 0.77 | 0.06 | 0.42 | 0.33 |
| S1 | *r* | 0.15* | 0.07 | -0.03 | 0.04 | 0.03 | -0.13 | 0.17 | 0.11 |
| | *p* | 0.04 | 0.34 | 0.72 | 0.56 | 0.85 | 0.30 | 0.18 | 0.38 |
| %A | *r* | .18* | -0.07 | -0.02 | -0.03 | 0.07 | -0.24 | 0.23 | 0.05 |
| | *p* | 0.01 | 0.37 | 0.83 | 0.65 | 0.57 | 0.06 | 0.08 | 0.67 |
| %P | *r* | -.28* | 0.08 | 0.06 | 0.01 | -0.21 | 0.21 | -0.22 | -0.08 |
| | *p* | <.00 | 0.31 | 0.43 | 0.86 | 0.11 | 0.10 | 0.09 | 0.55 |
| %0 | *r* | .15* | -0.01 | -0.07 | 0.04 | .25* | 0.07 | -0.03 | 0.04 |
| | *p* | 0.05 | 0.92 | 0.32 | 0.58 | 0.05 | 0.58 | 0.82 | 0.73 |
| %A5 | *r* | 0.05 | 0.01 | -0.11 | 0.03 | 0.08 | -0.20 | .26* | 0.10 |
| | *p* | 0.48 | 0.93 | 0.13 | 0.68 | 0.55 | 0.11 | 0.04 | 0.43 |
| %P5 | *r* | -0.10 | 0.14 | -0.09 | 0.04 | -0.03 | 0.22 | -0.09 | -0.03 |
| | *p* | 0.16 | 0.06 | 0.24 | 0.62 | 0.84 | 0.08 | 0.48 | 0.83 |
| %A9 | *r* | 0.24 | -0.09 | -0.04 | 0.16 | -0.03 | -0.29 | 0.11 | -0.16 |
| | *p* | 0.05 | 0.49 | 0.76 | 0.21 | 0.90 | 0.13 | 0.59 | 0.43 |
| %P9 | *r* | -0.07 | -0.10 | -0.11 | 0.01 | -0.03 | 0.07 | -0.09 | -0.08 |
| | *p* | 0.57 | 0.42 | 0.38 | 0.94 | 0.88 | 0.71 | 0.64 | 0.68 |
| ΣA | *r* | .19* | -0.04 | -0.06 | 0.01 | 0.09 | -.25* | 0.25 | 0.02 |
| | *p* | 0.01 | 0.61 | 0.42 | 0.88 | 0.46 | 0.05 | 0.05 | 0.90 |
| ΣP | *r* | -.24* | 0.07 | -0.02 | 0.03 | -0.15 | .28* | -0.19 | -0.06 |
| | *p* | <.00 | 0.33 | 0.78 | 0.71 | 0.25 | 0.03 | 0.13 | 0.63 |

Notes. Asterisks (*) denote significant correlations. Females n = 66; Males n = 28 for %A9 and %P9.

Table 6e

*Correlations between Validation Factors and COMPACT – vs. Pleasant*

| Measure | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| Combined Mean ($M_C$) | .26 (.01)* | -.07 (.52) | -.06 (.58) | .12 (.28) |
| Mean Aversive ($M_A$) | .21 (.05)* | -.07 (.49) | -.05 (.66) | .11 (.30) |
| Mean Pleasant ($M_P$) | .01 (.96) | .01 (.96) | -.03 (.78) | .04 (.72) |
| 1st Trial Sound (S1) | .13 (.24) | .02 (.88) | -.03 (.80) | -.11 (.31) |
| % Aversive (%A) | .22 (.04)* | -.07 (.49) | -.13 (.21) | .15 (.17) |
| % Pleasant (%P) | -.25 (.01)* | .10 (.36) | -.02 (.88) | -.11 (.29) |
| % No Response (%0) | .09 (.42) | -.05 (.66) | .22 (.04)* | -.04 (.73) |
| % Aversive 5 (%A5) | .20 (.06) | -.15 (.16) | .00 (.97) | -.01 (.90) |
| % Pleasant 5 (%P5) | -.15 (.15) | .11 (.32) | -.03 (.79) | .07 (.49) |
| % Aversive 9 (%A9) | .25 (.02)* | .05 (.66) | -.18 (.09) | .22 (.04)* |
| % Pleasant 9 (%P9) | -.01 (.91) | .02 (.85) | -.02 (.86) | .01 (.95) |
| Sum of Aversive (ΣA) | .26 (.01)* | -.03 (.76) | -.15 (.15) | .18 (.09) |
| Sum of Pleasant (ΣP) | -.22 (.04)* | .09 (.38) | -.04 (.70) | -.03 (.79) |

Notes. Values represent Pearson's correlation coefficients with corresponding *p* values in parentheses. Asterisks (*) denote significant correlations. n = 89.

the scales with which it was predicted to correlate positively. The new scale %A9 performed poorly in the aversive opponent condition of the COMPACT, exhibiting only a negative correlation with dire prosocial tendencies ($r$ = -0.20, $p$ = .05) and failing to correlate with any of the four validation factors. The scale %P9 performed even worse,

Table 6f

*Correlations between Validation Factors and COMPACT – vs. Pleasant by Gender*

| Measure | | Females (n = 58) | | | | Males (n = 31) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | AT | RPT | IPT | SDA | AT | RPT | IPT | SDA |
| $M_C$ | *r* | .30* | -0.04 | -0.06 | 0.12 | 0.19 | -0.10 | -0.09 | 0.09 |
| | *p* | 0.02 | 0.76 | 0.63 | 0.38 | 0.31 | 0.58 | 0.64 | 0.63 |
| $M_A$ | *r* | 0.25 | -0.01 | 0.01 | 0.10 | 0.10 | -0.17 | -0.18 | 0.09 |
| | *p* | 0.06 | 0.96 | 0.95 | 0.45 | 0.59 | 0.36 | 0.33 | 0.64 |
| $M_P$ | *r* | -0.06 | -0.07 | 0.05 | 0.03 | 0.03 | 0.14 | -0.20 | 0.01 |
| | *p* | 0.67 | 0.60 | 0.72 | 0.81 | 0.87 | 0.46 | 0.28 | 0.97 |
| S1 | *r* | 0.07 | 0.09 | -0.14 | -0.06 | 0.07 | -0.07 | 0.08 | -0.29 |
| | *p* | 0.59 | 0.49 | 0.29 | 0.67 | 0.70 | 0.72 | 0.66 | 0.11 |
| %A | *r* | 0.21 | -0.07 | -0.14 | 0.13 | 0.18 | -0.08 | -0.17 | 0.14 |
| | *p* | 0.11 | 0.62 | 0.31 | 0.32 | 0.34 | 0.68 | 0.37 | 0.44 |
| %P | *r* | -.30* | 0.06 | -0.02 | -0.13 | -0.16 | 0.16 | 0.02 | -0.07 |
| | *p* | 0.02 | 0.67 | 0.87 | 0.34 | 0.38 | 0.40 | 0.93 | 0.71 |
| %0 | *r* | 0.17 | 0.01 | .26* | 0.01 | 0.01 | -0.12 | 0.19 | -0.08 |
| | *p* | 0.20 | 0.94 | 0.05 | 0.95 | 0.96 | 0.51 | 0.32 | 0.67 |
| %A5 | *r* | 0.25 | -0.17 | 0.08 | 0.13 | 0.15 | -0.13 | -0.15 | -0.26 |
| | *p* | 0.06 | 0.21 | 0.53 | 0.32 | 0.41 | 0.48 | 0.42 | 0.16 |
| %P5 | *r* | -0.16 | 0.05 | -0.02 | 0.01 | -0.17 | 0.18 | -0.04 | 0.16 |
| | *p* | 0.24 | 0.70 | 0.86 | 0.97 | 0.35 | 0.32 | 0.83 | 0.40 |
| %A9 | *r* | 0.19 | 0.06 | -0.21 | 0.23 | 0.25 | 0.06 | -0.21 | 0.15 |
| | *p* | 0.14 | 0.67 | 0.12 | 0.09 | 0.18 | 0.76 | 0.26 | 0.43 |
| %P9 | *r* | -0.11 | 0.01 | -0.04 | 0.05 | 0.05 | 0.05 | -0.01 | -0.10 |
| | *p* | 0.43 | 0.97 | 0.76 | 0.71 | 0.77 | 0.77 | 0.94 | 0.61 |
| ΣA | *r* | 0.24 | -0.03 | -0.16 | 0.18 | 0.23 | -0.02 | -0.20 | 0.13 |
| | *p* | 0.07 | 0.84 | 0.24 | 0.17 | 0.22 | 0.90 | 0.28 | 0.47 |
| ΣP | *r* | -.31* | 0.05 | -0.04 | -0.03 | -0.12 | 0.17 | -0.05 | -0.03 |
| | *p* | 0.02 | 0.73 | 0.77 | 0.81 | 0.53 | 0.37 | 0.81 | 0.89 |

Notes. Asterisks (*) denote significant correlations.

failing to correlate with any validation factors or measures, with %P5 outperforming it in this group. Although %P9 also failed to exhibit any correlations in the pleasant opponent condition, %A9 demonstrated significant and unique effects in the pleasant opponent condition. When playing against an all-pleasant opponent, scores on %A9 were not only associated with physical ($r = 0.23$, $p = .03$) and verbal aggression ($r = 0.30$, $p < .01$), but were also uniquely correlated with self-directed aggression ($r = 0.21$, $p = .05$).

## Additional COMPACT Measures

In addition to the added extreme responses, numerous scales based on participant sound choice were included in the present study to determine their viability as additional COMPACT measures. Although the intent of doing so was to determine if differing methods of measuring pleasant responding would better reflect prosocial tendency than the initially studied scales (Biondolillo, 2010), additional variables were included for both pleasant ($M_P$, %P, and ΣP) and aversive ($M_A$, %A, and ΣA) responding, as well as to account for choosing not to deliver pleasant or aversive feedback (%0). All three of the additional aversive scales were significantly correlated with AT ($M_A$: $r = .17$, $p < .01$; %A: $r = .17$, $p < .01$; and ΣA: $r = .19$, $p < .01$) as expected, providing evidence that these measures are adequately tapping aggression. Two of the additional pleasant scales were negatively related to AT (%P: $r = -.26$, $p < .01$ and ΣP: $r = -.22$, $p < .01$), though $M_P$ was not significantly correlated with any of the factors in the overall sample. Curiously, %0 was also positively correlated with AT ($r = .15$, $p < .01$) in the combined sample.

## Influence of Opponent Type and Participant Sex on Scale Validity

The effects of opponent behavior type, demonstrated above with the development of the extreme scales, and the effects of participant sex were both predicted to exhibit a

profound influence on the performance of COMPACT scales. These effects were analyzed using a series of moderated multiple regressions, reported below.

Results from a series of moderated multiple regressions with COMPACT $M_C$ regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 7. Opponent condition exhibited a positive effect on $M_C$, resulting in a significant $R^2$ for the regression of each of the four factors onto $M_C$.

Table 7

*Results from Moderated Multiple Regression with COMPACT $M_C$ as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.118*** ** | **.080*** ** | **.079*** ** | **.081*** ** |
| Factor[1] | .202*** | -.043 | .009 | .046 |
| Group | .266*** | .286*** | .282*** | .278*** |
| Sex | .009 | .034 | .035 | .028 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.005** | **.005** | **.009** | **.003** |
| **Model 1 and 2 $R^2$ Total** | **.123*** ** | **.085*** ** | **.088*** ** | **.083*** ** |
| Factor[1] x Group | -.073 | .005 | .066 | -.058 |
| Factor[1] x Sex | -.050 | -.068 | .081 | -.006 |
| Group x Sex | -.009 | -.028 | -.031 | -.031 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.001** | **.001** | **.003** | **.001** |
| **Full Model $R^2$ Total** | **.124*** ** | **.086*** ** | **.091*** ** | **.084*** ** |
| Factor[1] x Group x Sex | .037 | -.030 | .064 | .020 |

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

This effect demonstrates that individuals who played against an opponent who chose only aversive sounds selected more aversive sounds on average than individuals who played against an opponent who chose only pleasant sounds. However, the only factor shown to have a unique effect on $M_C$ was AT, suggesting that this composite scale does not reflect prosocial behavior despite its score accounting for pleasant responding. No two-way or three-way interaction effects were significant in any of these four regressions on $M_C$.

Table 8

*Results from Moderated Multiple Regressions with COMPACT S1 as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.045**** | **.034**** | **.033**** | **.034**** |
| Factor[1] | .108* | .020 | .006 | .012 |
| Group | .030 | .036 | .039 | .038 |
| Sex | .069** | .183*** | .182*** | .181*** |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.004** | **.010** | **.014** | **.013** |
| **Model 1 and 2 $R^2$ Total** | **.049*** | **.044*** | **.047*** | **.047*** |
| Factor[1] x Group | .000 | -.030 | .054 | .138 |
| Factor[1] x Sex | -.045 | -.097 | .100 | -.004 |
| Group x Sex | -.055 | -.052 | -.053 | -.081 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.000** | **.000** | **.000** | **.003** |
| **Full Model $R^2$ Total** | **.049*** | **.044*** | **.047*** | **.050*** |
| Factor[1] x Group x Sex | -.022 | -.001 | -.012 | .076 |

* $p < .05$; ** $p < .01$; *** $p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

Results from a series of moderated multiple regressions with COMPACT S1 regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 8. The factor AT demonstrated a unique effect on S1, resulting in a significant $R^2$ for the main effects model and indicated that initial selection of an aversive response is related with aggression. Though the other three factors did not demonstrate unique effects on S1, participant gender was uniquely related to S1 in each of the four regressions, indicating that males exhibited slightly higher levels of aggression than females when given the choice to aggress without knowledge of what their opponents will do. No two-way or three-way interaction effects were significant in any of these four regressions on S1.

Results from a series of moderated multiple regressions with COMPACT $M_A$ regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 9. Of the four factors, only AT exhibited unique effects on $M_A$, indicating that this scale is measuring aggression. No main effects were observed for opponent condition or participant sex on $M_A$. No two-way or three-way interaction effects were significant in any of these four regressions on $M_A$.

Results from a series of moderated multiple regressions with COMPACT %A regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 10. Opponent behavior condition was found to have significant positive effects on %A when entered into the model with each of the four factors, resulting in a significant model 1 in each case. This effect indicates that %A scores were higher in participants assigned to the aversive opponent condition. Of the four validation factors, only AT exhibited a unique effect on %A, showing that scores on

Table 9

*Results from Moderated Multiple Regressions with COMPACT $M_A$ as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.034**** | **.009** | **.008** | **.010** |
| Factor[1] | .166** | -.050 | -.028 | .051 |
| Group | -.001 | .017 | .008 | .008 |
| Sex | .063 | .083 | .086 | .077 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.004** | **.004** | **.005** | **.010** |
| **Model 1 and 2 $R^2$ Total** | **.038*** | **.013** | **.013** | **.020** |
| Factor[1] x Group | -.058 | .013 | .032 | -.061 |
| Factor[1] x Sex | -.038 | -.051 | .056 | -.087 |
| Group x Sex | -.020 | -.035 | -.039 | -.028 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.002** | **.001** | **.009** | **.000** |
| **Full Model $R^2$ Total** | **.040** | **.014** | **.022** | **.020** |
| Factor[1] x Group x Sex | .063 | .023 | .110 | -.034 |

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

%A were positively influenced by AT as predicted. No two-way or three-way interaction effects were significant in any of these four regressions on %A.

Results from a series of moderated multiple regressions with COMPACT ΣA regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 11. The factor AT demonstrated a unique effect on ΣA, resulting in a significant $R^2$ for that model, and demonstrating that this scale relates

Table 10

*Results from Moderated Multiple Regressions with COMPACT %A as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.074*** ** | **.057*** ** | **.047*** ** | **.048*** ** |
| Factor[1] | .165** | -.101 | .005 | .020 |
| Group | .204*** | .228*** | .217*** | .215*** |
| Sex | -.030 | -.011 | -.009 | -.012 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.005** | **.008** | **.017** | **.008** |
| **Model 1 and 2 $R^2$ Total** | **.079*** ** | **.065*** ** | **.064*** ** | **.056** ** |
| Factor[1] x Group | -.035 | -.036 | .098 | -.077 |
| Factor[1] x Sex | -.051 | -.066 | .081 | .028 |
| Group x Sex | -.056 | -.066 | -.072 | -.068 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.000** | **.002** | **.002** | **.000** |
| **Full Model $R^2$ Total** | **.079*** ** | **.067** ** | **.066** ** | **.056** ** |
| Factor[1] x Group x Sex | .003 | -.051 | .058 | .031 |

* $p < .05$; ** $p < .01$; *** $p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

to aggression as predicted. Though the other three factors did not demonstrate unique effects on ΣA, opponent condition was uniquely related to ΣA in each of the four models, indicating that participants who played against the all-aversive opponent exhibited significantly more frequent and more intense aversive sounds than their peers who played against the all-pleasant opponent. No two-way or three-way interaction effects were significant in any of these four regressions on ΣA.

Table 11

*Results from Moderated Multiple Regressions with COMPACT ΣA as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.091*** ** | **.067*** ** | **.061*** ** | **.062*** ** |
| Factor[1] | .176*** | -.080 | -.014 | .037 |
| Group | .234*** | .256*** | .246*** | .245*** |
| Sex | .011 | .031 | .034 | .028 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.004** | **.010** | **.019** | **.007** |
| **Model 1 and 2 $R^2$ Total** | **.095*** ** | **.077*** ** | **.080*** ** | **.069*** ** |
| Factor[1] x Group | -.036 | -.055 | .096 | -.081 |
| Factor[1] x Sex | -.038 | -.086 | .105 | -.008 |
| Group x Sex | -.050 | -.060 | -.064 | -.059 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.000** | **.003** | **.006** | **.000** |
| **Full Model $R^2$ Total** | **.095*** ** | **.080*** ** | **.086*** ** | **.069*** ** |
| Factor[1] x Group x Sex | -.001 | -.064 | .083 | .025 |

* $p < .05$; ** $p < .01$; *** $p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

Results from a series of moderated multiple regressions with COMPACT %A5 regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 12. Opponent behavior condition was found to have significant positive effects on %A5 when entered into the model with each of the four factors, resulting in a significant model 1 in each case. This effect indicates that %A5 scores were higher in participants assigned to the aversive opponent condition. Of the

Table 12

*Results from Moderated Multiple Regressions with COMPACT %A5 as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.078*** ** | **.076*** ** | **.073*** ** | **.075*** ** |
| Factor[1] | .070 | -.057 | .001 | .047 |
| Group | .266*** | .278*** | .272*** | .268*** |
| Sex | .007 | .015 | .016 | .009 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.000** | **.006** | **.014** | **.001** |
| **Model 1 and 2 $R^2$ Total** | **.078*** ** | **.082*** ** | **.087*** ** | **.076*** ** |
| Factor[1] x Group | -.016 | -.012 | .012 | .032 |
| Factor[1] x Sex | .022 | -.083 | .125* | .009 |
| Group x Sex | .027 | .031 | .037 | .014 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.001** | **.004** | **.012*** | **.002** |
| **Full Model $R^2$ Total** | **.079*** ** | **.086*** ** | **.099*** ** | **.078*** ** |
| Factor[1] x Group x Sex | .031 | -.074 | .124* | .060 |

* $p < .05$; ** $p < .01$; *** $p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

four validation factors, none exhibited unique effects on %A5, despite predictions. Although there was a significant unique effect of the two-way interaction between the validation factor IPT and participant gender on %A5, this effect did not produce a significant change in $R^2$. However, the significant unique effect of the three-way

interaction between IPT, opponent condition, and participant gender on %A5 did result in a significant change in $R^2$.

This significant interaction effect on %A5 was tested for simple slope differences (Table 13). One significant simple slope difference between males and females, both of whom were assigned to the aversive opponent condition, was significant ($t = 3.80$, $p < .001$). This interaction can be seen in Figure 1, which shows that when facing an aversive opponent, the percentage of highly aversive responses produced by men increased as instrumental prosocial tendencies increased, whereas the inverse was true for women facing an aversive opponent. In other words, when faced with an aversive opponent, women who were higher in altruism counter-intuitively selected significantly more level 5 aversive sounds than did women who were low in altruism, whereas men faced with an aversive opponent displayed the opposite trend.

Table 13

*Simple Slope Differences for Significant 3-way Interaction Effect*

| Slope Differences for IPT x GROUP x SEX on %A5: | *t* | *p* |
|---|---|---|
| Male/Aversive Condition and Female/Aversive Condition | 3.800* | <.001 |
| Male/Aversive Condition and Male/Pleasant Condition | 1.467 | 0.143 |
| Male/Aversive Condition and Female/Pleasant Condition | 1.627 | 0.105 |
| Female/Aversive Condition and Male/Pleasant Condition | -1.475 | 0.141 |
| Female/Aversive Condition and Female/Pleasant Condition | -1.560 | 0.120 |
| Male/Pleasant Condition and Female/Pleasant Condition | 0.013 | 0.989 |

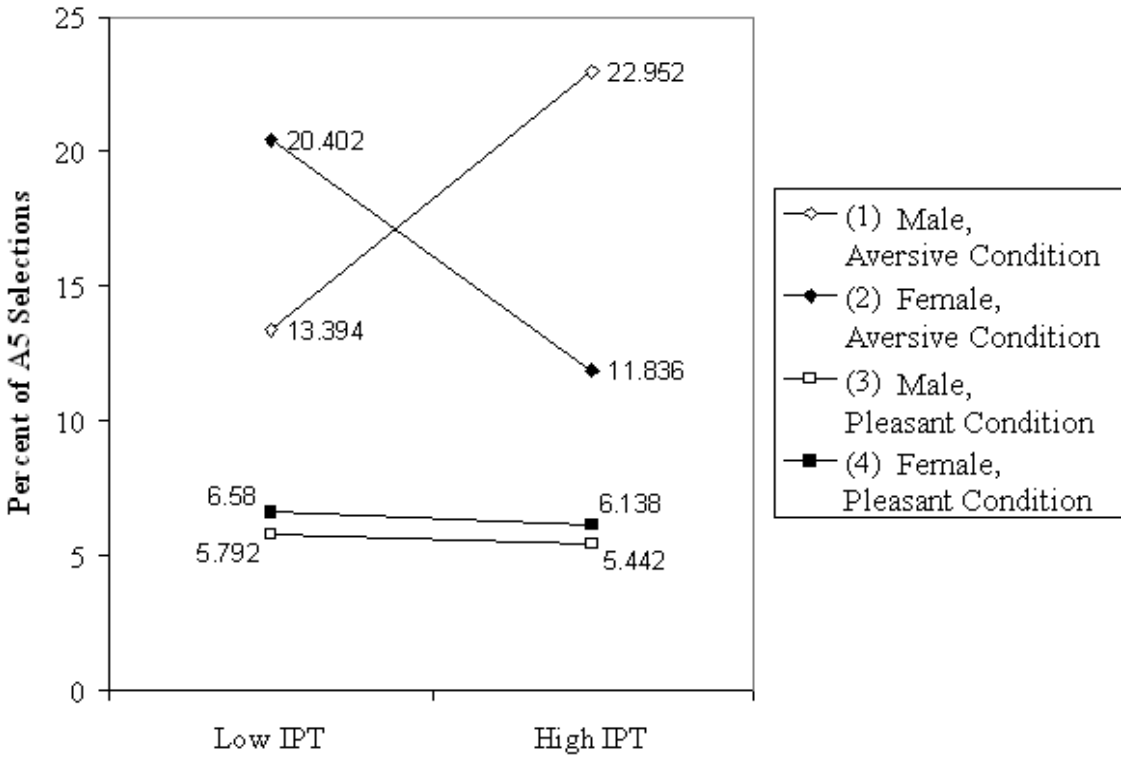


*Figure 1.* Simple Slopes for IPT x Group x Sex Interaction Effect on %A5.

Results from a series of moderated multiple regressions with COMPACT %A9 regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 14. Opponent behavior condition was found to have significant positive effects on %A9 when entered into the model with each of the four factors, resulting in a significant model 1 in each case. This effect indicates that %A9 scores were higher in participants assigned to the aversive opponent condition. Of the four validation factors, only AT exhibited a unique effect on %A9, showing that scores on %A9 were positively influenced by AT as predicted. Furthermore, participant gender exhibited significant unique effects when entered into a model with RPT and with IPT, though those two factors did not exhibit unique effects on %A9. Like most aggression scales, this demonstrates that men exhibit slightly higher scores than women. No two-

Table 14

*Results from Moderated Multiple Regressions with COMPACT %A9 as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.096*** ** | **.069** ** | **.073** ** | **.072** ** |
| Factor[1] | .176* | -.057 | -.087 | .077 |
| Group | .210** | .230** | .209** | .215** |
| Sex | .118 | .143* | .147* | .130 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.005** | **.014** | **.012** | **.022** |
| **Model 1 and 2 $R^2$ Total** | **.101** ** | **.083*** | **.085*** | **.094** ** |
| Factor[1] x Group | -.038 | -.114 | .098 | -.084 |
| Factor[1] x Sex | -.068 | -.067 | .039 | -.117 |
| Group x Sex | -.008 | -.014 | -.036 | -.009 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.005** | **.004** | **.001** | **.002** |
| **Full Model $R^2$ Total** | **.106** ** | **.087*** | **.086*** | **.096*** |
| Factor[1] x Group x Sex | -.067 | -.066 | .034 | -.042 |

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

way or three-way interaction effects were significant in any of these four regressions on %A9.

Results from a series of moderated multiple regressions with COMPACT $M_P$ regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 15. None of the four factors demonstrated unique

Table 15

*Results from Moderated Multiple Regressions with COMPACT $M_P$ as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.047*** ** | **.044** ** | **.049*** ** | **.044** ** |
| Factor[1] | -.083 | .064 | -.097 | .058 |
| Group | -.167** | -.181*** | -.184*** | -.178*** |
| Sex | .097 | .088 | .092 | .078 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.003** | **.009** | **.002** | **.000** |
| **Model 1 and 2 $R^2$ Total** | **.050** ** | **.053** ** | **.051** ** | **.044*** |
| Factor[1] x Group | -.029 | .057 | -.045 | .021 |
| Factor[1] x Sex | .043 | .101 | -.018 | .017 |
| Group x Sex | -.007 | -.018 | -.008 | -.012 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.000** | **.000** | **.003** | **.001** |
| **Full Model $R^2$ Total** | **.050*** | **.053*** | **.054*** | **.045*** |
| Factor[1] x Group x Sex | -.001 | .007 | .057 | .021 |

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

effects on $M_P$. However, opponent condition was uniquely negatively related to $M_P$ in each of the four models, resulting in a significant $R^2$ in each case. This demonstrates that $M_P$ scores increase significantly when participants play against the all-pleasant opponent. No two-way or three-way interaction effects were significant in any of these four regressions on $M_P$.

Results from a series of moderated multiple regressions with COMPACT %P regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 16. The factor AT demonstrated a unique effect on %P, resulting in a significant $R^2$ for that model, and demonstrating that this scale inversely relates to aggression as predicted. Though the other three factors did not demonstrate unique effects on %P, opponent condition was uniquely related to %P in Table 16

*Results from Moderated Multiple Regressions with COMPACT %P as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.105*** ** | **.053*** ** | **.043** ** | **.043** ** |
| Factor[1] | -.253*** | .106* | -.021 | -.035 |
| Group | -.186*** | -.218*** | -.208*** | -.203*** |
| Sex | .029 | .000 | -.002 | .002 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.003** | **.006** | **.008** | **.005** |
| **Model 1 and 2 $R^2$ Total** | **.108*** ** | **.059** ** | **.051** ** | **.048*** |
| Factor[1] x Group | .024 | .016 | -.018 | .056 |
| Factor[1] x Sex | .046 | .065 | -.085 | -.021 |
| Group x Sex | .030 | .043 | .040 | .047 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.001** | **.000** | **.005** | **.001** |
| **Full Model $R^2$ Total** | **.109*** ** | **.059** ** | **.056** ** | **.049*** |
| Factor[1] x Group x Sex | -.047 | .020 | -.077 | -.047 |

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

each of the four models, indicating that participants who played against the all-pleasant opponent exhibited significantly more frequent pleasant responses than their peers who played against the all-aversive opponent. No two-way or three-way interaction effects were significant in any of these four regressions on %P.

Results from a series of moderated multiple regressions with COMPACT ΣP regressed onto the four self-report validation factors, opponent behavior group, and

Table 17

*Results from Moderated Multiple Regressions with COMPACT ΣP as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.063*** ** | **.032*** | **.022** | **.017** |
| Factor[1] | -.217*** | .122* | -.067 | -.009 |
| Group | -.107* | -.137* | -.131* | -.123* |
| Sex | .062 | .038 | .038 | .036 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.003** | **.009** | **.004** | **.002** |
| **Model 1 and 2 $R^2$ Total** | **.066*** ** | **.041*** | **.026** | **.019** |
| Factor[1] x Group | .024 | .042 | -.028 | .012 |
| Factor[1] x Sex | .055 | .105 | -.062 | -.033 |
| Group x Sex | .003 | .010 | .014 | .025 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.001** | **.001** | **.001** | **.000** |
| **Full Model $R^2$ Total** | **.067**** | **.042*** | **.027** | **.019** |
| Factor[1] x Group x Sex | -.049 | .042 | -.046 | -.025 |

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

participant sex are located in Table 17. The factor AT demonstrated a unique effect on ΣP, resulting in a significant $R^2$ for that model, and demonstrating that this scale inversely relates to aggression as predicted. Though opponent condition was uniquely related to ΣP in each of the four models, indicating that participants who played against the all-pleasant opponent exhibited significantly more intense and frequent pleasant responses

Table 18

*Results from Moderated Multiple Regressions with COMPACT %P5 as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.014** | **.026*** | **.009** | **.005** |
| Factor[1] | -.103 | .150** | -.073 | .026 |
| Group | .003 | -.022 | -.013 | -.007 |
| Sex | .075 | .066 | .066 | .058 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.003** | **.004** | **.002** | **.001** |
| **Model 1 and 2 $R^2$ Total** | **.017** | **.030** | **.011** | **.006** |
| Factor[1] x Group | .056 | .037 | -.032 | -.040 |
| Factor[1] x Sex | .026 | .064 | -.006 | -.011 |
| Group x Sex | .015 | .025 | .032 | .038 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.000** | **.000** | **.000** | **.002** |
| **Full Model $R^2$ Total** | **.017** | **.030** | **.011** | **.008** |
| Factor[1] x Group x Sex | .013 | .002 | .001 | -.059 |

* $p < .05$; ** $p < .01$; *** $p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

than their peers who played against the all-aversive opponent, the only other validation factor with a significant $R^2$ in the main effects model was RPT. No two-way or three-way interaction effects were significant in any of these four regressions on ΣP.

Results from a series of moderated multiple regressions with COMPACT %P5 regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 18. The factor RPT demonstrated a unique effect on %P5, resulting in a significant $R^2$ for that model. When interaction terms were entered into the regression, the $R^2$ was no longer significant. No other factors, main effects, interactions, or changes in $R^2$ were significant for the regressions of the other three validation factors onto %P5.

Results from a series of moderated multiple regressions with COMPACT %P9 regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 19. The COMPACT scale %P9 was not related to any of the four factors and was unaffected by opponent condition or participant sex. No effects, interactions, or $R^2$ models were significant for %P9.

Results from a series of moderated multiple regressions with COMPACT %0 regressed onto the four self-report validation factors, opponent behavior group, and participant sex are located in Table 20. The validation factor AT produces a significant main effect on %0, resulting in a significant main effects model $R^2$. When interaction terms were entered into the regression, the $R^2$ was no longer significant. No main effects were observed in the regressions of the other three validation factors onto %0, although there was a significant unique interaction effect for IPT by opponent condition on %0. However, this did not produce a significant change in $R^2$.

Table 19

*Results from Moderated Multiple Regressions with COMPACT %P9 as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.008** | **.006** | **.010** | **.006** |
| Factor[1] | -.045 | -.023 | -.066 | -.024 |
| Group | -.051 | -.052 | -.064 | -.052 |
| Sex | .054 | .049 | .052 | .052 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.005** | **.007** | **.005** | **.005** |
| **Model 1 and 2 $R^2$ Total** | **.013** | **.013** | **.015** | **.011** |
| Factor[1] x Group | -.002 | -.027 | -.042 | -.002 |
| Factor[1] x Sex | .050 | .054 | .016 | -.049 |
| Group x Sex | -.062 | -.065 | -.055 | -.051 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.001** | **.001** | **.000** | **.001** |
| **Full Model $R^2$ Total** | **.014** | **.014** | **.015** | **.012** |
| Factor[1] x Group x Sex | -.030 | .035 | .002 | .023 |

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

## Participant Feedback

For reference, frequency and percentage of responses to the Likert scale items from the debriefing questionnaire, as well as chi-square comparisons of agree versus disagree endorsements per item are shown by total sample (Table 21) and split by opponent behavior condition (Table 22). The significant majority of participants reported

Table 20

*Results from Moderated Multiple Regressions with COMPACT %0 as Criterion and Self-report Validation Factors, Opponent Behavior Group, and Participant Sex as Predictors*

| | AT | RPT | IPT | SDA |
|---|---|---|---|---|
| **Model 1 – Main Effects $R^2$** | **.024*** | **.001** | **.002** | **.002** |
| Factor[1] | .151** | -.004 | .030 | .025 |
| Group | -.039 | -.027 | -.025 | -.030 |
| Sex | .002 | .021 | .020 | .018 |
| **Model 2 – 2-way Interactions $\Delta R^2$** | **.002** | **.003** | **.020** | **.002** |
| **Model 1 and 2 $R^2$ Total** | **.026** | **.004** | **.022** | **.004** |
| Factor[1] x Group | .021 | .036 | -.149* | .040 |
| Factor[1] x Sex | .010 | .005 | .005 | -.014 |
| Group x Sex | .049 | .044 | .059 | .039 |
| **Model 3 – 3-way Interaction $\Delta R^2$** | **.004** | **.002** | **.001** | **.001** |
| **Full Model $R^2$ Total** | **.030** | **.006** | **.023** | **.005** |
| Factor[1] x Group x Sex | .079 | .058 | .031 | .028 |

* $p < .05$; ** $p < .01$; *** $p < .001$

[1] "Factor" refers to the validation factor listed for the column: "AT" = Aggressive Temperament, "RPT" = Reactive Prosocial Tendencies, "IPT" = Instrumental Prosocial Tendencies, "SDA" = Self-Destructive Aggression

*Note.* Beta-weights reported for each predictor. **$R^2$** or **$\Delta R^2$** for models are shown in **bold.**

that the explanation of the study was sufficient to complete the COMPACT and that they were not suspicious about the intent of the study, with no significant difference between opponent condition groups on these reports.

When asked if they tried to be nice in response to an opponent trying to hurt them (Item 2) or in response to an opponent being nice to them (Item 3), about as many participants agreed with these statements as disagreed (Item 2: $\chi^2 = 1.23$, $p = .27$; Item 3:

Table 21

*Debriefing Questionnaire: Responses to Likert Items – Total Sample*

| Response | Item 1 | | Item 2 | | Item 3 | | Item 4 | | Item 5 | | Item 6 | | Item 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % |
| 1 | 7 | 3.8 | 48 | 26.2 | 53 | 29.0 | 84 | 45.9 | 90 | 49.2 | 63 | 34.4 | 77 | 42.1 |
| 2 | 7 | 3.8 | 27 | 14.8 | 26 | 14.2 | 29 | 15.8 | 27 | 14.8 | 25 | 13.7 | 17 | 9.3 |
| 3 | 35 | 19.1 | 46 | 25.1 | 38 | 20.8 | 36 | 19.7 | 34 | 18.6 | 44 | 24.0 | 38 | 20.8 |
| 4 | 43 | 23.5 | 41 | 22.4 | 41 | 22.4 | 27 | 14.8 | 22 | 12.0 | 29 | 15.8 | 30 | 16.4 |
| 5 | 91 | 49.7 | 21 | 11.5 | 25 | 13.7 | 7 | 3.8 | 10 | 5.5 | 22 | 12.0 | 21 | 11.5 |
| $\chi^2$ | 97.30* | | 1.23 | | 1.166 | | 42.46* | | 48.49* | | 9.85* | | 12.75* | |
| *p* | <.001 | | 0.266 | | 0.280 | | <.001 | | <.001 | | 0.002 | | <.001 | |

Note: $\chi^2$ comparisons for significant differences between endorsement of disagree (1,2) vs. agree (4,5).

Asterisks (*) denote significant differences.

Refer to Appendix C for item content and response scale.

$\chi^2$ =1.17, $p$ = .28). However, differences in responses between the two opponent conditions was significant for both cases, with participants in the aversive opponent group agreeing with Item 2 more frequently than participants in the pleasant opponent group ($\chi^2$ = 21.65, $p$ < .001) and disagreeing with Item 3 more frequently than participants in the pleasant opponent group ($\chi^2$ = 27.37, $p$ < .001). When asked if they tried to hurt the opponent in response to an opponent trying to being nice to them (Item 4) or in response to an opponent trying to hurt them (Item 5), significantly more participants disagreed rather than agreed with these statements (Item 4: $\chi^2$ = 42.46, $p$ < .001; Item 5: $\chi^2$ = 48.49, $p$ < .001). Furthermore, differences in responses between the two opponent

Table 22

*Debriefing Questionnaire: Responses to Likert Items – By Group*

| Response | | Item 1 | | Item 2 | | Item 3 | | Item 4 | | Item 5 | | Item 6 | | Item 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % |
| Vs. A | 1 | 5 | 5.3 | 17 | 18.1 | 38 | 40.4 | 48 | 51.1 | 34 | 36.2 | 28 | 29.8 | 38 | 40.4 |
| | 2 | 3 | 3.2 | 10 | 10.6 | 18 | 19.1 | 19 | 20.2 | 14 | 14.9 | 13 | 13.8 | 11 | 11.7 |
| | 3 | 22 | 23.4 | 20 | 21.3 | 20 | 21.3 | 18 | 19.1 | 20 | 21.3 | 26 | 27.7 | 19 | 20.2 |
| | 4 | 21 | 22.3 | 31 | 33.0 | 14 | 14.9 | 7 | 7.4 | 18 | 19.1 | 15 | 16.0 | 15 | 16.0 |
| | 5 | 43 | 45.7 | 16 | 17.0 | 4 | 4.3 | 2 | 2.1 | 8 | 8.5 | 12 | 12.8 | 11 | 11.7 |
| Vs. P | 1 | 2 | 2.2 | 31 | 34.8 | 15 | 16.9 | 36 | 40.4 | 56 | 62.9 | 35 | 39.3 | 39 | 43.8 |
| | 2 | 4 | 4.5 | 17 | 19.1 | 8 | 9.0 | 10 | 11.2 | 13 | 14.6 | 12 | 13.5 | 6 | 6.7 |
| | 3 | 13 | 14.6 | 26 | 29.2 | 18 | 20.2 | 18 | 20.2 | 14 | 15.7 | 18 | 20.2 | 19 | 21.3 |
| | 4 | 22 | 24.7 | 10 | 11.2 | 27 | 30.3 | 20 | 22.5 | 4 | 4.5 | 14 | 15.7 | 15 | 16.9 |
| | 5 | 48 | 53.9 | 5 | 5.6 | 21 | 23.6 | 5 | 5.6 | 2 | 2.2 | 10 | 11.2 | 10 | 11.2 |
| $\chi^2$ | | 0.45 | | 21.65* | | 27.37* | | 11.28* | | 16.26* | | 0.52 | | 0.02 | |
| *p* | | 0.50 | | <0.001 | | <0.001 | | <0.001 | | <0.001 | | 0.47 | | 0.90 | |

Note: χ2 comparisons between opponent condition groups on endorsement of disagree (1,2) vs. agree (4,5).

Asterisks (*) denote significant differences.

Refer to Appendix C for item content and response scale.

conditions were significant for both cases, with participants in both conditions disagreeing with the items more frequently than agreeing with them. However, there was a significantly higher frequency of disagrees in the aversive opponent group for Item 4 ($\chi^2 = 11.28$, $p < .001$) and a significantly higher frequency of disagrees in the pleasant

opponent group for Item 5 ($\chi^2 = 16.26$, $p < .001$). When asked if they only selected the extreme responses when the situation called for it (Item 6), significantly more participants disagreed rather than agreed with this statement ($\chi^2 = 9.85$, $p = .002$), with no significant difference in responses between groups ($\chi^2 = 0.52$, $p = .47$).

As participants were allowed to write as little or as much as they chose for Items 8-11, each participant's response was counted in as many categories as were applicable. Additionally, in some cases participants provided information in their responses that fit better with an item other than the one for which the response was written; in these cases, the content was coded as if the response was left for the more appropriate item. Thus, the total frequency of all responses for each of these items (Item 8: Table 23, Item 9: Table 24, Item 10: Table 25, & Item 11: Table 26) is not equal to the sample size (n = 183).

When asked to describe their opponent (Item 8), 71 (38.80%) indicated that the opponent was friendly/nice and 44 (24.04%) indicated that the opponent was aggressive/ mean. Both of these response categories exhibited a significant split by opponent condition where significantly more participants in the pleasant opponent condition indicated a friendly/nice opponent ($\chi^2 = 38.60$, $p < .001$) and significantly more participants in the aversive opponent condition indicated an aggressive/mean opponent ($\chi^2 = 28.40$, $p < .001$). Similarly, 26 (14.21%) remarked that that the opponent selected aversive responses and 22 (12.02%) remarked that the opponent selected pleasant responses. Both of these response categories exhibited a significant split by opponent condition where significantly more participants in the aversive opponent condition indicated that the opponent used aversive responses (Fisher's exact $p < .001$) and significantly more participants in the pleasant opponent condition indicated that the

Table 23

*Debriefing Questionnaire: Frequency (%) of Written Descriptions of Opponent*

| | Total (n = 183) | | vs. Aversive (n = 94) | | vs. Pleasant (n = 89) | | $\chi^2$ | *p* |
|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | | |
| Friendly/Nice | 71 | 38.80 | 16 | 17.02 | 55 | 61.80 | 38.60* | <.001* |
| Aggressive/Mean | 44 | 24.04 | 38 | 40.43 | 6 | 6.74 | 28.40* | <.001* |
| Picked Aversive | 26 | 14.21 | 24 | 25.53 | 2 | 2.25 | – | <.001* |
| Fast | 23 | 12.57 | 10 | 10.64 | 13 | 14.61 | .066 | 0.42 |
| Picked Pleasant | 22 | 12.02 | 2 | 2.13 | 20 | 22.47 | – | <.001* |
| Normal Temper | 18 | 9.84 | 9 | 9.57 | 9 | 10.11 | 0.02 | 0.90 |
| Competitive | 18 | 9.84 | 15 | 15.96 | 3 | 3.37 | – | 0.005* |
| Evenly Matched | 5 | 2.73 | 2 | 2.13 | 3 | 3.37 | – | 0.676 |
| Slow | 4 | 2.19 | 3 | 3.19 | 1 | 1.12 | – | 0.621 |
| Don't Know | 4 | 2.19 | 2 | 2.13 | 2 | 2.25 | – | 1.00 |
| Was a Computer | 3 | 1.64 | 2 | 2.13 | 1 | 1.12 | – | 1.00 |
| Not Competitive | 3 | 1.64 | 1 | 1.06 | 2 | 2.25 | – | 0.613 |

Note: $\chi 2$ comparisons between opponent condition groups on endorsement of each statement. Asterisks (*) denote significant differences. p-values with no associated $\chi 2$ value were obtained using Fisher's exact p-value. Cumulative frequency totals may differ from number of participants. Refer to Appendix C for item content.

opponent used pleasant responses (Fisher's exact $p < .001$). Thus, most participants were able to ascribe human qualities to their opponents based on observation of the opponent's behavior, with only three (1.64%) participants indicating that they believed that the opponent was a computer.

When asked how they felt as a result of the opponent's behavior (Item 9), 56 (30.60%) participants felt that the opponent's behavior had no impact on them, with no difference between responses based on opponent condition. There were 50 (27.32%) who reported their opponent's behavior made them feel good/friendly/nice/liked, with a significantly higher number of participants in pleasant opponent condition stating this ($\chi^2 = 27.32$, $p < .001$). Similarly, there were 29 (15.85%) who reported that the

Table 24

*Debriefing Questionnaire: Frequency (%) of Written Descriptions of How Participants Felt Due to Opponent Behavior*

| | Total (n = 183) | | vs. Aversive (n = 94) | | vs. Pleasant (n = 89) | | $\chi^2$ | *p* |
|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | | |
| No Effect | 56 | 30.60 | 29 | 30.85 | 27 | 30.34 | 0.01 | 0.94 |
| Friendly/Good/Nice /Liked | 50 | 27.32 | 9 | 9.57 | 41 | 46.07 | 30.66* | <.001* |
| Annoyed | 29 | 15.85 | 22 | 23.40 | 7 | 7.87 | 8.28* | .004* |
| Aggressive/Angry/ Mad/Disliked | 27 | 14.75 | 21 | 22.34 | 6 | 6.74 | 8.84* | .003* |
| Competitive/Quick | 8 | 4.37 | 5 | 5.32 | 3 | 3.37 | – | 0.721 |
| Anxious | 5 | 2.73 | 4 | 4.26 | 1 | 1.12 | – | 0.369 |
| Not Competitive/ Slow | 4 | 2.19 | 2 | 2.13 | 2 | 2.25 | – | 1.000 |
| Uncomfortable | 3 | 1.64 | 1 | 1.06 | 2 | 2.25 | – | 0.613 |

Note: $\chi 2$ comparisons between opponent condition groups on endorsement of each statement. Asterisks (*) denote significant differences. p-values with no associated $\chi 2$ value were obtained using Fisher's exact p-value. Cumulative frequency totals may differ from number of participants. Refer to Appendix C for item content.

opponent's behavior made them feel annoyed and 27 (14.75%) who reported that the opponent's behavior made them feel mad/angry/aggressive/disliked. Frequency of responses in both of these categories exhibited significant differences between opponent behavior conditions, with significantly more participants in the aversive opponent condition stating this ($\chi^2 = 8.28$, $p = .004$; $\chi^2 = 8.84$, $p = .003$, respectively). Thus, about one third of the sample reported liking the opponent, roughly one third felt annoyed or mad at the opponent, and about one third stated they were unaffected emotionally by the opponent, with the latter evenly split between opponent conditions.

When asked their opinion on what the opponent's intentions were (Item 10), 63 (34.43%) participants believed that the opponent's intention was to compete and 23 (12.57%) stated that they were not sure of the opponent's intentions, with neither of these exhibiting significant differences between opponent conditions. There were 28 (15.30%) who believed the opponent's intention was to be nice them and 17 (9.29%) who believed the opponent's intention was to have fun. There were significant frequency differences between opponent conditions for both of these categories, with significantly higher endorsement from the pleasant opponent condition (Fisher's exact $p < .001$; Fisher's exact $p = .021$). Likewise, there were 20 (10.93%) who believed the opponent's intention was to be mean to them, 18 (9.84%) who believed the opponent's intention was to annoy them, and eight (4.37%) who believed the opponent's intention was to distract them/slow their performance. Each of these exhibited significant differences between opponent behavior conditions with significantly higher endorsement from the aversive opponent condition (Fisher's exact $p = .002$; Fisher's exact $p < .001$; Fisher's exact $p = .007$, respectively). Also, 15 (8.20%) believed the opponent's intentions were simply to obtain

Table 25

*Debriefing Questionnaire: Frequency (%) of Written Descriptions of Opponent's Intentions*

| | Total (n = 183) | | vs. Aversive (n = 94) | | vs. Pleasant (n = 89) | | $\chi^2$ | *p* |
|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | | |
| Compete | 63 | 34.43 | 35 | 37.23 | 28 | 31.46 | 0.68 | 0.41 |
| Be Nice to Me | 28 | 15.30 | 3 | 3.19 | 25 | 28.09 | – | <.001* |
| Don't Know | 23 | 12.57 | 10 | 10.64 | 13 | 14.61 | 0.66 | 0.42 |
| Be Mean to Me | 20 | 10.93 | 17 | 18.09 | 3 | 3.37 | – | 0.002* |
| Annoy Me | 18 | 9.84 | 18 | 19.15 | 0 | 0.00 | – | <.001* |
| Have Fun | 17 | 9.29 | 4 | 4.26 | 13 | 14.61 | – | 0.021* |
| Obtain Extra Credit | 15 | 8.20 | 3 | 3.19 | 12 | 13.48 | – | 0.014* |
| Distract/Slow Me | 8 | 4.37 | 8 | 8.51 | 0 | 0.00 | – | 0.007* |
| Change My Choices | 6 | 3.28 | 2 | 2.13 | 4 | 4.49 | – | 0.434 |
| Punish Me | 5 | 2.73 | 5 | 5.32 | 0 | 0.00 | – | 0.060 |
| Motivate/Hasten Me | 2 | 1.09 | 1 | 1.06 | 1 | 1.12 | – | 1.000 |
| Adapt to my Behavior | 2 | 1.09 | 0 | 0.00 | 2 | 2.25 | – | 0.235 |

Note: χ2 comparisons between opponent condition groups on endorsement of each statement. Asterisks (*) denote significant differences. p-values with no associated χ2 value were obtained using Fisher's exact p-value. Cumulative frequency totals may differ from number of participants. Refer to Appendix C for item content.

extra credit via participation in the study, with significantly more participants in the pleasant opponent condition reporting this (Fisher's exact $p = .014$). Based on this

Table 26

*Debriefing Questionnaire: Frequency (%) of Written Descriptions of the Purpose of the Study*

| | Total (n = 183) | | vs. Aversive (n = 94) | | vs. Pleasant (n = 89) | | $\chi^2$ | *p* |
|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | | |
| Competitiveness | 45 | 24.59 | 20 | 21.28 | 25 | 28.09 | 1.14 | 0.28 |
| Aggression | 44 | 24.04 | 24 | 25.53 | 20 | 22.47 | 0.23 | 0.63 |
| Concentration / Reaction Speed | 43 | 23.50 | 23 | 24.47 | 20 | 22.47 | 0.10 | 0.75 |
| Reciprocity | 29 | 15.85 | 15 | 15.96 | 14 | 15.73 | 0.00 | 0.97 |
| Effects of Sounds | 21 | 11.48 | 10 | 10.64 | 11 | 12.36 | 0.13 | 0.72 |
| Interpersonal Behavior | 19 | 10.38 | 6 | 6.38 | 13 | 14.61 | 3.32 | 0.07 |
| Don't Know | 14 | 7.65 | 10 | 10.64 | 4 | 4.49 | – | 0.165 |
| Frustration Effects | 14 | 7.65 | 6 | 6.38 | 8 | 8.99 | 0.44 | 0.51 |
| Video Games | 14 | 7.65 | 6 | 6.38 | 8 | 8.99 | 0.44 | 0.51 |
| Self-Report vs. Behavior | 9 | 4.92 | 7 | 7.45 | 2 | 2.25 | – | 0.170 |
| Empathy / Sensitivity | 8 | 4.37 | 4 | 4.26 | 4 | 4.49 | – | 1.000 |
| Personality | 7 | 3.83 | 0 | 0.00 | 7 | 7.87 | – | 0.006* |
| Punishment/Reward | 5 | 2.73 | 4 | 4.26 | 1 | 1.12 | – | 0.369 |
| Effects of Win/Loss | 4 | 2.19 | 1 | 1.06 | 3 | 3.37 | – | 0.358 |

Note: $\chi 2$ comparisons between opponent condition groups on endorsement of each statement. Asterisks (*) denote significant differences. p-values with no associated $\chi 2$ value were obtained using Fisher's exact p-value. Cumulative frequency totals may differ from number of participants. Refer to Appendix C for item content.

feedback, participants appeared to be adequately influenced by the behaviors of their opponents.

When asked to describe the purpose the study, 45 (24.59%) said to study competitiveness, 44 (24.04%) said to study aggression, 43 (23.50%) said to study concentration and reaction speed as was stated in the instructions, 29 (15.85%) said to study reciprocation of pleasant or aversive behaviors, 21 (11.48%) said to study the effects of the sounds, and 19 (10.38%) said to study interpersonal behaviors. Other marginal responses included studying the effects of video games, studying frustration, comparing self-report measures with observed behaviors, studying personality, or studying reward and punishment. Thus, participants were generally not aware of the intent of the study, with the most reported explanation of the study being the explanation given in the deception.

# CHAPTER IV

# DISCUSSION

The primary functions of this study were 1) to replicate the results of Biondolillo (2010) which indicated that the COMPACT adequately measures participants' aggressive behaviors in an experimental context, 2) to determine whether extreme pleasant and aversive stimuli would provide a better measure of prosocial and aggressive behavior than the sequentially scaled maximum level available in the prior version of COMPACT, 3) to investigate the validity of several new COMPACT scales derived from aggregated sound selections across trials, 4) to demonstrate that participants respond differently to an opponent who chooses pleasant stimuli for them to receive as opposed to an opponent who chooses aversive stimuli for them to receive, 5) to examine the effects of participant gender on COMPACT effects with expectations that male participants' behaviors would exhibit stronger correlations with aggression than female participants' behaviors, and 6) to explore participants' thoughts and feelings regarding their experiences with the COMPACT and with their opponents, as well as their understanding of the purpose of the study and the effectiveness of the deception that the computer opponent is an actual person. These goals were achieved with varying degrees of success.

The current study was perhaps most successful in the goal of replicating the primary effects of Biondolillo (2010). The primary COMPACT scale from the previous study $M_{SL}$ (renamed $M_C$) retained its correlational pattern from the previous study exactly, demonstrating significant positive correlations with self-report measures of physical aggression, vengeance seeking, and normalizing beliefs regarding the use of aggression. Though this measure did not exhibit inverse correlations with self-report

measures of prosocial behaviors, its robust utility as a measure of behavioral aggression strengthens the claim that the COMPACT is a worthy arbiter of the reaction time aggression paradigm. Furthermore, the COMPACT baseline aggression measure $T1_{SL}$ (renamed S1) exhibited a stronger correlational pattern than in the initial study. S1 demonstrated significant positive relationships with not only physical aggression and verbal aggression, but also with significant life history of using aggressive actions and use of public prosocial behaviors, which have been conceptualized as a form of indirect aggression (Boxer et al., 2004).

The COMPACT scales $fA_{MAX}$ (%A5) and $fP_{MAX}$ (%P5) were somewhat more dubious, in part due to modifications to the COMPACT procedure to include the extreme response options – %A9 and %P9. Those options were presented to the user as categorically and visually distinct from the other options in order to increase the viability that these values were measuring something meaningfully distinct from the aggregated score on $M_C$. Though %A5 initially demonstrated a pattern of correlations congruent with $M_C$, %A5 correlated only with physical aggression in the current study, and %A9 exhibited only a negative correlation with dire prosocial behaviors. Thus, inclusion of %A9 appears to have mitigated the strength of %A5. On the other hand, although %P9 failed to demonstrate any significant effects at all, the effects of several validation measures on %P5 appears to have improved with the inclusion %P9. Whereas in the initial study %P5 exhibited only a negative correlation with anonymous prosocial behavior opposite of the anticipated direction, in the combined study with %P9 included as a response option, the significant correlations with %P5 were in the expected direction, relating positively with dire and emotional prosocial behaviors.

When analyzed with the validation factors, %A9 demonstrated a significant positive correlation with the factor AT, whereas the scale it was designed to replace, %A5, did not demonstrate a significant positive correlation any of the validation factors. The measure %P9 did not demonstrate a significant correlation with any of the validation factors; however, %P5 demonstrated a significant positive correlation with RPT, which was predicted but not observed in Biondolillo (2010). Though %P9 was not useful as a measure in its own right, its inclusion as a response option may have played a role in strengthening %P5. These scales provide adequate measures of aggressive and prosocial responding; however, they do not appear to indicate behavioral extremes on these categories across conditions as intended, exhibiting similar if not weaker patterns than some of the other variables of their class. However, %A9 scores in the pleasant opponent condition was the only case in which an effect was demonstrated on SDA, a scale indicating a history of self-destructive aggression including suicide, self harm, and experiencing negative consequences for engaging in violent behaviors. Thus, this measure of extreme aggression is only reflective of real life behaviors that would indicate extreme levels of aggression – whether directed outward or inward – when used in response to an opponent who is clearly not provoking such a response. This must be considered when designing studies with the COMPACT.

New COMPACT aversive scales ($M_A$, ΣA, and %A) and pleasant scales (ΣP and %P) appeared to appropriately function as additional measures of aggressive and prosocial responding, respectively, with a few caveats to consider. As a measure of aggression, the variable $M_C$ outperformed or matched each of the new aversive scale variables as a measure of aggressive behavior. Paired with the lack of association

between $M_C$ and measures of prosocial responding, this indicates that $M_C$ still ranks as the strongest index of aggression available in the COMPACT, holding true in both opponent conditions. When split by gender, correlation patterns for men were weaker than those observed for women. The best explanation for this difference is low statistical power due to significantly smaller number of men in the sample (Aversive Condition Males: n = 62; Pleasant Condition Males: n = 31). The new pleasant scales ΣP and %P both demonstrated better effects than the performance of %P5 in Biondolillo (2010); however, in the current study %P5 was the strongest index of prosocial behavior. Of note, ΣP and %P both exhibited patterns of inverse correlation with several aggression measures. Physical and verbal aggression, anger, hostility, vengeance seeking, and normalizing beliefs regarding the use of aggression were all negatively correlated with %P in the aversive opponent condition, whereas in the pleasant opponent condition, it was only negatively correlated with physical aggression and anger and was not associated with prosocial responding. ΣP exhibited a similar pattern, but did not associate with verbal aggression or hostility in the aversive condition, and did not associate with physical aggression in the pleasant condition. Thus, %P appears to be the best index of combined aggressiveness and prosocial tendencies. $M_P$ on the other hand exhibited no meaningful relationships with any other included measures.

Curiously, %0 correlated positively with verbal aggression, anger, and history of experiencing consequences for aggressive behavior in the aversive opponent condition, and correlated negatively with altruism in the pleasant opponent condition. These results perhaps make the most sense if this scale is conceptualized as failure or refusal to act in situations where action is appropriate. Persons who do nothing when faced with an

overtly aggressive person may be doing so in order to control their anger and may be more prone to outbursts that place them at risk for negative consequences. Persons who fail to respond in kind to the pleasant behaviors of others certainly are not exhibiting altruism, which is defined as intentionally helping others even when it may incur a personal cost (Carlo & Randall, 2002).

Participant feedback indicated that the majority of participants were not suspicious about the study intent, that they did not have difficulty understanding or participating in the COMPACT procedure, and that they did not suspect that the opponent was a computer. Their reports of their personal thoughts about the opponent were heavily influenced by opponent condition, with participants describing the aversive opponent as mean and aggressive and describing the pleasant opponent as friendly and nice. Furthermore, individuals who played against the aversive opponent were more likely to describe their opponents as someone who wanted to annoy them or distract them, whereas individuals who played against the pleasant opponent were more likely to describe their opponents as someone who wanted to have fun or as someone who just wanted to get extra credit. As the true motivation for all participants in the study was to obtain credit, this suggests that participants were significantly better able to identify with the opponent as someone with similar motivations when playing against a pleasant opponent.

## Limitations of the Study

Like the initial COMPACT validation study, this study was limited by having a predominantly female sample, whereas previous reaction time paradigm research has tended to utilize male samples (Taylor, 1967) due to known patterns of higher physical

aggression in males than in females (Bettencourt & Miller, 1996; Bushman, 1995; Conway et al., 2005; Hyde, 1984). Addressing this flaw in the sampling of future research participants may increase effect sizes obtained in future studies. Although in the initial study males were shown to have stronger effects than women across COMPACT scales, this result was not borne out by the combined data. As the most likely culprit for lack of effects demonstrated in male participants was low statistical power, it is possible that obtained results for the male sample were simply statistical error. Furthermore, although sample size was adequately powered for detecting correlations, the use of more complex analyses such as moderated multiple regression, as well as other analyses separated by groups, may have benefitted from a greater sample size. Future studies may also benefit from sampling methods to include participants other than college students to assess its validity with other populations. Future studies also need to examine the influence of opponent conditions that use both pleasant and aversive options, which was not addressed in this study. Additionally, a substantially greater number of participants played against the aversive opponent as compared to the pleasant opponent due to the initial study only including an aversive opponent condition. The relationship between the pleasant spectrum of responses and prosocial behavior should become clearer as more data is collected on this opponent condition. Also, comparisons between the two opponent conditions may yield more reliable results if this discrepancy is addressed.

The pleasant sound response spectrum was created with the intent of serving as a model of prosocial behavior within a confrontational context; however, the data suggests that its function may be more accurately defined as a measure of low aggression, at least when looking at mean scores across trials. These scales tended to exhibit stronger

inverse correlations with aggression than the positive correlations they exhibited with prosocial behavior. Thus, future researchers using the COMPACT may be limited in their ability to answer research questions regarding prosocial behaviors. However, it is worth noting that although the mean score of sound selections across trials was the best index on aggression, this measure was not related to prosocial behavior despite inclusion of prosocial responses in its calculations. Rather, the percentage of trials on which participants selected prosocial responses was the best index of prosocial tendency, and the intensity level of the prosocial responses was less relevant. This discrepancy of relevant response information between aggressive and prosocial response scales highlights that these two spectrums of the COMPACT are measuring different albeit related constructs. Thus, further investigation is warranted.

## Summary

This study supports the use of the COMPACT as a behavioral measure of aggressive and prosocial responding, with several COMPACT scales tapping into different effects. Furthermore, opponent behavior condition was shown to have broad effects on what scores on the COMPACT are measuring, though overall the COMPACT remains better suited to address research questions relating to aggressive behaviors than to questions relating to prosocial behaviors. Based on the results of this study and Biondolillo (2010), the following COMPACT behavior scales should be retained for future study: $M_C$, S1, %A, %A5, %A9, %P, %P5, %0. The scales $M_P$ and %P9 can be removed from future analyses due to lack of any significant correlations, whereas the variables $M_A$, ΣA, and ΣP can be removed from future analyses due to failure to demonstrate adequate unique effects beyond those of similar variables that were

measuring the same constructs. In review, though the effect sizes obtained in this study were not quite as strong as those exhibited in past reaction time paradigms (Bond & Lader, 1986a; Taylor, 1967), the COMPACT shows promise as a portable expanded design of this celebrated aggression research method.

APPENDIX A

INSTITUTIONAL REVIEW BOARD NOTICE OF COMMITTEE ACTION


# THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb


**HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE**
**NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **C29060803**
PROJECT TITLE: **A Validation of the Competitive Prosocial/Aggression Continuum Task (COMPACT)**
PROPOSED PROJECT DATES: **05/04/2010 to 05/04/2011**
PROJECT TYPE: **Change in a Previously Approved Project**
PRINCIPAL INVESTIGATORS: **Alexander Biondolillo**
COLLEGE/DIVISION: **College of Education & Psychology**
DEPARTMENT: **Psychology**
FUNDING AGENCY: **N/A**
HSPRC COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF APPROVAL: **05/17/2010 to 05/16/2011**

Lawrence A. Hosman
Lawrence A. Hosman, Ph.D.
HSPRC Chair

5-19-2010
Date

# APPENDIX B

## INFORMED CONSENT FORM

1. **Purpose:** The purpose of this study is to gain a better understanding of the effects of competition on concentration skills and reaction speed.

2. **Description of Study:** You will be asked to fill out a set of questionnaires on a computer, and participate in a competitive task against an opponent via the internet. You should expect the entire procedure, including questionnaires, to last about one hour. **You must be 18 years of age or older to participate in this study. If you are not 18 please notify the experimenter that you cannot participate so that you may be excused.**

3. **Benefits:** Engaging in this experiment will allow you to meet class requirements for research credit.

4. **Risks:** The present study presents no more than minimal risk, or the risk one would incur in the course of daily life. In the event that you find this experiment upsetting, the following mental health options may be used: the Student Counseling Center (601) 266-4829, Gutsch Counseling Clinic (601) 266-4601, the USM Psychology Clinic (601)266-4588, Pine Grove Recovery Center (601) 288-4800, and the Pine Belt Mental Healthcare Resources at (601) 544-4641. If problems arise please email either Alex Biondolillo at alexander.biondolillo@eagles.usm.edu or Dr. Tammy Greer at tammy.greer@usm.edu.

5. **Confidentiality:** You will not be asked to identify yourself on the self-report questionnaires you complete. You will be required to electronically sign a consent form, which will be kept as a record of participation. Consent forms will be kept separate from questionnaire data so information cannot be matched to identities. Once all data have been entered into a database, the original data collection documents will be deleted to maintain the confidentiality of participants.

6. **Alternative Procedures:** Participation in this study is voluntary and there are several other research projects available for students to engage in and complete for research credit. Students not wishing to participate in research may fulfill research requirements through alternative means. Also, if at any time during the study you begin to feel uncomfortable you may leave and no penalty will be assessed.

7. **Participant's Assurance:** Whereas no assurance can be made concerning results that may be obtained (since results from investigational studies cannot be predicted) the researcher will take every precaution consistent with the best scientific practice. The University of Southern Mississippi has no mechanism to provide compensation for subjects who may incur injuries as a result of participating in research projects. However, efforts will be made to make available the facilities and professional skills at the University. Participation in this project is completely voluntary, and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits. Questions concerning the research should be directed to Alex Biondolillo at (601) 266-4588 or Dr. Tammy Greer at (601) 266-6336. This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5147, Hattiesburg, MS 39406-0001, (601) 266-6820. You will be given a copy of this form.

_____ _____ _____ _____

Signature of Research Participant Date Signature of Researcher Date

APPENDIX C

DEBRIEFING QUESTIONNAIRE

Instructions: Please carefully answer the following questions about the study you just participated in using the scale indicated below. Answer all questions as honestly and completely as you can.

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

_____ 1. The explanation of the study was sufficient to complete the task.

_____ 2. I tried to be nice to my opponent even though he or she was trying to hurt me.

_____ 3. I tried to be nice to my opponent because he or she was nice to me.

_____ 4. I tried to hurt my opponent even though he or she was nice to me.

_____ 5. I tried to hurt my opponent because he or she was trying to hurt me

_____ 6. I only used extreme responses when the situation called for it.

_____ 7. I was suspicious about the intent of the study.

Please provide as much information as possible for the following questions.

8. How would you describe your opponent?

9. How did your opponent's responses make you feel?

10. What do you think your opponent's intentions were?

11. What do you believe is the purpose of the study?

APPENDIX D

PROSOCIAL TENDENCIES MEASURE

Instructions: Below are a number of statements that may or may not describe you. Please indicate HOW MUCH EACH STATEMENT DESCRIBES YOU by using the following scale:

1 – Does not describe me at all
2 – Describes me a little
3 – Somewhat describes me
4 – Describes me well
5 – Describes me greatly

| | |
|---|---|
| 1) I can help others best when people are watching me. | 1 2 3 4 5 |
| 2) It is most fulfilling to me when I can comfort someone who is very depressed. | 1 2 3 4 5 |
| 3) When other people are around, it is easier for me to help needy others. | 1 2 3 4 5 |
| 4) I think that one of the best things about helping others is that it makes me look good. | 1 2 3 4 5 |
| 5) I get the most out of helping others when it is done in front of others. | 1 2 3 4 5 |
| 6) I tend to help people who are in a real crisis or need. | 1 2 3 4 5 |
| 7) When people ask me to help them, I don't hesitate. | 1 2 3 4 5 |
| 8) I prefer to donate money anonymously. | 1 2 3 4 5 |
| 9) I tend to help people who hurt themselves badly. | 1 2 3 4 5 |
| 10) I believe that donating goods or money works best when it is tax-deductible. | 1 2 3 4 5 |
| 11) I tend to help needy others most when they do not know who helped them. | 1 2 3 4 5 |
| 12) I tend to help others particularly when they are emotionally distressed. | 1 2 3 4 5 |
| 13) Helping others when I am in the spotlight is when I | 1 2 3 4 5 |

work best.

| | |
|---|---|
| 14) It is easy for me to help others when they are in a dire situation. | 1 2 3 4 5 |
| 15) Most of the time, I help others when they do not know who helped them. | 1 2 3 4 5 |
| 16) I believe I should receive more recognition for the time and energy I spend on charity work. | 1 2 3 4 5 |
| 17) I respond to helping others best when the situation is highly emotional. | 1 2 3 4 5 |
| 18) I never hesitate to help others when they ask for it. | 1 2 3 4 5 |
| 19) I think that helping others without them knowing is the best type of situation. | 1 2 3 4 5 |
| 20) One of the best things about doing charity work is that it looks good on my resume. | 1 2 3 4 5 |
| 21) Emotional situations make me want to help needy others. | 1 2 3 4 5 |
| 22) I often make anonymous donations because they make me feel good. | 1 2 3 4 5 |
| 23) I feel that if I help someone, they should help me in the future. | 1 2 3 4 5 |

APPENDIX E

BUSS-PERRY AGGRESSION QUESTIONNAIRE

Instructions: Below are a number of statements that may or may not describe you. Please indicate HOW MUCH EACH STATEMENT DESCRIBES YOU by using the following scale:

1 – Extremely uncharacteristic of me
2 – Somewhat uncharacteristic of me
3 – Neither characteristic nor uncharacteristic of me
4 – Somewhat characteristic of me
5 – Extremely characteristic of me

| | |
|---|---|
| 1) Once in a while I can't control the urge to strike another person. | 1 2 3 4 5 |
| 2) Given enough provocation, I may hit another person. | 1 2 3 4 5 |
| 3) If somebody hits me, I hit back. | 1 2 3 4 5 |
| 4) I get into fights a little more than the average person. | 1 2 3 4 5 |
| 5) If I have to resort to violence to protect my rights, I will. | 1 2 3 4 5 |
| 6) There are people who pushed me so far that we came to blows. | 1 2 3 4 5 |
| 7) I can think of no good reason for ever hitting a person. | 1 2 3 4 5 |
| 8) I have threatened people I know. | 1 2 3 4 5 |
| 9) I have become so mad that I have broken things. | 1 2 3 4 5 |
| 10) I tell my friends openly when I disagree with them. | 1 2 3 4 5 |
| 11) I often find myself disagreeing with people. | 1 2 3 4 5 |
| 12) When people annoy me, I may tell them what I think of them. | 1 2 3 4 5 |
| 13) I can't help getting into arguments when people disagree with me. | 1 2 3 4 5 |
| 14) My friends say that I'm somewhat argumentative. | 1 2 3 4 5 |
| 15) I flare up quickly but get over it quickly. | 1 2 3 4 5 |
| 16) When frustrated, I let my irritation show. | 1 2 3 4 5 |

| | |
|---|---|
| 17) I sometimes feel like a powder keg ready to explode. | 1 2 3 4 5 |
| 18) I am an even-tempered person. | 1 2 3 4 5 |
| 19) Some of my friends think I'm a hothead. | 1 2 3 4 5 |
| 20) Sometimes I fly off the handle for no good reason. | 1 2 3 4 5 |
| 21) I have trouble controlling my temper. | 1 2 3 4 5 |
| 22) I am sometimes eaten up with jealousy. | 1 2 3 4 5 |
| 23) At times I feel I have gotten a raw deal out of life. | 1 2 3 4 5 |
| 24) Other people always seem to get the breaks. | 1 2 3 4 5 |
| 25) I wonder why sometimes I feel so bitter about things. | 1 2 3 4 5 |
| 26) I know that "friends" talk about me behind my back. | 1 2 3 4 5 |
| 27) I am suspicious of overly friendly strangers. | 1 2 3 4 5 |
| 28) I sometimes feel that people are laughing at me behind my back. | 1 2 3 4 5 |
| 29) When people are especially nice, I wonder what they want. | 1 2 3 4 5 |

APPENDIX F

VENGEANCE SCALE

Instructions: Listed below are a number of statements that describe attitudes that different people have. There are no right or wrong answers, only opinions. Read each item and decide whether you agree or disagree and to what extent by using the following scale.

1 – Disagree strongly
2 – Disagree
3 – Disagree slightly
4 – Neither disagree nor agree
5 – Agree slightly
6 – Agree
7 – Agree strongly

| | disagree agree |
|---|---|
| 1) It's not worth my time or effort to pay back someone who has wronged me. | 1 2 3 4 5 6 7 |
| 2) It is important for me to get back at people who have hurt me. | 1 2 3 4 5 6 7 |
| 3) I try to even the score with anyone who hurts me. | 1 2 3 4 5 6 7 |
| 4) It is always better not to seek vengeance. | 1 2 3 4 5 6 7 |
| 5) I live by the motto "let bygones be bygones." | 1 2 3 4 5 6 7 |
| 6) There is nothing wrong in getting back at someone who has hurt you. | 1 2 3 4 5 6 7 |
| 7) I don't just get mad, I get even. | 1 2 3 4 5 6 7 |
| 8) I find it easy to forgive those who have hurt me. | 1 2 3 4 5 6 7 |
| 9) I am not a vengeful person. | 1 2 3 4 5 6 7 |
| 10) I believe in the motto "an eye for an eye; a tooth for a tooth." | 1 2 3 4 5 6 7 |
| 11) Revenge is morally wrong. | 1 2 3 4 5 6 7 |
| 12) If someone causes me trouble, I'll find a way to make them regret it. | 1 2 3 4 5 6 7 |
| 13) People who insist on getting revenge are disgusting. | 1 2 3 4 5 6 7 |
| 14) If I am wronged, I can't live with myself unless I get revenge. | 1 2 3 4 5 6 7 |

| | |
|---|---|
| 15) Honour requires that you get back at someone who has hurt you. | 1 2 3 4 5 6 7 |
| 16) It is usually better to show mercy than to take revenge. | 1 2 3 4 5 6 7 |
| 17) Anyone who provokes me deserves the punishment that I give them. | 1 2 3 4 5 6 7 |
| 18) It is always better to “turn the other cheek.” | 1 2 3 4 5 6 7 |
| 19) To have a desire for vengeance would make me feel ashamed. | 1 2 3 4 5 6 7 |
| 20) Revenge is sweet. | 1 2 3 4 5 6 7 |

APPENDIX G

LIFE HISTORY OF AGGRESSION (SELF)

Instructions: Rate yourself on each of the following items using the rating system below. Only rate actual behavior, be it verbal and/or physical. Do not include in your ratings thoughts not followed by any action or fantasies. For these questions it is important to rate any events that have occurred over your **lifetime (including your years as a teenager and a young adult).**

0 – Never happened
1 – Only happened "once" (e.g., one time)
2 – Happened "a couple" or "a few" (e.g., 2-3) times
3 – Happened "several" (e.g., 4-9) times
4 – Happened "many" (e.g., 10+) times
5 – Happened "so many" times that I couldn't give a number

## How Many Times Would You Say You Did the Following Things Over the Course of Your Life to DATE?

| | |
|---|---|
| 1) "Throw" a temper tantrum (for example: screaming, slamming doors, throwing things when frustrated to the "breaking point") | 0 1 2 3 4 5 |
| 2) Get into physical fights with other people | 0 1 2 3 4 5 |
| 3) Get into verbal fights or arguments with other people | 0 1 2 3 4 5 |
| 4) Deliberately hit another person (or an animal) in anger | 0 1 2 3 4 5 |
| 5) Deliberately struck or deliberately broke objects (for example: windows, dishes, etc.) in anger | 0 1 2 3 4 5 |
| 6a) Deliberately tried to physically hurt yourself in anger or desperation | 0 1 2 3 4 5 |
| 6b) Deliberately tried to end your life or kill yourself in anger or desperation | 0 1 2 3 4 5 |
| 7) Had discipline problems in school which resulted in a reprimand by the school principal, or in a suspension or expulsion from school | 0 1 2 3 4 5 |
| 8) Had difficulties with bosses or supervisors, which resulted in a physical or verbal fight and led to a reprimand, a demotion, or a firing from your job | 0 1 2 3 4 5 |

| | |
|---|---|
| 9) Had difficulties with other people due to lying, stealing, sexual promiscuity, involvement in activities that were questionably legal, or disregard for the rights of others | 0 1 2 3 4 5 |
| 10) Had difficulties with the law or police, which resulted in a warning, arrest, or conviction for a misdemeanor or felony offense. | 0 1 2 3 4 5 |

APPENDIX H

NORMATIVE BELIEFS ABOUT AGGRESSION SCALE

Instructions: The following questions ask you about whether you think certain behaviors are WRONG or are OK. Indicate the answer that best describes what you think. Indicate ONE and only one answer.

Suppose a boy says something bad to another boy, John.

1) Do you think it's OK for John to scream at him?

IT'S PERFECTLY OK IT'S SORT OF OK IT'S SORT OF WRONG IT'S REALLY WRONG

2) Do you think it's OK for John to hit him?

IT'S PERFECTLY OK IT'S SORT OF OK IT'S SORT OF WRONG IT'S REALLY WRONG

Suppose a boy says something bad to a girl.

3) Do you think it's wrong for the girl to scream at him?

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

4) Do you think it's wrong for the girl to hit him?

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

Suppose a girl says something to another girl, Mary.

5) Do you think it's OK for Mary to scream at her?

IT'S PERFECTLY OK IT'S SORT OF OK IT'S SORT OF WRONG IT'S REALLY WRONG

6) Do you think it's OK for Mary to hit her?

IT'S PERFECTLY OK IT'S SORT OF OK IT'S SORT OF WRONG IT'S REALLY WRONG

Suppose a girl says something bad to a boy.

7) Do you think it's wrong for the boy to scream at her?

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

8) Do you think it's wrong for the boy to hit her?

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

Suppose a boy hits another boy, John.

9) Do you think it's wrong for John to hit him back?

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

Suppose a boy hits a girl.

10) Do you think it's OK for the girl to hit him back?

IT'S PERFECTLY OK IT'S SORT OF OK IT'S SORT OF WRONG IT'S REALLY WRONG

Suppose a girl hits another girl, Mary.

11) Do you think it's wrong for Mary to hit her back?

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

Suppose a girl hits a boy.

12) Do you think it's wrong for the boy to hit her back?

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

13) In general, it is wrong to hit other people.

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

14) If you're angry, it is OK to say mean things to other people.

IT'S PERFECTLY OK IT'S SORT OF OK IT'S SORT OF WRONG IT'S REALLY WRONG

15) In general, it is OK to yell at others and say bad things.

IT'S PERFECTLY OK IT'S SORT OF OK IT'S SORT OF WRONG IT'S REALLY WRONG

16) It is usually OK to push or shove other people around if you're mad.

IT'S PERFECTLY OK IT'S SORT OF OK IT'S SORT OF WRONG IT'S REALLY WRONG

17) It is wrong to insult other people.

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

18) It is wrong to take it out on others by saying mean things when you're mad.

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

19) It is generally wrong to get into physical fights with others.

IT'S REALLY WRONG IT'S SORT OF WRONG IT'S SORT OF OK IT'S PERFECTLY OK

20) In general, it is OK to take your anger out on others by using physical force.

IT'S PERFECTLY OK IT'S SORT OF OK IT'S SORT OF WRONG IT'S REALLY WRONG

# APPENDIX I

## ORAL PRESENTATION NARRATIVE

Welcome, everyone.

You are about to participate in a study investigating the effects of competition on reaction speed and concentration skills.

You will be competing against other students in various schools across the country in an online game that tests your concentration and reaction time.

Before starting the game, you will be required to answer a series of questions about yourself.

All information that you provide will be kept strictly confidential and will not be used to identify you in any way.

Please answer all questions as accurately and honestly as you can.

After that, you will be required to rank a series of pleasant sounds from most pleasant to least pleasant and a series of unpleasant sounds from most unpleasant to least unpleasant.

Before each round of the game, you will select one of these sounds to deliver to your opponent if you win the round and your opponent will do the same.

You will also have the option to select an extremely pleasant sound made up of the other pleasant sounds or an extremely unpleasant sound made up of the other unpleasant sounds, as well as the option to send no sound to your opponent.

For each round of the game, you will wait until a red "X" appears on the screen. Press the space bar as fast as you can when you see the red "X."

Whoever presses the space bar the fastest will win the round, and the winner's sound choice will be delivered to the player who lost the round.

If you or your opponent press the space bar before the red "X" appears, no sound will be delivered to either player, and the round will be repeated.

Please try to do your best when playing the game.

Don't worry if you've forgotten some of what I've said; the program will include instructions along the way to guide you through, so make sure you **read the instructions carefully**.

[brief pause]

Now, everyone please put on your headphones and enter the ID number from your printed Informed Consent form on the screen and click the "Start" button to begin the program.

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