The Word Game: An innovative strategy for assessing implicit processes in parents at risk for child physical abuse

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ABSTRACT

Objective: Contemporary theories of child physical abuse (CPA) emphasize the proximal role of social cognitive processes (many of which are implicit in nature) in the occurrence of parental aggression. However, methods that allow for the systematic examination of implicit cognitive processes during the course of aggressive interactions are needed. To address this need, the present study was designed to examine the utility of the Word Game, an innovative procedure designed to assess implicit changes in schema accessibility during the course of an interpersonal exchange involving aggressive response options.

Methods: The game involves a series of competitive reaction time trials which are actually lexical decision making trials designed to determine the accessibility of schema throughout the game. Each parent was led to believe that they were competing against another player with whom they exchanged sound blasts of varying intensities. Participants in the present study were parents who were either low (n = 50) or high (n = 20) risk for CPA.

Results: Results revealed that high CPA risk parents behaved more aggressively than low CPA risk parents and that provocation augmented the aggressiveness of all participants. Among high CPA risk parents, positive schema became less accessible (whereas negative schema became more accessible) following lost rounds. At the conclusion of the game, high CPA risk parents reported more aggressive motives than low CPA risk parents. Further, aggressive motives significantly mediated the association between CPA risk status and aggressiveness (i.e., mean sound blast selections).

Conclusions: Collectively, results support the potential utility of the Word Game as a means of advancing the study of social cognitive processes involved in parental aggression.

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Introduction

Theories of child physical abuse (CPA) run the gamut from sociological to psychological (Tzeng, Jackson, & Karlson, 1991), with the most recent models emphasizing the role of cognitive factors in the occurrence of parental aggression (Azar, Reitz, & Goslin, 2008; Bugental, Blue, & Cruzcosa, 1989; Bugental et al., 2002; Milner, 1993, 2000). Recent trends emphasizing the proximal role of information processing in CPA risk are in keeping with contemporary theories of aggression which postulate a proximal role of social cognitive processes (many of which are automatic in nature) in the etiology of various forms of human aggression (Anderson & Bushman, 2002; Anderson & Huesmann, 2003; Berkowitz, 2008; Crick & Dodge, 1996; Dodge, 2006; Huesmann, 1998; Todorov & Bargh, 2002).

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The proposed research is framed within the social information processing (SIP) model of CPA, which describes parental cognitive activities believed to impact risk of verbal and physical aggression directed at children (for a comprehensive review of the SIP model of CPA and related research see Milner, 1993, 2000). The SIP model theorizes that automatic processes play an important role in understanding how information processing activities increase CPA risk. In most social interactions, automatic processes are adaptive in that they allow for efficient and effective responding with minimal conscious effort. For at-risk and abusive parents, however, automatic processes may play a role in the development and maintenance of aggressive behavior patterns (Anderson & Bushman, 2002; Milner, 2000; Todorov & Bargh, 2002).

During automatic processing, preexisting schema may influence perceptions, interpretations, and behaviors in a rapid, effortless manner without conscious awareness (Schneider & Shiffrin, 1977; Shiffrin & Schneider, 1977). Aggression-related schema are believed to be comprised of a series of associated information structures, including: negative evaluations of others, attributions of hostile intent, low perceived control, and belief in the use of power assertion as a legitimate means of regaining control or protecting the self (Anderson & Huesmann, 2003; Beck, 1999). As a result of past experiences of violence exposure, victimization, and/or perpetration of aggressive behavior, at-risk and physically abusive parents are believed to have aggression-related schemata that are highly, and in some cases chronically, accessible (Crouch & Milner, 2005; Milner, 1993, 2000).

Data from a number of sources suggest that there are a variety of ways that pre-existing schemata and automatic processes may influence aggressive behavior in parents. For example, heightened accessibility of aggression-related schema may result in: (1) perceptual biases that favor aggression-relevant stimuli (Bargh & Pratto, 1986; Bargh & Thein, 1985); (2) encoding of ambiguous information in more negative terms (Crouch et al., 2010; Zelli. Huesmann, & Cervone, 1995); (3) hostile interpretations of ambiguous others (Farc, Crouch, Skowronski, & Milner, 2008); (4) heightened feelings of hostility (Crouch, Milner, Skowronski, & Harris, 2008) and/or (5) increased aggressive behavior across situations (Carver, Ganellen, Froming, & Chambers, 1983; Crouch et al., 2008). Indeed, under certain conditions, activation of aggression-related schema may automatically trigger aggressive behavioral responses without the intervening influence of other interpretative processes (Dijksterhuis & Bargh, 2001). As automatic processes, the influence of aggression-related schema on other information processing components is believed to be implicit in nature – taking place rapidly, without effort, and outside of the individual’s awareness (Todorov & Bargh, 2002).

By definition, implicit processes cannot be readily self-reported (because respondents lack awareness of them). Thus, methods other than self report are needed to examine such influences on aggressive parenting. Moreover, it is desirable to examine how these automatic processes unfold within the context of interpersonal exchanges that involve aggressive behavior. Toward this end, we developed the Word Game, a procedure which integrates methods of assessing implicit information processing into a widely used paradigm for assessing aggressive responding in a laboratory setting.

The Word Game: A variant of the Taylor Aggression Paradigm

Of the various laboratory paradigms for assessing aggressive behavior that have been developed, one of the most commonly used procedures is the Taylor Aggression Paradigm (TAP). In the original version of the TAP (Taylor, 1967) participants were told that they were competing in a competitive reaction time task. The goal of the task was to release a reaction time key upon cue and to do so more quickly than an opponent. The slower player was deemed the loser of that trial, and the loser received an electric shock. Before each trial, participants were given the opportunity to select the shock intensity to be sent to their opponent in the event the opponent lost the trial. In reality there was no opponent, and the sequence of wins and losses, as well as the shock intensities received by the participant, were preprogrammed. The “game” consisted of 21 trials, divided into the following segments: first trial, 6 trials of low intensity shock, 1 transition trial, 6 trials of moderate intensity shock, 1 transition trial, and 6 trials of high intensity shock. The main dependent variable in the TAP was the intensity of shock participants elected to send to their opponent. Since its original development, numerous variations of the TAP have been examined (e.g., inclusion of a “no shock” response option, using sound blasts rather than electric shocks, matching high and low aggression players against each other, e.g., Anderson, Buckley, & Carnegey, 2008; Bushman, 1995).

Ironically, performance on the reaction time task was not a variable of interest in the original TAP procedures. However, the fact that the TAP revolves around a reaction time task makes it an ideal paradigm in which to embed measures assessing implicit information processing, many of which use reaction time (i.e., response latencies) as the primary dependent measure. By embedding reaction-time based measures of implicit information processes in the TAP procedures, it may be possible to examine ongoing cognitive processes as participants engage in interpersonal exchanges involving aggressive response options.

To examine this possibility, we developed the Word Game which involved embedding lexical decision making trials in the TAP paradigm. More specifically, in the Word Game reaction times on the lexical decision making trials are used to examine accessibility of selected schema (e.g., hostility, control, negativity) throughout the game. As in the original version of the TAP, participants are led to believe that they are engaged in a competitive reaction time task with an “opponent.” However, in the Word Game, the reaction time task involves a series of lexical decision making trials in which players are expected to decide as quickly and as accurately as possible whether letter strings that appear on the computer screen are words or non-words. Participants are told that after each round (i.e., 12 lexical decision making trials) the computer will determine which player was the fastest and most accurate for that round and that the loser of a given round will receive a sound blast (the level of which is determined by the winner).
Of course combining the TAP and the lexical decision making task raises a number of questions. If the lexical decision making trials are embedded in a competitive task are reaction times still sufficiently sensitive to discern hypothesized changes in schema accessibility? Does embedding the lexical decision making trials in the TAP paradigm interfere with the occurrence of the well-established provocation effects observed in prior research using the TAP paradigm? To address these questions, we conducted the present study as a preliminary examination of the utility of the Word Game as a procedure for examining implicit processes during aggressive exchanges.

Although the Word Game could be used to study a variety of forms of aggression, we were interested in its use with parents at risk for CPA. Despite the fact that laboratory-induced aggression procedures have long been used in the study of general aggression, surprisingly little research has attempted to directly assess aggressive response selection among high CPA risk parents (for exceptions to this general state of affairs see Bugental, Lewis, Lin, Lyon, & Kopeikin, 1999; De Paul, Perez-Albeniz, Ormaechea, Vergara, & Terres-Gomez, 2006; Perez-Albeniz & de Paul, 2005, 2006). In an effort to advance research in this area, we recruited parents with varying degrees of CPA risk to participate in the Word Game. Although our ultimate goal is to modify the TAP cover story in order to learn about how parents approach the game when playing with children, in the present study we elected to portray the opponent as another adult in order to remain consistent with the original research employing the TAP in which adults competed against other adults.

Although a variety of aggression-related schemata (control, hostility) could be assessed using the Word Game, in the present study we chose to examine the accessibility of negative and positive schemata throughout the course of the game. Toward this end, we used negatively and positively valenced words as the target stimuli in the lexical decision making task. Prior research suggests that when processing ambiguous social stimuli, aggressive individuals (including high CPA risk parents) evince greater accessibility of hostility-related, negative schema, and a relative inaccessibility of nonhostile (e.g., benign, positive) schema (Crouch et al., 2010; Zelli et al., 1995). The present study was designed to extend this area of inquiry by examining how accessibility of positive and negative schemata might vary in response to positive (winning) and negative (losing, receiving a sound blast) interpersonal experiences.

The present study also was designed to examine the motives and goals that participants employ and perceive others to employ while engaging in laboratory tasks designed to measure aggression. In response to calls for additional data on motives employed in laboratory studies of aggression (Tedeschi & Quigley, 1996, 2000), recent research (Anderson & Huesmann, 2003) indicates that self reported aggressive motives partially mediate the association between trait aggressiveness and aggressive behavior observed in the laboratory setting (Anderson et al., 2008). Further, considerable theory and prior research indicate that aggressive individuals, including high CPA risk parents (Milner, 1993, 2000), are prone to making more hostile attributions regarding other people’s behavior, particularly in ambiguous situations. To pursue this avenue of inquiry, upon completion of the Word Game, participants were asked to report both the extent to which they engaged in aggressive motives and the extent to which they believed the other player had engaged in aggressive motives during the game.

In summary, the Word Game was designed to advance foundational research on the information processes underling hostile and aggressive parenting behavior. The present study advances research on CPA risk by: (1) directly assessing aggressive response selection among high CPA risk parents, (2) monitoring accessibility of positive and negative schema throughout the interaction, and (3) assessing perceived motives for aggressive behavior during the game.

Hypotheses

As has been demonstrated in previous research using the TAP procedures, we expected that as the sound blasts received on lost rounds became progressively louder, all participants would tend to send higher sound blasts to their opponents (e.g., Chermack, Berman, & Taylor, 1997; Taylor, 1967). Replication of this well-established provocation effect would serve as a procedure check in the present study (i.e., indicating that the alterations that we made did not substantially alter the character of the basic aggression paradigm). We also expected that high CPA risk parents would display higher levels of aggressive behavior and would evince greater cognitive and behavioral reactivity (i.e., changes in schema accessibility, aggressive behavior) following loss experiences (Taylor, 1967). Further, we expected high CPA risk parents would engage in more aggressive motives (Anderson et al., 2008; Anderson & Huesmann, 2003) and would attribute more aggressive intentions to their opponents (Milner, 1993, 2000, 2003). More specifically, we hypothesized that:

1. high, compared to low, CPA risk parents would evince (a) higher initial sound blasts, (b) higher mean sound blasts, (c) less frequent use of the option to not send a sound blast to their opponent, and (d) more frequent use of the highest sound blast level;
2. high, compared to low, CPA risk parents would select higher sound blasts following lost rounds than following won rounds;
3. high, but not low, CPA risk parents would respond faster to negative words and slower to positive words following lost (compared to won) rounds;
4. high, compared to low, CPA risk parents would rate their opponent as engaging in more aggressive motives;
5. high, compared to low, CPA risk parents would report engaging in more aggressive motives during the game.
Method

Participants

To recruit parents for the study, informational flyers were distributed through local agencies (e.g., daycares, churches, social service agencies). To ensure that an adequate number of high-risk participants were recruited, we distributed flyers to agencies and programs that served families with risk factors for abuse (e.g., voluntary home visiting programs, shelter services). The informational flyers stated parents must have at least one child living in their home in order to be eligible and that eligible parents would be asked to “play a word game, the goal of which is to be the fastest and most accurate player when classifying letter strings as words or nonwords” and “complete questionnaires about yourself and your opponent.” Participants were told that the study would take approximately 60 min and that they would receive $20.

A total of 115 parents were recruited to participate in the present study. Of these parents, 5 participants were excluded from analyses because of computer problems and 30 participants were excluded because of invalid responses on the Child Abuse Potential (CAP) Inventory (26 were faking good; 4 were randomly responding). An additional 10 participants were excluded from analyses because they did not meet the CAP score criteria for inclusion in either the low or the high CPA risk groups (i.e., their CAP abuse scores fell between 166 and 215). This exclusion rate, and exclusion for these reasons, is quite typical of research using the CAP Inventory to establish CPA risk groups (e.g., Milner, 1986, 1994, 2003; Wells et al., 2011). The final sample consisted of 50 low and 20 high CPA risk parents. Mean CAP scores for the low and high CPA risk groups were 83.8 (SD = 44.8) and 284.7 (SD = 47.9), respectively. The CPA risk groups did not differ significantly with respect to gender, race, marital status, age, highest grade completed or number of children (all p’s > .05). Table 1 presents the demographic characteristics of the total, final, low CPA risk, and high CPA risk samples.

Measures

Child Abuse Potential (CAP) Inventory. CPA risk status was determined using the CAP Inventory (Milner, 1986, 1994, 2003). The CAP is a 160-item, agree–disagree, self-report questionnaire designed to screen for CPA risk. Scores on the physical abuse scale range from 0 to 486, with higher scores reflecting greater CPA risk. In the present study, we used the clinical cut score of 215 to identify high CPA risk parents. Respondents were classified as low CPA risk if their CAP abuse scores were below the signal detection theory cut score of 166 (Milner, 1986). Although other approaches to constructing abuse risk groups are possible (e.g., using the signal detection cut score of 166 to divide the sample into high and low risk groups), we elected to use the more extreme cut score for the high CPA risk group given that this is the first study to examine the performance of high CPA risk parents in the Word Game.

The CAP Inventory also contains three validity scales (i.e., random responding, faking good, and faking bad) which were used to detect response distortion. The CAP validity scales are constructed from sets of items designed to detect tendencies to respond in a socially desirable manner, as well as inconsistent and/or random responding. Response distortion precludes reliable classification of participants with respect to CPA risk, due to the fact that their abuse scale scores may not be an accurate index of their actual abuse risk (Milner, 2006). Thus, participants were excluded if any of their response distortion indices were elevated, with one exception. As recommended in the CAP manuals (Milner, 1986, 2006), respondents with abuse scale scores above the clinical cut score despite having elevated faking good indices were classified as high CPA risk.

Research on the CAP Inventory has documented adequate internal consistency estimates (ranging from .92 to .95 for general population and maltreating parents), and adequate test–retest reliabilities in general population samples (.91 for 1-day, .90 for 1-week, .83 for 1-month, and .75 for 3-month intervals; Milner, 1986). Numerous studies report construct validity.
data for the CAP abuse scale (see Milner, 1986, 1994, 2003). For example, CAP Inventory abuse risk scores are significantly associated with measures of aggression in parents (McCurdy, 1995; Miller, Smyth, & Mudar, 1999; Montes, de Paul, & Milner, 2001; Nayak & Milner, 1998; Sachs & Hall, 1991; Zelenko, Huffman, Lock, Kennedy, & Steiner, 2001) and, with one exception (Dopke & Milner, 2000), the use of harsh discipline strategies by parents (Chilamkurti & Milner, 1993; Dolk, Cerezo, & Milner, 1997; Dopke, Lundahl, Dunsterville, & Lovejoy, 2003; Hasket, Scott, & Fann, 1995; McCurdy, 1995; Miller et al., 1999; Monroe & Schellenbach, 1989; Montes et al., 2001; Schellenbach, Monroe, & Merluzzi, 1991; Whissell, Lewko, Carriere, & Radford, 1990). Moreover, classification rates based on discriminant analysis of child physical abusers and matched comparison parents are in the mid-80% to low-90% range (Milner, 1986, 1994). Studies examining the CAP’s specificity indicate 100% correct classification of nurturing foster parents, low-risk mothers, and nurturing mothers. Prospective research revealed a significant association between CAP abuse scores and subsequent child physical abuse (Milner, 1986).

**Stimulus word sets.** A pilot study was conducted to select 10 negative, 10 neutral, and 10 positive words for use in the main study. These words were selected from an initial pool of 60 words chosen by the authors because they were thought to be positive (e.g., love, hug), neutral (e.g., number, from), or negative (e.g., hostile, hit). The goal of the pilot study was to ensure that parents could reliably recognize the target words as words (versus non-word letter strings) and that parents could reliably sort the word sets as to whether they represented constructs associated with being “mean,” “nice,” or “neither mean nor nice.” A lexical decision making task was used to determine reliable classification of words as words, whereas a card-sort task was used to determine reliable classification within word type (negative, neutral, positive).

Thirty parents participated in the pilot study and completed both the lexical decision making tasks (which included 2 trials per word) and the card-sort task for the initial pool of 60 words. Words included in the final sets of 10 negative/neutral/positive words met the following criteria: (a) 90% correct classification as a word versus a non-word on the lexical decision making task; (b) negative/positive words were never classified as nice/mean and were not misclassified as “neither mean nor nice” more than 10% of the time; and (c) neutral words were never classified as either “mean” or “nice.” The final set of 10 negative words included: negative, hostile, enemy, angry, spank, hate, mean, slap, kick, and hit. The final set of 10 positive words included: positive, playful, peace, happy, sweet, love, care, nice, kind, and hug. The final set of 10 neutral words included: something, number, other, every, small, long, what, many, from, and the.

**Motives survey.** To assess the strategies or motives participants used when making sound blast selections, we used the motives survey developed by Anderson and Murphy (2003). More specifically, participants were asked to think about the sound blast levels they sent to their opponent and to indicate on a scale from 1 (not true) to 6 (very true) the extent to which they used the following strategies when selecting their responses: (1) I wanted to impair my opponent’s performance in order to win more; (2) I wanted to control my opponent’s level of responses; (3) I wanted to make my opponent mad; (4) I wanted to hurt my opponent; (5) I wanted to pay back my opponent for the noise levels he/she set; and (6) I wanted to blast him/her harder than he/she blasted me. As completed by the parents in the present study, the internal consistency (Cronbach’s alpha coefficient) of the motives survey was .80.

**Opponent’s motives survey.** To assess participants’ interpretations of their opponents’ motives when selecting sound blasts, we used a modified version of the motives survey described above. Participants were asked to think about the sound blast levels their opponent selected and to indicate on a scale from 1 (not true) to 6 (very true) the extent to which they thought their opponent was trying to: (1) impair my performance in order to win more; (2) control my level of responses; (3) make me mad; (4) hurt me; (5) wanted to pay me back for the noise levels I set; and (6) wanted to blast me harder than I blasted him/her. Internal consistency of the opponent’s motives survey was .67.

**Perception of opponent’s gender/age.** Participants were asked to indicate whether they thought their opponent was male or female and to estimate their opponent’s age (<20, 20–30, 30–40, 40–50, 50+).

**Procedure**

The following procedures were reviewed and approved by the institutional review board at the first author’s institution. After they reviewed and signed the consent form, each participant was seated at a computer in one of four identical rooms that were approximately 8 ft by 10 ft and free of distractions. The Word Game was programmed in DirectRT experimental software (Empirisoft, 2004) and run on free-standing Dell Optiplex 6X520 PCs with Pentium 4 processors and 19-in. color monitors. Each participant was told that they would be playing a game against another person and that the person they were playing against arrived a few minutes early and was already set up to play in another room. Participants were told that for each turn of the game they would be asked to decide if a letter string was a word or a non-word. To win a turn, they needed to respond faster than their opponent with the correct answer (word or non-word). Participants were told to press the “z” key to indicate that the letter string was a word (mean) and the “m” key to indicate that the letter string was a non-word (lenp).

After explaining the goal of the game, a research assistant explained that after each round of 12 turns the computer would indicate who won (i.e., who was the most accurate – or in the case of a tie the fastest – player for that round). The winner of each round would then get to send a sound blast to their opponent, and the sound blasts could range from very soft (50 db)
to very loud (90 db). Respondents also were able to elect not to send a sound blast by pressing the 0 key. To select a sound blast level, participants were told to press one of the numbers on the keyboard, with 1 representing the softest sound blast (50 db) and 9 representing the loudest sound blast (90 db). The sound blasts were delivered via JVC HA-250 circumual noise canceling headphones. Before starting the Word Game, participants were presented sample sound blasts associated with various sound blast selections: 0 (no sound), 1 (50 db), 5 (70 db), and 9 (90 db). Participants were instructed to leave the headphones on for the duration of the computer task.

After addressing questions, the research assistant asked each participant to wait briefly while they left the room to check if the other player was ready. After a few seconds, the research assistant returned and instructed the participant to begin following the instructions as they appeared on the computer screen. The Word Game consisted of 24 rounds (with 12 lexical decisions in each round). In actuality, no opponent was present and the sequence of wins/losses was preprogrammed such that each participant won 50% of the rounds. Thus, each participant lost a total of 12 rounds, after which they heard a sound blast. The sound blast levels heard by participants were preprogrammed and progressively increased from softer to louder levels (rounds 1–8 sound blast levels were 2’s and 3’s; rounds 9–16 sound blast levels were 5’s and 6’s; rounds 17–24 sound blast levels were 7’s and 8’s).

Each round consisted of six turns in which non-word letter strings were presented and six turns in which words (three positive/negative words and three neutral words) were presented. Neutral words were included in each round to reduce the salience of the constructs of interest. The non-word letter strings and words were presented in a randomized order within each round.

Presentation of the positive target words and the negative target words was blocked within rounds. More specifically, 12 rounds featured positive target words, while 12 rounds featured negative target words. Presentation of the positive and negative rounds was counterbalanced with wins/losses and provocation condition.

Thus, the game consisted of 24 rounds with 12 turns (i.e., lexical decision making trials) per round. To begin each round, participants selected the level of sound blast their opponent would hear if the opponent lost the upcoming round. Each turn began with a brief presentation of a row of X’s to warn the participant that the turn was about to begin. Next, a letter string was presented for 300 ms in response to which the respondent pressed (as quickly as possible) the “z” key if the letter string was a word and the “m” key if it was not a word. After 12 turns, the computer “determined” whether the participant won or lost the round. The results were presented on the computer screen (e.g., “You Won!” or “You Lost!”). Regardless of whether the participant won or lost the round, the sound blast level selected by their opponent was displayed on the computer screen at the end of the round. On lost rounds, participants also heard a sound blast (of a predetermined level) through their headphones.

After completing the Word Game, participants were asked to indicate whether they thought their opponent was male or female and how old they thought their opponent was. Next, participants completed the Child Abuse Potential Inventory, Self Motives Survey, and the Opponent Motives Survey. Each participant was then debriefed and paid $20.

Results

Slightly over half (55.7%) of participants thought the person they were playing against was female. With respect to age, 10.0% thought their opponent was less than 20 years of age, 60.0% thought their opponent was between 20 and 30 years of age, and 30.0% thought their opponent was over 30 years old. The perceived gender and age of the opponent did not vary significantly by CPA risk status, nor were these variables associated with mean sound blast selections during the Word Game (all p’s > .30).

Sound blast selections

Dependent variables based on sound blast selections included: initial sound blast selection (unprovoked aggression), mean sound blast selection for each round, number of rounds on which 0 (no sound blast) was selected, number of rounds on which a 9 (maximal sound blast) was selected.

Initial sound blast selection. As expected (Hypothesis 1a), high CPA risk parents (M = 5.05, SD = 2.19) selected higher initial sound blast levels than low CPA risk parents (M = 3.52, SD = 2.25), t(68) = 2.59, p = .012, Cohen’s d = .63.

Mean sound blast selection. To analyze mean sound blast selections, we conducted a 2 (CPA risk: low, high) × 2 (provocation: low [rounds 1–12], high [rounds 13–24]) × 2 (word type: positive, negative) × 2 (outcome: won, lost) ANOVA with repeated measures on the last three variables. As expected (procedure check), results revealed a significant effect of provocation, F(1, 68) = 24.52, p < .001, η² = .265. Sound blast selections were higher in the high provocation condition than in the low provocation condition. Consistent with Hypothesis 1b, the effect of CPA risk was significant, F(1, 68) = 5.64, p = .020, η² = .077. Sound blast selections were higher among high CPA risk parents than among low CPA risk parents. Fig. 1 shows the combined influence of provocation and CPA risk, with high CPA risk parents in the high provocation condition evincing the highest mean sound blast selections.
Contrary to expectations (Hypothesis 2), the interaction of CPA risk by outcome was not significant \((p > .05)\). Indeed, none of the ANOVA terms involving the outcome variable were significant, indicating that sound blast selections did not vary systematically by outcome of the prior trial.

Percentage of parents who selected one or more 0 or 9 responses. Trends consistent with Hypotheses 1c and 1d were noted with respect to use of the 0 and 9 sound blast options, such that high CPA risk parents were somewhat less likely than low CPA risk parents to select one or more 0 responses \([10\% \text{ versus } 30\%; \chi^2(1) = 3.11, p = .078, \varphi = .211]\). Further, high CPA risk parents were somewhat more likely than low CPA risk parents to select one or more 9 responses \([55\% \text{ versus } 32\%; \chi^2(1) = 3.19, p = .074, \varphi = .213]\).

Response latencies

Analyses of the response latency data were limited to trials on which the correct response was given, resulting in exclusion of 3.94\% of trials \((SD = 4.51\%)\). In addition, extreme response times \((\leq 300\text{ ms} \text{ and } \geq 3,000\text{ ms})\) were excluded from analyses, resulting in exclusion of less than 1\% of trials.

To examine the patterning of the response latency data we conducted a 2 (CPA risk: low, high) \(\times\) 2 (provocation: low \([\text{rounds 1–12}]\), high \([\text{rounds 13–24}]\)) \(\times\) 2 (word type: positive, negative) \(\times\) 2 (outcome: won, lost) ANOVA with repeated measures on the last three variables. Results revealed a significant word type by outcome by CPA risk interaction, \(F(1, 68) = 5.24, p = .025, \eta^2_p = .071\). Follow-up analyses revealed that for low CPA risk parents the main effects for word type, \(F(1, 49) = 28.07, p < .001, \eta^2_p = .364\), and outcome, \(F(1, 49) = 11.39, p < .001, \eta^2_p = .189\), were significant; however, the interaction of word type \(\times\) outcome was not significant, \(F(1, 49) = 0.01, p = .927, \eta^2_p = .001\). Inspection of the means revealed that low CPA risk parents were slower to respond to negative \((\text{relative to positive})\) words; and slower to respond following lost \((\text{relative to won})\) rounds \((\text{see Fig. 2, top graph})\).

For high CPA risk parents, the interaction of word type and outcome was significant, \(F(1, 19) = 4.69, p = .043, \eta^2_p = .198\). As predicted (Hypothesis 3), high CPA risk parents exhibited greater/lesser accessibility of negative/positive words following lost \((\text{relative to won})\) trials. More specifically, follow-up analyses revealed that for positive words, high CPA risk parents tended to respond slower after lost, relative to won, \(F(1, 19) = 3.60, p = .073, \eta^2_p = .159\). For negative words, high CPA risk parents tended to respond faster following lost, relative to won, \(F(1, 19) = 4.33, p = .051, \eta^2_p = .185\) \((\text{see Fig. 2, bottom graph})\).

Motives

After completing the Word Game, participants were asked to indicate which \((\text{if any})\) of the 6 aggressive motives they used, and which they thought their opponent used, when selecting sound blast levels. To analyze responses to the motives items, we conducted a 2 (CPA risk: low, high) \(\times\) 2 (person: self, opponent) \(\times\) 6 (motive items: items 1–6) ANOVA, with repeated measures on the last 2 variables. Results from this analysis revealed a significant person \(\times\) CPA risk interaction, \(F(1, 68) = 15.42, p < .001, \eta^2_p = .185\) \((\text{see Fig. 3})\). Contrary to Hypothesis 4, low and high CPA risk parents did not differ in the extent to which they perceived their opponent as engaging in aggressive motives, \(F(1, 68) = 1.07, p = .303, \eta^2_p = .016\). However, consistent with Hypothesis 5, when describing their own motives, high CPA risk parents reported engaging in higher levels of aggressive motives than low CPA risk parents, \(F(1, 68) = 7.94, p = .006, \eta^2_p = .105\).
Exploratory analyses revealed that mean responses across the 6 aggressive motives were associated with mean sound blast selections, \( r(68) = .579, p < .001 \). However, mean responses across the 6 items assessing the opponent’s aggressive motives were not significantly associated with mean sound blast selections, \( r(68) = .170, p = .158 \). To further explore the self motives data, we used multiple regression analyses to examine whether self-reported aggressive motives mediated the association between CPA risk status and mean sound blast selections (see Baron & Kenny, 1986). Consistent with the ANOVA

Fig. 2. Response latencies for low (top graph) and high (bottom graph) CPA risk parents following won/lost rounds for negative and positive words. CPA, child physical abuse.

Fig. 3. Mean ratings of hostile motives for opponent and self by CPA risk status. CPA, child physical abuse.
analyses reported above, CPA risk status was significantly associated with self-reported aggressive motives, \( B = 0.395, SE = 0.140, \beta = 0.323, p = 0.006, R^2 = 0.105 \). Table 2 displays the results of the regression analyses in which CPA risk status and self-reported aggressive motives were entered as predictors of mean sound blast selections. As in the ANOVA analyses described above, CPA risk status was significantly associated with mean sound blast selections (Table 2, Model 1); however, this association was no longer significant once self-reported aggressive motives were entered into the regression (Table 2, Model 2). The Sobel test was used to examine the strength of the mediation path (Sobel, 1982) and it was significant, Sobel = 2.48, SE = 0.150, \( p = 0.013 \). Collectively, although not definitive, these findings are consistent with the notion that CPA risk status influenced sound blast selections through self-reported aggressive motives.

**Discussion**

Results from the present study support the utility of the *Word Game* as a procedure for assessing aggressive motives and behavior, as well as implicit information processes, during interpersonal exchanges in a laboratory setting. As predicted (Hypothesis 1), analyses of the sound blast data revealed that high CPA risk parents evinced higher initial and mean sound blast selections than low CPA risk parents. Also, trends in the data suggested that high CPA risk parents were more likely than low CPA risk parents to select the maximal sound blast level one or more times, and were less likely to elect to refrain from sending a sound blast on at least one trial. Collectively, these findings indicate that aggressive propensities of high CPA risk parents are apparent in the *Word Game*, despite the controlled nature of the laboratory setting.

Analysis of the sound blast data revealed that all participants, regardless of CPA risk status, sent higher sound blasts in the high provocation condition than in the low provocation condition. This finding replicates the provocation effect observed in previous studies employing the TAP (e.g., Chermack et al., 1997; Taylor, 1967) and confirms that changing the nature of the TAP’s reaction time task and the patterning of the sound blast selections (i.e., after rounds of 12 lexical decision making trials rather than after each discrete reaction time trial) did not disrupt this effect. Moreover, the main effects of CPA risk and provocation combined in an additive fashion such that the highest mean sound blast selections occurred among the high CPA risk parents in the high provocation condition.

It was expected that negative interpersonal experiences (losing and receiving sound blasts) would trigger cognitive and behavioral reactions that would predispose high CPA risk participants to behave more aggressively on rounds following a loss (Taylor, 1967). Contrary to expectations (Hypothesis 2), the present findings revealed that the outcomes of preceding trials (wins/losses) did not significantly influence sound blast selections in either high or low CPA risk parents. Interestingly, as in the present study, Anderson et al. (2008) employed a variant of the TAP procedures and found that the outcomes of previous trials similarly did not impact sound blast selections on subsequent trials for a sample of college students with either high trait aggressiveness or low trait aggressiveness. Thus, data are mixed as to the short-term influence of win/loss outcomes on subsequent aggressive behaviors in this paradigm.

Nonetheless, results of the present study provide evidence that win/loss experiences are differentially related to schema accessibility in high and low CPA risk parents. Consistent with Hypothesis 3, high CPA risk parents responded faster to negative words and slower to positive words after losing (compared to winning) rounds in the game. This pattern of findings supports the notion that for high CPA risk parents, positive schemata become less accessible (whereas negative schemata become more accessible) following negative interpersonal experiences (such as losing a round and receiving a sound blast). In contrast, low CPA risk parents slowed to both positive and negative words after losing a round, suggesting that they may have switched to a more effortful (hence slower) strategy of responding on all trials after losing a round. Regardless of whether they won or lost the prior trial, low CPA risk parents responded faster to positive (relative to negative words), suggesting greater accessibility of positive schemata across outcomes.

Collectively, findings from the present study fall short of demonstrating that changes in schema accessibility for positive words are related to aggressive response selections. Indeed, although high CPA risk parents evince more/less accessibility of negative/positive words after losing, their sound blast selections (i.e., aggressive behavior) were unaffected by prior outcomes. As has been noted by others (e.g., Anderson & Huesmann, 2003), aggressive behavior is a complex and multiply determined phenomenon and clearly much remains to be learned about the dynamic interplay of internal states (e.g., implicit cognitive processes, affect, and arousal) and contextual factors (e.g., aversive stimuli) that influence aggressive behavior. In the present study, as in prior research (Taylor, 1967), provocation served as a significant

### Table 2

Summary of regression analysis for predicting mean sound blast selections (n = 70).

<table>
<thead>
<tr>
<th>Variable</th>
<th>( B )</th>
<th>( SE )</th>
<th>( \beta )</th>
</tr>
</thead>
</table>
| CPA risk status 
Model 1           | 0.598     | 0.247   | 0.28*      |
| CPA risk status 
Model 2           | 0.224     | 0.222   | 0.11       |
| Aggressive motives  | 0.947     | 0.181   | 0.55**     |

Note: \( R^2 = 0.079 \) for Model 1 (\( p = 0.18 \)); \( R^2 \) change = 0.266 for Model 2 (\( p = 0.001 \)); CPA, child physical abuse.

* \( p < 0.05 \).
** \( p < 0.01 \).
“situational instigator” (Anderson & Huesmann, 2003) for aggressive behavior. However, the internal mechanisms (e.g., behavioral imitation, cognition, emotion, arousal) through which provocation influences aggressive response selection remain unclear.

Contrary to Hypothesis 4, high and low CPA risk parents did not differ in the extent to which they perceived their opponents as engaging in aggressive motives. On the surface, this finding appears to contradict the proposition that high CPA risk parents are more likely than low CPA risk parents to perceive others as possessing hostile intent. However, it should be noted that in the present study the preprogrammed sound blast selections of the “opponent” were designed to be perceived as provocative (i.e., steadily increased from lower to higher levels). Thus, CPA risk group differences in perceived hostility may be minimal when the behavior to be judged is explicitly designed to be recognized as aggressive. As proposed by the SIP model of CPA, differences in attributions of hostile intent among those that differ in CPA risk may primarily be evident in situations in which the behavior in question is ambiguous in nature.

Although aggressive motives attributed to the opponent did not differ by CPA risk status, CPA risk status was associated as expected (Hypothesis 5) with the extent to which respondents endorsed aggressive motivations related to their own sound blast selections. More specifically, high CPA risk parents reported higher levels of aggressive intent, including wanting to make their opponent mad and wanting to “pay back” or “blast” the opponent with sound blasts that were higher than the level that the opponent had selected on previous rounds. Consistent with prior research (Anderson et al., 2008), self-reported aggressive motives were plausible mediators of the association between CPA risk and aggressive behavior (sound blast selections) in this context. Thus, these data suggest that the Word Game provides a context that is effective in engendering aggressive motives associated with aggressive behavior in high CPA risk parents.

As with any study, a number of limitations should be considered. Although our high risk parents obtained scores above the clinical cut score on the CAP, it should be noted that CPA perpetration was not directly assessed in the present study, thus it is not clear whether the present findings generalize to abusive parents. It is also noteworthy that our high risk group was modest in size (n = 20). Moreover, participants in this study represented a convenience sample of parents who were willing to visit our laboratory in order to complete the study, which may further limit the generalizability of the present findings.

Although outcomes (i.e., loss experiences) were associated with shifts in schema accessibility among high CPA risk parents, loss experiences were not significantly associated with aggressive behavior in the present study. It is possible that losing a game in this context is not sufficient to “trigger” potentially abusive parents to respond aggressively. Alternatively, it is possible that certain aspects of the design of the present study may have unwittingly diminished our ability to observe individual differences in aggressive behavior in response to loss. It remains possible that outcomes may differentially impact aggressive behavior among high and low risk parents in situations in which the provocation is less clear, the opponent’s behaviors are more ambiguous, and/or the exchanges are less scripted. For example, in the present study the sound blast selections made by the opponent were presented on the computer screen after every round—regardless of the outcome. Thus, even when participants won on a given round, they were aware of their opponents’ sound blast selections for that round. Removing the visual display of the opponent’s sound blast selections and only sending sound blasts of varying intensities on lost rounds may result in more ambiguity with respect to the opponent’s motives and behavior and thus enhance opportunities for observing risk group differences throughout the game.

Another limitation of the present study is the fact that motives were only assessed using self reports, and as such represent the respondents’ conscious construal of the motives underlying their behavior. The extent to which the various motives influencing behavior during the game were consciously accessible is unclear. Moreover, respondents were asked to report on their own and their opponents’ motives only after completion of the Word Game. Although results of the regression analyses were consistent with the possibility that aggressive motives mediated the association between CPA risk and aggressive behavior, reverse causal interpretations cannot be ruled out. More specifically, it is possible that behaving aggressively during the game increased post hoc interpretations of one’s aggressive motives. Assessment of motives prior to, as well as during, the aggressive exchange is needed to clarify this issue. It also should be noted that although aggressive motives attributed to the adult opponents in the present study were not associated with aggressive behavior during the Word Game, it remains possible that high CPA risk parents may be more likely than low CPA risk parents to attribute aggressive intent to child opponents.

Indeed, by varying the parameters of the Word Game a number of additional research questions could be examined. For example, participants could be told that they are competing against either a child or an adult, allowing for examination of whether CPA risk is associated with selective increases in aggressiveness toward children. Further, the patterning of the sound blasts received from the opponent could be manipulated so that it is either provocative (steadily increasing) or ambiguous (i.e., randomized). Also, win/loss ratios could be varied to increase or decrease perceived threat or frustration. Moreover, changing the target word sets would allow for the accessibility of different types of schema to be selectively examined (e.g., control, threat) in response to these situational manipulations. Additional variants of the game could be developed by incorporating other reaction time tasks (e.g., dot probe paradigm) which would allow for assessment of other aspects of information processing (e.g., attentional bias). Clearly, the Word Game may serve as a useful vehicle for generating programs of theory-driven research to advance our understanding of parental aggression, paving the way for refinement of existing interventions and/or development of innovative strategies for reducing parental risk for child physical abuse.
References


