

## ABSTRACT

Title of Document: THE EMOTIONS AND SOCIAL  
INFORMATION PROCESSING PATTERNS  
OF AGGRESSIVE CHILDREN

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This study examined children's emotions, ratings of aggressive behaviors and aggression related social information processing patterns. Second and third grade students completed self-reports of anger and aggression, as well as a measure of SIP. The students' teachers and peers also completed aggression ratings that differentiated between reactive and proactive aggression and overt and relational aggression respectively. Exploratory factor analyses revealed inconsistent results with previous studies regarding the designation of items as "reactive" or "proactive" on aggression ratings scales. Generally, teachers and peers agreed in their ratings of aggression, but did not agree with students' own self-reported aggression. There were modest correlations between hostile SIP responses and reports of aggression, and modest to moderate correlations between hostile SIP responses and self-reported anger. Finally, neither aggression nor anger made a unique contribution to predict SIP hostile intent

attribution. However, anger did contribute above and beyond SIP intent attribution to predict self-reported aggression.

THE EMOTIONS AND SOCIAL INFORMATION PROCESSING PATTERNS OF  
AGGRESSIVE CHILDREN

By

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## Table of Contents

Chapter 1 .....	1
The Role of Social Information Processing in Children’s Social Adjustment .....	1
Social Information Processing and Emotion.....	3
Aggression and Emotion.....	4
Issues in the Measurement of Aggression .....	5
Issues in the Measurement of Emotion.....	7
Statement of the Problem and Research Questions .....	8
Chapter 2: Literature Review.....	11
Social Information Processing Models .....	11
Cue Encoding.....	13
Cue Interpretation. ....	14
Clarification of goals.....	16
Response access.....	18
Response decision.....	18
Types of Aggression and Social Information Processing.....	19
Social information processing and emotion.....	23
Encoding and interpretation of cues. ....	24
Attribution of intent and anger.....	24
Goal clarification. ....	27
Response decision and anger. ....	29
Anger and aggression.....	30
Observational methods.....	33
Self report methods.....	36
Statement of the Problem and Hypotheses .....	39
Chapter 3: Methods.....	42
Participants.....	42
Measures .....	42
Anger.....	42
Social Information Processing.....	43
Aggression.....	45
Procedures.....	47
Data Analysis .....	48
Chapter 4: Results .....	50
Data Exploration .....	50
Aggression.....	50
Anger.....	59
Demographics.....	62
Question 1: The relationship between social information processing and aggression .....	63
Question 2: The relationship between social information processing and anger....	67
Hostile intent attribution.....	67
Response selection.....	68
Outcome Expectation.....	68
Question 3A: The unique contribution of aggression to social information processing after controlling for anger.....	70

Question 3B: The unique contribution of anger to aggression after controlling for social information processing. ....	72
Chapter 5: Discussion .....	74
Exploration of Measures of Aggression .....	74
Factor Analysis of Peer and Teacher Aggression Scales.....	74
Correlations between aggression measures. ....	77
Correlations between anger and aggression.....	79
Relationship between SIP and Aggression. ....	81
Relationship between Social Information Processing and Anger.....	84
Unique contribution of Social Information Processing and Anger to Aggression. ....	87
General Discussion and Future Research .....	89
References.....	92

## List of Tables

Table 1: Expected Findings.....	48
Table 2: Table of Measures.....	55
Table 3: Peer Aggression Measure Time 1.....	56
Table 4: Peer Aggression Measure Time 2.....	57
Table 5: Teacher Aggression Measure Time 1.....	58
Table 6: Teacher Aggression Measure Time 2-2 factors.....	60
Table 7: Means and Standard Deviations of Aggression Measures.....	62
Table 8: Pearson Correlations of all Aggression Measures.....	63
Table 9: Pearson Correlations between Time 1 and Time 2 ChiA Scales.....	65
Table 10: Means and Standard Deviations of ChiA Scales.....	66
Table 11: Correlations between Aggression and Anger.....	67
Table 12: Means and Standard Deviations for SIP Variables.....	69
Table 13: Summary of Spearman Correlations between variables and demos.....	69
Table 14: Pearson Correlations between SIP components.....	69
Table 15: Pearson Correlations between SIP and Aggression.....	70
Table 16: Pearson Correlations between SIP and Anger.....	72
Table 17: Regression of Intent Attribution on Anger and Aggression.....	75
Table 18: Regression of BBS T1 on SIP and Anger.....	78

# Chapter 1

## *The Role of Social Information Processing in Children's Social Adjustment*

The social information processing (SIP) model proposed by Crick and Dodge (1994) has been used repeatedly for studying the cognitive processes associated with aggressive behaviors in children. This model aims to break down social information processing into empirically testable components that include six steps: encoding of cues, interpretation of cues, clarification of goals, response access, response decision, and behavioral enactment. The cyclical nature of the model enables the various components to influence each other, although the steps are thought to occur in sequence. Each step of the model is influenced by social schemas stored in the child's memory. These schemas comprise an organized knowledge set that is called upon to help the individual respond in a new situation.

Research has consistently documented that socially maladjusted children, specifically aggressive children, differ from their socially adjusted peers in all stages of the SIP cycle (see Crick & Dodge, 1994). Aggressive children encode fewer cues in the environment and rely on their internal schemas to guide their interpretations of the situation (without considering the available information) more often than their non-aggressive peers (Dodge & Tomlin, 1987). When interpreting the cues, aggressive children make more hostile intent attributions in ambiguous social situations than non-aggressive children (Crick & Dodge, 1994; Orobio de Castro et al. 2002). Whereas socially adjusted children pursue relationship-enhancing goals, socially maladjusted children report more antisocial goals, such as revenge (Erdley & Asher, 1996). Lastly, aggressive children are more likely to access more aggressive



responses to ambiguous social situations than their non-aggressive peers, as well as enact more aggressive responses (Quiggle, 1992). Besides endorsing more aggressive responses, aggressive children also believe their responses will produce more favorable outcomes and they are more confident in ability to carry out an aggressive response than non-aggressive children (Erdley & Asher, 1996).

Aggressive behaviors in childhood have been linked with several coexisting problems, such as peer rejection and domestic conflict (Coie & Dodge, 1998), as well as documenting aggression's stability and predicting later adjustment problems such as delinquency, school drop out and substance abuse (i.e, Parker & Asher, 1987).

What is even more compelling is that many of those known correlates with aggression are disproportionately present among minority youth (Graham, Hudley, & Williams, 1992). The implications for more in depth research about the aggressive behaviors of children will be beneficial to revise or develop new interventions in schools to address aggressive behavior of students and help prevent social adjustment issues in the future.

The term aggression itself has come under scrutiny as to what exactly it is and how to measure it. Aggression has historically been defined as a behavior deliberately aimed at harming people and/or objects (Dodge & Crick, 1990). In this definition, harm is implicitly defined as hurting someone physically. However, other forms of harm include relational harm, in which harm is inflicted through damage or control of friendships or other relationships (Crick & Grotpeter, 1995). In the 1960's, aggression was defined as one category of behavior. At that time, there were two competing theories about aggression in humans. One was the frustration-aggression

theory by Dollard (1939) and was later revised by Berkowitz (1989) that suggests that aggression is a hostile and angry reaction to a perceived frustration. According to this theory, anger, perceived threat or goal blocking are all forms of frustration and frustration leads to aggression. The other dominant theory of aggression was social learning theory of Bandura (1973). Bandura considered aggression to be an acquired behavior that is controlled by an anticipated reward. In this theory, expected success of the behavior, rather than punishment, is what instigates aggression. As time passed, these two seemingly opposing theories recognized that each theory referred to a different aspect of aggression and it has become apparent that aggressive behavior manifests in multiple forms.

The social information-processing model is appealing to use as a framework for studying the social cognitive factors that influence aggressive behavior for a couple of reasons. First, the model is broken down into components at each stage of the cycle that is hypothesized to influence behavior. The components are theorized to be measurable points in time, which can then lead to providing empirical evidence to the model. Second, the SIP model is the integration of knowledge from diverse fields that have posited models about children's social behavior and adjustment, such as developmental and cognitive psychology and has contributed to our understanding of children's social adjustment by looking at individual's cognitions during a social interaction (Crick & Dodge, 1994).

### *Social Information Processing and Emotion*

In 2000, Lemerise and Arsenio called for the inclusion of emotionality in the SIP cycle. They claim that individual differences in emotional processes play a role

in SIP. Emotionality, as defined by Eisenberg and Fabes (1992) refers to how easily emotions are aroused, their duration and their intensity. Crick and Dodge (1994) refer to emotion, only briefly, in their re-formulation of the SIP cycle, by suggesting it can be included in the central database, which contains the individual's biologically determined capabilities that are brought into social situations. Lemerise and Arsenio (2000) suggest that the impact of emotionality on behavior depends on the ability to regulate emotions. Emotion regulation involves the management of the duration, intensity, and expression of emotions in order to successfully engage in the environment (Eisenberg & Fabes, 1992). Individual differences in emotion regulation have been reported at all ages. Preschoolers who have poor emotion regulation and high emotionality (high intensity and duration of emotions) are at risk for problem behaviors that may begin in elementary school (Eisenberg, Fabes, & Guthrie et al, 1996).

Lemerise and Arsenio (2000) have suggested that poor emotion regulation may be related to SIP patterns associated with socially maladaptive behaviors. For example, when children who are aggressive find themselves in mild to moderate emotional arousal, they make more SIP errors of hostile intent attributions and prefer instrumental goals over social relational goals than do their non-aggressive peers (Dodge & Somberg, 1987; Orobio de Castro, Slot, Bosch, Koops, & Veerman, 2003).

### *Aggression and Emotion*

Researchers have found that aggressive children express more negative emotions than their non-aggressive peers (Fabes & Eisenberg, 1992; Hubbard, 2001) and may therefore have difficulty in regulating the external expression of emotion. In

addition, researchers have also found that aggressive children experience more negative emotions than their non-aggressive peers (Eisenberg & Fabes, 1995) and these findings suggest that aggressive children may have difficulty regulating the internal experience of emotion. More specifically, research on emotion regulation strategies has suggested that aggressive children may have less well-developed strategies to regulate both external expression and internal experience of anger than their peers (Fabes & Eisenberg, 1995; Hubbard, 2001).

However, issues in the measurement of aggression and emotion, have lead to inconsistent findings. Several studies have failed to find a connection between ratings of aggressive behavior and anger expression during an aggressive act or a peer provocation (Arsenio, Cooperman, & Lover, 2000; Hubbard et al., 2002). When studies have found significant relationships, they have found that more baseline anger, that is, anger measured prior to the situation, does indeed associate with subsequent aggressive behavior (Arsenio, Cooperman, & Lover, 2000). The following sections describe the measurement issues that may be affecting aforementioned results.

### *Issues in the Measurement of Aggression*

Aggression is a multifaceted construct. Theories of aggressive behavior suggest different aggressive behaviors can be distinguished by their origin and function. According to Dodge and Coie (1987), reactive aggression is a hostile response to a provocation or a perceived threat and usually occurs with negative affect and expression, and proactive aggression is a non-provoked, purposeful act, aimed at harming others, albeit by intimidation or by obtaining a goal. Reactive

aggression's origin lies in frustration-aggression models (Berkowitz, 1993) and proactive aggression stems from social learning theories where behavior is controlled by reinforcements (Bandura, 1973). Substantial positive correlations have been found between the two types of aggression (Dodge & Coie, 1987), however, further research, using confirmatory factor analysis, on scales that seek to distinguish between the two have revealed that a two factor model is a better fit than a single factor for the two types of aggression (Poulin & Boivin, 2000). The current study will make the distinction between reactive and proactive aggression.

Teacher ratings are one commonly used measure of aggression in children, and researchers have developed teacher ratings scales that are able to differentiate reactive and proactive aggressive students (i.e., Dodge & Coie, 1987). Peer nominations are another commonly used method of measuring aggression in children. It appears as though teacher and peer ratings of aggression correlate for un-provoked physical aggression (a characteristic of proactive aggression), however, teachers' ratings of provoked physical aggression (i.e., reactive aggression), outburst aggression, and verbal aggression are not correlated with peer ratings (Lancelotta & Vaughn, 1989). Surprisingly, many studies interested in aggressive behavior do not make the reactive/proactive distinction when measuring aggression. This appears to be a problem because of the differing origins, means, goals, and behavioral enactments manifested by these types of aggression (Crick & Dodge, 1996), as well as questioning whether or not teachers and peers are accurately reporting all types of aggressive behavior.

Another issue in the measurement of aggression concerns the many informants available to researchers to call upon to report aggressive behaviors. Teacher ratings and peer rating are the two common methods to label children as aggressive or non-aggressive. A majority of the studies in the literature use either or both of these methods in investigations. A third way to measure aggression is to ask children directly about their aggressive behavior; however, this method is scarce in the literature. In general, there is no consensus in the field about how to best measure aggression and because there are various methods to measure aggression, inconsistencies obtained from study to study could be due to the differing measurement techniques. The current study will add to the literature by measuring aggression in the three ways described above, by teacher ratings, peer ratings, and self-report and by distinguishing between reactive and proactive aggression.

#### *Issues in the Measurement of Emotion*

The measurement of emotion has been difficult for researchers for many years, as there is a wide array of different approaches that have been utilized to measure anger. Some have suggested that different approaches to measuring anger may actually tap into different aspects of anger (Hubbard et al., 2002). For example, observational techniques may lead to a better understanding of the expression of anger (Hubbard, 2001), while children's self-reports and physiological methods may lead to insight about children's internal emotional regulation of anger (Hubbard et al., 2002). This issue has lead researchers to call for a multimethod approach, which will enable investigators to measure different aspects of anger (Hubbard et al., 2002).

Besides varying measurement techniques available to researchers to measure emotion, studies involving emotion greatly vary in the settings in which they take place. Some studies take place in a laboratory, where participating children come to play an anger-inducing game with a peer confederate and are then either asked how angry they felt about playing the game, after playing the game (i.e., Dearing et al., 2002), or observers record and code the participants' facial expressions and non-verbal gestures for anger content (i.e., Arsenio, Cooperman, & Lover, 2000). Other studies, although fewer in number, ask about emotion regulation in a more generalized way, and not in the context of a particular situation (i.e., Bohnert, Crnic, & Lim, 2003). It may be argued that these two experimental settings appear to describe different aspects of emotionality that impact subsequent behavior. The current study seeks to add to the literature pertaining to more generalized emotion regulation of anger and how it may be related to aggression, especially because this persisting type of anger has yet to be integrated to aggressive behavior in children.

#### *Statement of the Problem and Research Questions*

The present study will address the issues raised above. First, it will continue to add to the growing body of research connecting emotionality to social information processing and emotionality to aggression. Second, it will address the issues of measurement by differentiating between reactive and proactive aggressive children, and asking children to self-report about their general tendencies to experience and express anger, unrelated to a provoking social situation. There are three main parts to the study. The first part will explore the relationship between social information processing and types aggression, the second part will explore the relationship between

social information processing errors and anger, and the third part will explore the relationship between aggression and anger.

The specific questions in the first section, the relationship between social information processing and aggression are:

1A. What is the relationship between hostile intent attribution and presence of reactive and/or proactive aggressive behavior, as measured by self, teacher, and peer?

1B. What is the relationship between the degree of aggression in a student's response to a hypothetical situation and the presence of reactive and/or proactive aggressive behavior, as measured by self, teacher, and peer?

1C. What is the relationship between how effective a student's belief in the effectiveness of a hypothetical aggressive response to solve problems and the presence of reactive and/or proactive aggressive behavior, as measured by self, teacher, and peer?

The research questions for part two, the relationship between social information processing and anger are:

2A. What is the relationship between the level of anger of a student and how much hostile intent they attribute to a hypothetical situation when intent is unclear?

2B. What is the relationship between level of anger of a student and the aggressiveness of their hypothetical response to a hypothetical situation?

2C. What is the relationship between the level of anger of a student and how effective they believe an aggressive response would be to solve a problem?

The third part of the study, exploring the relationship between anger and aggression will answer the following questions:



3A. What is the relationship between social information processing and aggression, after controlling for anger?

3B. What is the relationship between anger and aggression, after controlling for social information processing?

## **Chapter 2: Literature Review**

Research on childhood aggression has revealed patterns in social information processing (Crick & Dodge, 1994), as well as in emotion regulation that characterize aggressive children, differentiating them from their non-aggressive peers (Fabes & Eisenberg, 1992). Aggressive behavior exhibited during childhood has been associated with negative outcomes later on in life, which may include, externalizing disorders, delinquency, and early school withdrawal (Kupersmidt & Coie, 1990; Parker & Asher, 1987). The current study seeks to better understand the relationships between social information processing, children's anger and children's aggressive behavior.

### *Social Information Processing Models*

For the past twenty years, researchers have studied children's social adjustment, stressing the possibility that difficulty in childhood can have a lasting impact through adulthood. Social information processing models have been created as one way to better understand a child's interaction with the social world (Dodge & Crick, 1990). Through further investigation, researchers have expanded the social information-processing model from a linear model, where a series of processes occur mentally within the child before producing a social behavior (Dodge, 1986), to a cyclical model of interrelated mental steps, which then produce a social behavior (Crick & Dodge, 1994). In social information processing models, it is proposed that

children enter a social situation with predetermined factors that will have an impact on the ultimate response to the situation. These factors include memories of past experiences and subsequent acquired social schemas. Additional factors may include biological predispositions. Other authors have further expanded upon Crick and Dodge's model to include emotional and cognitive processes as factors in determining social behaviors (i.e., Lemerise & Arsenio, 2000).

Crick and Dodge (1994) propose six steps in their social information-processing model. The first two steps deal with encoding and then interpreting the cues in the social situation. First, children selectively pay attention to internal and external cues and then select which cues they will interpret. After the cues are interpreted, children next clarify goals by selecting a desired outcome to resolve the social situation. Step four is response access or construction where children either used stored memories for a response, or they construct novel behaviors to respond to the social situation. The fifth step in the model is response decision. During this step, children evaluate the possible responses they have gathered in the previous step and select the behavior that is most positively evaluated. There are certain factors that weigh on this decision. Outcome expectations, self-efficacy of performing the act, and the appropriateness of the behavior are all possible factors that may be considered. The final step in the model is the actual behavior enactment. The model begins again after the behavior is evaluated and responded to by a peer, for a continuous flow of interactions.

The various components in social information processing models are often studied in discrete steps, although the theory itself suggests that all the steps are

interrelated. It is important to tease out the steps for research purposes in order for investigators to know that they are measuring a particular step and then know whether or not the participant is committing an error during the social problem solving process. The most common method of assessing social information processing is to present hypothetical vignettes to participants of either ambiguous or problematic social situations. After presenting the vignettes, participants are asked questions that are designed to elicit responses related to each stage of the social problem solving process. The extensive use of the social information process model and hypothetical situation method have produced patterns of results that suggest that children with deficits in social information processing are more likely to be socially maladjusted than peers who do not display such deficits. A selection of studies will be reviewed below with particular attention to aggressive behaviors.

### *Cue Encoding.*

Crick and Dodge (1994) suggest that in social situations, children encode cues by relying on previous knowledge and experiences and recalling them from memory. However, over-reliance on these internal processes may cause external factors, such as relevant cues in the immediate situation, to be overlooked and not utilized, leading to a misrepresentation of the situation and an inappropriate response. Dodge and Tomlin (1987) investigated cue encoding by asking children to infer intent of a provocateur in a hypothetical situation. They found that aggressive children were less likely than their non-aggressive peers to use information that was present in the immediate situation. Dodge and Tomlin also suggest that aggressive children rely on

information from internal schemas to guide their interpretation of an event more so than their non-aggressive peers.

*Cue Interpretation.*

Research on the various processing stages of the SIP model has produced evidence of a relationship between certain processing tendencies and aggression in children. One of the more studied phenomena is the greater tendency of aggressive children to make hostile intent attributions to a peer in an ambiguous social situation than their non-aggressive peers (Graham, Hudley, & Williams, 1992; Quiggle, Garber, Panak, & Dodge, 1992; Crick & Dodge, 1996). Quiggle, Garber, Panak, and Dodge (1992) studied a sample of third through sixth graders, aged nine to twelve, who were rated by both teachers and peers for aggressive behavior. After the participants were read a story about a provocation situation and an entry situation, they were asked a series of questions to test attribution of intent (was the act on purpose). The results indicate that children who were rated as aggressive were more likely to attribute hostile intent to the provocateur than those participants rated as non-aggressive. Graham, Hudley, and Williams (1992) found a similar result when they presented participants with a hypothetical vignette about an ambiguous social situation and then asked them about the intent of the provocateur. Aggressive participants attributed hostile intent significantly more than non-aggressive participants.

According to Crick and Dodge (1994), the tendency to find aggressive children interpreting peer intentions as more hostile than non-aggressive children is

found consistently in the literature from preschool age through 8<sup>th</sup> grade. More recently, due to the numerous studies that have or have looked at the connection between hostile attribution of intent and aggressive behavior, Orobio de Castro et al. (2002) conducted a meta-analysis to explain the differences in the findings. The meta-analysis established a strong relation between hostile attribution of intent and aggressive behavior. The results also indicated there were large differences in studies, ranging from robust effects to no effects that could be explained by differing study characteristics. A number of child characteristics and method characteristics are cited as possible explanations that may have influenced the varying results. One characteristic hypothesized is the severity of the participants' aggressive behavior. That is, one would expect a larger difference between hostile attribution of intent and a very aggressive child versus a non-aggressive child, than if the comparison groups were of children who both exhibit aggressive behavior. Another child characteristic proposed to explain the different findings is the type of aggressive behavior the participant exhibits. There is empirical evidence that shows a stronger relationship between hostile attribution of intent and reactive aggression rather than proactive aggression (e.g., Crick & Dodge, 1996). Gender and age are two other child characteristics that may influence the empirical studies conducted thus far. Crick and Dodge (1996) show that hostile attribution of intent and age are negatively correlated and Orobio de Castro et al. (2002) examined the potential impact gender may have on hostile attribution of intent and aggressive behavior.

Discrepant findings across a plethora of studies concerning social information processing and aggressive behavior may be explained by methodological differences

between the studies (for a review, see Orobio de Castro et al., 2002). First, studies vary in how they present the hypothetical ambiguous situation. The more personally involved the participant feels, the stronger the observed hostile attribution of intent is observed. For example, Orobio de Castro et al. (2002) found consistently smaller effects when the stimuli was presented to the participants in video or picture form and found larger effects when the stimuli was a live interaction. However, larger effects were seen for audio presented vignettes than video-based situations as well. The authors contend this may be because there is distracting information in pictures and videos that may cause the participants to not see the negative event as readily as when they only hear the situation. Second, the specifics of the story and the response format may also have an influence on the observed effect. For instance, studies vary in the severity of the socially threatening situation described in the vignette and those with more severe provocation, for example, physical harm, shows a larger effect than those with less harmful provocation (Orobio de Castro et al., 2002). Overall, despite child and methodological differences that may explain the range of effect sizes, there appears to be a significant relationship between hostile attribution of intent and aggressive behavior.

### *Clarification of goals.*

The third step in the social information processing model is clarification of goals. As Crick and Dodge (1994) suggest, children focus on a particular outcome in a given situation depending on how they interpret the cues. Studies show a significant relation between social adjustment and selection of social goals. Socially adjusted

children tend to pursue relationship-enhancing goals, while socially maladjusted children (i.e., aggressive) tend to select goals that are likely to damage a relationship (Crick & Dodge, 1994) such as revenge and hurting the person's feelings.

Erdley and Asher (1996) examined whether children's reported behavioral responses are related to differences in their social goals. Using the ambiguous hypothetical provocation paradigm, Erdley and Asher asked the participants how they would respond to a peer conflict situation and divided the answers they received into three groups: aggressive responder, withdrawn responders, and problem solvers. In a follow up interview, the participants were reminded of the previous situation and were asked "What would you be trying to do?" They were then asked to rate the extent to which they would be trying to accomplish the following eight goal alternatives: getting back at the provocateur, working out the problem peacefully, avoiding the protagonist, protecting the self, taking care of the problem created by the protagonist, maintaining the relationship, and maintaining an assertive relationship.

The results show withdrawn responders and problem solvers endorsed goals that can be categorized as prosocial goals (i.e., maintaining the relationship, taking care of the problem), while aggressive responders endorsed goals that were categorized by revenge and protecting the self. Additionally, those participants who attributed hostile intent, as well as benign, who still responded aggressively, were more likely to endorse hostile social goals. Erdley and Asher (1996) thus show that social goals have a moderating effect on intent attributions.



### *Response access.*

After children select goals, they must access behavioral response choices in order to attain the goal. These behavioral responses are recalled from long-term memory and contain strategies for how children will solve the problem (Crick & Dodge, 1994). Researchers have been interested in the number of behavioral responses generated, the actual content of the responses, and the order in which the responses are accessed. Studies have shown that aggressive children access fewer behavioral responses to solve social situations compared to their non-aggressive peers (Pettit, Dodge, & Brown, 1988), as well as access more aggressive responses and less friendship seeking responses to provocation (Quiggle et al., 1992).

### *Response decision.*

Upon accessing potential behavioral responses, children must then select the response they wish to enact. Crick and Dodge (1994) suggest that children evaluate potential responses to social situations by considering the content of the response, the expected outcome of the behavior, and the self-efficacy associated with enacting a particular response. Studies suggest that socially maladjusted children make response decisions that are aggressive or otherwise non-normative regardless of using aggression or rejection as an index of social maladjustment (i.e., Quiggle et al., 1992). For example, Quiggle et al. (1992) used the hypothetical situation paradigm to investigate the social information processing patterns of 220 children in grades 3-6. Peer nomination and teacher ratings identified children as either aggressive, depressed, both aggressive and depressed, or neither. The participants were read

three types of responses to the hypothetical situation that were either aggressive, withdrawn, or assertive, and were then asked to rate how good or not good the response was and also what they thought would happen if they acted out that behavior. The participants were then asked how likely they would engage in that behavior themselves in response to the situation and how easy it would be for them to react in the described manner. The results showed that for aggressive responses, aggressive children, compared to their non-aggressive peers, were more likely to endorse the aggressive response and said it would be easy for them. There was no effect for aggression in the withdrawn or assertive response condition.

Research also suggests that aggressive children differ in their self-efficacy in accomplishing their selected goals from withdrawn or prosocial children. Erdley and Asher (1996) asked children the following question after presenting them with eight social goals in relation to a hypothetical situation, “do you think you would be good at doing each of these things if you tried them?” They found that aggressive responders believed they would be good at completing antisocial goals, such as revenge, and less efficacious at achieving prosocial goals, such as working the problem out.

### *Types of Aggression and Social Information Processing*

Recently, based on patterns of social information processing deficits, researchers have made the distinction between two types of aggressive behavior, reactive and proactive aggression (Dodge & Coie, 1987; Crick & Dodge, 1996; Poulin & Boivin, 2000). Reactive aggression is characterized as a response in order

to defend oneself from provocation, while proactive aggression is described as using aggressive behavior to attain a desired social goal. Participants in studies who experience difficulties during cue interpretation of the social information processing model, most often attributing hostile intent to the situation, are often rated as reactive aggressive by teachers and peers (Crick & Dodge, 1994; Crick & Dodge, 1996) while proactive aggressive participants often experience deficits in stage five of the SIP model, response decision (Crick & Dodge, 1994; Crick & Dodge, 1996).

Dodge and Coie (1987) first tested a teacher rating scale to measure reactive and proactive aggressive behaviors in children. They examined the validity of reactive and proactive aggression as two distinct constructs and also looked for a relationship between type of aggression and attributional biases. Using a sample of 359 all male and all African American students in first and third grade, and using their teacher rating scale for reactive and proactive aggression, as well as sociometric ratings for liking, they found statistical support for the distinction between the two types of aggression but caution that it appeared as though teachers rate children's aggressive behavior based on one dimension. They also found different behavioral profiles for the different types of aggression. Reactive aggressors were viewed as more angry, whereas proactive aggressors were viewed as leaders and as having a good sense of humor. To test for attributional biases, Dodge and Coie showed the students videotaped vignettes of ambiguous situations and then asked multiple choice questions about the intent of the characters as well as how the student would respond. They found that reactive aggressors made more attributional bias errors than an average peer and that reactive aggressors generate more aggressive responses than all

other groups. It's important that in this study, the Dodge and Coie made the distinction between reactive and proactive aggression. Not all studies make this distinction, although studies in recent years have supported the behavioral differences between the two.

Many studies have shown the distinction between reactive and proactive aggression as two valid types of aggressive behavior. For example, Poulin and Boivin (2000) used confirmatory factor analysis based on teacher ratings using Dodge and Coie's (1987) teacher rating form that purportedly measures reactive and proactive aggression to show that a two-factor model was a better fit for the measure than one model and provided evidence for two types of aggression in a sample of fourth, fifth, and sixth grade boys. Research has shown that reactive aggressive children are more likely to attribute hostile intent in socially ambiguous situations (Crick and Dodge, 1996; Camodeca & Goosens, 2005). Using the SIP model, Crick and Dodge (1996) tested the hypothesis that reactive-aggressive children would exhibit a processing pattern involving hostile attributional bias, that is, more likely to attribute hostile intent to an ambiguous provocation situation. The large sample consisted of third through sixth graders, both boys and girls, 40% African American and the rest Caucasian. Teachers were asked to rate the children on Dodge and Coie's (1987) aggression rating measure, which distinguishes between reactive and proactive aggression. Attribution of intent was measured by reading stories of a social situation to the participants, followed by answering pre-developed questions that when scored produced an attribution of intent score. Results indicate that the younger participants were more likely to attribute hostile intent than the older

participants. However, within the older group, there was an interaction between the reactive and proactive aggressive groups. The reactive aggressive group made significantly more hostile intent attributions than non-aggressive participants. However, the reactive aggressive group did not make significantly more hostile attributions than the proactive group or the combined reactive-proactive group.

In more recent research, the distinction between reactive and proactive aggression and the presence of hostile attribution of intent has been less clear. Camodeca and Goosens (2005), using the same teacher ratings as Crick and Dodge (1996) to measure aggression, the narrative story paradigm to measure SIP, and a participant role scale (bully, victim, follower, defender, outsider, not involved) found that bullies and victims attributed more hostile intent to the situation than the other participants and found a link between bullying and both reactive and proactive aggression, but victimization was only associated with reactive aggression. This is not the distinction that Crick and Dodge (1996) and others (i.e., Poulin & Boivin) have made between the two types aggression. Generally, reactive aggression is associated with victimized and rejected children, while proactive aggression is associated with bullies. Camodeca and Goosens interestingly suggest that the SIP model proposed by Crick and Dodge (1994) is even more supported by their finding because bullies and victims produced deficits in all SIP stages. The cyclical SIP model proposes that every stage influences the next, and Camodeca and Goosens argue that their findings support the notion that by attributing hostile intent during stage two, this then begins a chain reaction carried through the following steps, leading to biased processing, and more aggressive behavior.

### *Social information processing and emotion*

Recently, the literature on the connection between social information processing and children's social maladjustment has expanded to include a focus on potential emotion processes that may occur during the cognitive process. Lemerise and Arsenio (2000) proposed an integration of emotion processes into Crick and Dodge's (1994) social information processing model. Although Crick and Dodge suggest the potential to include emotions in their model, they do not further articulate specific processes or where in the model these emotions would be inserted. The central database of Crick and Dodge's model, from which specific social information processing sequences are drawn, contains memories of prior social situations, social schemas, acquired rules and social knowledge that help guide a child through the social information process. Lemerise and Arsenio (2000) assert that individual differences in emotional processes play a role in social information processing. They suggest that emotion processes from previously experienced feelings to more enduring moods can exert influence on how cues are encoded and interpreted, how goals are pursued and how the social knowledge retrieved from the central database will be utilized during the various steps of the social information process.

Research shows that emotion regulation and emotional style are important components to add to this central database because individuals differ in the intensity of the experience and expression of their emotions, and these differences have the potential to be related to social competence (e.g., Burks, Laird, Dodge, Pettit, & Bates, 1999). Children enter social situations with an existing mood that may be completely unrelated to the situation, such as the anxiety about something at home

and children differ in how they regulate their predisposed emotions. Children who do not regulate their emotions well are at a higher risk to become socially maladjusted (Eisenberg et al., 1996). Lemerise and Arsenio (2000) hypothesize that poor emotional regulators will display social information processing patterns associated with more aggressive behavior. Below is a brief review of some studies that have examined the model Lemerise and Arsenio (2000) propose and have added to our understanding of the role emotions and social information processing.

*Encoding and interpretation of cues.*

In ambiguous situations, a provocateur's anger cues leads to a hostile attribution of intent (Dodge & Somberg, 1987). Cue encoding and interpretation can also be influenced by pre-existing mood or an emotion resulting from interpreting the cue (e.g., Graham, Hudley, & Williams, 1992). After a hypothetical scenario was presented to seventh and eighth graders in a majority African American and Hispanic neighborhood, participants were asked how mad, angry, and grateful they would feel toward the provocateur in the situation. Aggressive students were categorized by teacher ratings and peer nominations. Graham and her colleagues found that aggressive participants reported feeling more angry toward the provocateur than their non-aggressive peers.

*Attribution of intent and anger.*

The emotion of anger and its potential influence on interpreting social cues is becoming a popular area of study. Research suggests that children who report feeling angry toward a provocateur will then be more likely to attribute hostile intent and also

respond in an aggressive manner, or at least endorse such a response more favorably than a peer who does not feel angry toward the provocateur (i.e., Graham, Hudley, & Williams, 1992; Arsenio, Cooperman, & Lover, 2000; Orobio de Castro, Bosch, Veerman, & Koops, 2003; Orobio de Castro, Slot, Bosch, Koops, & Verman, 2003).

Orobio de Castro, Slot, Bosch, Koops, and Veerman (2003) assessed whether boys with aggressive behavior problems attribute more hostile intentions to peers when they are in a negative emotional state. In addition, the study also investigated the question of whether an increase in hostile attributions would be associated with an increase in aggressiveness of response to hypothetical vignettes about social conflict. The participants were 57 boys from the Netherlands, ranging from 9-13 years old. Highly aggressive boys were those referred to special education, moderately aggressive boys were boys who had externalizing problems in the borderline to clinical range as reported by their teachers using the TRF (Achenbach, 1991), and non-aggressive boys were boys who were rated below the Dutch average on the TRF for externalizing problems. The participants were also read vignettes about being hindered by a peer in an ambiguous situation and then asked about the peer's intent and also how they would respond to the situation. Emotion was measured using "Mood-o-meters" which asked the participants to report how they were feeling about each step of the study. In order to induce a negative affective state, the researchers used a computer game where the boys would lose.

Orobio de Castro et al. (2003) found that when highly aggressive boys were in a negative affective state, they were more likely to attribute more hostile intent to a peer's actions, compared to moderate and non aggressive children in negative



affective states. However, an increase in hostile attribution scores following the induction of negative feelings was not followed by an increase in response aggressiveness. Interestingly, before the mood manipulation, highly and moderately aggressive boys did not attribute more hostile intentions than non-aggressive boys. Orobio de Castro et al. (2003) explain this finding in terms of the complicated and evolving understanding of what combination of participants and measures produce the hostile attribution effect and how meta-analyses show there are large unexplained variances in studies once participants and measures are taken into account. Perhaps future studies involving the assessment of more chronic moods would show links between anger, SIP and more aggressive behavior. Chronic tendencies to experience anger may be associated with schemas that would influence aggressive behavior. The inconsistent results from this study underscore the importance for future work to use different measures and populations to study hostile attribution of intent. The present study seeks to add to the existing literature by using a different measure of mood, in this case anger, by employing a standardized measure, as well as various informants to the aggressiveness of the participant, not special education placement.

More recently, Camodeca and Goosens (2005) applied Crick and Dodge's (1994) social information processing model to see how bullies and victims appraise social information and how they react to it. The distinction between reactive and proactive aggression was made in this study, something not commonly seen in the literature when including emotional variables. The authors hypothesize that bullies and victims will display reactive aggression and they will misinterpret ambiguous situations as hostile intentionality. To measure aggressiveness, the authors used

teacher reports and to define bullies and victims, peer reports were used. Social information processing was measured by presenting a hypothetical story with a child interacting with a peer. An incident with ambiguous intent is presented and then each step of the SIP cycle was measured with specific questions. After asking a question about the intent of the provocateur, the authors asked the participants about their emotions about the situation they heard about. There was no additional emotion measure.

The results show that both bullies and victims reported more hostile attributions to the hypothetical situation than other children and they were more likely to say they were angry when asked about their emotions toward the provocateur than peers who were not identified as bullies or victims. As stated earlier, the present study aims to address the discrepancies in the literature by having multiple informants identify aggressors and by using a chronic measure of anger.

#### *Goal clarification.*

As stated earlier, goal clarification has a selective influence on the subsequent steps of response generation, evaluation, and selection in social information processing models (Crick & Dodge, 1994; Lemerise & Arsenio, 2000) and it is characteristic of aggressive children to endorse revenge and dominance instrumental goals (Erdley & Asher, 1996). More recent evidence has shown that when aggressive children are exposed to mild or moderate emotional arousal, they make more social information processing errors of hostile intent attributions and they prefer instrumental goals over relational goals more than their non-aggressive peers (e.g., Orobio de Castro, et al., 2003). Unfortunately, there is no evidence to date that looks

at the differences between reactive and proactive aggressors with respect to the impact of emotional arousal on goal clarification.

Lemerise, Fredstrom, Kelley, Bowersox, and Waford (2006) wanted to assess goal clarification and response decision steps of SIP and how differences in other's display of emotion would influence SIP. They suggested that rejected-aggressive children would endorse hostile/instrumental goals more frequently when the provocateurs were angry and/or sad than when they are happy. In contrast, well-liked children were expected to endorse prosocial and problem-solving goals for all provocateurs' emotions. The sample consisted of 402 children in first, third, and fifth grade, predominantly Caucasian (81%) community. Peer nominations were used to classify children into the following groups: popular-nonaggressive, average-nonaggressive, rejected-nonaggressive, and rejected-aggressive. The participants were shown videotaped hypothetical situation vignettes that showed different provocateur emotions and then asked to evaluate six different goals, dominance, revenge, avoid trouble, avoid provocateur, problem focus, and social relational, and how important each of these goals are to them.

When the provocateur was angry, rejected-aggressive children rated revenge and dominance more highly than the nonaggressive groups, whereas the popular group rated social relational goals more highly than the average group. When the provocateurs were happy, rejected-aggressive children rated dominance and avoiding trouble as more important than did the nonaggressive groups. However, when the provocateur was sad, rejected-aggressive children again rated dominance and revenge more highly than the nonaggressive groups. Finally, correlations revealed that for

rejected-aggressive children, the more important dominance was as a goal, the less friendly the problem-solving response, and this was significantly stronger than those for the nonaggressive groups. The results presented by Lemerise et al. (2006) provide evidence that goal clarification is related to problem-solving strategies and that other's emotions can influence the social information process. The rejected-aggressive children are more reactive to emotional cues and this reactivity may impact their cognition. These results, combined with Eisenberg and Fabes (1992) view about individual differences in children's emotionality and the ability to interpret other's emotions, suggest that emotions are an important component to integrate into SIP to better understand social adjustment. This includes the emotions experienced by the actors as well as reactions to perceived emotions of others.

#### *Response decision and anger.*

Crick and Dodge (1994) state that after children access possible responses to a social situation, they then evaluate the responses in terms of goals, likely outcomes, and the child's self-efficacy in performing that particular response. Lemerise and Arsenio (2000) further suggest that a child's emotion can impact how the responses are evaluated and that anger, sadness, and happiness may pull for different responses. There has not been much research specifically looking at the role emotions may play in this specific social information processing step.

In the previous described study by Camodeca and Goosens (2005), participants were asked to assess their perceived self-efficacy in performing an aggressive response, the ability to inhibit an aggressive response, and performing an assertive behavior by asking them how easy it would be for them to perform the

described behavior. Bullies, victims, and followers said it would be easier for them to act aggressively compared to other children. Camodeca and Goosens indirectly link emotions to step 5 in SIP. They suggest that bullies and victims are angry, and that these groups find it easy to behave aggressively and that anger may influence their confidence to react aggressively, but this was not tested directly.

### *Anger and aggression*

There are inconsistencies in the literature regarding the connection of aggressive behavior and children's anger. Some studies have found that anger is related to aggression (e.g., Arsenio, Cooperman, & Lover, 2000) while others have found no relation between anger and aggression (e.g., Hubbard, 2001). Variation in measurement may be the culprit to these discrepant findings. Anger is usually measured in one of the following ways in the reviewed studies. One method is to observe participants in live settings, either natural or laboratory, and record and code their behavior, mainly their facial expression and nonverbal behaviors (e.g., Hubbard, 2001; Dearing et al., 2002). The other way anger has been operationalized is through self-reports (e.g., Hubbard et al., 2002). In this method, participants are asked, usually via a questionnaire, to report how angry they felt during a particular situation. These different measurement techniques may ultimately tap into different aspects of anger, where observational methods measure external expression of anger, while self reports, as well as physiological methods may look at the internal experience of anger (Hubbard et al., 2002). Interestingly, there are few studies that look at more underlying anger emotions, such as temperament or baseline anger, despite Lemerise and Arsenio (2000) describing emotionality as a natural addition to social information

processing models and social maladjustment. The importance of temperamental or baseline anger lies in their influence on the development and access to schemas that provide the data base for interpretation of and responses to specific situations (what is measured by SIP).

To help better understand the relationship, if any, between the observation of behaviors and self-reports of emotional expressions, Underwood and Bjornstad (2001) tested the correlations between these two methods in reference to children's responses to peer provocation. Children, ages 8-12 years old participated in the study in which they lost a computer game, while being taunted by a peer. Immediately following losing the game, the participants were asked questions about their emotional responses to the peer provocation. For example, questions included "Do you feel mad?" and "When you kept losing, how much did you feel mad?" While the participants were playing the game, the investigators coded their facial expressions, verbal responses, and gestures.

The results indicate only very modest correlations between children's self-reported anger emotion and an observed anger index created by the authors, which included observed anger verbalizations, angry faces, and angry gestures. The overall correlation between self-reported anger and the observed anger index was  $r = .07$ ,  $p < .10$  and due to the small magnitude of all the correlations, self-reports accounted for less than 6% of the variance in observed behaviors. Underwood and Bjornstad (2001) caution that due to ethical considerations they were limited in the types of questions they were able to ask. Moreover, the interaction took place in a laboratory setting and the participants' answers may not be representative of how they would respond in a

natural setting. While these results do not appear to promote the use of children's self-reports over observational techniques for coding emotions, it can be argued that perhaps the small relationships were found because the researchers were asking about children's emotions about a specific situation and not about temperamental anger.

As stated earlier in this review, there are also various ways in which investigators measure aggression. Teacher, peer, self, and parent ratings have all been used to identify aggressive behavior in children for research purposes. Dodge and Coie (1987), as described earlier, created and validated a teacher rating scale for aggressive behavior and found that while their measure was able to detect differences in the types of aggression (reactive and proactive), teachers very often reported aggression on one dimension, mostly physical aggression. Lancelotta and Vaughn (1989) assessed the relation between teacher's perceptions and peer's perceptions of students' aggressive behavior. They used a sample of third and fourth graders, and to measure aggression both teachers and peers used a method called "The Guess Who Game," where description sentences were read and participants were asked who in their class best fit the description. There were five different types of aggression measured, provoked physical aggression, outbursts, unprovoked physical aggression, verbal aggression and indirect aggression, which described acts of tattling and breaking things of another student on purpose. The results indicated that teacher and student perceptions correlated positively for unprovoked physical aggression and indirect aggression and Lancelotta and Vaughn suggest that teachers and peers agree when it comes to identifying bullies, as unprovoked physical aggression descriptions were all sentences about a peer responding aggressively in order to attack or injure

another without provocation. The following review of the literature regarding anger and aggression will reveal that there is still much to learn about the relationship between these two constructs.

*Observational methods.*

One interesting model looking at emotions and aggression suggests that there are two different types of emotions that can be present during an aggressive interaction (Arsenio & Lover, 1997). First, there are aggression-related emotions, that is, emotions that are present during the aggressive behavior. Second, there are baseline emotions that are present during all other times. Arsenio and Lover (1997) were interested in how these two types of emotions would be related to children's conflict and aggressive behavior. In a study with 37 preschool participants, the authors used structured observations to record the preschoolers' emotion displays and the conflict. The observations were made during outdoor free play. The results indicate that children who displayed more baseline anger were only more likely to initiate aggressive behavior. Children who displayed more anger during conflict were also more likely to initiate aggressive behavior, but there was no connection between more anger during conflict and the frequency of aggressive behavior. The intensity of negative emotions also appears to play a role. Arsenio and Lover (1997) found that children with more intense negative baseline emotion and emotion during conflict were more likely to initiate aggression as well as be the target of aggressive behavior.

Building from Arsenio and Lover's (1997) idea of distinct types of emotions, Arsenio, Cooperman, and Lover (2000) looked to see if children who were angrier during baseline periods would not only be angrier during aggressive acts and but



would also be more likely to be aggressive in general. In this study, the authors not only used observational methods of measuring aggression and anger, but used self and teacher report as well. The participants in this study were 51 four to five years olds. The authors' measured anger and aggression through structured observations that were then coded for the acts that were recorded. The children were also asked about their knowledge of emotions and were given scenarios of different situations and asked how the characters in the story felt using puppets. Teachers were also asked to complete the Dodge and Coie (1987) teacher aggression scale as well as complete The Social Competence Scale for preschoolers (Fabes & Eisenberg, 1992).

The findings of this study reveal several interesting points. First, the authors' hypothesis was correct in that children's baseline anger was a significant predictor of aggression, meaning that emotions not related to a specific act affects how the person reacts in that situation. However, secondly, aggression-related anger was not associated with children's aggression. Arsenio et al (2000) suggest that because their study was conducted with preschoolers, anger during aggressive behavior may be considered normal, but anger during non-aggressive acts is not normal behavior. More research with different aged children is needed to see if this finding is based on age differences. It is also important to continue to investigate the distinction between baseline emotions and those evoked in a given context.

Researchers have attempted to use laboratory settings to better understand the relationship between anger and aggressive behavior. Unexpectedly, results from these more standardized experiments reveal inconsistent results, many times not finding a relation between expressed anger and aggression. Hubbard (2001) created a

procedure in which participants played a game with a confederate. The game was rigged to have the participant lose and the confederate blatantly cheated. The game was videotaped and then a coding system was developed to code facial expressions, verbal intonation, and nonverbal behavior. The coding of the facial expression revealed three different variables and three different emotions (anger, sadness, and happiness). The variables coded for each emotion were: the frequency of the expression, the average duration of the expression, and finally the intensity of the expression. Aggressive behavior was measured by peer nominations in second grade classrooms. Hubbard found no differences between aggressive and non-aggressive children in the expression of anger, sadness, or happiness. The nonsignificant finding could be the result of the types of items in the peer nomination process, which were heavily influenced by proactive aggressive behaviors (unprovoked physical aggression) and not on reactive aggressive behaviors. Hubbard points out that emotion expression may be more related to reactive aggression because it is a retaliatory reaction to a provocation and is defined as an emotional response to a perceived or real threat (Dodge & Coie, 1987).

More recently, Hubbard et al. (2002) used a similar experimental procedure to test the emotional expression differences in reactive versus proactive aggressive children. Using a sample of second graders again, Hubbard utilized the same laboratory procedure of rigging a game by a cheating confederate. However, in this experiment, teacher ratings were used to differentiate between reactive and proactive aggressive behavior, but no peer nominations were used. Analyses reveal that only the observed measure of angry nonverbal behaviors was related to aggression, where

it was positively related to reactive aggression and negatively related to proactive aggression. High reactive aggressive children displayed angry nonverbal behaviors more often than low reactive children while playing the game and these behaviors increased as the game progressed. It should be noted that in Hubbard (2001), when the distinction between reactive and proactive aggression was not made, no relation was found between angry nonverbal behaviors and aggression. Similar to other studies, there was also no relationship between anger facial expressions and reactive aggression. Hubbard et al. (2002) suggest this may have been due to the coding scheme used to code the nonverbal behaviors were obvious and facial expressions were more subtle. Hubbard et al. (2002) caution that even though a significant finding was present, it was not particularly strong and suggests that other factors besides anger could be related to reactive aggression, such as self-defense.

#### *Self report methods.*

Researchers have also asked participants to provide information about their emotional processes and expression through self-reports. As Underwood and Bjornstad (2001) found, self-reported measures correlated modestly with observed behaviors of emotion expression and gestures. The self-report methods used in Underwood and Bjornstad (2001) as well as others, (e.g., Hubbard et al., 2002), ask participants to reflect how they were feeling at a particular moment, usually during a peer provocation. The available literature suggests that self-reported emotions about a specific event are not related to aggressive behavior. Hubbard et al. (2002) asked participants to watch a video of the interaction they just experienced, losing a game with a provoking peer, and asked them at each turn of the game, how angry they felt

at that particular moment. There was no relationship between reported anger and either reactive or proactive aggressive behavior that was rated by the teacher. The authors suggest that their finding may be due to the relatively low levels of anger they were able to elicit by the participants losing the game.

Dearing et al. (2002) decided to measure anger regulation and anger expression as two distinct constructs, as measured through self-report. They claim that children may possess knowledge about their own emotion regulation that is not observable by adults. Dearing et al. focused on children's use of display rules for anger, that is, what guides children's decisions about whether or not to regulate the external expression of anger. Social preference and aggression was measured by peer nominations, where the students nominated fellow classmates who best fit the description for overt aggressive behavior (e.g., "Kids in your class who starts fights"). As discussed previously, there are different types of aggressive behavior that children engage in due to the circumstance of the situation, and these overtly aggressive items are relevant to proactive aggression and do not tap into reactive aggression. Again, this is an important distinction because reactive aggression is purportedly linked more to anger than proactive aggression. The study was conducted on 274 2nd grade children, 135 girls and 139 boys. After playing an anger-arousing game with a confederate playing unfairly, the participants were asked "How angry did you feel?" and chose from three choices, a little angry to a lot angry. There were also observational coders of the participant's facial expressions. Dearing et al. found no direct correlational evidence of a relationship between anger regulation variables and aggression. There was no relationship between how angry a participant was and how

aggressive they were rated by their peers. Interestingly, indirect analyses revealed links between internal experience of anger and aggression, specifically, mediated by nonverbal anger expression. However, there was no indirect relationship between the dissembling of external anger expression. Dearing et al. suggest their results highlight the importance of differentiating between internal and external emotion regulation in future research and how individual differences in the development of these two strategies may affect anger regulation and aggression.

No studies could be found that directly linked a generalized, trait-like emotionality, the type of emotionality Lemerise and Arsenio (2000) suggest should be linked to social adjustment, to aggression. However, Bohnert, Crnic, and Lim (2003) sought to better understand the link between emotional competence and aggressive behavior and if diminished emotional competence would be indicative of higher aggressive behavior levels in children. The sample included 87 children, ages 7-10 years old (53 boys, 34 girls). Emotional competence was operationalized in several ways, including the Kusche Affective Interview-Revised (KAI-R) (Beilke et al., 1989). The KAI-R measures children's knowledge of their own emotions during situations. Emotional competence was also measured by children's reactions in a disappointment interview where participants received a disappointing prize and how many times they said they were angry during the interview. The participants' mothers also completed a measure that asked how children express and experience anger in more general contexts, as well as rated their own child's aggressive behavior using the CBCL (Achenbach & Edelbrock, 1983).

Bonhert, Crnic, and Lim (2003) found that the more mothers rated their children as less able to regulate their emotions, the more they rated their children as aggressive. Observations during the disappointment interview revealed that more intense and frequent anger expression was associated with higher levels of mother rated aggression. Even though this study utilized mother-reports, not a commonly used method, a relationship was found between more generalized anger regulation and aggressive behavior. Previous studies that looked at situation-specific anger did not find an association between anger expression and aggression.

#### *Statement of the Problem and Hypotheses*

A large body of research has focused on better understanding the functioning of aggressive children. A review of the literature demonstrates the SIP is a useful model for studying children's social maladjustment, particularly childhood aggression. More recently, emotion processes, such as emotional regulation, has been added to the SIP model to increase our knowledge of how children navigate the social realm. Establishing a connection between SIP, aggression, and emotion has not been investigated thoroughly. To address conceptual and measurement issues, the present study will focus on three main relationships: the relationship between social information processing and types of aggression (reactive and proactive), the relationship between anger and social information processing, and finally, the relationship between anger and type of aggression.

The first set of research questions concern the correlations between social information processing and aggression. Based on the evidence presented, the following hypotheses are expected:

1A. It is expected that hostile intent attribution would be correlated with the reactive and proactive aggression, as rated by self, teacher, and peer, with the strongest correlation with teacher reactive aggression.

1B. It is expected that the degree of aggression in a student's response to a hypothetical situation, response selection step in the SIP model, would be correlated with reactive and proactive aggressive behavior, as rated by self, teacher, and peer.

1C. It is expected that student beliefs in the effectiveness of a hypothetical aggressive response to solve problems, response decision in the SIP model, would be correlated with proactive, but not reactive aggression, as rated by self, teacher, and peer.

The second set of research questions refers to correlations between social information processing and anger. Findings from previous research show a relationship between situational anger arousal and social information processing. The following hypotheses are expected using a measure of chronic anger:

2A. It is expected that hostile intent attribution of a hypothetical situation would be positively correlated with chronic anger levels.

2B. It is expected that aggressiveness in a student's response to a hypothetical situation would be positively correlated with chronic anger levels.

2C. It is expected that a student's belief in the effectiveness of a hypothetical aggressive response to solve problems would be positively correlated with chronic anger levels.

The third set of research questions concerns the unique contributions of anger and social information processing to aggressive behavior. It is hypothesized that anger alone will correlate with aggression, however, when SIP is included in the model, anger will no longer contribute unique variance. The following hypotheses regarding type of aggression are also expected:

3A. It is expected that when controlling for anger, social information processing will contribute unique variance in reactive, but not proactive aggression, as rated by self, teacher, and peer.

3B. It is expected when controlling for social information processing, anger will contribute less unique variance to the relationship with reactive, but not proactive aggression, as rated by self, teacher, and peer.

Table 1

Expected findings for Question 1

	Attribution Intent	Response Selection	Outcome Expectation
Reactive Teacher	Highest positive correlation	Positive correlation	No correlation
Proactive Teacher	Positive correlation	Positive correlation	Positive correlation
Reactive Peer	Positive correlation	Positive correlation	No correlation
Proactive Peer	Positive correlation	Positive correlation	Positive correlation
Self	Positive correlation	Positive correlation	Positive correlation

Expected findings for Question 2

	Attribution Intent	Response Selection	Outcome Expectation
Chronic Anger	Positive correlation	Positive correlation	Positive correlation



## Chapter 3: Methods

### *Participants*

The participants were recruited from six second and third grade classrooms in an ethnically and culturally diverse elementary school. The current study utilizes data from a longitudinal study that have already been collected. The sample consists of 107 participants, 63 male and 44 female and 57 second graders and 50 third graders. Sixty seven percent of the participants were African American, 17% were Hispanic, 11% were Asian American, and 5% were Caucasian. Participation required parental consent as well as student assent.

### *Measures*

#### *Anger.*

The Children's Inventory of Anger (ChIA; Nelson & Finch, 2000) is a self-report measure of anger, composed of four subscales measuring frustration, physical aggression, peer relationships, and authority. Items describe different situations that make some children angry. Each subscale contains items on a 4-point Likert scale associated with a pictorial representation with increasing anger levels ranging from one to four as "I don't care...", "that bothers me...", "I'm really angry...", and "I can't stand that..." The items were read aloud to the students and they will be asked to choose which picture best depicts how angry they would be if they were in the situation described. The total scale and subscale scores are converted to T-scores. High scores indicated more anger.

Reliability for the ChIA has been established in sample of 1,604 children, ages 6-16 (Nelson & Finch, 2000). The authors mention that 21% of their sample was of ethnic minority, but no further specific information is available. The psychometric properties of the ChIA are satisfactory. The alpha coefficient for the ChIA total score was reported to be 0.95, with subscale alpha coefficients ranging from 0.85 to 0.86. The reported test-retest correlation for the total score is 0.75, and for the subscales range from 0.65 to 0.75.

There have been some studies that have established various forms of validity of the ChiA. In a review Flanagan and Allen (2005) critique the concurrent validity of the measure, which has been proposed by correlating the ChiA with other measures that ChiA authors chose. Overall, results from the validity investigations have provided evidence that the ChiA measures an internal state, not overt aggressive behavior. For example, Flanagan and Allen report that there were moderate correlations between the ChiA and Buss and Perry's (1993) Aggression Questionnaire, however only 20% of the variance was explained by the relationship between the two measures. Using multi-rater, multi-method assessments, the ChiA was correlated with depression measures as reported by both students and teachers, but was not correlated with student, teacher and parent measures of conduct problems (Flanagan & Allen, 2005).

#### *Social Information Processing.*

Social information processing (SIP) was measured by a shortened version of the procedures described by Dodge, Laird, Lochman, and Zelli (2002). Students

listened to vignettes adapted from Brown and Lemerise (1990) that describe one of two types of hypothetical situations happening to the student. One type of situation involved the student being excluded from a group, and the other type described some sort of aggression (e.g., a student is bumped into). Three SIP variables were scored from the vignettes.

*Attribution of intent.* Attributions of hostile intent (SIP1a) were measured by asking the students to say why the hypothetical peer acted the way he or she did. The response given by the student was scored as either hostile or non-hostile. Hostile responses were scored when the student suggests in any way that the person did what he/she did in the order to be mean or that the peer did it on purpose. Everything else was scored as non-hostile. Non-hostile responses were coded with a “1” and hostile responses were coded with a “2”. The inter-rater agreement between three trained raters was calculated for the present study for SIP1a and found to be strong (.90), that is all three raters agreed 90% of the time. For analyses, each participant received a total SIP1a score by summing all four responses.

*Social Problem Solving.* Social problem solving (SIP1b) was measured by asking the student what he/she would do in the hypothetical situation (after obtaining attributions of intent). Responses were originally scored on a scale from 1 to 5 as (1) the child would do nothing, (2) the child suggests making a comment to the peer, (3) the child requests or demands that the peer do something or they would ask an adult to intervene on their behalf, (4) the child threatens the peer or suggests seeking out an adult who would punish the peer, and (5) the child responds with a direct physical or verbal aggressive retaliation toward the peer. The inter-rater agreement for SIP1b

was sufficient for three trained raters in the present study (.80). For the current study, this scale was collapsed into three response categories that increased in degree of hostility and activity. The first three categories were combined to form a “1”, which was a non-hostile response. The original “4”, threats/adult punish became a “2”, a hostile verbal response and the original “5”, direct physical retaliation became a “3”, a hostile physical response. Each participant received a total SIP1b score by totaling the score from each individual situation. This sum was the score used in subsequent analyses.

*Effectiveness of aggressive response.* The effectiveness of aggressive response (SIP2) was measured by asking the students questions about how effective an aggressive response would be in that situation. The first question asked what would happen if you reacted aggressively to the situation. Responses were assigned either a 1 for responses that show undesirable outcomes or a 2 for responses that show desirable outcomes as a result of an aggressive response. The second question asked whether the aggressive response would be a good way to solve the problem. A “no” response received a 1 and a “yes” response received a 2. The scores from questions one and two were totaled with a higher total indicating the use of an aggressive behavior as an effective response to the situation. Inter-rater reliability for SIP2 was .90 among three raters.

#### *Aggression.*

Aggression was measured from three different sources; a self-report measure, a teacher report measure, and a peer report measure.

*Self:* Students reported their own aggression using the Bullying Behavior Scale (BBS; Austin & Joseph, 1996), which was embedded within the Self-Perception Profile for Children (Harter, 1985). The BBS subscale contains six questions. Students responded “really true for me” or “sort of true for me” to items such as “Some children do not hit and push other children but other children do hit or push other children.” Each item was scored on a scale of 1 to 4 with higher scores indicating greater bullying behavior. Austin and Joseph (1996) found the internal reliability for the BBS to be satisfactory (Cronbach alpha= 0.82) on a sample of 425 students (204 boys and 221 girls) between the ages of 8 and 11 in England.

*Teacher:* Teachers reported on students’ aggressive behavior using Teacher Rating Scale for Aggressive Classroom Behavior (Dodge & Coie, 1987). This scale contains items that measure reactive and proactive aggressive behaviors. Teachers were asked to rate students on items assessing aggression using the following 5-point Likert scale: never, rarely, sometimes, often, and almost always on items such as “When this child has been teased or threatened, he or she gets angry easily and strikes back” and “This child uses physical force in order to dominate other kids”. Dodge and Coie (1987) reported the internal consistency of reactive aggression was 0.88 and the internal consistency for proactive aggression was 0.87. The correlation between reactive and proactive aggression was 0.76. All the teachers in this sample were African American females.

*Peer:* Peer reported aggression was measured by a sociometric peer nomination measure consisting of items drawn from two individual scales, a relational aggression scale and an overt aggression scale (Crick & Werner, 1998;

Perry, Kusel, & Perry, 1988). Students were given a class-seating chart and asked to select which of their classmates best fit a list of descriptive items, such as “Kids who hit others” (an example of overt aggression) and “Kids who tell friends they will stop liking them unless the friend does what they want” (an example of relational aggression). Subscales included on this measure include perceived classroom support, victimization, as well as overt and relational aggression. Several studies have used sociometric methods to measure overt aggressive behavior. Poulin and Boivin (2000) reported the internal consistency for the Peer Nomination Inventory (Perry et al., 1988) to be 0.97. Elsewhere, the internal consistency for relational aggression is reported as ranging from .82 to .89 (Crick & Werner, 1998).

### *Procedures*

This study was part of a larger longitudinal study where other measures were administered. The school psychologist and a team of graduate students described the purposes of the study to the students in their classrooms. In the fall and spring of the school year, each student completed all the measures during two one-hour long interviews conducted individually. After parental consent, the students also gave their assent for participation at the beginning of data collection and, they were told they could choose not to participate if they do not want to. The interviewer administered the instruments described in the “measures” section in two one-hour sessions. The time 1 was administered in the middle of October and the time 2 was administered at the end of May. The same instruments were used for both time 1 and time 2. All instruments were introduced by the interviewer by explaining to the student what they would be doing and how they were to answer the questions. The

interview had standardized procedures so that all data were collected in the same manner and all written items were read aloud to the students. Following data collection, the research team scored, coded, and entered all of the data in teams of two or three so inter-reliability could be calculated and data entry checked.

### *Data Analysis*

For each the questions in parts one and two, which explored the relationship between social information processing and aggression and between social information processing and anger, correlations were used to determine the relationship between the variables. To answer the questions in part three, multiple regression analyses were performed to determine the unique contribution of anger and social information processing to variance in aggression scores. The ratings of aggression by teacher, self, and peer were converted to z scores for each class to account for variance contributed by class.

Table 2  
Table of Measures

<u>Anger</u>	<u>Aggression</u>	<u>Social Information Processing</u> (Dodge, Laird, Lochman, and Zelli (2002))
The Children’s Inventory of Anger (ChIA; Nelson & Finch, 2000) *High scores indicate more anger	Teacher Rating Scale for Aggressive Classroom Behavior (Dodge & Coie, 1987) *High scores indicate more aggressive behavior	Attributions of hostile intent (SIP1a) *High scores indicate more aggressive response
	Sociometric peer nomination measure (Crick & Werner, 1998; Perry, Kusel, & Perry, 1988 ) *High scores indicate more aggressive behavior	Social problem solving (SIP1b) *High scores indicate elevated aggression
	Bully Behavior Scale (Austin & Joseph, 1996); Student self-report *High scores indicate more aggressive behavior	Effectiveness of aggressive response (SIP2) *High scores indicate greater aggression



## Chapter 4: Results

### *Data Exploration*

#### *Aggression.*

Prior to answering the specific research questions, preliminary analyses were conducted to explore the relationship between the various measures of aggression across informants. First, a peer aggression scale was created from peer nominations discussed in the methods section. A total peer aggression scale was formed by adding the total number of peer nominations received for a specific question and then all five questions for overt peer aggression were summed, as were the five questions for relational peer aggression. Finally, Z scores were created based on classroom for the overt and relational scales. Analyses revealed that the overt and relational scales were highly correlated ( $r=.681$ ,  $p<.01$ ) and the combined items had acceptable internal consistency ( $\alpha=.919$ ). Principal component factor analysis also revealed that for the time 1 data, one factor was the best fit for the data (see Table 3). Therefore, in subsequent analyses, the overt and relational time 1 scales were combined into one peer aggression time 1 measure.

Table 3  
Peer Aggression Measure Time 1

	Component 1
Kids who hit others? (O)	.767
Kids who push and shove others around? (O)	.895
Kids who call other kids mean names? (O)	.849
Kids who say mean things to other kids to insult them? (O)	.860
Kids who tell others they will beat them up unless the kid does what they say? (O)	.761
Kids who when mad at a person ignore the person or stop talking to them? (R)	.640
Kids who tell friends they will stop liking them unless the	.706

friend does what they want? (R)	
Kids who try to keep certain people from being in a group when it is time to play? (R)	.729
Kids who when mad at a person get even by keeping that person from being in their group of friends? (R)	.755
Kids who try to make other kids not like a person by spreading rumors about them or talking behind their back? (R)	.675

Cronbach alpha= .919

(O)= original Overt scale, (R)= original Relational scale

As Table 4 shows, two factors emerged for the time 2 peer aggression data. A closer inspection of the items and their factor loadings suggest that some items loaded on both factors. This double loading is consistent with the literature indicating that there is significant overlap between the overt and relational aggression constructs and the difficulty measuring relational aggression as a separate construct is an issue that continues to trouble researchers. Since the two scales were highly correlated ( $r=.700$ ,  $p<.01$ ), the overt and relational aggression scales were combined into one peer time 2 aggression scale for all subsequent analyses.

Table 4  
Peer Aggression Measure Time 2

	Overt Aggression	Relational Aggression
Kids who hit others? (O)	.883	.259
Kids who push and shove others around? (O)	.894	.171
Kids who call other kids mean names? (O)	.741	.441
Kids who say mean things to other kids to insult them? (O)	.802	.430
Kids who tell others they will beat them up unless the kid does what they say? (O)	.851	.253
Kids who when mad at a person ignore the person or stop talking to them? (R)	.388	.636
Kids who tell friends they will stop liking them unless the	.573	.527

friend does what they want? (R)		
Kids who try to keep certain people from being in a group when it is time to play? (R)	.371	.764
Kids who when mad at a person get even by keeping that person from being in their group of friends? (R)	.053	.905
Kids who try to make other kids not like a person by spreading rumors about them or talking behind their back? (R)	.474	.598

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

Cronbach alpha for overt= .897; relational= .825; combined= .924

Next, the teacher aggression measures were analyzed. There were three items within the teacher aggression that have been studied and used in several prior investigations that are thought to measure reactive aggression (items 1, 2, 3). Likewise, there were three items thought to measure proactive aggression (items 4, 5, 6). Several additional items were included in the current study that have also been used to measure reactive and proactive aggressive behaviors. Factor analysis of the time 1 teacher data indicates that a two-factor model was extracted, with about half of the items loading on the appropriate factor (see Table 5). The teacher reactive and proactive time 1 scales were also highly correlated ( $r=.637$ ,  $p<.01$ ). Given that the scales constructed with the additional items had good internal consistency, reactive alpha was .921 and proactive alpha was .927, subsequent analyses were run using these “expanded” reactive and proactive scales.

Table 5  
Teacher Aggression Measure Time 1

	Reactive Aggression	Proactive Aggression
Overreacts angrily to accidents (R)	.780	.167
Strikes back when teased (R)	.805	.249
Blames others in a fight(R)	.478	.701
Uses physical force to dominate (P)	.285	.870
Gets others to gang up on a peer (P)	.208	.790
Threatens and bullies others (P)	.470	.625
Teases and name calls (P)	.574	.664
Starts fights with peers (P)	.772	.315
Gets into verbal arguments (P)	.787	.220
When frustrated, quick to fight (R)	.799	.350
Breaks rules in games (P)	.491	.691
Responds negatively when fails (R)	.084	.800
Hits others when angry (R)	.635	.582
Gets angry easily (R)	.661	.557
Says means things when angry (R)	.597	.642

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

Cronbach alpha for reactive scale= .921; for proactive scale= .927

(R)= Reactive; (P)= Proactive

Preliminary analyses of the time 2 teacher aggression ratings were less clear-cut. During the first analysis, four factors were extracted but these factors did not make conceptual sense. A subsequent analysis, forcing items into a two-factor solution was conducted (see Table 6). The first three items, used in the past to measure reactive aggression, loaded onto the reactive aggression factor and the next two items, used in the past to measure proactive aggression, loaded onto the proactive factor. This alignment was similar to that found in many previous investigations. The third original proactive item double loaded on each factor. When the additional

reactive and proactive items were included, most of the items double loaded onto each factor as well. Again, the two scales were highly correlated ( $r=.688$ ,  $p<.01$ ), and because of the strong internal consistencies of the two expanded scales, alpha values of .897 and .879 for reactive and proactive respectively, the expanded reactive and proactive teacher scales as originally designated were used for all subsequent analyses. For both pre and post teacher aggression ratings, when significant results were found in subsequent analyses, the data were re-run with reactive and proactive scales constructed from the item loadings based on the factor analysis results. These additional results will be shown in parentheses and labeled as “new scales”.

Table 6  
Teacher Aggression Measure Time 2- when forced into 2 factors

	Reactive Aggression	Proactive Aggression
Overreacts angrily to accidents (R)	.738	.238
Strikes back when teased (R)	.838	.087
Blames others in a fight(R)	.887	.088
Uses physical force to dominate (P)	.395	.622
Gets others to gang up on a peer (P)	-.266	.708
Threatens and bullies others (P)	.593	.577
Teases and name calls (P)	.629	.454
Starts fights with peers (P)	.687	.474
Gets into verbal arguments (P)	.758	.153
When frustrated, quick to fight (R)	.640	.483
Breaks rules in games (P)	.181	.653
Responds negatively when fails (R)	.246	.747
Hits others when angry (R)	.476	.541
Gets angry easily (R)	.552	.674
Says means things when angry (R)	.543	.662

Extraction Method: Principal Component Analysis  
 Rotation Method: Varimax with Kaiser Normalization  
 Cronbach alpha for reactive scale= .897; proactive scale= .879

A few interesting points about the teacher aggression scales are worth discussing. First, the item “Responds negatively when fails” was originally designated as a reactive item, but for both the time 1 and time 2, loaded substantially higher on the proactive factor. In the present sample, this behavior was not associated with other reactive behaviors as others have found. The item “Gets into verbal arguments” was originally designated as proactive, however, emerged as reactive in both the time 1 and time 2 analyses. Based on previous literature, it appears as though “gets into verbal arguments” is not necessarily only a proactive behavior

because other items such as “says mean things when angry” and overreacts angrily to accidents”, which are classified as reactive could involve a verbal argument. Based on these findings, further research to fine-tune the distinction between reactive and proactive aggression behaviors that others can identify and rate could help clear up these issues. It may be that three scales are needed to describe aggressive behavior, clearly reactive, clearly proactive, and a combined scale. Results from the factor analyses in this study support such an idea as several items for both time 1 and time 2 loaded equally onto both factors (e.g., “Teases and name calls”, “Hits others when angry”, “Gets angry easily”, “Says mean things when angry”).

Means and standard deviations for all aggression measures are presented in Table 7.

Table 7  
Means and Standard Deviations of aggression measures

	N	Mean	Standard Deviation
Self BBS T1	100	3.54	.57
Self BBS T2	99	3.49	.57
Peer T1	99	10.62	14.61
Peer T2	99	11.88	12.21
Teach React T1	105	11.34 (9.66)	4.42 (3.74)
Teach Proact T2	105	9.36 (11.05)	3.47 (4.36)
Teach React T1	100	11.98 (11.58)	4.97 (4.65)
Teach Proact T2	100	9.03 (9.43)	2.86 (3.50)

(Scales created from factor analyses)

Finally, correlations between all the aggression measures were obtained and are highlighted in Table 8. All aggression measures were converted into Z scores by class. It is interesting to note that all of the ratings that were completed by “others”,

i.e., peers and teachers, were moderately to highly correlated with each other, ranging from  $r=.478$  to  $.867$  ( $p<.01$ ). The highest correlations are the time 1 and time 2 of the same scale, which one would hope would be the case because it supports the reliability of the scale. Correlations across the various aggression measures completed by “others” were moderate. Accordingly, time 1 peer aggression and post peer aggression were highly correlated ( $r=.723$ ,  $p<.01$ ) and were moderately correlated with time 1 teacher reactive ( $r=.478$ ,  $p<.01$ ), time 1 teacher proactive ( $r=.617$ ,  $p<.01$ ), post teacher reactive ( $r=.572$ ,  $p<.01$ ), and post teacher proactive ( $r=.576$ ,  $p<.01$ ).

On the other hand, there were few and weak relationships between “other-rated” aggression and self-reported aggression. Time 1 self-reported aggression was only correlated with one “other” rating, time 2 teacher reactive aggression and that correlation was modest ( $r=.213$ ,  $p<.05$ ), meaning that those children who rated themselves as aggressive in the beginning of the year were more likely to be rated by their teachers as reactive aggressive at the end of the year. Time 2 self aggression scores were modestly correlated with all “other” aggression measures except for peer aggression time 1, ranging from  $r=.213$  to  $.382$  ( $p<.05$ ). It appears that as children make their way through the year, they become more in agreement with rating their behaviors as others see them. It should not come as a surprise that time 1 peer aggression was not related to time 1 or time 2 self-reported aggression ratings. The time 1 was given in the beginning of the school year from the beginning to middle of October and the students may have been less familiar with the behaviors of their peers than at the time 2 at the end of the year when the students had more time to get to



know the behaviors of their classmates. Teachers also rated the students during the same time frame as students, but perhaps their pre and post ratings correlated with post self-report ratings because teachers may be more familiar with children's behavior and therefore may be more accurate raters than other children themselves. However, the correlations are modest between teacher pre and post ratings and post self-reports.

Table 8  
Pearson Correlations of all aggression measures

	Self BBS T1	Self BBS T2	Peer T1	Peer T2	Teach React T1	Teach Proact T1	Teach React T2	Teach Proact T2
Self BBS T1		.254*	.072	.023	.189	.177	.213*	.174
Self BBS T2			.135	.263*	.382*	.249*	.238*	.224*
Peer T1				.723**	.478**	.617**	.572**	.576**
Peer T2					.659**	.676**	.625**	.610**
Teach React T1						.637**	.867**	.688**
Teach Proact T1							.599**	.851**
Teach React T2								.694**

\*p<.05, \*\*p<.01

n= 99 time 1; n=101 time 2

Relationships between aggression ratings and demographic variables were also explored. As can be seen from Table 13, as expected, boys were more likely to be rated as reactive aggressive by teachers as well as aggressive by their peers (r=-

.222,  $p < .05$ ;  $r = -.248$ ,  $p < .05$  respectively). One perplexing relationship that emerged was a positive correlation between time 2 self-reported aggression and gender, indicating that girls were more likely to rate themselves as aggressive compared to boys ( $r = .310$ ,  $p < .01$ ). This finding is inconsistent with the literature and may be connected to another unexpected relationship between girls and hostile response selection. Girls in this sample were also more likely to endorse hostile response selections to ambiguous hypothetical situations on the SIP measure ( $r = .296$ ,  $p < .01$ ). One explanation for this unexpected finding could be due to self-report measure itself. Of the six questions in the BBS, three of the items are not asking about direct physical aggression, but rather indirect aggression, such as teasing, being laughed at, and calling someone names. Other researchers have found gender differences such that indirect aggression is more common in girls than boys (Salmivalli, Kaukianen & Lagerspetz, 2000). In the current study, girls may have answered more strongly to these questions because this is the type of aggressive behavior they engage in and therefore reported more aggression than boys, who commonly engage in more physical aggression. This could also explain why boys were rated as more reactive aggressive by their teachers than girls. Reactive aggression includes mostly overt aggressive behavior, which boys may engage in more than girls. Follow up studies could separate these items to clarify these gender differences.

### *Anger.*

All ChiA scales scores were converted into Z scores by classroom, consistent with other measures. Time 1 and time 2 Pearson correlations were computed for all

five scales within the ChiA measure. Table 9 summarizes these findings and shows acceptable test-retest reliability for the measure. Means and standard deviations are shown in Table 10.

Table 9  
Pearson Correlations between time 1 and time 2 ChiA scales

Chia Scales	Total T2	Frust T2	Phys T2	Peer T2	Auth T2
Total T1	.583**	.494**	.548**	.543**	.545**
Frust T1	.549**	.514**	.449**	.551**	.464**
Phys T1	.484**	.386**	.560**	.371**	.477**
Peer T1	.547**	.453**	.491**	.535**	.499**
Auth T1	.471**	.382**	.466**	.403**	.496**

\*\*p<.01  
All n=97

Table 10  
Means and Standard Deviations of ChiA scales

Chia Scales	N	Mean	Standard Deviation
Total T1	101	46.37	9.60
Frust T1	101	46.78	10.20
Phys T1	101	47.44	9.62
Peer T1	101	46.00	8.71
Auth T1	101	47.03	9.83
Total T2	99	45.42	9.66
Frust T2	99	45.57	10.20
Phys T2	99	46.83	8.81
Peer T2	99	44.67	9.92
Auth T2	99	46.51	10.13

Pearson correlations were obtained for aggression and anger. As illustrated in Table 11, none of the ChiA time 1 measures of anger, a self-report, correlated with any of the aggression measures supplied by “others.” The ChiA time 1 only correlated modestly with self-reported aggression time 2, with Pearson’s *r* ranging from .247 to .314 (p<.01), indicating that children who rated themselves as more

aggressive at the end of the year were more likely to rate themselves as angrier both in the beginning of the year as well as the end of the year. This is the first finding in the literature that provides preliminary evidence for a relationship between self-reported “trait-like” anger and self-reported aggression. No other known study has found a connection between anger and aggression using self-reported measures of anger. In addition to the self-report findings, ChiA time 2 scores modestly correlated with both types of time 1 teacher rated aggression. Children who rated themselves as more angry at the end of the school year were rated as more aggressive by their teachers in the beginning of the year, but not at the end of the year (see Table 9). Perhaps throughout the year, the children were better able to regulate their behaviors so that feelings of anger were less likely to be translated into aggressive behaviors that could be seen by others, but the children still rated themselves as aggressive.

Table 11  
Correlations between Aggression and Anger

Chia Scales	Peer T1	Peer T2	Teacher Re T1	Teacher Re T2	Teacher Pro T1	Teacher Pro T2	Self BBS T1	Self BBS T2
Total T1								.296**
Frust T1								.314**
Phys T1								.193
Peer T1								.286**
Auth T1								.247*
Total T2					.220*		.233*	.342**
Frust T2							.255*	.333**
Phys T2					(.199*)			.294**
Peer T2					.199*			.330**
Auth T2			.230* (.212*)		.231* (.224*)		.264**	.292**

Note: Pr=Time 1, Po= Post test

\*p<.05, \*\*p<.01

n=101 for time 1, n=97 for post test  
(New teacher scales in parentheses)

The only demographic variable to be associated with anger ratings was grade.

A negative correlation was observed for both time 1 and time 2 ChiA Total scale

scores and grade ( $r=-.371$ ,  $p<.01$ ;  $r=-.222$ ,  $p<.01$  respectively), indicating that second graders rated their anger as higher than did third graders. Perhaps as children grow older, they are better able to regulate their emotions and not report as strong feelings as they had previously.

### *Demographics.*

Means and standard deviations for SIP variables are shown below in Table 12. Table 13 provides a summary of all the correlations between the variables and demographics that have been discussed. The relationship between gender and aggression was somewhat surprising in that girls were more likely to rate themselves as aggressive at the time 2. Teacher and peer ratings revealed that boys were more likely to be viewed as aggressive and this finding is consistent with previous literature. There was one relationship between gender and a SIP variable that was consistent with girls' higher self rated aggression. Girls selected more hostile responses than did boys to hypothetical situations. Finally, there was a relationship between grade and anger. Younger students rated themselves as angrier than older students. Younger students also were more likely to suggest a hostile response to a hypothetical situation. These last two findings suggest that as children become older, they may be better able to monitor their verbal responses such as self reported anger and self reported hostile response selection. In the absence of grade differences in aggression reported by peers and teachers, these verbal responses may not translate into behaviors observable to others.

Table 12  
Means and Standard Deviations for SIP variables

	N	Mean	Standard Deviation
Intent Attribution	101	6.17	1.24
Response Selection	101	9.96	2.30
Outcome Expectation	101	26.15	4.53

Table 13  
Summary of Spearman correlations between variables and demographics

	Gender	Grade
Self Aggression-BBS T2	.310** n=99	
Teach Aggression-React T1	-.222* n=101	
Peer Aggression-T1	-.248* n=101	
Response selection	.296** n=101	-.210* n=101
Chia Total T1		-.371** n=101
Chia Total T2		-.222** n=99

\*p<.05, \*\*p<.01

*Question 1: The relationship between social information processing and aggression*

All of the time 1 social information processing variables were related to each other (see Table 14), meaning more hostile intent attributions were moderately associated with more aggressive responses and more favorable outcomes using aggression and that more hostile responses were associated with more favorable outcomes using aggression. For the time 2, outcome expectation was the only SIP variable available for analysis and the Pearson correlation between the time 1 and time 2 of outcome expectation was  $r = .536$  ( $p < .01$ ).

Table 14  
Pearson Correlations between SIP components

	Intent Attributions	Response Selection	Outcome Expectation
Intent Attributions		.352**	.242*
Response Selection			.385**

\*p<.05, \*\*p<.01

n=101

Table 15 shows the relationships between hostile intent attribution, response selection, and outcome expectations and time 1 children's aggression as reported by peers, teachers, and themselves. Intent attribution was modestly correlated with self-reported aggression ( $r=.207, p<.05$ ). Children who attributed hostile intent to an ambiguous hypothetical situation were more likely to rate themselves as aggressive. This finding partly supports the study's hypothesis regarding SIP intent attribution but contrary to expectations, none of the other measures of aggression were related to intent attribution. It is interesting to note that self rated aggression and SIP attributions of intent share a common source. The hypothesized connection between response selection and aggression was supported with a modest correlation between SIP response selection and teacher reactive ( $r= .209, p<.05$ ) and proactive aggression ( $r=.241, p<.05$ ), using the original scales. Children who supplied hostile responses to ambiguous hypothetical situations were rated by their teachers as more aggressive. However, there was no support for the hypothesized relationship between SIP response selection and aggression from self and peer perspectives. When the reactive aggression scale based on the results from the factor analysis was used in place of the original reactive aggression scale, the correlation held up ( $r=.254, p<.05$ ), further

supporting the relationship between response selection and reactive aggression ratings.

Surprisingly, outcome expectation was significantly correlated with teacher reactive aggression ratings ( $r=.224$ ,  $p<.05$ ), contrary to findings in the literature and the hypotheses of this investigation which posited a relationship between proactive aggression and outcome expectations. Findings indicate that the more children view an aggressive response as an effective way to solve the problem, the more likely they were to be rated as reactive aggressive by their teachers. Previous literature has shown that SIP outcome expectations are associated with proactive aggression ratings by teachers because both variables are suspected to measure behaviors exhibited by bullies, where reactive aggression is not thought to be associated with bullying behavior, rather an impulsive reaction to a perceived threatening situation (Crick & Dodge, 1996).

Negative outcomes were expected for reactive aggression because such responses are not viewed as an effective way to handle a problem because reactive aggression is theorized to be a reaction to a perceived threat and not as a planned behavior to achieve a goal. However, when the reactive aggression scale based on the results of the factor analysis was used, there was no relationship between outcome expectation and reactive aggression. Similarly, when the proactive scale that was constructed from the items resulting from the factor analysis was used, there was no correlation between proactive aggression and response selection. Perhaps the measurement issues can account for these findings. Grade and gender were significantly correlated with only response selection, where girls were more likely to



choose more hostile responses to hypothetical ambiguous provocation social situations than boys ( $r=.296$ ,  $p<.01$ ) and second graders were also more likely to choose hostile responses than third graders ( $r=-.210$ ,  $p<.05$ ). Previous investigations have also found that younger children are more likely to respond with hostile behaviors to hypothetical situations (i.e., Crick & Dodge, 1996) and younger children evaluate aggression more favorably than older children (Crick & Dodge, 1996). However, the gender finding was unexpected and again, the measure used in this study could explain this finding, with half of the items students answered about their own aggressive behavior focused on indirect aggression, more common in girls than boys.

In summary, some of the expected findings for questions in set 1 were found. Hostile intent attribution was related to self-reported aggression, but not teacher or peer as expected. As expected, hostile response selection was related to teacher reactive and proactive aggression ratings, but contrary to expectation, not to peer or self-reported ratings of aggression. Also contrary to hypotheses, outcome expectation was related only to reactive aggression and not to proactive aggression using the original scales.

Table 15  
Pearson Correlations between SIP and Aggression

	Intent Attributions	Response Selection	Outcome Expectation
Peer Aggression T1	NS	NS	NS
Teacher Re T1	NS	.209* (.254*)	.224* (.185)
Teacher Pro T1	NS	.241* (.151)	NS
Self BBS T1	.207*	NS	NS

\*p<.05

(Scales created from factor analyses results)

*Question 2: The relationship between social information processing and anger*

As previously discussed, preliminary analyses showed there was a modest to moderate negative correlation between grade and ChiA scaled scores where second graders were more likely to rate themselves as angry compared to third graders. To answer the research questions regarding the relationship between social information processing components and anger, a series of Pearson correlations were conducted.

Table 16 presents these correlations.

*Hostile intent attribution.*

Frustration and Peer time 1 scales of the ChiA, were modestly yet significantly correlated with hostile intent attribution ( $r = .206, p < .05$ ;  $r = .200, p < .05$ ). Children who rated themselves in the beginning of the year as more angry, specifically as more easily frustrated, attributed hostile intent to ambiguous hypothetical situations more so than their less angry peers. These results support the hypothesis that there would be a relationship between anger and hostile intent

attribution and supports previous findings in the literature showing such a relationship.

*Response selection.*

SIP response selection was moderately correlated with all time 2 chronic anger only, ranging from  $r=.307$  to  $r=.364$  ( $p<.01$ ) meaning that children who chose to respond to a hypothetical situation with hostility in the beginning of the year, rated themselves as more angry at the end of the year. It was expected that anger and response selection would be positively correlated, however, the relationship found with time 2 anger only warrants an explanation. Perhaps throughout the year, students became more in-tune with their feelings and become better at regulating their emotions, but in the beginning of the year it is not as easy to report how they are feeling. This could be the reason for not finding a relationship between time 1 anger and response selection. The students in the beginning of the year could report how they would behave, but not how they feel. It is also possible that social cognitions fostered interactions that promote anger. Longitudinal studies are needed to test these possible causal relationships. It would be interesting to see how well the time 2 SIP data correlates with time 2 anger scores and future research should look more in depth at the comparisons between time 1 and time 2.

*Outcome Expectation.*

Also, those children who viewed aggressive responses as a favorable way to solve a problem were more likely to rate themselves as angry at the end of the year, as shown by the modest correlation between SIP outcome expectations with time 2 of

anger, Pearson's  $r$  ranging from .203 to .229 ( $p < .05$ ). A similar explanation to the relationship between response selection relationship and anger could be used to understand this finding as well.

Table 16  
Pearson Correlations between SIP and Anger

Chia Scales	Intent Attributions	Response Selection	Outcome Expectations
Total T1	NS	NS	NS
Frust T1	.206*	NS	NS
Phys T1	NS	NS	NS
Peer T1	.200*	NS	NS
Auth T1	NS	NS	NS
Total T2	NS	.364**	.210*
Frust T2	NS	.309**	.203*
Phys T2	NS	.307**	NS
Peer T2	NS	.337**	NS
Auth T2	NS	.336**	.229*

\* $p < .05$ , \*\* $p < .01$   
n=100

When the correlations were run by grade, an interesting pattern emerged. In grade 2, only outcome expectations were associated with anger scores ( $r = .301$ ,  $p < .05$ ) and in grade 3, only response selection was associated with anger scores ( $r = .382$ ,  $p < .05$ ). Younger children have been found in other investigations to evaluate aggression more positively than older children, so the finding in the current study further supports this notion. Also, as we have already seen, younger students were more likely to rate themselves as angry. Younger children also have less experience forming social cognitions about the effectiveness of using aggression to solve a problem and this combination, as a function of their age, may contribute to why we see the relationship between SIP outcome expectation and anger. The older students have had more experience navigating the social world and regulating their emotions,

so perhaps when the older students are angry because they are less likely to be so, their emotions get the better of them and they react to a situation by using hostile responses.

*Question 3A: The unique contribution of aggression to social information processing after controlling for anger.*

In order to determine the unique contribution of aggression to social information processing after controlling for anger, hierarchical multiple regressions were run using information gathered from the previously run correlations.

When both anger and social information processing were correlated with aggression, their unique contributions were examined. As seen in earlier correlations, hostile intent attribution correlated with a time 1 measure of anger, specifically with the frustration and peer subscales of the ChiA. Additionally, only self-reported aggression time 1 was correlated with intent attribution. It is important to determine how much of the variance in intent attributions is due exclusively to self-reported aggression and how much is due to self-reported anger. As a result, multiple regressions were performed with intent attribution as the dependent variable in the first set of regressions. The original hypothesis of the study separating reactive and proactive aggression could not be tested directly because they were not related to any of the time 1 SIP variables. Further research should be conducted on the time 2 SIP variables and their relationships with aggression to add to our understanding of the association between SIP components and reactive and proactive aggression.

In the first analysis, anger was entered first and aggression (BBS Pre) second. The results are presented in Table 17. When entered first, anger contributed to variance in intent attributions,  $F$  change (1, 98)= 4.337,  $p$ = .040. Although significant, only 4.2% of the variance of SIP intent was explained by anger. When aggression was added at step 2, no additional variance in SIP intent was explained by aggression,  $F$  change (1, 97)= 2.386,  $p$ = .126. Next, aggression was entered alone at the first step and results show that aggression significantly predicted SIP intent scores  $F$  change (1, 98)= 4.388,  $p$ = .039. However, similar to anger, aggression only explained 4.3% of the variance in SIP intent scores. When anger was added at the second step, again, no additional variance could be explained in SIP intent scores  $F$  change (1, 97)= 2.336,  $p$ = .130 for Frustration Anger and  $F$  change (1, 97)= 2.291,  $p$ = .133 for Peer Anger.

Taken together, it appears that neither aggression nor anger makes a unique contribution above and beyond the other variable to predict SIP intent attribution.

Table 17  
Regression of intent attribution on anger and self-reported aggression

Predicted Variable	Predictor Variable	Zero-Order Correlation	Beta	R square	F change	F change sig
Intent Attrib	1- Frust T1	.206	.157	.042	4.337	.040
	2-BBS T1	.207	.159	.065	2.386	.126
Intent Attrib	1- Peer T1	.200	.155	.040	4.074	.040
	2- BBS T1	.207	.165	.065	2.596	.110
Step 1						
Intent Attrib	1- BBS T1	.207	.159	.043	4.388	.039
Step 2						
Intent	2- Frust	.206	.157	.065	2.336	.130

Attrib	T1					
	2- Peer T1	.200	.155	.065	2.291	.133

*Question 3B: The unique contribution of anger to aggression after controlling for social information processing.*

To understand if there is any unique contribution from anger to aggressive behavior after controlling for social information processing, a series of hierarchical multiple regressions were conducted based on previous correlations between the variables. The analyses were conducted with self-reported aggression as the outcome variable and SIP intent attribution and time 1 ChiA Frustration and ChiA Peer scales as the predictors, all of which have been shown to be related. As illustrated in the Table 18, anger, as measured by both ChiA scales contributed above and beyond SIP intent in predicting self-reported aggression  $F$  change (1, 97)= 7.806,  $p$ = .006 for Frustration Anger and  $F$  change (1, 97)= 6.117,  $p$ =.015 for Peer Anger. SIP intent scores accounted for 4.3% of the variance and ChiA frustration explaining an additional 7.1% of the variance and ChiA Peer adding 5.7% of the variance after SIP intent. However, when anger was entered first into the model, SIP intent did not add anything above and beyond anger when predicting self-reported aggression  $F$  change (1, 97)= 2.386,  $p$ = .126. This finding was unexpected and suggests that anger may be a better predictor of self-reported aggression than social information processing because it contributes to the variance in self-reported aggression. This relationship may well change with age and needs to be investigated in longitudinal studies.

Table 18  
 Regressing Self-reported aggression (BBS T1) on SIP and Anger

Predicted Variable	Predictor Variable	Zero-order correlation	Beta	R square	F change	F change sig
Step 1						
Self BBS T1						
	Intent Attrib	.207	.151	.043	4.388	.039
Step 2						
Self BBS T1	Frust T1	.304	.273	.114	7.806	.006
	Peer T1	.275	.243	.100	6.117	.015
Self BBS T1	1- Frust T1	.304	.273	.092	9.972	.002
	2- Intent Attrib	.207	.151	.114	2.386	.126
Self BBS T1	1- Peer T1	.275	.243	.076	8.008	.006
	2- Intent Attrib	.207	.158	.100	2.596	.110



## Chapter 5: Discussion

The purpose of this study was to examine social information processing (SIP) patterns associated with children's anger and aggression. An important goal of this study was to add to the literature regarding relationships among various informants reporting aggression, as well as focusing on different forms aggression, namely reactive and proactive aggression. Thus, the present study utilized a variety of measures, examining the relationship between them and whether or not they were differentially related to social cognitive variables.

### *Exploration of Measures of Aggression*

#### *Factor Analysis of Peer and Teacher Aggression Scales.*

Before the peer and teacher aggression nominations scales were used in the analyses, exploratory factor analyses were conducted to judge the appropriateness of the scales and to investigate if the scales yielded the same factors that have been found in previous investigations. Interestingly, the time 1 peer aggression scale yielded only one factor, with factor loadings ranging from .895 to .675. This finding for the time 1 is inconsistent with the literature that has utilized this scale and in which two distinct factors have been found (Crick, 1997). The internal consistency for the time 1 peer aggression scale was very strong at .919 and the overt and relational aggression scale within the peer measure was strongly correlated ( $r = .681$ ). The time 2 peer aggression measure revealed one distinct factor, overt aggression, with factor loadings ranging from .894 to .741 and several double loadings on the

second factor, with the exception of one item “Kids who when mad a person, get even by keeping that person from being in their group of friends, which had a strong loading of .905. These results highlight the difficulty of measuring indirect aggression as a construct, as well as the need to consider when during the school year data should be collected to obtain the most accurate rating of peers’ behaviors. One possible explanation for this finding is that children did not know their classmates as well in the beginning of the year at the time 1 measurement compared to the time 2 measurement. Perhaps as the year progresses, children become better at reporting their classmates’ behaviors and that’s why we see two factors in the time 2, compared to the one factor in the time 1. Studies utilizing this measure have used third graders and above in the sample (i.e., Crick & Werner, 1998), so additional information regarding a younger population seems judicious. Future research should also focus on the timing at which they ask students about others behaviors because the measurement may be more accurate closer to the end of the year rather than the beginning of the year. To date, no study specifies when during the school year the study was completed.

Next, an exploratory factor analysis was conducted on the reactive/proactive teacher aggression scales and for the time 1, a two-factor solution was found but it was not as distinct as past investigators have found (Poulin & Boivin, 2000). One reason for this is that in the present study, additional reactive and proactive items were used because the original scales were composed of only 3 items for each type of aggression and these two original scales were highly correlated  $r = .76$ . The findings from the current factor analysis reveal the reactive items did not all load onto the

reactive aggression scale and the two scales were correlated .637. There were double loadings for some of the items, and others loaded onto the proactive scale instead. Poulin and Boivin (2000) found a similar pattern of a two-factor solution but also strongly correlated scales. It could be that teachers cannot distinguish between the two types of aggression, or it could reflect that some children display both reactive and proactive behaviors.

When exploratory factor analysis was conducted on the time 2 teacher ratings, no distinct factors could be generated; rather four components were extracted, but did not converge into factors. When the items were forced into a two-factor solution, very similar results were found with past research. All but one of the original items came out as originally designated, with loadings ranging from .622 to .887, except for one proactive item, which double loaded. Like the time 1, many of the new items double loaded, while some retained their original status and the two scales were strongly correlated ( $r = .688$ ). The high correlation between reactive and proactive aggression appears to be a robust finding in the literature and one that is supported in the present study. Only in a sample of all boys is a modest correlation found between the two scales (Day, Bream, & Pal, 1992). However, it may be because their sample was comprised of only aggressive boys that teachers were able to differentiate among various forms of aggressive behaviors that may not be as obvious to teachers in a general classroom with boys and girls.

Further inspection of the items revealed some interesting findings among both pre and post test teacher ratings. “Teases and name calls” and “Starts fights” was thought to represent proactive aggression, however, these actions could be reactive in

nature if the student who is performing these behaviors feels threatened. Perhaps there are some children who display a combination of reactive and proactive aggressive behaviors and should be considered their own group. The current study provides some preliminary evidence for such a categorization by the double loading of several of the items previously designated as either reactive or proactive.

*Correlations between aggression measures.*

When all of the aggression measures were correlated, an interesting and expected pattern emerged. Similar to the results obtained by Hudley (1993), teacher and peer aggression ratings were related in the both the beginning of the year and the end of the year even though different items were used on each scale. This suggests that all forms of aggression are related and somewhat stable. It would be interesting to see if there are differences among peers and teachers in their aggression ratings based on age and gender to add to the literature in this area as well as longitudinal studies that tap into the stability of aggression ratings over time.

When children's self-reported aggression was evaluated, there was a different pattern. Similar to "others" ratings, children who rated themselves as aggressive in the beginning of the year, did so at the end of the year ( $r = .254$ ). The only "other" related rating with time 1 self-reports was post teacher reactive scale ( $r = .213$ ) and this suggests that as teachers became better acquainted with their students, they were better able to rate them and perhaps the reactive aggression items were more representative of the behaviors teachers saw than the proactive scale. Children's self-report of aggression was correlated with all teacher ratings both pre and post and post peer as well. This finding provides further preliminary evidence that when

administering peer and teacher ratings, timing in the school year and how long the raters have known the target child's behavior are important. It seems that waiting until later in the school year would give a more accurate view of children's behavior.

There was a relationship between gender and self-reported aggression in an unexpected finding. Girls in the current sample were more rated themselves as higher in aggressive behaviors than did boys ( $r = .310$ ) even though the authors of the self-report measure indicated that in their sample boys were rated more aggressive (Austin & Joseph, 1996). No sample demographics except for gender and age are provided for this measure and perhaps due to the high percentage of minority students in the current sample, different results emerged. Also, as mentioned earlier, the literature has shown that girls are rated by their peers as more indirectly aggressive than boys (Salmivalli, Kaukianen & Lagerspetz, 2000), and that the self-report measure used in this study contained several indirect aggression questions. Thus, it is not too surprising that girls would rate themselves as more aggressive on those dimensions.

Teachers also tended to rate boys as more reactive aggressive during the time 1. This is consistent with others (Crick & Werner, 1998) who have found that teachers rate boys as more directly aggressive than girls. However, some caution is needed in this interpretation. Overall, the evidence is inconsistent about gender differences in reactive and proactive aggression. While some (i.e., Hudley, 1993) find differences between boys and girls, others have not (e.g., (Connor, Steingard, Anderson, & Melloni, 2003). The relationship between girls and reactive and proactive aggression is still unclear and perhaps an additional confirmatory factor analysis that includes girls in the sample (Poulin and Boivin's 2000 study was only

done with boys) will help us better understand any gender differences in teacher rated aggression.

Peer ratings of aggression in the beginning of the year show that boys were rated as more aggressive than girls. This finding is interesting because of the combination of direct and indirect aggression items on the peer scale. One explanation could be the time of year these items were given (October) and that over the course of the year, peers become more accurate in their assessment of each others' behaviors, so during the time 2, no relationship between gender and peer rated aggression was found due to better understanding. It would be interesting to look for gender difference between the two different peer aggression scales, overt and relational, at the time 2. Based on the emergence of two factors at time 2 in the current study and past findings (i.e., Crick & Werner, 1998), one might expect that boys would be rated higher on the overt scale, while girls would be rated on the relational scale.

#### *Correlations between anger and aggression.*

The relationship between anger and aggression was of interest to the present study because researchers are just beginning to examine how these two constructs are related. Self-reported anger and aggression were most consistently moderately correlated between the time 2 measures. That is, children who reported they were angry at the time 2 also rated themselves as aggressive at the time 2. This is an important finding because there are no other known studies that employed a self-report measure of anger that was not in the context of a constructed situation. The literature is inconsistent about the relationship between anger and aggression with

some studies finding positive results between teacher and peer ratings of aggression and observations of anger (i.e., Arsenio, Cooperman, and Lover, 2000) and others have not (i.e., Hubbard, 2001). These inconsistent results may have to do with the types of measures used because there are various ways to measure aggression (teacher, peer, parent, self). There are also various ways to measure anger and most of the published studies asked children how they felt during a social situation they just heard about or involve the child in a situation the researcher is hoping will make them angry. Observational coding schemes have also been developed in order for researchers to look at facial expressions and nonverbal behaviors that are theorized to be linked to emotions (i.e., Hubbard, 2001). The use of a trait-like measure in the current study has added depth to our understanding of how temperamental anger is related to aggressive behavior.

Time 1 teacher rated aggression appears to be related to time 2 reported anger. One explanation for this could be that as children become older, they become better at regulating their anger and consequently do not act as aggressively, resulting in a weaker relationship. It is interesting that both teacher reactive and proactive time 1 ratings were related to anger because prior research has found a stronger relationship between reactive aggression and situational, observed anger (Hubbard, 2001). Perhaps temperamental anger affects aggression in a different way than situational anger in that it is related to both reactive and proactive aggression. Even when the correlation was rerun with the new reactive aggression scale, a relationship was still present. Further research in this area is necessary to tease out differences in findings. For example, the findings of Hubbard et al (2003) show no relationship between

situational self-reported anger and teacher rated reactive and proactive aggression. Others have found that situational self-reported anger and peer rated aggression was not related (e.g., Dearing et al., 2002), but peer aggression is related to observed anger facial expressions and nonverbal behaviors (Arsenio, Cooperman, & Lover, 2001). In the current study, there was no relation between temperamental self-reported anger and peer rated aggression. Again, it would add to our knowledge of how anger and peer aggression were related if the peer overt and relational aggression scales were analyzed separately.

#### *Relationship between SIP and Aggression.*

According to Crick and Dodge's (1994) social information processing model, children, when faced with a social situational cue, engage in five mental stages of responses before enacting a response. Reactive and proactive aggression was related to deficiencies in different stages of social information processing (Crick & Dodge, 1996). The current study looked for patterns not only in reactive and proactive aggression, but also for relationships between the SIP components and peer and self-reported aggression. For intent attribution, step two of the SIP model, it was hypothesized that all informants of aggressive behavior would be related to increased hostile intent attribution, that is when the child is faced with ambiguous provocations, they would tend to interpret their peer's behavior as hostile when the real motive behind the peer's behavior is unknown. Surprisingly, only self-reported aggression was modestly correlated with intent attribution ( $r = .205$ ). Not finding a relationship between peer or teacher ratings may be the result of the age of the sample. Many of



the studies that have found a connection between teacher and peer rated aggression and intent attributions have been in older children (fourth grade or older) than in the present study (i.e., Dodge & Tomlin, 1987; Erdley & Asher, 1996).

The second SIP component tested in the present study was response selection, how a child would respond to the hypothetical situation presented if it actually happened to them. Previous research has shown that a hostile response selection is associated with more aggressive behavior, as measured by teacher reports (i.e., Quiggle, 1992; Crick & Dodge, 1996). It was hypothesized that hostile response selection would correlate with all aggression measures. Results indicate SIP response selection was modestly correlated with only time 1 reactive and proactive teacher reported aggression ( $r = .209$ ,  $r = .241$  respectively). This finding was expected based on previous findings in the literature. The lack of relationship between hostile response and self-reported aggression is interesting because of the relationship between self-reported aggression and hostile intent attributions. One explanation could be that children say they would do one thing and then in actuality do another. They may know that it is less socially desirable to say you would react to a situation in a hostile manner, but when they are asked directly about their own behavior, they may be more forthcoming in the responses and these may be more aggressive.

Younger students were also more likely to endorse hostile responses than older students. This finding is consistent with the developmental hypothesis from social information processing, which states that changes in behavior are related to changes in the processing of information (Crick & Dodge, 1994). Therefore, as children get older, they become more familiar with the consequences of aggressive

behavior and may be less likely to support its use. An unexpected finding in the present study was that girls were more likely to have hostile response selection than boys. This could be due to the hypothetical situations that were presented. Two of the situations depict more relational aggression behavior by the role of the provocateur, such as not allowing a student to sit at a particular table at lunch, or preventing the child from joining in a game. As we have seen, girls are more likely to experience relational aggression and because they are more familiar with these types of behaviors, are more likely to attribute hostile intent to the hypothetical situations. Future studies might want to differentiate the type of provocation presented according to whether the provocation is indirect (relational) or direct (overt).

The final SIP component was outcome expectation and how favorable the students' found aggressive responses to be in solving problems. In contrast to reactive aggression, proactive aggression has been found to correlate with the latter three stages of the SIP cycle, clarification of goals, response access, and response decision (Crick & Dodge, 1996). Proactive aggressors are also more confident in enacting aggressive behaviors and believe that aggressive responses will enable them to obtain their goals (Erdley & Asher, 1996). It was expected in the present study that teacher proactive aggression, peer aggression, and self-reported aggression would be correlated with more favorable views of using aggression to solve a problem (SIP outcome expectations), but teacher reactive aggression would not. This hypothesis was not supported. In fact, teacher reactive aggression was the only aggression measure correlated with outcome expectation ( $r = .224$ ). Based on the findings from the factor analysis discussed earlier, when a new reactive aggression scale was

constructed using the items that loaded onto the reactive factor, there was no relationship between reactive aggression and outcome expectation ( $r = .185$ ). When the analyses were rerun with a newly constructed proactive aggression scale, there was also no relationship between proactive aggression and outcome expectation ( $r = .188$ ). The age of the sample could be one explanation for this unexpected finding. Prior studies that have found differential relationships of SIP with reactive and proactive aggression were conducted with children who were older than the participants in the current study. Timing of the data collection could also have an effect. The SIP data was collected in the beginning of the year and it is possible that patterns of relationships between aggression and SIP, collected at the end of the year, may differ. Perhaps, if relationships were present, they would be revealed at the end of the year because as we have seen, peers and teachers seem to have a more accurate view of children's behaviors after they have known them for the year. The emergence of two factors in the peer time 2 versus one factor in the time 1 supports the importance of time of year data is collected.

*Relationship between Social Information Processing and Anger.*

There is paucity in the literature about the relationship of chronic anger and social information processing. Much of the previous work in this area has involved asking participants about how they feel in the moment when answering questions about the SIP cycle or have focused on the accurate emotional recognition of the provocateur in a social situation. Very few studies have looked at more temperamental aspects of emotion although researchers have hypothesized that

emotion, specifically anger should be related to deficiencies in SIP components. The current study sought to look for relationships between intent attributions, response selection, and outcome expectations and a measure of anger, unrelated to the specific vignettes presented during the SIP data collection. In fact, SIP data and anger data were collected on different days during both time 1 and time 2 collections. It was expected that stronger feelings of anger would result in more hostile intent attributions, more hostile response selections, and viewing aggressive responses to solve a problem as effective.

Two of the ChiA subscales at time 1, frustration and peer anger, were significantly positively correlated with intent attribution scores ( $r = .206$  and  $r = .200$  respectively), supporting the hypothesis that more anger would be related to more hostile intent attributions. This finding enhances our working knowledge of how emotions are related to social cognitions by adding to the research base that has found that when participants are angry at the provocateur in the social situation, they are more likely to attribute hostile intent. However, these correlations are quite low and should be interpreted with caution. Future studies should address the relationship between anger and intent attribution across the school year.

Interestingly, the relationship between response selection and outcome expectation and anger appeared in the time 2 measure of anger and not in the time 1. All of the ChiA scales were moderately correlated with response selection, and most of the post ChiA scales were related to outcome expectation, so that children with higher anger scores also reported more hostile responses to the hypothetical situations and view aggressive responses as effective ways to solve a social problem. This

relationship is supported by previous research. For example, Orobio de Castro et al (2003) induced anger feelings into a group of boys before asking the SIP cycle questions about hypothetical social situations, and in the anger induced state, the participants were more likely to provide aggressive responses to solve the problem. However, some explanation for the time 2 only finding in the current study is warranted.

The timing of data collection could explain why only time 2 anger scores correlated with SIP response selection scores and time 1 anger scores did not. Children may have a better understanding of their emotions as the year progresses and may be more accurate reporters of anger at time 2 than time 1. Those children who reported responding in a hostile manner on the SIP in the beginning of the year may have been influenced by their social cognition throughout the year. When they are asked about their anger nine months later, they have a better understanding of their emotions and their hostile response is related to their emotion. This explanation is supported by Dearing et al (2002) who suggest that children's development for regulating the internal experience of anger may develop more slowly than their knowledge of strategies for regulating their external expression of anger. It would be beneficial in the future to know how these children would respond to SIP cycle questions during the time 2 and if their responses are consistent with the time 1 and if so, would those responses be related to anger scores as the time 1 SIP scores were.

The difference in rate of development of internal and external emotional regulation may also explain the observed grade differences. When the second graders were analyzed, only the relationship between anger and outcome expectation was

present. Aggression may be more acceptable to second graders as a way to solve a problem because they could still be developing social cognitive strategies to deal with social situations and may not have had as many negative experiences using aggression with their peers as third graders. When third graders were analyzed, only a relationship between anger and response selection was observed. Perhaps third graders have more experience interacting with their peers and they know that using aggression to solve a problem is not acceptable with their peers.

The implication for interventions from the results concerning anger and SIP could be the importance of teaching children to monitor and regulate their own emotions. Preliminary evidence for the effectiveness of this intervention goal has been shown with a group of highly aggressive special education boys. Orobio de Castro et al (2003) found that when the boys were taught to monitor and regulate their emotional response to a hypothetical provocation situation, hostile responses to SIP vignettes decreased. In the non-aggressive comparison group, considering the peer's emotions and intentions decreased hostile responses, while increasing hostile responses in the aggressive group, suggesting that the internal experience of emotion is an important aspect of an intervention. Follow up studies including girls and non-special education students are necessary to better understand what would be an effective intervention.

#### *Unique contribution of Social Information Processing and Anger to Aggression.*

The results of the multiple regression analyses reveal an overlap in anger and aggression with respect to the prediction of SIP intent attributions. Due to the fact

that self-reported anger and aggression were both significantly correlated, it was interesting to see whether either measure contributed uniquely to intent attribution. When self-reported anger is accounted for, self-reported aggression does not contribute significantly to variance in intent attributions and when self-reported aggression is accounted for, self-reported anger does not contribute significantly to variance in intent attributions. These results suggest that anger and aggression both influence the SIP stage of interpretation of cues where hostile intent attribution occurs.

Next, it was of interest to determine if anger and intent attribution contributed uniquely to self-reported aggression. When intent attribution is accounted for, self-reported anger contributed significantly to variance in self-reported aggression. However, when anger is accounted for, intent attribution does not contribute significantly to variance in self-reported aggression. Based on these findings, it appears that anger is a better predictor of self-reported aggression scores than intent attribution because of anger's unique contribution. The implication of this finding further contributes to our understanding about the relationship between self-reported aggression and anger, which is a relationship lacking understanding in the context of social cognitive problem solving. The results of the two sets of multiple regressions suggest that trait-like self-reported anger, anger measured unrelated to a provoking situation, is a construct that investigators should study more in depth to better understand anger's influence on social cognitive functioning. Age may also play a key role and longitudinal studies would help clarify all of these relationships.

### *General Discussion and Future Research*

One of the overall themes emerging from the present study is that there are complex relationships between social information processing, aggression, and anger. The measures selected to study these constructs can greatly impact the findings. The literature on the measurement of aggression in children shows that subtypes can be distinguished but are substantially correlated. The use of self-reports for all three variables is unique to the literature and has provided some useful results for others to build upon. Longitudinal studies would be helpful to learn if self-reported aggression, anger and social information processing decisions are stable over time. We have also seen that gender and age appear to affect the relationships between these three constructs.

One question that researchers need to address is: what is the best way to measure aggressive behavior? Existing scales for both teachers and peers have proven to be inconsistent in their results. In the current study, exploratory factor analysis discovered that the teacher reactive and proactive scales did not load onto the same factors that have been found by others. This decreases the teacher rating scale's construct validity. Confirmatory factor analysis would be helpful determine if a two-factor model would indeed provide the best fit to the data, or if there are really three factors that can be obtained from the data. A previous confirmatory factor analysis by Poulin and Boivin (2000) was conducted on a sample of only boys. It seems highly important to include girls in these analyses to determine if reactive and proactive aggression is applicable to both boys and girls or if these categories need to be revised.



Perhaps measurement issues of aggression are linked to the evolving definition of aggression. The study and theory of aggression, which began with looking at physical aggression (i.e., hitting), then included verbal aggression (i.e., mean names and verbal insults), and now includes relational aggression (using the relationship as a means of harm). While these categories of aggression help researchers fine-tune their understanding of aggressive behavior, the methods of measurement employed for one type of aggression may not be applicable to another. For example, relational aggression may have to be measured in a different manner than physical aggression (Crick & Zahn-Waxler, 2003).

Another important implication from this research is the use of a predominantly minority sample. Many of the prior investigations looking for relationships between anger, aggression, and SIP, with a few exceptions, have been conducted on either European samples that are almost exclusively Caucasian or samples in the United States that are more heterogeneous, but still with Caucasian majority. It would be too simplistic to attribute the findings in the present study that was not supported by the literature to be a function of the sample, but the uniqueness of the current sample does provide some insight that perhaps the measures may not be as valid with this population as the ones it is mostly studied with.

What has become clear as a result of the present research is that future investigations should not dismiss the importance of including emotions to their studies regarding aggression and social cognitions. Although these connections still need to be studied further and their relationships are not completely understood, there is evidence provided here and by others that emotions, specifically anger, play a role

in children's understanding of social situations and how they choose to behave as a result.

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