

Cyberbullying in Elementary School: The Role of Hostile Attribution Bias in
Children's Social Information Processing

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Abstract

As children gain access to electronic communication devices at increasingly younger ages, bullying is no longer restricted to the traditional “schoolyard” setting. The present study investigates a) the prevalence of cyberbullying in a sample of fourth and fifth graders and b) the role of hostile attribution bias (HAB) in children’s interpretations of ambiguous cyber provocation scenarios and involvement in traditional and cyber bullying and victimization. Fourth and fifth graders completed self-report measures that assessed their past involvement in traditional and cyber bullying and victimization, as well as HAB. It was found that children are involved in cyberbullying as early as elementary school, and that while involvement in traditional bullying predicts being a cyber bullying, both traditional victimization and HAB index predicts being a cyber victim. These data suggest that there is overlap between traditional and cyber bullies and victims; however, the results also demonstrate the increased inherent ambiguity of the cyber environment. These results have important implications for understanding the potentially harmful role of social cognitive deficits in children and it is therefore important for future researchers to continue to investigate traditional and cyber bullying through a social information processing framework.

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In light of numerous publicized cases of bully-related suicides in the past several years, increased efforts have been made to identify and understand the factors that may predict children's involvement in bullying. Additionally, researchers and policymakers have focused much attention on creating effective interventions aimed at educating children about the harmful consequences of involvement in bullying. Nonetheless, bullying continues to occur both in and outside of school, leading many children and adolescents to experience long-term pain and emotional distress (Beran & Li, 2007; Toblin, Schwartz, Gorman & Abou-ezzedine, 2005).

Moreover, rapid technological advances have resulted in increasingly younger age groups gaining widespread access to electronic communication devices. As early as elementary school, children average 46 minutes of computer use in a typical day. Additionally, the percentage of 8 to 10 year olds who own a cell phone has grown from 21% in 2004 to 31% in 2009 (Rideout, Foehr, & Roberts, 2010). Despite the potential merits of children using such forms of technology, these new modes of communication have created new venues for negative social interactions that were previously restricted to traditional social contexts (i.e., face-to-face communication). More specifically, the types of bullying that previously exclusively occurred in a traditional "schoolyard" setting are materializing in cyberspace. In light of the transition of bullying from traditional to cyber environments, the present study investigates how a typical predictor of traditional aggression and victimization, the hostile attribution bias, may similarly predict children's involvement in cyberbullying. By evaluating children's social information processing, I

hope to identify the extent to which attributional biases are related to children's involvement in cyberbullying.

Children's Technology Use

From 1999 to 2009, 8- to 18-year-olds have increased their average daily amount of media use from 6 hours and 19 minutes to 7 hours and 38 minutes. Additionally, significantly more children and young adults have their own electronic devices (e.g., cell phones, laptops, iPods) than in 2004 (Rideout, Foehr, & Roberts, 2010). These statistics alone demonstrate the growing role that electronic media play in children's lives and indicate that these numbers will likely only continue to increase as time goes on and reliance on quick and efficient communication grows.

More specifically, the most popular activities among 8- to 18-year-olds are social networking both online and through text messaging, behaviors that often go unmonitored by parents or school officials. With a 17% jump in laptop ownership among this same age group (from 12% in 2004 to 29% in 2009), it is hardly surprising that children and adolescents' online activity typically occurs within private confines and therefore may be of a socially inappropriate nature (Rideout, Foehr, & Roberts, 2010). As Internet processing speed continues to quicken and social networking sites, such as Facebook and MySpace, become increasingly accessible to younger age groups, more and more children have come to incorporate electronic communication into their daily social lives.

What is Cyberbullying?

Due to the aforementioned changes in early technology access and use in the past five years, increased emphasis has been placed on understanding children and adolescents' bullying behavior within a cyber context. Although the exact definition of

cyberbullying slightly varies across studies and specific researchers, it has typically been defined as repeated acts of aggression that are carried out through an electronic medium and are characterized by an imbalance of power between bully and victim (Dooley, Pyzalski, & Cross, 2009; Li, 2007; Li, 2010). Additionally, this aggression typically involves ignoring others (e.g., not responding to a message), spreading rumors, and/or disrespectful name-calling (Patchin & Hinduja, 2006).

Recent research has indicated that a significant percentage of students across elementary, middle, and high school have been involved in cyberbullying to some extent, whether it be as victims, bullies, or both. Although relatively early studies of cyberbullying found that approximately 20% of middle school students were involved in some degree of electronic bullying (Kowalski & Limber, 2007; Li, 2007), more recent reports of cyberbullying frequencies in middle school students indicate that up to 50% have been victims alone and approximately 33% have bullied others online (Mishna, Cook, Gadalla, Dcciuik & Solomon, 2010). These high rates of cyberbullying are a cause for alarm and necessitate additional research to explore both why and how children become involved in cyberbullying. Furthermore, because the abovementioned frequencies relate specifically to students in middle school, it remains unclear if elementary students' involvement in cyberbullying mirrors that of early adolescents. Although several studies have included participants in elementary school, their data have rarely been analyzed separately; rather, these studies combine results across ages, making it difficult to draw conclusions about elementary school students in particular. In light of the sparse research examining cyberbullying in elementary school students, the majority

of research reviewed here concerns older age groups, specifically middle and high school students.

Cyberbullying Versus Traditional Bullying

Although there is evidence that individuals involved in traditional bullying as victims, bullies, or both are often also involved in cyberbullying (Li, 2007), several significant differences exist between these two forms of bullying. Through comparisons of cyberbullying and traditional bullying, researchers have demonstrated disparity between the two, both in terms of the frequency of occurrence and the nature of bullying behavior itself. In general, cyberbullying occurs less frequently (although nonetheless appreciably) than traditional bullying (Slonje & Smith, 2008; Smith et al., 2008). Additionally, whereas traditional bullying typically occurs in school, cyberbullying is more likely to take place outside of school, especially given the restrictions on electronic device use in the classroom (Smith et al., 2008).

Because cyberbullying occurs electronically, children are afforded anonymity that is missing in face-to-face interactions. By hiding behind a computer or phone screen, children feel more comfortable communicating in ways that are interpreted as inappropriate in alternate contexts. Victims often do not know the identity of their cyberbullies; the invisibility of perpetrators may therefore make cyber victims feel significantly more threatened and paranoid than they would be with knowledge of the sender (Kowalski & Limber, 2007; Suler, 2004). In addition to inducing some degree of dissociative anonymity (separation of online actions from in-person identity) in users, electronic communication takes place in a venue where victim and perpetrator lack access to the social and contextual cues typically present in face-to-face interactions. Therefore,

bullies may not perceive their cyber communications to be hurtful, whereas victims may interpret hostility in the absence of additional contextual cues (e.g., tone of voice) (Kowalski & Limber, 2007). Without the different types of feedback that exist in physically proximate interactions, such as facial expressions, extent of eye contact, and body language, individuals interacting in cyberspace experience increased disinhibition of language and actions and greater difficulty making accurate attributions of intent (Suler, 2004).

The electronic nature of cyberbullying also limits the specific forms of aggression exhibited in this context. Extensive research has identified several different forms of traditional aggression, of which relational and physical aggression are most commonly cited (Crick, Ostrov & Werner, 2006). Physical aggression, as implied by its title, is generally overt and involves the use or threat of physical damage in order to induce harm. Alternatively, and more commonly seen in girls, relational aggression entails the use or threat of relationship damage in order to induce harm. Rather than kicking or punching, agents of relational aggression engage in rumor-spreading, social exclusion, and/or social threats (e.g., “I won’t be your friend if...”) to aggress against others. Because victims and bullies are not physically proximate in the cyberworld, the majority of cyber-aggression involves specific forms of relational aggression. Alternatively, physical aggression in cyberspace is limited solely to threats of harm.

Research has also indicated that cyberbullying causes increased harm to victims given its somewhat inescapable nature. Whereas traditional bullying is typically restricted to the confines of the school, cyberbullying can occur across multiple environments. Although limitations on cell phone and computer use in schools help to prevent instances

of cyberbullying in academic settings, cybervictims' homes often transform from safe havens to new sites for harassment (Dempsey, Kowalski, Nichols & Storch, 2009; Slonje & Smith, 2008). Unfortunately, victims of cyberbullying exhibit reluctance to report instances of harassment to both school officials and parents. Children often fear a loss of Internet and phone privileges at home and do not interpret the school administration as having jurisdiction over extra-institutional instances of bullying (Slonje & Smith, 2008).

Focus group studies have also provided personal insight from students themselves regarding how cyberbullying is unique in its impact on their social and emotional functioning. Echoing many findings of previous empirical studies on cyberbullying, middle and high school students emphasized their reluctance to report incidents due to fear of privilege loss at home and reported an increased frequency of cyberbullying outside of the school environment (Agaston, Kowalski & Limber, 2007). Although they proposed some potential strategies for responding to cyberbullying (e.g., blocking sender), they did not acknowledge the option of asking an authority to take down an offensive website or speaking up as a bystander to cyberbullying. Therefore, it seems that the non-confrontational nature of cyberbullying, unlike traditional bullying, leaves victims feeling a lack of efficacy in preventing future instances of harassment.

Because cyberbullying appears to be a distinct construct, it is important to understand its unique impact on children. Although there is some degree of overlap between children who are involved in traditional bullying and cyberbullying, such dual involvement is by no means the case across all individuals. It is possible that children who are neither involved in relational nor physical aggression in the traditional sense are chronic victims or bullies in the cyber world (Dempsey, Kowalski, Nichols & Storch,

2009). The anonymity and lack of contextual cues in cyber interactions may make individuals more likely to interpret harmless online interactions as intentionally hostile. Therefore, more research is necessary to examine how these features unique to cyberbullying affect children's social cognitions.

Types of Cyberbullying

Although the present study examines social cognitive variables associated with cyberbullying at a more general level, cyberbullying, like traditional bullying, takes a variety of forms both in terms of the physical mechanism used by perpetrators and the content of the specific affront. Many of the tactics used in cyberbullying exemplify its uniqueness as a type of bullying, and are thus helpful in understanding children's interpretations of online/mobile social interactions.

Despite the numerous forms of modern technology that allow for instant communication among children, most research on cyberbullying to date has identified the Internet and mobile phones as being the most common domains for such activity (Katzner, Detchenhauser & Belschak, 2009; Slonje & Smith, 2008). More specifically, cyberbullying tends to take place in chatrooms, over email, and through text messaging. As these technologies continue to develop innovative capacities that allow fast-paced interactions and the exchange of more than just text content (e.g., pictures and video), children are becoming equipped with a wide variety of options for both positive and negative forms of social communication.

It is therefore hardly surprising that these forms of electronic media serve as venues for new forms of bullying. Across several studies, researchers have converged upon seven typical types of cyberbullying: harassment, denigration, masquerading,

outing, trickery, exclusion, and cyberstalking (Dempsey, Sulkowski, Nichols & Storch, 2009; Katzer, Detchenhauser & Belschak, 2009; Mishna, Cook, Gadalla, Daciuk & Solomon, 2010; Willard, 2004). Although all of these categories fall under the umbrella of cyberbullying, each one exhibits a distinct definition and purpose. Harassment, as the term typically connotes, involves the repeated sending of offensive or hurtful messages across any form of electronic media (Li, 2010; Willard, 2004). Similarly, cyberbullies who engage in denigration publically send or post cruel assertions (which are not necessarily true) about another peer.

Some research has demonstrated that victims of online bullying often know the bully; however, it is not rare for cyberbullies to engage in masquerading, or the impersonation of someone else. Because the online environment facilitates attempts at anonymity, masquerading provides children an opportunity to aggress upon their peers without concern for eventual identification (Suler, 2004). Masquerading also allows for online forms of relational aggression; a bully can pretend to be someone else and then send/post information to destroy a person's reputation or social relationships (Willard, 2004). In the same vein of reputation damage, outing refers to the online and public disclosure of someone's private information or pictures. Given the permanent nature of the Internet and phone messages, outing in the context of cyberbullying may exacerbate the victim's feelings of shame and powerlessness. A similar mechanism for cyberbullying is trickery, or misleading someone into divulging personal and/or embarrassing secrets about him/herself (Willard, 2004). As in the case of outing, acts of trickery often result in hurtful posts or messages that are impossible for the victim to remove. Another form of cyberbullying, perhaps most parallel to traditional types of bullying, is exclusion.

Exclusion generally involves deliberately leaving someone out of an online or mobile group, such that the person is not awarded access to the social cyber-interactions of his/her peers (Willard, 2004).

The final form of cyberbullying, cyberstalking, is arguably the most harmful and thereby most concerning method of victimization. Characterized by recurring harassment and attacks, cyberstalking is used by bullies to instigate fear and intimidation in their victims (Willard, 2004). In the case of cross-gender cyber interactions, cyberstalking has been found to occasionally take the form of sexual harassment. More specifically, especially among older adolescents, girls have been found more likely than boys to receive unsolicited sexual pictures or messages requesting them to engage in some sort of sexual act for a boy online (Mishna, Cook, Gadalla, Daciuk & Solomon, 2010).

Cyberstalking, in addition to the six other aforementioned methods of cyberbullying, consistently demonstrates its potential to provoke intense hurt and shame in the victims of such acts. Although typically observed in middle and high school students, with growing numbers of elementary school students gaining access to electronic communication, cyberstalking may begin to emerge at even younger ages. In order to effectively understand reasons for young children's involvement in cyberbullying both as victims and perpetrators, we must be mindful of the specific practices most frequently used to carry out aggressive exploits.

Characteristics of Cyber Bullies and Victims

Much research has also been dedicated to identifying personal characteristics of children and adolescents who are typically involved in cyberbullying. Although the present study specifically focuses on the role of social information processing variables

as they relate to cyberbullying, it is important to understand how and why particular deficits in social cognition may uniquely relate to individuals involved in cyberbullying as bullies, victims, or both.

In movies and television, bullies are often characterized as big, violent boys who pick on their weaker and less popular classmates. In actuality, bullies are rarely immediately recognizable, and their motives for engaging in aggressive behavior are more complex than simply being driven by anger. Across multiple studies, several key variables have been identified as consistent predictors of cyberbullying, the first of which concerns students' perceptions of the moral acceptability of engaging in cyberbullying. Perhaps not surprisingly, youth in elementary, middle, and high school who express moral approval of cyberbullying are more likely to be cyberbullies themselves (Pornari & Wood, 2010; Williams & Guerra, 2007). Students' perceptions of their school environments also serve a predictive value, such that youth who view their school climates positively are less likely to participate in cyberbullying. Similarly, youth who perceive themselves to have a supportive and trusting peer network report lower levels of involvement in cyberbullying (Williams & Guerra, 2007).

Victims are also characterized by a set of distinct variables, both psychosocial and behavioral in nature. In general, victims are often low in popularity and self-concept, making them appear as easy targets (Katzner, Detchenhauer & Belschak, 2009). Furthermore, high levels of characterological self-blame (blaming own personality for harm) have been found closely associated with a victim status. It seems that individuals who hold stable negative views of themselves perceive such traits as unchangeable, and are thus less likely to attempt to alter their own behaviors. Victims are also more likely

than uninvolved children to exhibit interpretive biases in social cognition, such that they assume hostile intent in other people's actions when it may actually be absent or inadvertent (Pornari & Wood, 2010). Finally, research has demonstrated slight differences in victim responses to bullying across gender, such that victimized boys exhibit high levels of revenge-seeking tendencies whereas victimized girls display depressive attributional styles (Shelley & Craig, 2010).

In addition to studying the characteristics of cyberbullies and victims, researchers have also directed attention towards a third category of cyber roles: bully-victims. As the title implies, bully-victims are involved in cyberbullying both as the perpetrator and the victim, making them a particularly interesting group of youth to study. Children and adolescents who fall into this category are typically high frequency and high expertise Internet users who lack adequate parental monitoring (Ybarra & Mitchell, 2004). Like victim-only children, they also tend to display significant interpretive biases (Bailey & Ostrov, 2008). Such biases lead bully-victims to often engage in a cyclic pattern of cyberaggression; because they often misinterpret hostile intent of others, they are more likely to retaliate by cyberbullying the perceived perpetrator or other children (Pornari & Wood, 2010). Interpretive biases in social information processing, therefore, can set in motion a potentially destructive chain of events for cyberbullies and victims.

Social Cognitive Theories of Aggression

To better understand the motivations driving participation in childhood cyberbullying, attention must be focused on identifying the underlying cognitive mechanisms involved in such aggression. Much of the relevant research to date focuses on how certain children's social information processing is prone to cognitive biases that

ultimately result in inaccurate interpretive patterns and maladaptive behavior (Bailey & Ostrov, 2008; Camodeca & Goossens, 2005; Camodeca, Goossens, Schuengel & Terwogt, 2003; Crain, Finch & Foster, 2005; Dodge & Frame, 1982; Dodge, Murphy & Buchsbaum, 1984; Joscelyne & Holttum, 2006; Shelley & Craig, 2010; Toblin, Schwartz, Gorman & Abou-ezzeddine, 2005). Although social cognitive theories of childhood aggression are widespread, they largely focus on traditional forms of aggressive behavior and have not yet addressed how new social environments (e.g., electronic media) may alter the nature of social cognition. Here, I review previous research exploring how social information processing relates to traditional aggression and examine the extant, though minimal, literature investigating similar theories in the context of traditional and cyber bullying.

Social Information Processing Model. Extensive research has explored how children and adolescents' social information processing (SIP) styles affect their cognitions and, in turn, their behavioral responses to perceived provocation. Dodge (1986) conceptualized a model that outlines five separate stages of social information processing in children which, when completed skillfully, results in appropriate behavioral responses. Alternatively, deficits in one or more stages of processing often result in maladaptive responses, such as aggression. Dodge and Crick (1994) later reformulated this model to include six distinct stages involved in social information processing. In stage one, children encode social cues in the environment, often using cognitive heuristics (e.g., schemata) to efficiently keep track of appropriate information. Following encoding, children develop causal attributions and interpret the intention behind a given action. The third stage involves the determination of goals, followed by stage four, a

mental search for potential responses to a specific provocation or interaction. In the final stages, children select the response they perceive as most appropriate (stage five) and then finally, in stage six, enact the selected behavior.

Dodge's social information processing model provides an effective framework for understanding the cognitive mechanisms underlying aggressive behavior. Children who, for example, fail to accurately encode and interpret the existing social cues are likely to select inappropriate behavioral responses, such as aggression (Dodge & Crick, 1990). Consequently, much of the existing research on social information processing as it relates to aggression has focused on identifying the cognitive mechanisms that differentiate aggressive children from nonaggressive children. Early research concerned specifically with aggression in young boys has demonstrated that an association exists between aggression and attribution biases, such that aggressive elementary school boys, as compared to nonaggressive elementary school boys, overattribute hostile intent to peers (Dodge & Frame, 1982). Additionally, this deficit in intention reading exists only when the subject interprets himself, rather than a second peer, as the target of victimization. Therefore, it appears that cognitive biases in attribution are stronger when individuals interpret a personal threat.

Further research has replicated these findings across both male and female elementary school students, indicating that the association between attribution style and aggression holds across both boys and girls. Dodge (1986) found support for the SIP model in his study of social information processing patterns of severely aggressive second through fourth graders. Not only were aggressive children more likely than nonaggressive children to assume that peers did not want to play with them, but they also

expressed lower levels of support for competent solutions to relieve feelings of social discomfort. Aggressive children also failed to acknowledge the ineffectiveness of their proposed solutions, indicating that in addition to struggling with general social information processing, aggressive children lack awareness of their own social incompetence. Similarly, socially deviant children have been found to frequently mislabel prosocial and accidental intentions as being hostile, leading them to favor aggressive responses to provocation scenarios (Dodge, Murphy & Buchsbaum, 1984). It seems, then, that children who lack accuracy in intention-cue reading are predisposed to higher levels of aggression.

Previous research has also examined how different stages of the SIP model may be uniquely associated with specific subtypes of aggression, namely *proactive* and *reactive* aggression. Whereas proactive aggression has been characterized as instrumental and deliberate in nature, reactive aggression is retaliatory and defensive, and usually accompanied by frustration and/or anger (Camodeca, Goossens, Schuengel & Meerum, 2003; Camodeca & Goossens, 2005; Crick & Dodge, 1994; Crick & Dodge, 1996). Given the distinction between these two forms of aggression, it has been proposed that each subtype reflects deficits in distinct stages of the social information processing model. Multiple studies have demonstrated that reactively aggressive children exhibit biases in the interpretive stage of processing, such that they often attribute hostile intent to peers in ambiguous provocation scenarios, frequently resulting in retaliatory acts of aggression. Alternatively, proactively aggressive children show evidence of distorted response decision processes, viewing instrumentally aggressive behavior as effective and positive means to an end. Proactive aggression, unlike reactive aggression, is

characterized by a goal-oriented motivation in which aggression is interpreted as the most valuable instrument (Crick & Dodge, 1994; Crick & Dodge, 1996; Pornari & Wood, 2010). Moreover, proactive aggression is associated with bullies, whereas reactive aggression has been found to be more characteristic of victims (Toblin, Schwartz, Gorman & Abou-ezzeddine, 2005). Essentially, bullies may be driven by a deliberate intention to engage in aggression to fulfill a goal, whereas victims are prone to interpretations of hostile intent and, in turn, retaliatory aggression.

More recent research has challenged such a polarized distinction between reactive and proactive aggression as they relate to the social information processing model, demonstrating that there may indeed be more overlap in the social cognitive processing of proactive and reactive aggressors than previously conceived (Camodeca & Goossens, 2005). Although proactive aggression was found to be uniquely associated with bullying, reactive aggression was linked with both bullying and victimization, indicating that bullies may too show deficits in their interpretive patterns. Moreover, both bullies and victims exhibited processing deficits in all stages of the SIP model, indicating that this framework describes a relatively circular process where each step is interrelated. Early steps of interpretation influence the later behaviors, and the outcome influences future social interpretations; the same pattern continues across future social interactions. These findings offer a more cohesive structure for understanding social information processing as it relates to aggression, illustrating that perhaps different subtypes of aggression and specific stages of SIP cannot be studied in isolation.

Hostile Attribution Bias. In identifying the specific deficits associated with each stage of Dodge's social information processing model, researchers have pointed to a

hostile attribution bias (HAB) as an interpretive bias that leads to the frequent misinterpretation of social cues. Across multiple studies, hostile attribution bias has been defined as a tendency to attribute hostile intent to others' unintentional negative actions/interactions due to deficits in the second (interpretive) stage of social information processing (Camodeca, Goossens, Schuengel & Terwogt, 2003; Crick & Dodge, 1996; Katsurada & Sugawara, 1998). Past research has revealed that victims of aggression tend to exhibit hostile attribution biases, although there remains uncertainty as to the direction of this relationship (Pornari & Wood, 2010). Hostile attribution bias is also a particularly strong predictor of reactive aggression, such that individuals who inaccurately attribute hostile intent to social cues are more likely to interpret threat and react aggressively (Bailey & Ostrov, 2008). Even in preadolescents, hostile attribution bias partially mediates the association between victimization and engagement in relational aggression (Yeung & Leadbeater, 2007), and therefore this cognitive bias appears to be an important mechanism driving involvement in aggression.

Additional research has specified the contexts in which HAB is more or less strong by taking into account the significance of relationship type in peer provocations (Peets, 2007). Hostile attribution biases have been identified as a cognitive deficit that skew social interpretations in many aggressive children; however, these biases actually demonstrate remarkable flexibility, such that children generally show greater hostile attributions towards enemies than other peers, especially friends. It has also been proposed that, in general, the association between hostile attribution bias and aggression is significantly stronger for traditionally aggressive boys than relationally aggressive girls. When girls were presented with ambiguous relational provocation scenarios and

asked to report intent attributions, there was not a strong relationship between HAB and peer-nominated reports of relationally aggressive behavior (Crain, Finch & Foster, 2005). Taken together, these findings provide evidence for the potential context-specificity of the SIP model; certain types of aggressive scenarios demonstrate significantly stronger associations with hostile attribution biases and other cognitive mechanisms than others. Furthermore, when examining HAB in the context of cyberbullying it is important to acknowledge the unique characteristics of the bullying environment and tactics used by perpetrators.

Social Cognitive Theories of Bullying

Despite the breadth of research examining social information processing as it applies to childhood aggression, less attention has been directed at understanding how a similar social cognitive perspective provides insight into the mechanisms driving different forms of bullying. Because bullying involves repeated instances of aggressive behavior, it is important to identify the social cognitive deficits that may characterize both bullies and victims. As early as elementary school, children demonstrate an ability to develop their own attributional accounts of why bullying occurs, using both characterological and behavioral explanations (Joscelyne & Holttum, 2006). They are able to attribute bullies' actions to both internal stable traits (e.g., The bully isn't smart) and behaviors (e.g., The bully hit the boy because the boy was calling him names). However, school age children involved in bullying as either victims, bullies, or both exhibit more deficits than uninvolved children in understanding the actions and intentions of their peers' social behavior and are more likely to interpret threats in social situations (Camodeca, Goossens, Schuengel, & Terwogt, 2003). More specifically, those involved

as both bullies and victims tend to show deficits in the second stage of social information processing (interpretation) as well as the fifth stage (response selection), suggesting that perpetrators and victims of bullying are overwhelmingly characterized by deficits in social cognition abilities. Therefore, I seek to use a social information processing framework to further investigate the relationship between children's attributional tendencies and interpretations of ambiguous social interactions in a cyber context. In doing so, I hope to better understand how children's social cognitions may relate to their involvement in cyberbullying.

Social Cognitive Theories of Cyberaggression

Of particular interest to the present study is how theories of HAB and Dodge's social information processing model operate in the relatively novel cyber world. To date, limited research has explored the role of social cognitive factors associated with individuals involved in cyberbullying. Furthermore, the extant findings largely concern middle and high school populations, rather than elementary school students, thus providing an incomplete window into the phenomena of interest. In fact, to my knowledge there has only been one study to date that has examined HAB in relation to cyber aggression. Focusing specifically on the relationship between cognitive mechanisms in both traditional and cyber aggression, researchers found that both cyber victimization and traditional victimization are associated with hostile attribution bias, indicating that victims of aggression may hold negative and skewed views of their social environment and interactions (Pornari & Wood, 2010). It is therefore important for future research to elucidate the social cognitive mechanisms underlying children who are involved in cyberbullying, both as victims and aggressors.

The Present Study

In light of the sparse literature examining cyberbullying through a social cognitive lens, the present study aims to explore how school-aged children's attribution styles may predict their interpretations of ambiguous social cues in a cyber environment. Cyber interactions by nature lack many of the contextual cues present in traditional social interactions, such as tone of voice and physical gestures. Therefore, it seems likely that children's deficits in interpreting social stimuli will be exacerbated in cyber situations. Based on the aforementioned previous research, the present study has three main objectives and corresponding hypotheses.

First, and most generally, I seek to contribute to preexisting literature that has examined the prevalence of cyberbullying in elementary school students. Because, to date, the majority of research on cyberbullying has focused on adolescents and young adults in middle and high school, the present study intends to fill a gap in the literature by examining cyberbullying within a sample of school-aged children. Furthermore, of the existing cyberbullying studies that do include elementary school students, most group younger participants' data with those of older children, preventing insight into specifically elementary students' behaviors and attitudes as they relate to technology use and cyberbullying (Katzner, Fetchenhauer, & Belschak, 2009; Ybarra & Mitchell, 2004). Reports of growing technology use among school-aged children necessitate greater attention to cyberbullying in even younger age groups. Therefore, based on recent reports of children's technology use, it is hypothesized that students will be using electronic communication as early as elementary school and that they will, at least to some extent, be involved in cyberbullying as bullies, victims, or both. Although these frequencies may

not mirror the higher numbers previously seen in middle and high school students due to fewer children with Internet access and mobile phones, it is nonetheless important to understand how early these forms of electronic aggression begin to emerge in children.

The current study also aims to determine if one particular social information processing deficit, hostile attribution bias associated with children's involvement in cyberbullying as bullies or victims. In other words, do children who are involved in cyberbullying consistently interpret hostile intent in ambiguous cyber provocation scenarios? In line with previous research on attribution biases in traditional bullying, I expect that children who report involvement in cyberbullying as victims or bullies will exhibit a pattern of hostile intent attributions, indicating that one driving force behind involvement in cyberbullying is maladaptive social information processing. Additionally, based on recent research indicating that there is a relatively circular relationship between victimization and involvement in aggressive behavior, I expect that there will be a relationship between cyberbullying involvement and HAB, regardless of the function such bullying (i.e., proactive versus reactive).

Finally, I seek to better understand how the nature of cyber environments (e.g., lack of environmental/contextual cues) may alter the social information processing of all children, regardless of involvement in (cyber)bullying. Given the inherent ambiguity of online and mobile phone interactions, does cyber communication by nature cause most children, rather than just those involved in cyberbullying, to exhibit interpretive biases? Given the existing literature demonstrating that cyberbullying differs from traditional bullying in that it lacks the same degree of face-to-face social cues, I hypothesize that hostile attribution biases in cyber contexts will not be uniquely exhibited by cyber

victims and bullies; rather, even children who report no past involvement in cyberbullying will demonstrate attribution deficits for ambiguous cyber scenarios.

The majority of previous bullying research using a social cognitive framework has only focused on traditional forms of aggression and bullying; therefore, it is expected that the current research examining the SIP model in the context of cyberbullying will provide useful insight into how this new phenomenon may or may not mirror some of the trends observed in studies of traditional bullying. Additionally, developing a better understanding of the cognitive mechanisms driving such behaviors will ultimately be useful for developing appropriate cyberbullying prevention and intervention programs.

Method

Participants

The subjects were 129 school-aged children (62.8% female and 31.0% male) from the fourth (62.0%) and fifth (31.8%) grade in four local elementary schools. However, due to logistical demands and school preferences, not all children completed all measures. Approximately 55.0% of the students were Caucasian, followed by “other” (12.4%), African American (7.8%), Asian (4.7%) and Native American (1.6%). Nine percent of students indicated not wanting to reveal their race. A total of 31.9% of parents provided consent for children, and 89% of those children provided assent.

Measures

Student Technology Use Survey. Modeled after a technology use survey from Li (2010), this measure was developed to assess the extent of children’s technology use. More specifically, the survey assesses children’s use of cell phones (for talking, texting, and picture messaging) and computers (for emailing, using social networking websites,

participating in chatrooms, and Instant Messaging). Participants indicate if they had access to certain types of technology (e.g., “Do you own a cell phone”), responding with “yes” or “no.” If they respond with “yes”, participants then indicate the frequency with which they use such technology in different ways (e.g., “How many texts do you send per day?”) by responding on a frequency scaled that varies depending on the question asked (e.g., texts per day vs. minutes of computer use).

Cyberbullying Student Survey. This questionnaire includes 28 total items adapted from Li’s 2010 study of cyberbullying; however, only two items from the survey were considered in the present study. At the beginning of the measure, participants are presented with a definition of cyberbullying to reference throughout completion. Cyberbullying is defined as sending hurtful messages to someone else, for example in a text message or Facebook post. The first item asks children to report the frequency with which they have cyberbullied others (“How often have you cyberbullied others?”), and the second item asks children to report the frequency with which they have been cyberbullied (“How often have you been cyberbullied by others?”). Both items are responded to on a five-point Likert scale, ranging from “Never” to “Almost every day.”

Revised Olweus Bully/Victim Questionnaire. This measure evaluates children’s involvement in and attitudes towards bullying as bullies and/or victims and was adapted from Olweus’ original measure; however, only two items from the survey were considered in the present study. The first item of the questionnaire evaluates children’s frequencies of bullying others (“How often have you bullied others at school in the past couple months?”) and the second item evaluates children’s frequencies of being victims of bullying (“How often have you been bullied by others at school in the past couple

months?”). Both items are responded to on a five-point Likert scale, ranging from “Never” to “Several times a week”.

Assessment of Hostile Attribution Bias. Modeled after assessments of social information processing developed by Crick (1995) and Dodge (1996), this novel instrument evaluates participants’ hostile attribution bias through a set of hypothetical ambiguous provocation scenarios. The measure includes seven hypothetical stories, three of which evaluate attributions of ambiguous traditional relational provocations (e.g., friend does not say hi to you) and four of which evaluate attributions of ambiguous cyber provocations (e.g., friend does not respond to your text message). For each story, participants evaluate the aggressor’s intent by reporting the likelihood of four explanation items on a four-point Likert scale (1=definitely not, 4=definitely yes). For each story, two of the intent explanations are unintentional (e.g., My friend forgot about the plans we made) and two were hostile (e.g., My friend wanted to make me feel unimportant). After recoding all unintentional items, indices of traditional and cyber HAB were calculated by summing and averaging all of the responses. These indices will be referred to as the traditional and cyber likelihood HAB. One final question for each story asks participants if the aggressor intended to be mean (i.e., Do you think your friend meant to be mean to you?), with a “yes” or “no” response scale. After recoding the intent items (yes=2, no=1), indices of traditional and cyber intent attributions were calculated by summing and averaging all of the responses. These indices will be referred to as the traditional and cyber dichotomous HAB. The subscale for traditional HAB was found to be reliable after the deletion of the items “The kids at the table were busy talking amongst themselves,” and “The kids at the table didn’t hear me say, ‘Hi’,” with a Cronbach’s alpha of .70. The

subscale for cyber HAB was found to be reliable after the deletion of the item “My friend was upset about his/her own grade on the math test,” with a Cronbach’s alpha of .72.

Procedure

All students completed the aforementioned measures within a larger battery of questionnaires. Prior to participation, all students were required to obtain parental consent and, regardless of consent or not, students were rewarded with an eraser prize for returning consent forms. All students who participated in the study were also provided with a pizza party reward and an educational pamphlet about cyberbullying after completion of testing.

The specific testing procedure slightly varied across schools. At three of the elementary schools, researchers provided verbal instructions to students, reminding them that they could stop at any time and ask questions throughout the testing session. Students independently completed the measures within one or two testing sessions (depending on reading speed) ranging from 30 minutes to half an hour. However, at the fourth elementary school, due to children’s reading difficulties, teachers administered the survey during class time across several weeks by reading all students the measures.

Results

Technology Use

The extent and frequency of technology use among elementary school students varied across specific forms and functions of electronic communication. The majority of participants reported using the Internet for more than 30 minutes per day and slightly more than half reported owning a cell phone. For specific frequencies of technology use, see Table 1.

Bullying and Cyberbullying Frequencies

Students' extent of involvement in traditional bullying varied across the sample, with approximately 52% of children involved in traditional bullying as either victims, bullies, or both. More specifically, 22% reported bullying others at least once, and 47% reported having been victims of bullying at least once. Additionally, just below 15% of children were involved in traditional bullying both as bullies and victims.

Frequencies of children's involvement in cyberbullying were lower, though nonetheless noteworthy, than frequencies of involvement in traditional bullying. Approximately 28% of children experienced cyberbullying as victims, bullies, or both. Just over 13% of children reported cyberbullying others on at least one occasion, and approximately 23% of children were victims of cyberbullying on at least one occasion. Only 9% of children reported being involved in cyberbullying as both victims and bullies. There were also significant positive correlations between traditional and cyber bullying $r(84) = .64, p < .001$ and between traditional and cyber victimization, $r(86) = .30, p = .004$.

HAB and Involvement In Bullying and Cyberbullying

Correlations. Table 2 depicts the pattern of correlations between the four indices of HAB (likelihood and dichotomous for traditional and cyber) and involvement in bullying (victims and bullies of traditional and cyber). All correlations between HAB indices and both traditional and cyber victimization were positive and statistically significant, with the exception of the correlation between the cyber dichotomous HAB index and cyber victimization, an association which was only marginally significant.

However, there were no significant correlations between HAB indices and traditional or cyber bullying experience.

Linear regression analyses. Linear regression analyses were conducted in order to determine if traditional and/or cyber HAB were significant predictors of involvement in traditional and/or cyber bullying. The first regression analysis predicting involvement in cyberbullying was significant, $F(7, 63) = 6.20, p < .001$. The frequency of traditional bullying was a significant predictor of frequency of cyberbullying ($\beta = .66, p < .001$), whereas frequencies of traditional ($\beta = -.07$) and cyber ($\beta = .09$) victimization, level of traditional ($\beta = -.09$) and cyber ($\beta = -.09$) likelihood HAB, and level of traditional ($\beta = .54$) and cyber ($\beta = .03$) dichotomous HAB were not significant predictors.

In order to determine what variable(s) predicted cyber victimization, an additional linear regression analysis was conducted. The overall model was significant, $F(7, 56) = 2.46, p = .03$. Traditional dichotomous HAB index ($\beta = .40, p = .06$) and traditional victimization ($\beta = .25, p = .08$) were marginally significant predictors of cyber victimization. However, frequencies of traditional ($\beta = -.11$) and cyber ($\beta = .12$) bullying, traditional ($\beta = -.08$) and cyber ($\beta = .16$) likelihood HAB, and cyber dichotomous HAB ($\beta = -.29$) were not significant predictors of cyber victimization.

Traditional Versus Cyber HAB

Cyber and traditional likelihood HAB were significantly positively correlated, $r(74) = .51, p < .001$. Similarly, cyber and traditional dichotomous HAB were significantly positively correlated $r(74) = .63, p < .001$.

However, across all children, hostile attribution bias was significantly higher for cyber items ($M = 2.51, SD = .45$) than traditional items ($M = 2.37, SD = .48$), $t(75) = -$

2.65, $p = .01$. Similarly, participants reported significantly more hostile intent attributions for ambiguous cyber provocations ($M = .39$, $SD = .34$) than for ambiguous traditional provocations ($M = .29$, $SD = .34$), $t(73) = -3.04$, $p = .003$.

Discussion

The main goals of the present study were to explore the prevalence of technology use and cyberbullying in elementary school students, examine the association between hostile attribution bias and involvement in both traditional and cyber bullying, and determine if the increased ambiguity of the cyber context increases the likelihood of exhibiting interpretive deficits. A more general aim was to better understand if and how cyberbullying may differ from traditional bullying with a focus on how the association between bullying involvement and interpretive deficits translates to cyberbullying. Given the absence of social and contextual cues (e.g., body language, facial expressions, tone of voice) in electronic communication, the cyber world serves as an ideal venue for examining children's interactions through a social information processing framework. The results of the present study demonstrate that HAB is uniquely associated with victimization in both traditional and cyber contexts, but that interpretive deficits are overall stronger in cyber contexts. Moreover, the cyber world appears to provide a new venue for aggression previously restricted to face-to-face interactions; there is significant overlap between children involved in traditional and cyber bullying and victimization.

Technology Use and Cyberbullying Involvement

In light of recent increases in children's access to different technologies, the present study examined the extent to which fourth and fifth graders were actively using electronic communication and, furthermore, if children at this age were using these media

to engage in cyberbullying. This study found that the majority of children used some form of electronic communication, with almost all children spending time on the Internet and about half owning personal cell phones. However, because not all parents provided consent for their children to participate in the study, it is possible that the current study overestimates the proportion of students who own and use communication technologies. Given the nature of the study, parents may have chosen not to provide consent if their child did not own or use electronic communication. Nonetheless, the finding that there is widespread use of electronic communication at such an early age provides further justification for the expectation that elementary school students may be involved in cyberbullying.

Before addressing rates of cyberbullying among the current sample, it is worth noting that slightly over half of students reported being involved in traditional bullying as bullies, victims or both. This finding alone demonstrates that bullying is a significant problem in schools that begins as early as elementary school. Additionally, the high prevalence of traditional bullying in this sample suggests that access to electronic communication provides students with a novel venue for these same types of negative social interactions. Accordingly, just under 30% of children reported being involved in cyberbullying as cyber bullies, victims, or both. Although a minority of students currently take part in this phenomenon, it seems likely that as access to technology continues to increase, cyberbullying will become an increasingly prevalent behavior among this age group. As recently as 2007 one study found that only 5% of children reported cyberbullying others (Williams & Guerra, 2007), as compared to 13% in the present study. Such a discrepancy provides further evidence for children's rapidly increasing

access to electronic communication that can be used to promote negative social interactions. Past research has also found that anywhere from 40 to 58 percent of middle school students report involvement in cyberbullying (Beran & Li, 2007, Li 2007).

Therefore, it appears that cyberbullying may begin as early as elementary school but grow in prevalence as children enter middle school and experience the social turbulence associated with this transition period (Hirsch & Rapkin, 1987; Kowalski, 2007).

Predicting Children's Involvement in Cyberbullying

Although cyberbullying appears to pose a growing problem in elementary school aged children, a remaining uncertainty concerns the degree to which cyberbullying mirrors traditional bullying in terms of the children involved and associated characteristics of bullies and victims (e.g., HAB). In the current sample, the best predictor of being a cyberbully was simply being a traditional bully, lending support to the theory that cyberbullying is hardly a unique phenomenon, but rather just an old behavior in a new venue. The finding of consistency between traditional bullies and cyber bullies replicates past research that has demonstrated the similarity between these two roles (Li, 2007; Vandebosch & Van Cleemput, 2009) and challenges Ybarra and Mitchell's (2004) claim that traditional victims typically retaliate and seek revenge by becoming cyberbullies. Students who bully others in school may view cyberbullying as a means of continuing such behavior at home or in other contexts in which other children are not physically present. More specifically, the potential for anonymity and the lack of adult monitoring in cyber contexts may motivate bullies to aggress in this venue, interpreting fewer threats of identification and subsequent punishment (Suler, 2004; Varjas, Talley, Meyers, Parris, & Cutts, 2010).

Similarly, the present study provides evidence for some degree of overlap between victims of traditional and cyber bullying. Although traditional victimization was only a marginally significant predictor of cyber victimization, both forms of victimization were significantly positively correlated. Therefore, cyber victimization, like cyberbullying, may represent the extension of an old phenomenon in a new physical context. This finding is consistent with past research that has reported a strong association between traditional and cyber victimization (Beran & Li, 2007; Li, 2007; Sontag, Clemans, Graber, & Lyndon, 2011). In light of such overlap, it is important that parents and teachers generally monitor children who exhibit bullying behavior or experience victimization at school. The implications of such overlap for parental action and school interventions will be further explored later in this discussion.

HAB and Victimization

In addition to traditional victimization, the traditional dichotomous HAB index was a marginally significant predictor of cyber victimization. Children's experiences of victimization in traditional contexts, as well as children's responses to the question "Do you think he/she meant to be mean to you?" on all traditional, but not cyber, scenario items from the Hostile Attribution Assessment predicted their status as cyber victims. Children more likely to attribute hostile intent (answer "yes") were more likely to be victimized in cyber, but not traditional, venues. Additionally, both cyber and traditional victimization, but not traditional and cyber bullying, were associated with both cyber and traditional HAB. These findings raise several important questions regarding the value of HAB in predicting victimization.

As previously noted, HAB was found to be uniquely associated with victimization across both bullying contexts, indicating that such an attributional bias may specifically characterize children who are targets of bullying. In the existing literature on HAB and traditional bullying, there has been some debate over whether or not this interpretive deficit is unique to a specific role in bullying. Whereas some research has indicated that bullies, victims, and bully-victims exhibit increased hostile interpretations (Camodeca, Goossens, Schuengel, & Meerum, 2003; Camodeca & Goossens, 2005), there have also been findings that HAB is exclusively associated with victimization in both the traditional and cyber context (Pornari & Wood, 2010). The results of the present study suggest that, consistent with the findings of Pornari and Wood, HAB plays a similar role in both traditional and cyberbullying. Victims of bullying and cyberbullying, rather than the bullies themselves, are characterized by deficits in an early stage of the social information processing model, namely accurately interpreting social information. Such a finding raises important questions regarding the nature of the relationship between victimization and HAB. It remains unclear if HAB is a cause or consequence of victimization, or both. A potential explanation for this unique association is that some children become targets of bullying for reasons such as low sociometric popularity or antisocial characteristics (Veenstra et al., 2005), and as a result of repeated victimization they develop a predisposition to interpret hostile intent as an adaptive response to potential social threats. In future ambiguous provocation scenarios, therefore, they are prepared to make hostile intent attributions given their history of encountering harmful peer behavior. Some research has supported this hypothesis in the context of videogame playing; children who played a violent videogame responded more negatively to different

ambiguous provocation stories than children who played a non-violent game (Kirsh, 1999). Therefore, it seems plausible that early experiences of victimization ultimately prompt children to develop this interpretive deficit, which then leads to increases in later perceived victimization. However, because the present study only asked students to report frequencies of traditional and cyber victimization in recent months, there is no way of knowing their histories of victimization. Alternatively, HAB may be an individual difference factor, such that certain children experience differential development of their social knowledge structures, leading to biased social perceptions and interpretations (Anderson & Bushman, 2002). Additionally, although hostile attribution bias was exclusively associated with victimization, this is not to say that bullies are altogether free from interpretive deficits; alternatively, it is possible that bullies typically engage in unprovoked and goal-oriented aggression, behavior associated with deficits in later stages of social information processing, such as determining the social behavior or response that they deem most appropriate (Dodge & Crick, 1994). If bullies demonstrate deficits in later stages in information processing but not the earlier interpretive steps, we would not expect to see associations between bullying and HAB, as was the case in the present study.

Despite unique correlations between HAB and victimization in traditional and cyber contexts, the linear regression model indicated that one predictor of cyber victimization, although only marginally significant, was children's score on the "yes/no" intent attribution questions for traditional provocation scenarios. However, this same score did not predict children's traditional victimization. So, what about the traditional intent item uniquely predicts cyber victimization? Why does the traditional intent item

not predict traditional victimization? And why does the traditional, but not cyber, attribution intent index predict cyber victimization?

Examining the content of the Hostile Attribution Assessment measure provides insight into why exclusively the traditional dichotomous index, but no other HAB indices, demonstrated value in predicting cyber victimization. Children read an ambiguous provocation scenario, decided the likelihood of several explanations for the behavior (two benign, two hostile), and then reported whether or not they thought the actor in the vignette intended to be mean. It is possible that the final intent item actually provided the best index of HAB because it most explicitly asked children if they interpreted hostile intent. Although they were asked to rate the likelihood of hostile explanations for the behavior in the vignette, these explanations did not necessarily involve someone intending to be mean. For example, when presented with a vignette in which two other students whisper to one another in the participant's presence, one of the hostile explanations provided was "They were saying something mean about me." Although rating this explanation as likely may indicate HAB, it is also possible that participants rated this explanation as likely without interpreting complete hostile intent. Instead, participants may have reasoned that although the children were likely saying something mean, they did not *intend* to be mean. In other words, the other children, despite potentially sharing a mean comment about the third party, may have not wanted that person to overhear them or notice their exchange. The two indices thus slightly differed in the specific attribution they asked the participant to make.

Therefore, the intent item may have actually been the most discriminating measure of children's HAB, rather than their responses to the likelihood of hostile and

benign interpretations of ambiguous provocation scenarios. Several past studies of HAB in children have used similar hypothetical vignettes but, rather than children rating the likelihood of both the hostile and benign options, they were required to choose the most likely explanation and also respond to an identical “yes/no” intent attribution item (Crick & Dodge, 1996; Yeung & Leadbeater, 2007). The discrepancy between the current likelihood and dichotomous HAB measures is thus a limitation of the present study, and future research should explore alternative ways of accurately measuring this interpretive deficit in children. Perhaps providing a forced choice among explanations would function similarly to the intent attribution item, requiring children to make a more global judgment of intent. This line of methodological modification will be further discussed in the context of the present study’s limitations.

Distinguishing Between Traditional and Cyber HAB

A remaining question concerns why specifically the traditional, but not cyber, attribution intent index predicts cyber victimization. This finding suggests some degree of inherent discrepancy between traditional and cyber attribution deficits and is in turn supported by examining the current findings on traditional versus cyber HAB scores. Both the likelihood HAB index and dichotomous HAB index were found to be significantly higher in the cyber context; participants were more likely to interpret hostile intent when the ambiguous provocation scenario took place in cyberspace. These findings are consistent with the original hypotheses that the inherent ambiguity of cyber interactions due to minimal social and contextual cues result in a general trend to misattribute others’ intent in this particular context (Kowalski & Limber, 2007; Suler, 2004). Although all of the hypothetical scenarios in the Hostile Attribution Assessment

involved some sort of ambiguous social provocation, it is possible, and likely, that the cyber scenarios in themselves were relatively more ambiguous than the traditional scenarios. Children who do not exhibit HAB in face-to-face interactions may be more likely to choose hostile explanations for an ambiguous behavior within a cyber, rather than traditional, context, a line of reasoning consistent with my finding of relatively higher cyber HAB levels. In this sense, it is traditional HAB, rather than cyber HAB, that is the most discriminating predictor of children's cyber victimization. Perhaps cyber HAB does not function as a predictor of cyber victimization because interpretive deficits in cyber contexts are the norm, and thereby exhibited across participants, regardless of involvement. Contrarily, it is specifically the children with pronounced interpretive deficits who misattribute hostile intent in ambiguous *traditional* scenarios, and are thereby at greater risk of cyber victimization. Nonetheless, given that the finding of specifically traditional HAB predicting cyber victimization was somewhat unexpected, future research needs to replicate this predictive pattern.

Limitations

The results of the present study should be interpreted carefully given several methodological limitations. First, although children were told and reminded that their responses on the survey were completely anonymous and confidential, the sensitive nature of the material (e.g., reporting being a bully) may have resulted in some children not responding honestly. In particular, this hesitancy to tell the truth could explain why so many more children reported being victims than bullies. Using the term "bully" and "cyberbully" in items assessing children's frequency of involvement was a quick and concise way of evaluating their behavior; however, children may have reported greater

involvement in bullying if they had been asked about specific behaviors, rather than being exposed to the rather loaded term, “bully.” In fact, past research has demonstrated that children report significantly lower levels of involvement in bullying when the word “bully” is used in the measure (Kert, Coddington, Tryon, & Shiyko, 2010). It is therefore likely that the present study underestimates the extent of children’s bullying behavior. In order to develop a more accurate understanding of children’s bullying and cyberbullying rates, future studies should use behavioral items and refrain from including potentially threatening terms in surveys, especially with younger age groups.

Additionally, the cross-sectional nature of the study prevents explanations of timing, with respect to the association between HAB and victimization. It remains unclear if children develop this interpretive deficit at an early age and are then at a greater risk of victimization or if being victimized results in children developing a hostile attribution bias. It is also possible that both these processes can explain the aforementioned association; some children may exhibit HAB from a young age, whereas others only exhibit this bias following experiences of victimization. The inability to distinguish if HAB is an antecedent, consequence, or both of any type of involvement in aggression is a problem faced in similar studies (Pornari & Wood, 2010). Accordingly, it would be valuable to conduct a longitudinal study as a means of determining the nature of the association.

Finally, as briefly previously explained, the value and function of the likelihood HAB index from the Hostile Attribution Assessment needs to be further explored. Despite the likelihood index being correlated with victimization, it did not uniquely predict cyber victimization. I suggested several explanations for why specifically the

traditional dichotomous HAB index was a significant predictor of cyber victimization, including the explicitness of the dichotomous item providing a better estimate of HAB than rating the likelihood of different explanations. Because the measure only presented children with four possible explanations for the ambiguous social interaction, children's cognitions about what was occurring in the vignette may not have been covered by the explanations provided. Put simply, there are endless explanations for a given behavior, and only four were provided in the measure. This may have resulted in an index that did not completely accurately reflect children's social cognitions, specifically how they interpret ambiguous social information. In order to circumvent this problem, future research should explore alternative ways of measuring HAB and allow open-ended responses for children's personalized attributions. Additionally, given the apparent predictive value of the dichotomous item, studies evaluating HAB should continue to incorporate this particular part of the measure.

Directions for Future Research

The present study exclusively focused on one specific interpretive deficit and, consequently, one specific stage of the social information processing model. In order to further an understanding of how children's social cognition relates to their involvement in both traditional and cyber bullying, attention should be focused on additional social cognitive factors that may relate to aggression in the cyber context, such as theory of mind and social problem-solving skills. Given that theory of mind involves the ability to understand others' mental states and intentions, it seems plausible that deficits in this skill may increase the likelihood of cyber aggression and victimization (Slaughter, Dennis, & Pritchard, 2002). Similarly, identifying associations between social problem-solving

skills and involvement in cyberbullying could help determine if children become cyberbullies in reaction to victimization due to a lack of alternative coping strategies. Because I found that HAB was exclusively associated with victimization, future research should also seek to identify the social cognitive profile of bullies. Factors such as moral disengagement, outcome expectancies, and response decision making strategies have been linked with bullying in traditional contexts (Toblin, Schwartz, Gorman, & Abou-ezzeddine, 2005), but very little attention has been focused on the extent to which they relate to cyberbullying. Developing an understanding of how other social cognitive variables relate to cyber aggression will help to provide greater insight into children's social information processing in the cyber world and the deficits associated with each individual step of the six-stage SIP model.

In terms of methodology, future research could benefit from modifying the current measure of HAB, or implementing multiple measures of HAB, rather than solely a paper and pencil questionnaire. Because the likelihood HAB index in the current questionnaire exhibited no predictive value, it would be worth altering the nature of this component of the measure. Past research has asked children to choose the most likely option of four different explanations (two benign, two hostile) for an ambiguous provocation scenario, rather than rating the likelihood of each explanation (Crick & Dodge, 1996; Murray-Close, 2011). This forced choice option may provide a more explicit index of HAB because it requires children to make a more definitive decision about the intention of the actors. In this sense, a forced choice likelihood index may function more similarly to the current dichotomous HAB index, which was successful in predicting cyber victimization.

Additionally, some studies have replaced written vignettes with videotaped vignettes involving an ambiguous provocation scenario, followed by questions assessing children's intent attributions (Katsurada & Sugawara, 1998). Using videotapes allows children to observe a more realistic peer interaction, rather than relying on them to imagine a hypothetical scenario involving faceless actors. Furthermore, a videotape measure could be adapted to include cyber items. In addition to witnessing videos of ambiguous social interactions that take place in a school setting, participants could watch videos of ambiguous chatroom exchanges or text message conversations, followed by an assessment similar to the forced choice indices previously mentioned.

Finally, it is important that future studies examine how demographic variables, such as gender and race, may further inform the nature of my findings. Extensive research has explored how aggression type varies across gender, with boys more commonly engaging in overt or physical aggression and girls tending towards relational aggression (Crick, Ostrov & Werner, 2006; Katsurada & Sugawara, 1998). Given that cyberbullying rarely takes the form of physical aggression (with the exception of threats of physical harm), it would be worth investigating if and how the context of cyberbullying puts girls or boys at greater risk of bullying or being victimized. Similarly, research has explored how race and ethnicity influence involvement in traditional bullying and found that ethnic minority adolescents are actually less victimized but at a greater risk of bullying others in an ethnically heterogeneous classroom (Vervoort, Scholte, & Overbeek, 2010). In light of the potential for anonymity in cyber contexts, ethnicity may play a less significant role in influencing cyber, versus traditional, bullying and victimization. Furthermore, studying the specific demographic characteristics as well

as the social cognitive profiles of children who are involved in both traditional and cyber bullying will help to inform future bullying prevention and intervention programs.

Implications for Prevention and Intervention Initiatives

The findings of the current study should inform future bullying prevention and intervention programs, especially given that children as early as elementary school are engaging in both traditional and cyber bullying. There is significant overlap between children involved in traditional and cyber bullying and victimization, and thus it is important for children who take part in these behaviors within traditional contexts to be identified and appropriately educated so as to prevent the translation of these experiences in the cyber world. Although cyberbullying frequently takes place outside of school, it is crucial that school officials do not simply brush off this behavior as outside of their jurisdiction. In light of the overlap between traditional and cyber bullies and victims, communication between children, parents, and school officials is of utmost importance. As bullying crosses new boundaries at increasingly younger ages, schools should seek to introduce intervention programs that address tackling both traditional and cyberbullying, stressing the severity of both phenomena.

Additionally, my findings concerning children's social cognitive skills demonstrate that hostile attribution bias is operating as early as the elementary school years and, at least to some extent, making children more vulnerable to victimization. These results, though troubling, underscore the importance of incorporating some form of cognitive training in bullying and cyberbullying interventions. Educational programs that target children's social information processing biases would likely be effective in reducing interpretive deficits characterized by the misattribution of hostile intent. More

specifically, teachers and parents alike should assist children in developing benign attributions for ambiguous provocations by offering them alternative explanations for behavior that children consider hostile. By providing children with the skills necessary to more objectively interpret ambiguous social provocations, adults can help to reduce the prevalence of children's perceived victimization. In order for such educational opportunities to arise, however, it is also important that adults continually reinforce to children the importance of informing adults when they perceive victimization. Efforts should also be made to create attributional retraining interventions in schools to ensure that all children receive the tools to modify their potentially maladaptive social information processing.

Although cyberbullying and victimization do not appear to be distinctly new constructs, it is nonetheless important to acknowledge how this context is unique in its ambiguity and how this characteristic may create an environment of heightened social risk for young children. Parents and teachers should be aware that children need more guidance and supervision when first using electronic communication; by teaching children the appropriate functions of these technologies, adults can help to circumvent children's negative social experiences in cyber space. When children begin using the Internet and cell phones, parents should alert them to the more ambiguous nature of cyber interactions and encourage them to seek out an adult when they encounter such unclear information while electronically socializing with peers.

Conclusion

Taken together, the results of the present study indicate that children have access to electronic communication technology as early as elementary school and use these

devices, at least to some extent, to engage in bullying behaviors. Children who are bullies and/or victims in traditional contexts are more likely to take on these same roles within the cyber context. Moreover, deficits in social interpretation appear to be closely related to victimization across both contexts. In light of these findings, it is hoped that future research continues to explore the prevalence of cyberbullying involvement in elementary school aged children. Furthermore, my results indicate that a social information processing perspective provides an effective framework for better understanding the social cognitive profiles of bullies and victims.

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Table 1

Frequencies of Technology Use (%)

	Not at all	< 30 Min	30-60 min	> 1 hour
Cell phone	26.4	38.8	10.1	8.5
Internet	8.5	31.0	32.6	22.5
Facebook	38.8	16.3	5.4	10.9
Chatrooms	40.3	15.5	10.9	9.3

Table 2

Correlations Between HAB and Frequencies of (Cyber)Bullying Involvement

	Trad Likelihood	Cyber Likelihood	Trad Dichot.	Cyber Dichot.
	HAB	HAB	HAB	HAB
Overall	.39**	.26*	.45*	.20
involvement				
Bullying	.06	.02	.03	-.09
involvement				
Vict.	.41**	.30**	.50**	.31**
Involvement				
Trad	.36**	.24*	.37**	.23*
involvement				
Cyber	.25*	.18	.34**	.09
involvement				
Trad bully	.04	.02	.01	-.07
Trad vict.	.45**	.35**	.52**	.32**
Cyber bully	.08	.02	.05	-.08
Cyber vict.	.26*	.23*	.43*	.19