

# Toward an Integrated Gender-Linked Model of Aggression Subtypes in Early and Middle Childhood

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An integrative model is proposed for understanding the development of physical and relational aggression in early and middle childhood. The central goal was to posit a new theoretical framework that expands on existing social-cognitive and gender schema models (i.e., Social Information-Processing Model of Children's Adjustment [N. R. Crick & K. A. Dodge, 1994] and the Schematic-Processing Model of Sex Role Stereotyping [C. L. Martin & C. F. Halverson, 1981]). The proposed model suggests several individual- and group-level effects and the available evidence for each of these hypotheses is discussed. The ways in which the proposed model may guide future research in the field are presented.

*Keywords:* theory, relational aggression, physical aggression, social information processing

The vast majority of research has historically addressed physical forms of aggression, defined as the intent to hurt or harm another with physical force or the threat of physical force (e.g., hitting, kicking, pushing; Dodge, Coie, & Lynam, 2006). However, researchers also have been increasingly studying relational aggression, defined as the intent to hurt or harm another through the manipulation, threat, or damage to close relationships (Crick & Grotpeter, 1995). Relationally aggressive actions include both direct actions (e.g., friendship-withdrawal threats, silent treatment) and indirect actions (e.g., spreading malicious secrets, gossip, or lies about a peer). Two additional important, conceptually related but arguably distinct forms of aggression include social aggression and indirect aggression. As others have discussed at length (see Crick & Zahn-Waxler, 2003; Underwood, 2003), social aggression is defined as behaviors directed at damaging another's self esteem or social status and uniquely includes nonverbal aggressive acts (e.g., rolling eyes) as well as verbal insults that are not part of the relational aggression construct (Galen & Underwood, 1997). Indirect aggression includes behaviors in which the identity of the perpetrator may not be known (Lagerspetz, Björkqvist, & Peltonen, 1988), and in addition to various covert acts, such as spreading malicious gossip and rumors, it could include property damage (e.g., placing gum on a peer's chair; Goldstein, Tisak, & Boxer, 2002). Social aggression is rarely studied during early childhood and indirect aggression is arguably rare during early childhood (cf. Vaillancourt, Brendgen, Boivin, & Tremblay,

2003). Moreover, indirect aggression is theorized not to develop fully until early adolescence (Björkqvist, Lagerspetz, & Kaukiainen, 1992). Given our present concern with close relationship systems in part during early childhood, and because we are guided by past research and theory on relational and physical aggression (e.g., Crick, 1997; Crick & Dodge, 1994), we use the term *relational aggression* in the present article but fully acknowledge that the proposed model is likely relevant for the study of social and indirect aggression.

The history of the study of aggression subtypes has been reviewed extensively by other scholars (e.g., Crick & Zahn-Waxler, 2003; Underwood, 2003). It is important to note that past studies with various assessment techniques have been conducted in most developmental periods and a myriad of cultural, relationship, and social contexts (for review, see Heilbron & Prinstein, 2008). Despite the fact that gender differences for relational aggression do not appear to be as robust as previously theorized (see Card, Stucky, Sawalani, & Little, 2008), there are several reasons why it is still appropriate to consider an integrated gender-linked theory of aggression subtypes. The gender-linked hypothesis of aggression is only one small component and prediction from the current articulated model. This hypothesis originally stated that, because of different gender-linked social goals, men (motivated by instrumental goals) engage in more physical aggression than do their female peers and that women (motivated by relational and intimacy goals) engage in more relational aggression relative to their male peers (Crick & Grotpeter, 1995). The evidence for this hypothesis is now reviewed in at least two known meta-analyses (Archer, 2004; Card et al., 2008), and the conclusion seems to be that only small significant differences, but not necessarily meaningful effect sizes, are found in favor of the hypothesis concerning indirect, relational, and social aggression. Given potential differences in methodology (e.g., teacher reports more often reveal girls as more relationally aggressive than boys; see Archer, 2004), culture, context, developmental period, and even error associated with assessing the constructs (see Little, Jones, Henrich, & Hawley, 2003), there are some justified reasons for not concluding too quickly that there are no meaningful and developmentally salient

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We thank Julie C. Bowker, Craig R. Colder, and Leonard J. Simms for suggestions and comments. We thank the University at Buffalo Social Development Laboratory staff and, in particular, Emily J. Hart and Adam D. Mullins for their comments. We acknowledge Nicki R. Crick for guidance during the development of this article.

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gender differences. For example, even though the overall magnitude of effects are rather small and “trivial” (Card et al., 2008, p. 1194), observational methods have at times revealed moderate and significant effect sizes for mean level differences in relational aggression between boys and girls in early childhood (e.g., Crick et al., 2006; Murray-Close & Ostrov, 2009). More important, as discussed later in this article, gender may be related to these constructs in other ways, rather than just frequency differences. However, even if there are robust differences in the frequency of behavior, the field has moved away from this overly simplistic question to arguably more important hypotheses concerning mechanisms of action and predictions of adjustment outcomes (see Underwood, 2003). The present article presents a new integrated theoretical model for understanding aggression subtypes and gender schemas. To this end, we integrate across both past traditions and advance novel theoretical components to move the field closer to an explanatory social-cognitive developmental model that incorporates multiple domains and levels of influence.

### Developmental Considerations

We focus on early and middle childhood (approximately 3 to 12 years old) in the present model because of the shared social context of this developmental period with respect to gender-segregated peer interactions. We argue that the gender-segregated social world of peer interactions permits greater gender-specific socialization influences and frequent access to gender stereotypes (see Rose & Rudolph, 2006). This context permits the further strengthening of gender schemas, which, in turn, are associated with gender-linked aggressive behaviors. With the onset of romantic relationships in adolescence and the breakdown of gender-segregated peer interactions, it is posited that the current model will not be as relevant or valid in later developmental periods.

We believe that our model is consistent with available findings in cognitive and social-cognitive development fields and provides innovative testable theoretical assertions for future psychological research. For example, our model is theorized to be applicable to children as young as 3 years old, but given limited social-cognitive and perspective-taking abilities, it is unlikely that our model would apply to children younger than 36 months. That is, it seems that even though there are improvements in perspective-taking capacity and the ability to rely on perceptual cues from others between 3 and 5 years of age, there is reasonable evidence to conclude that at least a rudimentary theory of mind is present for typically developing children by 36 months (see Harris, 2006). Theory of mind is likely involved in the onset of both prosocial and aggressive behavior, because children who understand that others have different perspectives may be able to either help them or more effectively harm them. In fact, deception has been studied as a proxy for theory-of-mind capacity and has been found to be associated with both physical and relational aggression (Ostrov, 2006).

Cognitive developmental psychologists have documented that, perhaps because of vast improvements in basic memory processes (e.g., encoding, consolidation, storage, and retrieval), by 36 months of age, the quality of the memory representation and the ease by which that representation is retrieved becomes much more efficient (Bauer, 2006; Hayne, 2004). Relative to early developmental periods, retrieval of specific episodic memories becomes

more probable during early childhood, and experience with continual retrieval of specific events likely facilitates long-term retention of these memories (Hayne, 2004). These typical developmental changes permit the formation of autobiographical memory or episodic events of direct relevance to the self (Bauer, 2006). In fact, the self-system (i.e., “I” and “me”) is largely believed to be developed by 36 months (Howe & Courage, 1997), which permits greater awareness of the self and promotes autobiographical memory.

Despite fundamental changes in children’s memory and overall cognitive processes as children make the transition from early to middle childhood, there is documented continuity in basic cognitive domains like memory during these periods (see Bauer, 2006). Further, we know that there are documented gender differences for memory narratives in middle childhood. For example, school-age girls tend to generate social narratives that are often longer, are more coherent, and involve greater reference to emotion than do same-age male peers (Bauer, 2006). These differences are attributed, in part, to differential gender-based socialization experiences from parents during early and middle childhood (Bauer, 2006). These cognitive and social-cognitive processes have direct implications for our understanding of self-construals and the use of schemas, which are key components implicated in the present articulated social-cognitive model.

### Past Theory

To date, a number of theoretical models have been used to advance the study of subtypes of aggressive behavior. The present article is not designed to review each of these models and compare their advantages and disadvantages (see Anderson & Bushman, 2002; Archer, 2004, 2006; Crick & Zahn-Waxler, 2003; Hyde, 2005; Rose & Rudolph, 2006). Rather, despite these various models and traditions, little theoretical work has attempted to integrate any of these frameworks, and no known model has advanced a comprehensive yet parsimonious explanation for the development of gender-based aggressive behavior. Moreover, the current models fall short in providing testable predictions with respect to gender-based schemas and gender-linked behavior. The present article attempts to integrate across and improve upon several theoretical models to understand and predict both individual and group-level effects on the development of aggression subtypes and gender in children. Specifically, we attempt to integrate a social-cognitive perspective (e.g., Bussey & Bandura, 1992) that recognizes social information processing (i.e., the Social Information-Processing Model of Children’s Social Adjustment [SIP]; Crick & Dodge, 1994, 1996), self-construals, and socialization influences with a constructivist model used to explain gender schemas (i.e., Schematic-Processing Model of Sex Role Stereotyping; Martin & Halverson, 1981).

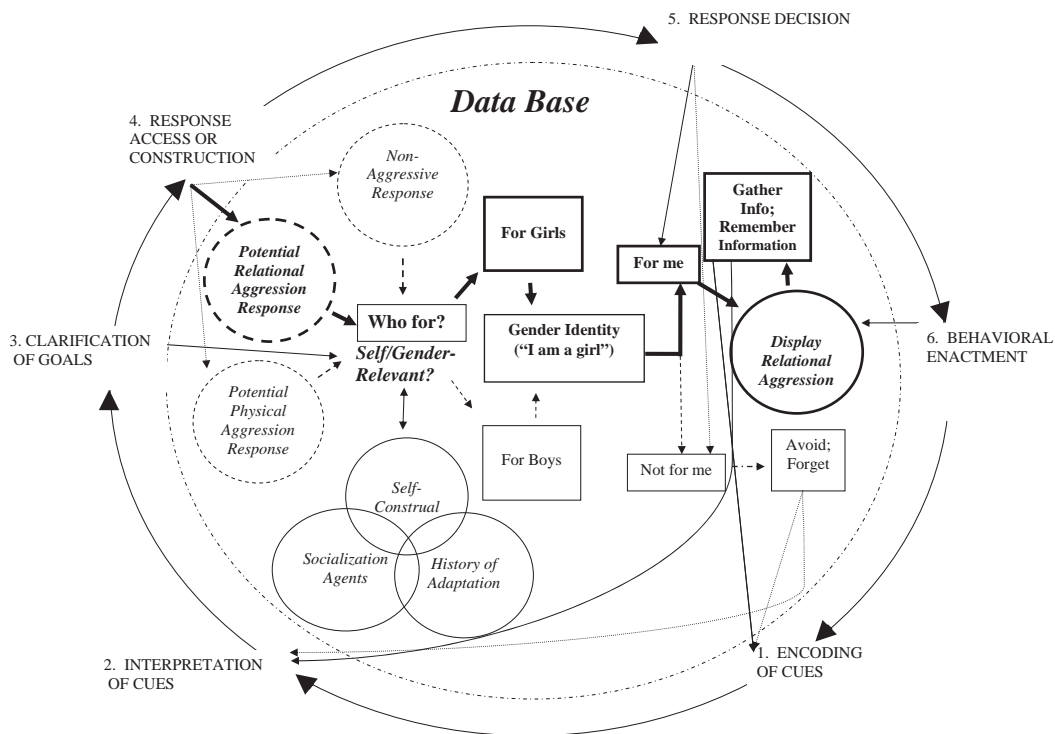
### Social Information Processing (SIP)

The SIP, an individual differences framework, recognizes that children are active agents on their context (Crick & Dodge, 1994). The SIP emphasizes the “on-line, real-time processing” of cues and decision making (i.e., response selection) that occurs within the context of different types of social interactions (Crick & Dodge, 1994, p. 77). It argues that children enter social scenarios

with a “database” of memories of prior experiences and social schemas (Crick & Dodge, 1994, p. 76). It is important to note that this database of memories, schemas, and scripts interacts in a dynamic and bidirectional fashion with each step of processing. There are currently six sequential and distinct steps in the model (see Figure 1, labeled 1–6; Crick & Dodge, 1994). It is believed that children move through these steps in a relatively automated fashion and that peer evaluation and response can provide a feedback process that will potentially increase future processing speed (Crick & Dodge, 1994). This model has been expanded in recent years to include, for example, both emotion and emotion-regulation processes as intervening factors between the six steps and the database (Lemerise & Arsenio, 2000; Lemerise, Gregory, & Fredstrom, 2005). Researchers have primarily focused on the interpretation of cues and associated hostile attribution biases for ambiguous provocation situations (e.g., Crain, Finch, & Foster, 2005; Crick, 1995; Crick, Grotpetter, & Bigbee, 2002; Dodge & Coie, 1987; Hubbard, Dodge, Cillessen, Coie, & Schwartz, 2001; for review, see Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002) and response decision steps of the SIP (e.g., Crick & Dodge, 1996; Perry, Perry, & Rasmussen, 1986).

Crick and Dodge (1994) theorized that gender moderates the relation between SIP and social-psychological adjustment. They

posited that interpersonally related social cognitions would be associated with maladaptive outcomes for girls and that instrumentally focused cognitions would predict adjustment problems for boys (Crick & Dodge, 1994). Researchers who have studied hostile attribution biases or interpreting ambiguous provocation situations as hostile and intentional have supported these hypotheses (see Crick et al., 2002). Unfortunately, the mechanism by which schemas and scripts (hypothesized to be part of the “black box” database of the SIP) influence the individual steps in the model has rarely been examined, with the exception of studies on social knowledge structures (i.e., internal mental representations stored as schemas, scripts, etc.) and normative beliefs about aggressive behavior (e.g., Bailey & Ostrov, 2008; Burks, Dodge, Price, & Laird, 1999; Huesmann & Guerra, 1997; Werner & Nixon, 2005). Important studies in this area have demonstrated that, for example, children who have higher levels of hostile knowledge structures are significantly more likely to interpret social cues in a hostile fashion and have a higher probability of displaying aggressive behavior (Burks, Laird, Dodge, Pettit, & Bates, 1999). This prior work has shown that, for example, beliefs about the display of relational aggression are specifically associated with using relational aggression with peers during adolescence (Werner & Nixon, 2005). The SIP falls short in providing testable hypotheses related



*Figure 1.* Gender-linked model of aggression subtypes. This model is based on the Schematic Processing Model of Sex Role Stereotyping (solid squares; from “A Schematic Processing Model of Sex Typing and Stereotyping in Children,” by C. L. Martin and C. F. Halverson, 1981, *Child Development*, 52, p. 1121. Copyright 1981 by the Society for Research in Child Development. Adapted with permission) and the Social Information-Processing Model of Children’s Social Adjustment (from “A Review and Reformulation of Social Information Processing Mechanisms in Children’s Social Adjustment,” by N. R. Crick and K. A. Dodge, *Psychological Bulletin*, 115, p. 74. Copyright 1994 by the American Psychological Association. Adapted with permission). Portions of the original models are not shown for ease of communication. Components in italics are additions to the models.

to gender schemas and gender-linked behavior and does not provide a useful theoretical framework for understanding *how* gender-based behaviors develop in children. Moreover, the SIP model does not fully elucidate the “black box” database and does not sufficiently indicate how the database is linked to the various steps in the model, which hinders the generation of testable hypotheses. To date, only limited work has examined other theoretically salient schemas such as gender-linked schemas and the SIP steps of aggressive behavioral response decision or behavioral enactment.

## Gender Schema Theory

Constructivist theoretical frameworks have emphasized the active role that children have in dictating their own experiences and generalized social cognitions concerning social roles (i.e., gender). For example, according to the Schematic-Processing Model of Sex Role Stereotyping, gender schemas serve an important function in guiding preferences, knowledge, memory, and behavioral interactions with others (Martin & Halverson, 1981). An extensive literature supports this model with numerous findings suggesting that children have better memories for gender-role stereotype-consistent events (Martin & Halverson, 1983; Signorella & Liben, 1984). It is even clear from past work with behavioral measures of explicit memory (i.e., elicited imitation) that general information concerning gender-linked behaviors influences the memories of very young children (i.e., 25-month-olds; Bauer, 1993). Moreover, this work in early developmental periods suggests that rudimentary identification of two gender groups and classification of the self to one of those gender groups is sufficient for gender-linked schemas to influence behavior (Bauer, 1993). Unfortunately, this model is not often used by psychologists because it does not explicitly address *how* gender schemas may impact future social behaviors and social cognitions.

## Additional Relevant Theoretical Models

The social-cognitive theory posited by Bandura (see Bandura, 1973; Bussey & Bandura, 1992) suggests that children’s developing cognitive structures are strongly influenced by both proximal and distal factors, such as parents, siblings, other significant adults, and peer relationships, as well as by the media and culture. Moreover, with social knowledge acquisition and social experience across early and middle childhood, children begin to generate individually guided expectations for gender-linked behavior (Bussey & Bandura, 1992). In support of this framework, past research has shown that older preschool-age children engage in gender-consistent behavior and disapprove of opposite-gender activities (Bussey & Bandura, 1992). The proposed model specifically extends these contentions to a focus on social information processing and more specifically applies these suppositions to the study of aggressive behavior in preschool and school-age children.

Evolutionary theory has also been invoked to make predictions concerning gender-linked behavior. Incorporating evolutionary theory, Archer (1996) posited that sex differences in social behavior may arise because of differential selection pressures and reproductive conflict between the sexes, which lead men to compete for resources (e.g., for women) and to potentially more frequent instances of physical aggression among men. Campbell (1999) provided an additional evolutionary perspective, focusing the discus-

sion more on female behavior. Campbell (1999) used evolutionary theory to explain why women may use indirect strategies or arguably less risky methods to settle disputes, because women have limited reproductive resources and thus must be more concerned with their own safety if they want to be reproductively successful. Therefore, women may be more likely to use such behaviors as social manipulation or gossip, where their identity is less likely to be known, to aggress (Campbell, 1999). This focus on ultimate factors may fit within this proposed model, as it provides an additional theoretical basis, in part, of the proposed gender differences between male use of physical aggression and female use of covert relational aggression. Such evolutionary theories can help to contextualize the proposed model, which focuses on the causes of more immediate behaviors within the context of developmental history and socialization.

Although the present model focuses on the SIP theoretical framework for aggression, there have been many other important theoretical attempts to explain aggressive behavior. First, similar to the SIP, Huesmann (1988) proposed an information-processing model in which children acquire scripts for aggressive behavior. These scripts or cognitive guides for behavior become reinforced through both active and observational learning and may become more entrenched throughout development as they are repeatedly activated (Huesmann, 1988). Huesmann’s (1988) framework is important to consider, as it provides more support for conceptualizing the development of aggression from an information-processing perspective. The present model departs from Huesmann’s (1988) in that we specifically focus on self-construals and gender schemas as a way of understanding how gender-linked aggressive behavior may develop. A second relevant model includes Geen’s (1990) affective aggression model, which theorizes that aggression is the result of the state of the person (i.e., the potential or predisposition for aggression based on background factors) and the situation that provokes the aggression. A third explanatory framework includes Berkowitz’s (1994) cognitive-neoassociationist model of aggression, which proposes that negative affect activates associative networks of cognitive and emotional states related to both fight and flight tendencies, as influenced by genes, prior experience, and learning, as well as situational factors. Finally, the General Aggression Model (GAM), as proposed by Anderson and Bushman (2002), integrates across various theories and was developed as a general parsimonious model to address multiple motives of aggressive behavior. This model explicitly emphasizes the interaction between person and situational factors and incorporates Huesmann’s script theory, among others.

The integrative gender-linked model of aggression subtypes that we introduce shares some components with GAM but also articulates novel theory for how the database within the SIP model operates. Specifically, we elucidate various mechanisms by which gender and self-relevant information, socialization agents, and a child’s history of adaptation directly and indirectly impact schemas, social knowledge structures, and social-cognitions and, in turn, impact behavior with peers. GAM provides a model for understanding how personological variables (e.g., trait hostility), situational variables (e.g., aggressive cues), and internal states (i.e., affect, cognition, and arousal) interact to lead to either thoughtful or impulsive action (Anderson & Bushman, 2002). It is important

to note that the present model expands on GAM by explicitly describing *how* the child's self-construals and gender identity (along with interactions with socialization agents and the child's developmental history) are affected and influenced by the gender-based aggressive beliefs, schemas, and scripts (Anderson & Bushman, 2002). The present theory builds on GAM to demonstrate the specific mechanisms by which the various "inputs" (i.e., person and situation variables) and "routes" (i.e., present internal state), as articulated by Anderson and Bushman (2002), actually interact with online cognitive processing. Moreover, we specifically posit how various explicit mechanisms (i.e., links between explicit memory of gender-based experiences and interpretation of cues) may be applied to gender- and self-based schemas and knowledge structures. As such, much like GAM, we integrate across a number of past theories and models to generate a comprehensive understanding of the processes that occur during children's social information processing. Thus, despite some overlap, we integrate across models that are not presently considered by GAM (e.g., Schematic-Processing Model of Sex Role Stereotyping and Peer-Socialization Model), and we posit novel theoretical suppositions not articulated by GAM or other known theories.

A peer-socialization model was recently introduced to articulate the mechanisms by which same-gender peer interactions lead to gender-linked peer relationship influences and gender-linked developmental pathways to social-psychological adjustment (Rose & Rudolph, 2006). This model recognizes the importance of early gender-segregated play and peer socialization influences but also incorporates an understanding of social-cognitive styles in relationships or self-construals (Rose & Rudolph, 2006). Building on this theory, the present model explicitly recognizes the importance of early socialization agents, such as same-gender peers, but also posits that other socialization agents, such as parents, siblings, teachers, and the media, are powerful influences that interact in a dynamic bidirectional fashion with a child's history of adaptation (Sroufe, 1997) and self-construals (Cross & Madson, 1997) to directly impact both self- and gender-relevant schemas. That is, an important assumption of the present model is that a child's history of adaptation in a variety of contexts (i.e., with a multitude of socialization agents), coupled with their self-construals, impacts future decisions about the self- and gender relevancy of possible social behaviors.

Theorists have posited that early gender-segregated behavior patterns (i.e., competition, rough-and-tumble play for boys and emphasis on dyadic interpersonal relationships and maintaining these social connections for girls) form the foundation for adult behavior (Cross & Madson, 1997). These patterns are believed to have a powerful influence on subsequent behavior because they directly influence the initial development of the self-system (Cross & Madson, 1997). Cross and Madson (1997) identified two gendered self-construals: *independent* (i.e., autonomy and individualistic goals motivate behavior) and *interdependent* (i.e., connectedness or relatedness to others motivate behavior). In keeping with this model, past examinations of gender differences for preferences for dyadic versus group social interaction during early childhood have demonstrated that girls enjoy dyadic interaction more than do boys, and boys seem to prefer group interactions relative to girls (e.g., Benenson, 1993).

### Toward an Integrated Gender-Linked Model of Aggression Subtypes

The proposed gender-linked model integrates across a number of theoretical frameworks and advances novel theoretical contributions. Although it includes components from several past theories, the model primarily integrates across two models: Social Information Processing Model of Children's Social Adjustment (Crick & Dodge, 1994) and the Schematic-Processing Model of Sex Role Stereotyping (Martin & Fabes, 2008; Martin & Halverson, 1981). The model begins with the traditional six steps of the SIP. However, we are the first to posit that the gender schematic processing model is fully incorporated in the SIP (via the database) and influencing all of the steps (see Figure 1). Beginning at Step 1, information from past gender-relevant peer experiences will have been stored as memories and will be readily accessible when children encounter an ambiguous provocation situation. That is, we argue that children will be guided by these previously reinforced gender schemas, which will impact the encoding of cues. We posit that those cues that are more consistent with their gender- and self-relevant schemas will be processed in a more efficient manner and will likely occur with more physiological arousal relative to those that are not central to their self-construal.

At Step 2, interpretation of these cues will be directly impacted by gender schemas. As shown in Figure 1, information about behaviors that are enacted in keeping with gender-relevant and self-schemas will be retained, and this episodic information will be encoded and directly influence the interpretation of social and environmental cues in future situations. That is, cues and relevant information consistent with the prior experiences as well as gender and self-schemas will be more likely to be interpreted in a hostile, distressing manner than will gender-irrelevant sources of information. For example, for girls, information about potential relational slights by female peers will be viewed as more distressing and, when the provocation is ambiguous, will be more likely viewed as hostile, intentional acts when the information is consistent with prior experience and self- and gender schemas.

Clarification of goals (Step 3), considered to be an arousal-regulating process, may be influenced in part by gender schemas (Crick & Dodge, 1994). Gender schemas, potentially guided by cultural or subcultural norms, may be a source of goal orientation within this step (Crick & Dodge, 1994). Therefore, children may consider what appropriate goals for their gender are when they are clarifying their goals for social situations (Crick & Dodge, 1994). In addition, we posit that self-construals will directly impact these processes. For example, a child with an interdependent self-construal may have an activated salient social goal that strongly supports either the preservation or damage of peer relationships.

At Step 4, the child generates possible responses (e.g., relational aggression, physical aggression, no aggressive response). In the posited model, potential behavioral responses that are consistent with gender and self-schemas and prior experiences are more likely to be accessed as the primary option for the interpersonal interaction. We suggest that even when a series of options are considered (as depicted in Figure 1), only those that are ultimately consistent with self- and gender-relevant schemas are typically displayed and reinforced cognitively. For example, as illustrated in Figure 1, a girl who accessed a potential relationally aggressive response will evaluate whether the behavior is relevant for her

social situation, and this information will impact the subsequent response decision. Implicit in this process is that the relationship orientation or self-construal of the child (Cross & Madsen, 1997; Rose & Rudolph, 2006) will also impact the types of responses accessed, salience of the response, and the subsequent response decision. For example, if the child has an interpersonal or interdependent relationship self-construal, she will be prone to believe that relationally aggressive behavior is relevant for them (Crick & Zahn-Waxler, 2003). This decision is also impacted by a child's history of adaptation, which by definition includes the dynamic, ongoing transactions between the child and his or her context (Sroufe, 1997). As Sroufe (1997) previously articulated, from a developmental frame of reference, behavior may be conceptualized as a product of environment, genes, and prior adaptation. In the present model, we conceptualize the history of adaptation as interacting in an ongoing dynamic fashion with both socialization factors and self-construals, which impact the self- and gender-relevancy evaluations that we argue are most central to the third and fourth steps in the model.

At Step 5, once the child processes this self-relevant information and associated aggressive behavioral options with respect to his or her gender ingroup, we theorize that he or she is more likely to decide to use the behavior (Step 5). For example, if the response is consistent with a child's gender identity and self-relevant appraisals, he or she will be more likely to display the behavior. On the other hand, if the behavior is evaluated as a response not typical of his or her gender and inconsistent with self-relevant evaluations, the child will be less likely to initially access the option, which will reduce the likelihood of selecting the behavior as the response.

In keeping with our model, they will in turn enact the aggressive behavior (Step 6) and gather/retain as much information as possible about the utility of the act in the given social situation. As discussed, over time, we believe the display of gender-consistent acts will conceivably increase the speed of processing in the future for similar social situations, which would affect subsequent steps in the model, like encoding of cues in future social situations (Step 1; see Figure 1). Moreover, in keeping with the SIP, a feedback loop between response decision and response access is implied (not shown in Figure 1) and presumably assists in making the process more automated across development. Alternatively, according to the present model, if the potential behavioral response is associated with the gender outgroup, children should avoid using the behavior and forget anything they might have learned about it, which reduces the likelihood of future response access for this behavior option.

## Developmental Changes

Past developmental scholars have carefully reviewed the literature on gender-role development (see Ruble, Martin, & Berenbaum, 2006; Zahn-Waxler, Crick, Shirtcliff, & Woods, 2006), so that is not our present goal. Rather, it is important to place our model within the context of typical gender-development processes. It is clear that there are several sources of socialization, and the present model includes these various agents (i.e., parents, siblings, peers, teachers, media; see Zahn-Waxler & Polanichka, 2004). Moreover, these socialization agents influence children's developing social behavior and gender-based schemas in direct and indirect ways. For example, parents interact differently with girls and

boys, monitor their behavior in gender-specific ways, and hold gender-biased views concerning various abilities and attributes (e.g., Condry & Ross, 1985; Gurwitz & Dodge, 1975; Zahn-Waxler et al., 2006). In addition, adults have been found to evaluate aggressive behavior in gender-biased ways and believe that, for example, physical aggression between boys is more acceptable than between girls or within mixed-gender dyads (Condry & Ross, 1985; Lyons & Serbin, 1986; Susser & Keating, 1990). Gender roles change between early and middle childhood and become more rigid (i.e., the peak of rigidity is arguably between 5 and 7 years old; for review, see Ruble et al., 2006) and more susceptible to socialization agents outside of the family (i.e., peers; Serbin, Powlisha, & Gulko, 1993; Zahn-Waxler & Polanichka, 2004). The peer environment may modify earlier gender-based socialization experiences concerning aggression and antisocial behavior (Zahn-Waxler & Polanichka, 2004). Thus, the present model is a developmental model and recognizes that although the salience of specific socialization agents may change as children transition from early to middle childhood (i.e., a shift from parents to peers as primary socialization agents), children's social cognitions and schemas are still directly impacted by prior experiences and socialization processes.

The current theoretical model is innovative in several ways, and we believe it makes a novel contribution above and beyond the extant developmental theory. First, our integrative model is needed to help to create testable hypotheses about the SIP with respect to the nebulous "black box" or database component of the traditional SIP. That is, we are proposing mechanisms by which gender schemas and self-construals may directly influence the processing and interpretation of social cues in the child's environment as well as the steps by which behaviors are cognitively accessed, selected, and, in turn, enacted. Second, the proposed model advances the existing literature by being the first theory to provide several testable hypotheses concerning gender-based schemas and gender-linked behavior during early and middle childhood. Third, we further propose that dynamic interactions (i.e., ongoing transactions) between socialization factors, self-construals, and a child's history of adaptation impact the processing of gender- and self-relevant information, which, in turn, influences the child's analysis of social knowledge and available cues. We argue that socialization experiences with various agents (i.e., parents, siblings, peers, teachers, and media) directly and indirectly influence and reinforce the child's developing self- and gender identity. Moreover, we suggest that prior experiences with gender- and self-relevant behaviors (i.e., history of adaptation) directly impact not only the developing self-system and gender domain but also the encoding, storage, and memory-retrieval processes. As depicted in the model, these processes then impact the probability of future behavioral enactment. As described, the integrity and efficiency of the memory domain (e.g., encoding, consolidation, storage, and retrieval) will be superior for self- and gender-relevant information, because experiences that the child can identify with serve as a heuristic, facilitating memory development (Bauer, 2006).

The following example is presented as a way of further conveying the novel processes of our model. In our example, a male child is primarily socialized by male peers at school and male television characters with whom he identifies. From ongoing experience with these models, he has learned that when in conflict situations with others, hitting is one possible response that, in many cases, has

some immediate positive outcome expectations (i.e., he obtains the desired toy). When in an ambiguous provocation situation, this child interprets social cues as hostile given his previous socialization experiences (e.g., others rejecting and behaving negatively in response to his aggressive behavior) and accesses the database for potential behavioral responses. In doing so, the child quickly weighs several options (e.g., physical aggression, relational aggression, nonaggressive disengagement, possibly seeking assistance from an adult). It is at this point that the child must consider his own gender- and self-relevant identity. Past socialization experiences impact these systems. He has learned that when angry, boys hit, and he knows that he is a boy; therefore, he should hit when angry at others (gender-congruent action). In addition, he is the type of person who cares about dominance and independence (i.e., independent self-construal), and therefore, his personal goals take precedence over the feelings of others (i.e., interdependent or relational self-construal; Cross & Madson, 1997). Collectively, this child is thus more likely to engage in physical aggression than the other behavioral responses. Over time, this child's experiences (perhaps a history of adaptation, which includes several physical aggression bouts) will reinforce this schema (hitting is an option for getting a desired toy when conflict arises with male peers during free play). If the child has positive experiences with the enacting of this behavior, reinforcement of this response will occur, which make this option a more activated/probable behavior in the future. These experiences help to enhance the memory for these events and provide more efficient processing, encoding, storage, and retrieval of these gender- and self-relevant behaviors in the future. That is, as a heuristic, these cognitive processes allow for more efficient processing in the future, and it becomes more automated, making the selection of alternative behavioral responses and in particular those contrary to gender- and self-relevant schemas increasingly less likely. Thus, as this extended example reveals, the proposed model is further novel in that we argue for a theoretical orientation that recognizes the full dynamic bidirectional interaction between social and cognitive developmental processes and propose a model relevant for multiple developmental periods. The proposed model is helpful for making several predictions concerning individual behavior during early and middle childhood.

### Individual-Level Effects

The present model supports several predictions about an individual child's behavior during early childhood. First, it suggests that children will have more knowledge about gender-typical subtypes of aggression than gender-atypical forms of aggression. To date, no known studies have empirically tested this prediction with children in early and middle childhood. Second, children should associate female gender identity with relational aggression and male identity with physical aggression. This prediction has been supported by work in both early and middle childhood (Crick, Bigbee, & Howes, 1996; Giles & Heyman, 2005) and in the United States and Indonesia (French, Jansen, & Pidada, 2002). Third, we contend that children will recall more information about hypothetical scenarios, actual events, and specific behavioral descriptions for their gender-typical subtype of aggression than they should have for aggressive behaviors that do not fit with their gender identity and schema. In keeping with this prediction, children not

only associate female gender status with displaying relational aggression and male gender with physical aggression but they also distort their actual memories of aggressive events to fit with their gender schemas (Giles & Heyman, 2005). In keeping with these results are past studies that have documented that children in middle childhood report that relational aggression is what girls engage in when angry at others and physical aggression is the means by which boys display anger (Crick et al., 1996). Fourth, children are theorized to prefer to use gender-consistent aggressive behaviors and avoid the display of gender-inconsistent aggressive acts. This prediction has been supported in prior research with a large sample of ethnically diverse girls and boys in middle childhood (Putallaz et al., 2007). Fifth, as speed of processing increases, response decision processes should become more automated, less deliberate, and faster across development. This point is an assumption made by the SIP, but no known research has addressed this question to date. Sixth, children should evaluate their gender-consistent subtype of aggression as being more harmful or morally wrong than gender-inconsistent subtypes. Goldstein et al. (2002) provided preliminary support for this prediction in that female preschool children evaluated relationally aggressive responses to relational provocation situations as more wrong than did male children. Moreover, male participants rated the physically aggressive responses as more wrong than did their female peers (Goldstein & Tisak, 2004; Goldstein et al., 2002).

Although the present model was developed primarily for use in early and middle childhood, there are conceivable individual-level implications across development. For example, as gender identity becomes more constant (see Maccoby, 1988), modifications in response decision processes and behavioral enactment of alternative subtypes of aggression should follow (i.e., gender nonnormative aggressive behavioral responses and enactment should be decreased). To our knowledge, this prediction has not been empirically tested. This proposed model is also useful for making several predictions related to group-level gender differences.

### Group-Level Effects

The proposed model supports several group-level predictions. There are at least four types of gender differences with respect to subtypes of aggression that stem from this model. The first, arguably less interesting, are differences in the frequency of the display or receipt of aggression subtypes. The model suggests that young girls should display and receive more relational aggression than boys once gender identity is clearly established and during periods of development and/or contexts marked by high levels of gender segregation. The model would argue that young boys should display and receive more physical aggression than girls. As mentioned, the collective evidence for this point seems to be mixed with a recent meta-analysis indicating that girls are significantly more indirectly aggressive, but the magnitude of this effect was rather small (Card et al., 2008). The second hypothesis, also supported by sexual selection theory (Pellegrini & Long, 2003; Pellegrini et al., 2007), is that aggression subtypes should be targeted at more same-gender peers than opposite-gender peers. That is, boys should display more physical aggression to male peers than they do to female peers. In addition, girls should display more relational aggression to female peers than they do to male peers. The evidence for this prediction seems to be promising, with

several studies supporting this point. For example, past studies have documented greater number of aggressive bouts between same-gender peers than between opposite-gender peers during early childhood (e.g., Pellegrini et al., 2007). Moreover, girls have been found to direct more relational aggression to female peers than they display to male peers in three independent observational studies during early childhood (Crick et al., 2006; Ostrov, 2006; Ostrov & Keating, 2004). The third prediction is that girls should display relational aggression more than physical aggression, whereas, boys should display physical aggression as their modal subtype of aggression. This hypothesis has been supported in the past during middle childhood (e.g., Putallaz et al., 2007), but future work must replicate this finding with younger children (see Card et al., 2008).

The final point for the present discussion is that gender should serve as an important moderator of associations between aggression and future social-psychological adjustment problems. More specifically, for girls, relational aggression should be more developmentally salient and thus more likely to predict indicators of social-psychological adjustment across time. Past evidence has been mixed on this point, but there is evidence supporting this prediction in various developmental periods. Increases in intimate disclosure by a close friend have been associated with a time-dependent dynamic increase in relational aggression, but only for girls during middle childhood (Murray-Close, Ostrov, & Crick, 2007). In early childhood, relational aggression has been found to be associated with future peer rejection only for girls (Crick et al., 2006). Moreover, in early childhood, relational aggression was found to be a significant unique predictor of future relational victimization, controlling for physical aggression, but again, only for girls (Ostrov, 2008). According to the model, for boys, physical aggression should be more developmentally salient and thus more likely to be associated with future social-psychological outcomes (see Dodge et al., 2006). The available evidence seems to support this assertion. For example, for boys, only physical aggression has been found to be associated with future peer rejection during early childhood (Crick et al., 2006).

### Future Research Questions

The present model suggests many novel research questions and provides a testable explanatory framework for future studies. Several years ago, Hartup, Brady, and Newcomb (1983) argued for the “need to measure social behavior and social cognition in the same context if we are to further our understanding of the interaction of cognition” (p. 106). As the authors asserted, behavior and cognitions are not synonymous and may not be inferred from each other. Therefore, we echo their call for future work using multiple methods and informants of social cognition and behavior in real world contexts. Interviews and hypothetical scenario procedures must be supplemented with carefully controlled experimental designs and naturalistic observational procedures. Moreover, the use of neurocognitive assessments and measures of electrocortical activity (e.g., event-related potentials [ERPs]) may help to further unpack the SIP database. The use of ERP studies of aggression may have particular utility, given the temporal resolution of these assessments (Stanford, Houston, Villemarette-Pittman, & Greve, 2003) for testing the specific hypotheses related to latency of processing articulated in the present model. Testing the role of

culture as a moderator of various mechanisms in the present model is needed. Future work must explore multiple levels, from larger macrosystem influences related to the media as well as more mesosystem effects of neighborhoods and communities to micro-system factors, such as family customs and socialization practices (Bronfenbrenner, 1986). In addition, future work and theory should also include consideration of intraindividual differences, such as genetics or arguably more biologically based factors, such as temperament. The present early and middle childhood model acknowledges the role of development and changes across time, but further prospective research is needed to fully decipher the mechanisms by which these changes occur in later developmental periods. There are numerous other explanatory models and theoretical frameworks that have been used to test important hypotheses concerning aggressive behavior and more recently subtypes of aggression. The introduction of the present integrative model builds on this prior tradition but also suggests the fruitfulness of future attempts to integrate across other seemingly disparate theoretical orientations and frameworks for the development of aggression.

### Conclusions

The current goal was to propose an integrative gender-linked model of aggression subtypes during early and middle childhood. The central goal was to posit a new theoretical framework that expands on existing social-cognitive, peer-socialization, and gender-schema models. Although evidence for the individual and group-level effects is still preliminary, there are several novel, testable hypotheses that are derived from the present model. Collectively, with further efforts to test meaningful theory-driven hypotheses, with reliable and valid assessments, we will continue to move forward as a burgeoning scientific field.

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Received July 28, 2008

Revision received September 15, 2009

Accepted September 17, 2009 ■