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Child physical abuse risk moderates spontaneously inferred traits from ambiguous child behaviors[☆]

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Abstract

The present study examined whether parents at high-risk for child physical abuse (CPA) differed from low-risk parents in their tendency to infer positive traits and negative traits from children's behaviors. The final sample consisted of 58 (25 low CPA risk and 33 high CPA risk) parents. Parents completed a false-recognition task, which involved viewing behavior descriptions paired with child photographs. Half of the behavior descriptions vaguely/strongly implied a trait and half of the implied traits were positive/negative. The contributions of automatic processes and controlled processes to task performance were examined using process dissociation procedures. Low CPA risk parents were significantly less likely to indicate negative traits were present in behavioral descriptions of children when negative traits were vaguely (compared to strongly) implied. In contrast, high CPA risk parents were equally likely to indicate negative traits were present regardless of whether the traits were vaguely or strongly implied. For low (but not high) CPA risk parents, automatic processes contributed significantly less to task performance when negative traits were vaguely implied compared to when the same traits were strongly implied. Given that parenting involves negotiating a seemingly endless series of ambiguous behaviors as children grow and develop, the capacity to refrain from automatically attributing negative traits to children when they exhibit vaguely negative behaviors may serve an important function in reducing risk of aggressive parenting behavior.

Keywords

Physical child abuse; Child abuse potential; Spontaneous trait inferences; Process dissociation procedure

Introduction

The tendency for observers to spontaneously form trait inferences as they observe the behavior of others is a well-established cognitive phenomenon (e.g., Carlston and

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Skowronski, 1994; Crawford, McCarthy, Kjaerstad, & Skowronski, 2013; Skowronski, Carlston, & Hartnett, 2008; Todorov and Uleman, 2002, 2003, 2004; Wells, Skowronski, Crawford, Scherer, & Carlston, 2011). To the extent that perceivers hold schemata about behaviors and the implications of what behaviors may reveal, spontaneous trait inferences are formed when perceivers' pre-existing schemata tacitly guide the interpretation of behavioral information. Thus, perceivers who possess different schemata may form different inferences from observing the same behavior. However, research examining the extent to which individual differences, such as child physical abuse risk, moderate spontaneous trait inference generation is limited.

According to the Social Information Processing (SIP) model of child physical abuse (CPA), physically abusive/at-risk parents differ from non-abusive/low-risk parents in the types of pre-existing schemata they bring to the parent-child context (Milner, 1993, 2003). Thus, parents with varying degrees of CPA risk might be expected to differ in the types of inferences they form as they encode information about children's behaviors. Indeed, the SIP model proposes that parental pre-existing schemata may automatically influence the manner in which child behaviors are encoded, evaluated, and interpreted, such that parents have a tendency to "see" children as possessing traits that are consistent with the parent's pre-existing schemata. To the extent that high-CPA risk parents routinely form negative trait inferences about children's behaviors, such inferences may increase the likelihood of attributions of hostile intent to the child which in turn increase risk of aggressive parenting responses (e.g., Slep & O'Leary, 1998).

Thus, one might speculate that while high-risk parents and low-risk parents may not differ in their tendency to form spontaneous trait inferences when observing children's behaviors, they may vary in the types of traits they spontaneously infer (e.g., positive, negative). Further, these differences may be especially pronounced when child behaviors are ambiguous (Milner, 1993). The present study was designed to examine patterns of spontaneous trait inferences in parents who were either high in CPA risk or low in CPA risk. In order to ensure that we were measuring trait inferences made during behavior encoding we utilized an experimental task that was novel to parent samples – the false recognition paradigm. Further, the inherent structure of the false recognition paradigm allowed us to explore the extent to which automatic cognitive processes and controlled cognitive processes contributed to experimental task performance. These topics are both explored in detail in the following sections.

False recognition paradigm

In the false recognition paradigm used in the present study, participants were shown: (a) photographs of children paired with behavior descriptions that both implied and contained a trait word (Example 1) and (b) photographs of children paired with behavior descriptions that implied, but did not contain, a trait word (Example 2).

Example 1. The stubborn child refused to eat after being told to finish eating dinner.

Example 2. The child refused to eat after being told to finish eating dinner.

Later, participants were shown the same photographs again, each paired with a trait word (e.g., *stubborn*). Participants were asked to decide whether or not the trait word actually appeared in the behavior description previously paired with the photograph. “Yes” responses (i.e., decisions that the trait word had appeared in the behavior previously paired with the photograph) may represent either *hits* or *false recognitions*. A hit reflects a “yes” response to a trial in which the trait word actually appeared in the behavior description paired with the photograph. A false recognition reflects a “yes” response to a trial when the trait word did not appear in the behavior description (but had been implied). Thus, false recognitions suggest that traits were inferred during encoding, associated with the photograph paired with the behavior, and these associations caused erroneous responding during the trait recognition task. A notable strength of this paradigm is that parents are not prompted to form inferences nor are they required to report inferences; trait inference generation is assumed from task performance.

Given differences in their pre-existing parenting schemata, one might expect high-risk parents to evince more negative/fewer positive spontaneous trait inferences on the trait recognition task than low-risk parents. Moreover, given that pre-existing schemata should be most likely to influence encoding of ambiguous child behaviors, parent CPA risk effects in false recognition task performance should be most pronounced for ambiguous child behaviors. However, although the influences of pre-existing schemata during information encoding are often thought of as being largely implicit, in actuality, false recognition task performance is influenced by both automatic cognitive processes and controlled cognitive processes (McCarthy & Skowronski, 2011a). Fortunately, the false recognition paradigm is designed so that the independent contributions of controlled processes and automatic processes to the trait recognition task performance can be mathematically estimated via the application of a process dissociation procedure.

Process dissociation procedure

The process dissociation (PD) procedure was developed as a strategy for separating the contributions of automatic processes and controlled processes to task performance (Jacoby, 1991). Application of the PD procedure involves the comparison of task performance on trials in which automatic processes and controlled processes both work in concert to task performance on trials in which automatic processes and controlled processes work in opposition. The following illustration (adapted from Payne & Bishara, 2009) provides a description of the PD rationale.

Suppose that Al is the father of two young children. Al has always had a bad temper and under most conditions he believes that expressing anger is an effective way to communicate annoyance. However, as a parent Al has decided that it would be best if he did not lose his temper in front of his children. Let’s assume that Al’s urge to lose his temper arises automatically, regardless of whether his children are with him. Al is generally successful at controlling his temper in front of his children, but occasionally slips and loses it when they are with him. Thus, when Al is with his children his tendency to lose his temper works in *opposition* to his intention to remain calm. When his children are not with him, Al’s tendency to lose his temper is *congruent* with his intentions to express himself.

The PD procedure suggests that AI's self-control can be estimated by comparing how often he loses his temper in front of his kids (i.e., when impulses to lose his temper oppose his intention to control his temper) to how often he loses his temper when his kids are not with him (when impulses to lose his temper are congruent with his intentions to express himself). If the probability of AI losing his temper when his kids are not around is .70, and the probability of AI losing his temper when his kids are around is .10, then AI's probability of exerting self-control over his temper is .60 and his probability of self-control failure is .40 (i.e., $1 - \text{self-control}$).

The PD procedure assumes that automatic influences drive behavior whenever controlled processes fail. In keeping with this assumption, the likelihood that AI will lose his temper in front of his kids (despite his efforts to control it) is represented by the joint probability of AI's automatic tendency to lose his temper in front of his children and the likelihood of self-control failure (lose temper in front of children * $[1 - \text{self-control}]$). In the present example, the likelihood of AI losing his temper in front of his children despite efforts to control it (i.e., .10) equals the automatic tendency (A) to lose his temper multiplied by the rate of self-control failures (i.e., .40). Thus, we can solve for AI's automatic tendency to lose control ($A = .10/[1 - .60] = .25$). In this manner, the PD procedure can be used to generate estimates of the contributions of controlled processes (i.e., self-control = .60) and automatic processes (i.e., automatic expression of temper = .25) to AI's tendency to lose his temper.

Research examining the validity of the estimates generated from PD methods has demonstrated that the estimates respond in predictable ways to known moderators of automatic/controlled processes (see Payne & Bishara, 2009; Yonelinas & Jacoby, 2012, for reviews). Of particular relevance to the current study, McCarthy and Skowronski (2011a) conducted a series of experiments in which they provided evidence that the PD procedure was a valid means of quantifying the contributions of automatic processes and controlled processes to performance on a false-recognition task that was designed to measure spontaneous trait inferences.

The present study

In the present study we used the false-recognition paradigm to examine whether high-risk parents differed from low-risk parents in the kinds of spontaneous inferences they formed about children's behaviors. The behaviors used as stimuli in the present study were intended to elicit positive trait inferences (e.g., kind) or negative trait inferences (e.g., mean) about children. Further, as predicted by the SIP model of CPA, it was expected that inference formation would be especially likely to be guided by pre-existing schemata when behavioral information is ambiguous (e.g., Bauer & Twentyman, 1985; Bugental, Lewis, Lin, Lyon, & Kopeikin, 1999). Thus, some behavior descriptions used in the present study were designed to strongly imply traits, whereas other behavior descriptions only vaguely implied traits.

We hypothesized that (a) high CPA risk parents would not differ from low CPA risk parents in their ability to intentionally recall positive/negative child traits presented in the behavior descriptions. However, we predicted that (b) high CPA risk parents would form more negative/fewer positive spontaneous trait inferences than low CPA risk parents, and (c) CPA

risk group differences in spontaneous trait inferences would be especially evident when traits were vaguely implied compared to when traits were strongly implied.

Utilizing the PD procedures, we also examined differences in the relative contribution of automatic processes and controlled processes to performance on the trait recognition task. For positive behavior descriptions, we hypothesized that estimates of automatic processes would be greater for low-risk parents compared to high-risk parents, and that this difference would be especially large for positive traits that were vaguely (compared to strongly) implied. For negative behavior descriptions, we hypothesized that estimates of automatic processes would be greater for high CPA risk parents compared to low CPA risk parents, and this difference would be especially large for negative traits that were vaguely (compared to strongly) implied.

Methods

Participants

The initial participant pool consisted of 155 parents. Two-thirds (64%) of the sample were female, half (53%) were single (21% married, 14% divorced/separated, and the remaining did not reveal relationship status), and 41% had 12 or fewer years of education. The majority of the sample was African American (54%; 34% White, 3% Latino/Latina, 3% more than one race, 1% Asian, the remaining were other or missing) and the mean age for this sample was 34.52 ($SD = 12.26$) years.

Stimuli

Child photographs—Thirty-six photographs of children were obtained from publicly available sources (e.g., Google pictures, www.istockphoto.com, etc.). The photographs (half male/half female) were of children that were approximately 6–10 years of age and racially diverse.

Behavior descriptions—Three types of behavior descriptions, which were pretested as part of a prior study (Irwin, 2009), were used: strongly implicative, vaguely implicative, and nonimplicative. Results of the pretest indicated that strongly implicative behaviors evinced high consensus on the trait implications of the behavior description. For example, the behavior “The child threw rocks at the neighbor’s cat” strongly implied *cruel* and did so for most pretest subjects. Vaguely implicative behaviors (“The child stroked the kitten”) evinced both moderate consensus on a behavior’s trait implications (*kind*) and a higher variability among pretest subject ratings than the ratings for the strongly implicative behaviors. Finally, a third category of behaviors was designed to be nonimplicative. For example, the behavior “The child went to school on weekdays” is fairly uninformative as to the child’s disposition.

The strongly implicative behaviors and vaguely implicative behaviors developed during the pretest were adapted for use in the false-recognition paradigm. This involved writing two versions of each behavior. The first version of the behavior both implied and explicitly included a trait word (e.g., “The kind child stroked the kitten”). The second version implied, but did not contain, a trait word (e.g., “The child stroked the kitten”). The nonimplicative

behaviors never implied or contained a trait word. An equal number of these three types of behaviors were used and we ensured that an equal number of behaviors implied positive traits as implied negative traits and an equal number of behaviors vaguely implied traits as strongly implied traits.

Child abuse potential (CAP) inventory—CPA risk status was determined using the CAP Inventory (Milner, 1986, 1994), 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 potential for child physical abuse. Respondents were classified as low CPA risk if their CAP abuse scores were at or below the general population mean (i.e., 91), whereas respondents who scored at or above the clinical cut score of 215 were classified as high CPA risk (Milner, 1986). Excluding respondents with intermediate CAP abuse scores (i.e., between 91 and 215) helped reduce attenuation of results due to misclassification of individuals with mid-range scores. The CAP Inventory also contains three validity scales which were used to detect response distortion (i.e., random responding, faking good, and faking bad). Respondents who randomly responded were removed from subsequent analyses. Respondents who obtained low CPA risk scores (below 91) and who were faking good also were removed from analyses.

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). For example, CAP Inventory abuse risk scores are significantly associated with measures of trait aggression in parents (Crouch et al., 2012) and the use of harsh discipline strategies by parents (Rodriguez, 2010). 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.

Procedures

There were three parts to the experiment: (1) initial exposure to the child photograph-behavior pairings, (2) the trait recognition task, and (3) completing the CAP Inventory. Upon arriving for the individually scheduled study session, consent was obtained and the participant was directed into a small room with a computer station. Parents were told to follow the instructions as they appeared on the computer screen. The instructions indicated that for the first part of the study parents would see photographs paired with behavior descriptions in order to familiarize them with the types of stimuli that would be used in the study. These instructions were designed to ensure that participants attended to the stimuli without a goal to form an impression of the persons depicted in the photographs; therefore, any inferences prompted by these stimuli were considered spontaneous (e.g., Carlston & Skowronski, 1994).

Parents then saw randomly selected photographs of children in the upper half of the screen each paired with a randomly selected behavior description in the lower half of the screen. Photographs were paired with behavior descriptions that either: (1) both contained and implied a trait word (e.g., “The stubborn child refused to get out of the car”) or (2) merely implied, but did not contain, a trait word (e.g., “The child refused to get out of the car”). Parents also viewed 12 trials in which child photographs were paired with behaviors that did not contain or imply a trait (i.e., control trials). Each photo-behavior dyad appeared on the screen for nine seconds before automatically moving on to the next photo-behavior dyad. In all, parents viewed 36 photo-behavior dyads: In addition to the 12 nonimplicative behaviors, parents saw an equal number (3 each) of positive/negative, vaguely implicative/strongly implicative, trait explicit/trait implied behaviors. After the last photo-behavior dyad was presented, parents engaged in a 5-min filler task intended to remove content from short-term memory.

In the second part of the experiment, a previously seen photograph appeared in the upper half of the computer screen and a trait word appeared in the lower half. The participant’s task was to determine (“yes” or “no”) whether the trait word actually appeared in the behavior description that was previously paired with the photograph by pressing the “z” or “/” key. In order to aid the parents, each screen contained the prompt “‘z’ appeared in the behavior earlier” and “‘/’ did not appear in the behavior earlier” shown on the bottom of the screen.

For some of these trials a “yes” response (a response that a trait word had appeared in the behavior previously paired with the photograph) was correct. “Yes” responses to these trials were considered hits. For other trials a “yes” response was incorrect. For trials in which the to-be-recognized trait was implied by the behavior previously paired with the photograph a “yes” response was a false-recognition. For trials in which the photograph was previously shown with a nonimplicative behavior (i.e., control trials), a “yes” response was considered a guess.

There are several notable features of our stimuli counterbalancing approach. First, when collapsed across all participants, each behavior was shown an equal number of times with the trait included and with the trait implied. Further, if a participant saw a version of the behavior in which the trait was included, that participant did not view the version of that behavior in which the trait was implied and vice versa. Second, the computer randomly selected the child photographs, the behavior paired with each photograph, and the order of the stimuli presentation. Therefore, when collapsed across participants, any idiosyncratic pairing or ordering of stimuli could not have systematically affected our results. Finally, in order to fit into the factorial design, the nonimplicative behaviors were randomly assigned to be either a vaguely implicative behavior or a strongly implicative behavior. Whether a nonimplicative behavior was a positive trial or a negative trial was determined by the valence of the to-be-recognized trait paired with the child photograph during the trait recognition task.

After completing the trait recognition task, participants completed the CAP Inventory, as well as a number of other questionnaires (which were part of a separate study). Upon

completion of the self-report measures, each parent was debriefed and paid \$30 for their participation.

Process dissociation procedures

In addition to analyzing “yes” responses during the trait recognition task, we also used PD procedures to estimate contributions of automatic cognitive processes and controlled cognitive processes to trait recognition task performance (e.g., Jacoby, 1991). There are at least two qualitatively distinct cognitive processes that contribute to trait recognition performance. First, because the false-recognition paradigm is ostensibly a recall accuracy task, participants presumably exert cognitive effort to accurately recall exact wordings of the behavior information (i.e., Controlled Processing). Second, actor-trait associations that were spontaneously formed during behavior encoding may become expressed during the trait recognition task and also contribute to performance on the trait recognition task (i.e., Automatic Processing).

PD compares performance on trials in which automatic processes and controlled processes work in concert (i.e., inclusion trials) to performance on trials in which processes work in opposition (i.e., exclusion trials). In the false-recognition paradigm, inclusion trials are those in which the to-be-recognized trait appeared in the behavior description previously paired with a child photograph (e.g., correctly recognizing *kind* as appearing in the behavior “The kind child stroked the kitten”). A “yes” response (i.e., a hit) can either be due to accurate recall of behavior description wording or, when recall fails, to the expression of the actor-trait association that formed automatically during encoding: $\text{Inclusion} = \text{Control} + (\text{Automatic} * (1 - \text{Control}))$. Exclusion trials are those in which the to-be-recognized trait was merely implied by the behavior previously paired with the child photograph (e.g., erroneously recognizing *kind* as appearing in the behavior “The child stroked the kitten”). A “yes” response (i.e., a false recognition) is the joint probability of the failure to accurately recall the wording of the behavior description and the unintentional expression of an actor-trait association: $\text{Exclusion} = \text{Automatic} * (1 - \text{Control})$.

Estimates of Controlled Processing can be computed by subtracting exclusion trial performance from inclusion trial performance: $\text{Control} = \text{Hits} - \text{False Recognition}$. This allows for calculation of an estimate of Automatic Processing: $\text{Automatic} = \text{False Recognitions} / (1 - \text{Control})$. Because estimates of Controlled Processing theoretically represent the extent to which participants were able to accurately discern between traits actually seen and traits that were merely implied, participants with more “yes” responses to exclusion trials than inclusion trials were coded as having Controlled Processing of the theoretical minimum of zero. This reflects the notion that trait recognition performance was not influenced by accurate behavior recall.

Participant selection

Six parents experienced computer malfunctions during the experiment and did not provide usable data. Of the remaining 149 parents, 59 were excluded because their CAP scores were not below 91 or above 215 (and, therefore, were not classified as low-CPA risk or high-CPA risk); 30 parents were excluded because of response distortions on their CAP Inventories (26

faked good and 4 responded randomly); and two participants were not native English speakers and had difficulties with the experimental task. The final sample consisted of 58 (25 low CPA risk and 33 high CPA risk) general population parents. Over half (59%) of the final sample was female, half (48%) were single (29% married, 10% divorced/separated, and the remaining were missing relationship status), and 31% had 12 or fewer years of education. The sample was mostly White (48%; 36% African American, 3% more than one race, the remaining were other or missing) and the mean age for this sample was 35.1 years ($SD = 11.11$). In the final sample, the mean CAP score for low-CPA risk parents was 49.96 ($SD = 25.31$) and for high-CPA risk parents it was 289.15 ($SD = 44.31$).

Low-risk parents and high-risk parents did not differ in gender, $\chi^2(2, N = 58) = 0.13, p = .94$, race/ethnicity, $\chi^2(4, N = 58) = 3.78, p = .44$, or age, $t(56) = 1.29, p = .20$. However, in comparison to high-risk parents, low-risk parents reported higher levels of education, $\chi^2(8, N = 58) = 15.31, p = .053$, and were more likely to be married, $\chi^2(4, N = 58) = 9.77, p = .04$.

Results

Education and marital status were recoded into two dichotomous variables representing whether a parent had 12 or fewer years of education (vs. more than 12 years of education) or whether the parent was married (vs. not married). Bivariate correlations explored whether either of these two measures, or the age measure, predicted recognition task performance. Of 24 correlations calculated, only 2 were significant: Married parents were less likely than non-married parents to make false recognitions for strongly implied positive traits ($r = -.31, p = .02$) and parents with more than 12 years of education were less likely to guess “yes” to negative traits (i.e., negative control trials) than were parents with 12 or fewer years of education ($r = -.26, p = .05$). Results of additional correlation analyses showed that the demographic variables were generally not associated with PD estimates. Of 16 correlations calculated between demographic characteristics and PD estimates, only one was significant: Married parents had slightly lower estimates of automatic processing for strongly implied positive trials than non-married parents ($r = -.27, p = .04$). Because of the general lack of association between demographic variables and our dependent variables the analyses presented below do not include any covariates.

Analyses of “Yes” responses

The percentage of “yes” responses (decisions that a trait appeared in the behavior description previously paired with the child photograph) was tabulated for each of the trial types (i.e., trait explicit, trait implied, and control trial) to determine the Hit rates, False Recognition rates, and Guessing rates for the positive traits and negative traits which were either vaguely or strongly implied. The percentages of “yes” responses were analyzed in a 3 (Trial Type [hits, false recognitions, guesses]) $\times$ 2 (Trait Valence [positive, negative]) $\times$ 2 (Imply Strength [vaguely implied, strongly implied]) $\times$ 2 (CPA Risk Status [low-risk, high-risk]) ANOVA with the last variable being between-participants. The analyses of the “yes” responses were used to determine: (1) whether spontaneous trait inferences were successfully generated in the present study, (2) whether spontaneous trait inferences varied by CPA risk group, and (3) whether CPA risk groups differed with respect to their general

patterns of “yes” responses across positive traits and negative traits that were either vaguely or strongly implied.

Evidence of spontaneous trait inferences—Results of the ANOVA revealed a trial type effect, $F(2, 108) = 129.85, p < .001$. Decomposition of this effect indicated that parents responded “yes” more often when the trait appeared in the behavior (i.e., hit rate, $M = 0.63$, $SD = 0.19$) than when the trait was merely implied (i.e., false alarm rate, $M = 0.53$, $SD = 0.19$), $F(1, 56) = 13.12, p = .001$, Cohen’s $d = 0.53$. In turn, the false alarm rate was greater than the rate observed when the trait was neither shown in nor implied by the behavior (i.e., control rate, $M = 0.24$, $SD = 0.17$), $F(1, 56) = 161.91, p < .001$, Cohen’s $d = 1.61$. This latter effects shows that parents erroneously reported seeing traits that were implied by the behaviors previously paired with the child photographs more often than when the traits were not implied (i.e., False Recognitions > Guesses). This suggests that traits were spontaneously inferred and associated with the child photographs during encoding, and that these inferences systematically led to errors during the trait recognition task.

The ANOVA also revealed a valence effect, $F(1, 56) = 36.57, p < .001$: Participants responded “yes” more frequently to positive traits than negative traits. This effect was qualified by a significant Trial Type $\times$ Valence interaction, $F(2, 112) = 6.20, p = .003$, as well as a Trial Type $\times$ Valence $\times$ Imply Strength interaction, $F(2, 112) = 4.01, p = .021$. Follow-up analyses revealed that for trials in which traits were vaguely implied, participants responded “yes” more frequently to positive traits than negative traits regardless of trial type (i.e., Hits, False Recognitions, Guesses). For trials in which traits were strongly implied, participants responded “yes” significantly more frequently to positive, relative to negative, traits on control trials, but not on trials in which the trait was explicitly stated or implied (but not explicitly stated). Given that participants were generally more likely to say “yes” to trials involving positive, compared to negative, traits, follow-up analyses to higher order interactions involving valence and CPA risk group variables were examined within valence (i.e., positive vs. negative) type.

CPA risk group differences—The ANOVA results also revealed a significant Trial Type $\times$ CPA Risk Status interaction, $F(2, 112) = 4.41, p = .014$: High CPA risk parents provided higher rates of “yes” responses on control trials compared to low CPA risk parents, but the CPA risk groups did not differ in their rates of “yes” responses on trait-explicit trials or on trait-implied trials. Thus, high CPA risk parents did not differ from low CPA risk parents with respect to their Hit rates and False Recognition rates, but high, compared to low, CPA risk parents were somewhat more likely to incorrectly guess that a trait was present on the control trials.

The ANOVA results also revealed a significant Imply Strength $\times$ CPA Risk Status interaction, $F(1, 56) = 4.98, p = .030$, which was qualified by a trending three-way interaction of CPA Risk $\times$ Valence $\times$ Imply Strength, $F(1, 56) = 2.40, p = .127$. Although this three-way interaction did not reach conventional standards of significance, a priori theoretical interests supported exploration of the interaction (see Fig. 1). Follow-up tests revealed a significant CPA Risk $\times$ Imply Strength interaction for negative traits, $F(1, 56) = 7.94, p = .007$, but not for positive traits, $F(1, 56) = 0.21, p = .648$. Inspection of the CPA

Risk $\times$ Imply Strength interaction for negative words revealed that high CPA risk parents were equally likely to say “yes” to negative traits regardless of whether the negative trait was vaguely implied ($M = 0.40$, $SD = 0.21$) or strongly implied ($M = 0.39$, $SD = 0.18$) by the behavior description, $t(32) = 0.48$, $p = .636$, Cohen’s $d = 0.05$. In contrast, low CPA risk parents were significantly less likely to say “yes” to negative traits when they were vaguely implied ($M = 0.31$, $SD = 0.19$) compared to when the negative traits were strongly implied ($M = 0.43$, $SD = 0.20$), $t(24) = 3.90$, $p = .001$, Cohen’s $d = 0.62$.

Analyses of PD parameter estimates

Analyses of “yes” responses are uninformative as to the cognitive processes producing these responses. Analyses of PD estimates allow direct examination of the extent to which controlled processes or automatic processes contributed to performance on the trait recognition task. Accordingly, PD estimates of controlled processing and automatic processing were computed. These were analyzed in parallel 2 (Valence [positive, negative]) $\times$ 2 (Imply Strength [vaguely implicative, strongly implicative]) $\times$ 2 (CPA Risk Group [low CPA risk, high CPA risk]) ANOVAs with the last variable being between-participants.

Analyses of controlled processing estimates—The controlled processing estimates indicate the extent to which controlled processes contributed to deliberate recall of the presence or absence of a trait in the behavior description paired with each child photograph. Results from the ANOVA analyses yielded no significant effects, indicating that contributions of controlled processes to task performance did not vary by CPA risk group, imply strength, or trait valence.

Analyses of automatic processing estimates—Two significant effects emerged from the analysis of automatic processing estimates. Overall, participants had higher estimates of automatic processing for positive trials ($M = 0.74$, $SD = 0.25$) than for negative trials ($M = 0.55$, $SD = 0.21$), $F(1, 56) = 13.72$, $p < .001$, Cohen’s $d = 0.82$. However, this valence main effect was qualified by a significant Valence $\times$ Imply Strength $\times$ CPA Risk Group interaction, $F(1, 56) = 5.60$, $p = .02$ (see Fig. 2). Follow-up tests revealed a significant CPA risk $\times$ Imply Strength interaction for negative traits, $F(1, 56) = 6.97$, $p = .011$, but not for positive traits, $F(1, 56) = 0.41$, $p = .521$. Inspection of the CPA risk $\times$ Imply Strength interaction for negative traits revealed that the contribution of automatic processes to task performance among high CPA risk parents did not depend on whether negative traits were vaguely implied ($M = 0.59$, $SD = 0.36$) or strongly implied ($M = 0.55$, $SD = 0.36$) by the behavior description, $t(32) = 0.62$, $p = .536$, Cohen’s $d = 0.11$. In contrast, among low CPA risk parents automatic processing estimates were lower when negative traits were vaguely implied ($M = 0.42$, $SD = 0.39$) compared to when the negative traits were strongly implied ($M = 0.65$, $SD = 0.38$), paired-samples $t(24) = 3.27$, $p = .003$, Cohen’s $d = 0.60$.

Discussion

Spontaneous trait inference-making reflects the fact that perceivers tend to encode trait information implied by behaviors – even when such traits were not explicitly stated in the behavior descriptions. To our knowledge, the present study was the first to utilize the false

recognition paradigm to examine trait inference tendencies in parents with varying degrees of CPA risk as they encoded behavioral information associated with child photographs. Of interest was whether patterns of spontaneous trait inferences might vary for high CPA risk parents and low CPA risk parents, particularly when behavioral descriptions vaguely implied traits. Results revealed that high CPA risk parents and low CPA risk parents did not differ with respect to (1) their ability to correctly recall positive traits and negative traits that were explicitly stated in the behavior descriptions, or (2) their tendency to falsely recognize traits (e.g., tendencies to incorrectly state that positive traits and negative traits had appeared in the behavioral descriptions when in fact those traits were merely implied by the behaviors described).

Nonetheless, overall differences were noted between CPA risk groups with respect to their tendencies to state that negative traits were present in behavior descriptions. High CPA risk parents were equally likely to indicate that negative traits were present in the behavioral descriptions regardless of whether the negative traits had been vaguely implied or strongly implied in the behavior descriptions. In contrast, low CPA risk parents were less likely to indicate that negative traits were present when behavioral descriptions only vaguely implied negative traits compared to when negative traits were strongly implied. Thus, when the behavior descriptions were vague, low CPA risk parents were less likely to indicate that negative traits were present in the descriptions associated with child photographs, regardless of whether the traits were explicitly stated, merely implied, or neither stated nor implied by the behavioral descriptions.

Given that parenting involves negotiating a seemingly endless series of ambiguous behaviors as children grow and develop, the capacity to refrain from attributing negative traits to children when they exhibit vaguely negative behaviors may serve an important function in reducing risk for aggressive parenting behavior. For example, is the crying infant who cannot sleep through the night being oppositional? Is the child who gets paint on the living room floor while painting a picture being naughty? Clearly, the types of traits parents attribute to children during these challenging moments may influence subsequent cognitive processes and behavioral responses. For example, trait inferences have been shown to be related to predictions about how we think others will behavior in the future (McCarthy & Skowronski, 2011b), and spontaneous hostile inferences have been shown to predict subsequent self-reported daily anger and daily aggressive behaviors using college student samples (e.g., Wilkowski & Robinson, 2010). Our findings are consistent with the theory that the pre-existing schemata of low CPA risk parents serve a protective function by reducing the likelihood that negative traits will be ascribed to children when their behaviors are only vaguely negative (Dodge, 2006; Milner, 1993).

Collectively, the results from the PD analyses enhance this conclusion by suggesting that regardless of CPA risk group status, all parents encoded both the vaguely implied and the strongly implied negative child behaviors and could retrieve them equally well via controlled processes. However, for low CPA risk parents, the implicit influence of the vaguely implied negative memory traces on task performance was significantly less than when negative traits were strongly implied by behaviors. Such differences were not observed for high CPA risk parents: The implicit influence of negative trait inferences was

similar for vaguely implied negative traits and strongly implied negative traits. For low-risk parents, when negative traits are only vaguely implied, their implicit influence may be insufficient to override the positive interpretive tendencies of low CPA risk parents (Crouch et al., 2010; Dopke, Lundahl, Dunsterville, & Lovejoy, 2003). In contrast, strongly implied negative traits may lead low CPA risk parents to override their positive interpretive tendencies, resulting in attribution of a negative trait to a child. For high CPA risk parents, negative behaviors (whether vaguely or strongly implied) may be encoded as consistent with negative pre-existing beliefs about children; thus even vaguely negative child behaviors may lead to negative trait attributions which, in turn, may fuel negative evaluative tendencies that arise as they deal with children (Risser, Skowronski, & Crouch, 2011).

Given such cognitions, one might wonder about interventions that could be developed to help high risk parents' minimize the influence of negative trait attributions. We believe interventions could take two forms. First, interventions could be designed to help high-risk parents recognize when negative trait inferences have been formed and to effort-fully counter the expression of these attributions. For example, Bugental et al. (2002) used an attribution retraining intervention with at-risk mothers, which involved helping mothers identify negative or hostile attributions made about their children's behaviors and then assisting them in generating alternative interpretations until a benign or positive interpretation was generated. Obviously, such strategies are dependent upon effortful processing on the part of high-risk parents, and their success may depend on ensuring that caregiving environments allow high-parents to utilize all of their cognitive resources (e.g., make sure they are not sleep deprived or helping them minimize multi-tasking while parenting). This would be a "retroactive" approach because a negative inference is still formed, but the intervention would be designed to inhibit the expression of these already-formed inferences in the form of anger or aggression. Second, interventions could be designed to promote the development of more positive/less negative schemata that would be used to encode and interpret child behaviors. This would be a "proactive" approach because the intervention would be designed to prevent unwanted trait inferences from being formed initially. Although such proactive approaches to intervention are preferable, the feasibility of altering aggression related pre-existing schemata in at risk parents has yet to be demonstrated.

The present study is limited by the fact that cognitive processes were assessed in the carefully controlled context of a laboratory setting. Indeed, the patterns of cognitive processing revealed in the present study represent those that were evoked as parents responded to a computer task in a quiet room that was free from distractions. Clearly, such a setting is not representative of most parenting contexts – which are more often characterized by competing demands, interruptions, and dynamic interactions with others. Research has shown that some of the features characteristic of caregiving situations (e.g., tasks requiring divided attention, presence of distractions, self-control depletion due to stress, fatigue, cognitive load, the necessity of rapid responding) may influence levels of controlled and/or automatic processes. Additional research is needed to examine the extent to which contextual factors commonly present in parenting situations may impact spontaneous trait inference tendencies.

Despite these limitations, the present study successfully demonstrated that low CPA risk parents were less likely than high CPA risk parents to attribute negative traits to children exhibiting behaviors that only vaguely implied such traits. Although this might seem like a minor difference in cognitive processing patterns, the implications of this difference become apparent when multiplied by the thousands of instances of vaguely negative behaviors exhibited by children as they mature. For low CPA risk parents, the capacity to refrain from negative trait attributions following vague behaviors may be facilitated by the protective influence of their positive/benign pre-existing schemata. For high CPA risk parents, unless strategies are developed to promote schema change, more effortful strategies will be required to help them counter the influence of their automatic tendencies to attribute negative traits to children.

References

- Bauer AD, Twentyman CT. Abusing, neglectful and comparison mothers' responses to child-related and non-child-related stressors. *Journal of Consulting and Clinical Psychology*. 1985; 53:335–343. <http://dx.doi.org/10.1037/0022-006X.53.3.335>. [PubMed: 4008718]
- Bugental DB, Ellerson PC, Lin EK, Rainey B, Kokotovic A, O'Hara N. A cognitive approach to child abuse prevention. *Journal of Family Psychology*. 2002; 16:243–258. <http://dx.doi.org/10.1037/0893-3200.16.3.243>. [PubMed: 12238408]
- Bugental DB, Lewis JC, Lin E, Lyon J, Kopeikin H. In charge but not in control: The management of teaching relationships by adults with low perceived power. *Developmental Psychology*. 1999; 35:1367–1378. <http://dx.doi.org/10.1037/0012-1649.35.6.1367>. [PubMed: 10563727]
- Carlston DE, Skowronski JJ. Savings in the relearning of trait information as evidence for spontaneous inference generation. *Journal of Personality and Social Psychology*. 1994; 66:840–856. <http://dx.doi.org/10.1037/0022-3514.66.5.840>.
- Crawford MT, McCarthy RJ, Kjaerstad HL, Skowronski JJ. Inferences are for doing: The impact of approach and avoidance states on the generation of spontaneous trait inferences. *Personality and Social Psychology Bulletin*. 2013; 39:267–278. <http://dx.doi.org/10.1177/0146167212473158>. [PubMed: 23314230]
- Crouch JL, Irwin LM, Wells BW, Shelton CR, Skowronski JJ, Milner JS. The Word Game: An innovative strategy for assessing implicit processes in parents at risk for child physical abuse. *Child Abuse & Neglect*. 2012; 36:498–509. <http://dx.doi.org/10.1016/j.chiabu.2012.04.004>. [PubMed: 22749613]
- Crouch JL, Milner JS, Skowronski JJ, Farc MM, Irwin LM, Neese A. Automatic encoding of ambiguous child behavior in high and low risk for child physical abuse parents. *Journal of Family Violence*. 2010; 25:73–80. <http://dx.doi.org/10.1007/s10896-009-9271-2>.
- Dodge KA. Translational science in action: Hostile attributional style and the development of aggressive behavior problems. *Development and Psychopathology*. 2006; 18:791–814. <http://dx.doi.org/10.1017/S0954579406060391>. [PubMed: 17152401]
- Dopke CA, Lundahl BW, Dunsterville E, Lovejoy MC. Interpretations of child compliance in individuals at high- and low-risk for child physical abuse. *Child Abuse & Neglect*. 2003; 27:285–302. [http://dx.doi.org/10.1016/S0145-2134\(03\)00007-3](http://dx.doi.org/10.1016/S0145-2134(03)00007-3). [PubMed: 12654326]
- Irwin, LM. Unpublished Master's thesis. DeKalb, IL: Northern Illinois University; 2009. Are individual differences in child abuse potential (CAP) related to the tendency to spontaneously make trait inferences about children?.
- Jacoby LL. A process dissociation framework: Separating automatic from intentional uses of memory. *Journal of Memory and Language*. 1991; 30:513–541. [http://dx.doi.org/10.1016/0749-596X\(91\)90025-F](http://dx.doi.org/10.1016/0749-596X(91)90025-F).
- McCarthy RJ, Skowronski JJ. The interplay of controlled and automatic processes in the expression of spontaneously inferred traits: A PDP analysis. *Journal of Personality and Social Psychology*. 2011a; 100:229–240. <http://dx.doi.org/10.1037/a0021991>. [PubMed: 21299314]

- McCarthy RJ, Skowronski JJ. What will Phil do next? Spontaneously inferred traits influence predictions of behavior. *Journal of Experimental Social Psychology*. 2011b; 47:321–332. <http://dx.doi.org/10.1016/j.jesp.2010.10.015>.
- Milner, JS. Child abuse potential inventory: Manual. Webster NC: Psyte; 1986.
- Milner JS. Social information processing and physical child abuse. *Clinical Psychology Review*. 1993; 13:275–294. [http://dx.doi.org/10.1016/0272-7358\(93\)90024-G](http://dx.doi.org/10.1016/0272-7358(93)90024-G).
- Milner JS. Assessing physical child abuse risk: The child abuse potential inventory. *Clinical Psychology Review*. 1994; 14:547–583. [http://dx.doi.org/10.1016/0272-7358\(94\)90017](http://dx.doi.org/10.1016/0272-7358(94)90017).
- Milner JS. Social information processing in high-risk and physically abusive parents. *Child Abuse & Neglect*. 2003; 7:7–20. [http://dx.doi.org/10.1016/S0145-2134\(02\)00506-9](http://dx.doi.org/10.1016/S0145-2134(02)00506-9). [PubMed: 12510028]
- Payne, BK.; Bishara, AJ. An integrative review of process dissociation and related models in social cognition. *European Review of Social Psychology*. 2009. <http://dx.doi.org/10.1080/10463280903162177>
- Risser HJ, Skowronski JJ, Crouch JL. Implicit attitudes toward children may be unrelated to child abuse risk. *Child Abuse and Neglect*. 2011; 35:514–523. <http://dx.doi.org/10.1016/j.chiabu.2011.02.008>. [PubMed: 21839515]
- Rodriguez CM. Parent-child aggression: Association with child abuse potential and parenting styles. *Violence and Victims*. 2010; 25:728–741. <http://dx.doi.org/10.1891/0886-6708.25.6.728>. [PubMed: 21287963]
- Skowronski, JJ.; Carlston, DE.; Hartnett, JL. Spontaneous impressions derived from observations of behavior: What a long strange trip it's been (and it's not over yet). In: Ambady, N.; Skowronski, JJ., editors. *First impressions*. New York, NY: Guilford Press; 2008. p. 313–333.
- Slep AM, O'Leary S. The effects of maternal attributions on parenting: An experimental analysis. *Journal of Family Psychology*. 1998; 12:234–243. <http://dx.doi.org/10.1037/0893-3200.12.2.234>.
- Todorov A, Uleman JS. Spontaneous trait inferences are bound to actors' faces: Evidence from a false-recognition paradigm. *Journal of Personality and Social Psychology*. 2002; 39:549–562. <http://dx.doi.org/10.1037/0022-3514.83.5.1051>.
- Todorov A, Uleman JS. The efficiency of binding spontaneous trait inferences to actors' faces. *Journal of Experimental Social Psychology*. 2003; 39:549–562. [http://dx.doi.org/10.1016/S0022-1031\(03\)00059-3](http://dx.doi.org/10.1016/S0022-1031(03)00059-3).
- Todorov A, Uleman JS. The person reference process in spontaneous trait inferences. *Journal of Personality and Social Psychology*. 2004; 87:482–493. <http://dx.doi.org/10.1037/0022-3514.87.4.482>. [PubMed: 15491273]
- Wells BM, Skowronski JJ, Crawford MT, Scherer CR, Carlston DE. Inference making and linking both require thinking: Spontaneous trait inference and spontaneous trait transference both rely on working memory capacity. *Journal of Experimental Social Psychology*. 2011; 47:1116–1126. <http://dx.doi.org/10.1016/j.jesp.2011.05.013>.
- Wilkowski BM, Robinson MD. Associative and spontaneous appraisal processes independently contribute to anger elicitation in daily life. *Emotion*. 2010; 10:181–189. <http://dx.doi.org/10.1037/a0017742>. [PubMed: 20364894]
- Yonelinas AP, Jacoby LL. The process-dissociation approach two decades later: Convergence, boundary conditions, and new directions. *Memory and Cognition*. 2012; 40:663–680. <http://dx.doi.org/10.3758/s13421-012-0205-5>. [PubMed: 22528824]

Fig. 1. Percentages of "yes" responses for positive traits and negative traits by CPA risk status and imply strength. Error bars represent one standard error above and below the mean.

Fig. 2. Estimated contribution of automatic processes to “yes” response selection for positive traits and negative traits by CPA risk status and imply strength. Error bars represent one standard error above and below the mean.