Relatational aggression and physiological reactions to stress in preschool aged children

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Abstract
Relational aggression has been found to occur in children as young as three and can lead to adverse effects for both the aggressor and the victim. It has also been found that children who engage in relational aggression have lower levels of physiological arousal than children who do not engage in these behaviors. This paper examines the characteristics of relational aggression in preschool aged children and how children that engage in relational aggression respond to stressful situations. Future research should focus on creating more intervention and prevention programs for preschool children and should look further into identifying risk factors for relational aggression, such as low physiological arousal, early on, so as to prevent children from engaging in behaviors that lead to adverse outcomes.

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RELATIONAL AGGRESSION AND PHYSIOLOGICAL REACTIONS TO STRESS IN PRESCHOOL AGED CHILDREN

A THESIS

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# Table of Contents

Abstract ........................................................................................................................................... 2

Introduction ..................................................................................................................................... 3

Relational Aggression ..................................................................................................................... 3

Assessment of Relational Aggression in Preschool Children ......................................................... 5

  Teacher Reports ........................................................................................................................................ 6
  Peer Nominations ..................................................................................................................................... 7
  Observations ............................................................................................................................................. 9

Intervention and Prevention Programs.......................................................................................... 11

  The Early Childhood Friendship Project ............................................................................................ 11
  You Can’t Say You Can’t Play .............................................................................................................. 13
  I Can Problem Solve (ICPS) ................................................................................................................ 15
  Walk away, Ignore, Talk, and Seek help (W.I.T.S.) ............................................................................... 16
  Friend to Friend (F2F) ............................................................................................................................ 18
  Preventing Relational Aggression in Schools Everyday (PRAISE) ....................................................... 22
  Indirect Aggression: Violence Unseen ................................................................................................... 25
  Social Aggression Prevention Program (SAPP) ..................................................................................... 27
  Creating a Safe School (CASS) .............................................................................................................. 29

Relational Aggression and Physiological Reactions to Stress ...................................................... 32

  Physiology ........................................................................................................................................... 32
  Physiology and Relational Aggression .................................................................................................. 34

Conclusion .................................................................................................................................... 35

References ..................................................................................................................................... 38
Abstract

Relational aggression has been found to occur in children as young as three and can lead to adverse effects for both the aggressor and the victim. It has also been found that children who engage in relational aggression have lower levels of physiological arousal than children who do not engage in these behaviors. This paper examines the characteristics of relational aggression in preschool aged children and how children that engage in relational aggression respond to stressful situations. Future research should focus on creating more intervention and prevention programs for preschool children and should look further into identifying risk factors for relational aggression, such as low physiological arousal, early on, so as to prevent children from engaging in behaviors that lead to adverse outcomes.
Introduction

Relational aggression has been found to occur in children as young as 3-years-old (Crick, Casas, & Mosher, 1997). These behaviors typically continue as the child gets older (Martin & Huebner, 2007). There are many different risk factors for engaging in relationally aggressive behaviors, including peer interactions, characteristics of the child’s family, and characteristics of the child (Herrenkohl et al., 2007). One thought is that children who have lower levels of arousal engage in more relational aggression than children with normal levels of arousal. It is thought that these children may be engaging in relationally aggressive behavior to feel a more heightened level of arousal (Woods & White, 2005). Relational aggression has been shown to have adverse effects for both the aggressor and the victim, including both externalizing and internalizing problems (Crick & Grotpeter, 1995). This paper examines the literature on relational aggression in preschool aged children, including characteristics of relational aggression, assessment measures used in research, and intervention and prevention programs. This paper also examines the literature on physiological reactions to stress and how these reactions interact and correlate with relationally aggressive behaviors.

Relational Aggression

Relational aggression is defined as aggression that causes harm through damage to relationships and social status through behaviors such as social exclusion, using the “silent treatment,” spreading rumors, gossiping, threatening to end a friendship, or encouraging classmates to reject a peer (Crick et al., 1997; Crick & Grotpeter, 1995; Crick et al., 2006). Relational aggression is much more covert than physical aggression. Many times it is harder to detect because of the subtle behaviors involved (Crick & Bigbee, 1998). Previous research has found a significant amount of overlap between relational aggression and more overt aggression.
It was found that 57% of the variance was overlap between the two forms of aggression and that there was a greater amount of overlap among boys than among girls (Card, Stucky, Sawalani, & Little, 2008).

Research on relational aggression has typically focused on middle school aged children (e.g., Graham, Bellmore, & Mize, 2006; Martin & Huebner, 2007; Mathieson & Crick, 2010). However, it has been found that relational aggression can start in children as young as age three (Crick et al., 1997). More studies have been conducted on preschool aged children since this discovery in order to determine factors that contribute to the development in relational aggression (e.g., Bonica, Arnold, Fisher, Zeljo, & Yershova, 2003; Crick et al., 2006; Fanger, Frankel, & Hazen, 2012).

Research on gender differences in relationally aggressive behavior has been mixed. When teacher reports are utilized, girls are rated as more relationally aggressive than boys. This is true of older children as well as preschool aged children (Crick et al., 1997; Crick et al., 2006). Observations confirm these results (Crick et al., 2006; Ostrov & Keating, 2004). However, when peer reports are utilized among younger children, no gender differences are found. This could be because peers typically engage in same sex play when they are younger and do not experience aggression between genders (Bonica et al., 2003; Crick et al., 1997; Sebanc, 2003).

A multitude of risk factors have been found to be associated with relational aggression. Among adolescents, one study found that risk factors fell into three categories: peer influences (e.g., interaction with antisocial peers), characteristics of the youth (e.g., low commitment to school, rebelliousness, attitudes favorable towards antisocial behavior, sensation seeking, concentration problems, and impulsivity), and family characteristics (e.g., poor family management, family conflict, and family history of antisocial behavior; Herrenkohl et al., 2007).
A study among elementary school children found that risk factors for engaging in relational aggression included amount of overall relational aggression exhibited by children within the classroom, peer rejection, and past engagement in relational aggression (Kuppens, Grietens, Onghena, Michiels, & Subramanian, 2008). Perceived popularity and gender also had weak associations with engaging in relationally aggressive behaviors (Kuppens et al., 2008).

Relational aggression is associated with many negative effects, both short-term and long-term. Some of the problems associated with relationally aggressive behavior are social problems, social maladjustment, and internalizing problems (depression, loneliness, and social isolation). Children who engage in relational aggression are often liked less than other peers (Crick & Grotpeter, 1995). There has also been a unique association with high prosocial behaviors that is not present with more direct forms of aggression. This association was found through a meta-analysis (Card et al., 2008). Card et al. (2008) stated that these results have not been found in individual studies due to the lack of power to detect the effect. It was also hypothesized that this association between relational aggression and prosocial behavior exists because children who are engaging in relational aggression must first gain support and assistance of their peers in order to be efficient in their aggressive behaviors (Card et al., 2008). Although there are many negative effects on the aggressor associated with relational aggression, it is unclear if these problems are a result of relationally aggressive behavior, or if relational aggression develops as a maladaptive coping skill for these problems (Crick & Grotpeter, 1995).

**Assessment of Relational Aggression in Preschool Children**

There are typically three different assessment methods utilized in the research of relationally aggressive children. Teacher reports are the most commonly utilized by researchers. This includes a self-report measure of the individual children in each teacher’s classroom (Crick
et al., 1997). Peer nominations are the next most commonly utilized assessment method in the study of relational aggression. Peer nominations typically involve a research assistant interviewing each child in a given study about their peers in the classroom (Crick et al., 1997).

Finally, observations are sometimes utilized in research on relationally aggressive children. This would involve a research assistant observing children for various amounts of time throughout the course of the study and noting relationally aggressive behaviors that the children perpetrate (Ostrov & Keating, 2004). All three methods are further reviewed in the following section, in the order of most commonly utilized in the study of relational aggression.

**Teacher Reports**

Teacher reports have been used very frequently in the study of relational aggression. Almost every study on this topic has utilized teacher reports (e.g., Bonica et al., 2003; Crick et al., 1997; Crick & Grotpeter, 1995; Leff, 2010; Ostrov et al., 2009). Reports by teachers are used frequently because of the amount of time that teachers spend with children, particularly younger children who only have one teacher (Crothers & Levinson, 2004). There have been teacher reports developed for both preschool children (the Preschool Social Behavior Scale; Crick et al., 1997) and elementary school children (the Children’s Social Behavior Scale; Crick, 1996).

The teacher report scale used for preschool aged children is the Preschool Social Behavior Scale-Teacher Form (PSBS-T) developed by Crick et al. (1997). This scale was adapted for younger children from a scale previously developed for elementary aged children, the Children’s Social Behavior Scale-Teacher Form (Crick, 1996).

The teacher completes a form for each child in the classroom. The PSBS-T involves a response scale from one to five, with one being “never or almost never true” and five being “always or almost always true.” There are 19 items on the scale: six on a relational aggression
scale, six on an overt aggression scale, four on a prosocial behavior scale, and three on a depressed affect scale. Cronbach’s alpha showed each scale to be highly reliable ($\alpha=0.96, 0.94, 0.88, 0.87$ for relational aggression, overt aggression, prosocial behaviors, and depressed affect scales respectively; Crick et al., 1997). A principal-components factor analysis was conducted. The researchers found that each scale represented its own factor. The four factors accounted for 81% of the variation in children’s scores. The relational aggression factor accounted for 50% of the variance in scores, the overt aggression factor accounted for 16% of the variance in scores, the prosocial behaviors factor accounted for 10% of the variance in scores, and the depressed affect factor accounted for 6% of the variance in scores.

Teacher ratings are useful because teachers see students more often than observer would. The information can typically be gathered fairly quickly and they are inexpensive. However, as with the observation method, teachers may not see the full extent of relationally aggressive behaviors because these behaviors are covert. It is also possible that the teacher could be biased about particular students. Despite these potential problems, teacher ratings, especially when combined with observations and peer nominations, have been found to be very useful in the study of relational aggression (McEvoy, Estrem, Rodriguez, & Olson, 2003).

Peer Nominations

Peer nominations are used in many studies of relational aggression (e.g., Crick et al., 2006; Crick, Casas, & Ku, 1999; Leff et al., 2010). Peer nominations are how researchers identify which children are engaging in relationally aggressive behaviors. The only peer nomination scale that has been developed for preschool aged children is the Preschool Social Behavior Scale-Peer Form (PSBS-P) developed by Crick et al. (1997). This scale was adapted for younger children from a scale previously developed for elementary aged children (Crick &
Grotpeter, 1995). A pilot study conducted with preschool aged children was completed prior to using this measure to ensure the adaptations were sufficient. The researchers also conducted observations of preschoolers’ social behavior prior to the development of this measure in order to make adequate adaptations.

The PSBS-P consists of 12 items overall: four on an overt aggression scale, four on a relational aggression scale, and four on a prosocial behaviors scale. The PSBS-P is completed in two 15-minute interviews with each child in the classroom, session A and session B. Session A and session B were conducted about a week apart. Half of the items are given in each session. It is not clear why this is done. However, it is possible that only half of the items are given so that the children can sustain attention throughout the interview. The order in which children completed sessions A and B was randomized. In each interview, the interviewer shows the child pictures of every classmate. They have the child name each classmate in order to help the child think about the whole class. The child then completes practice items in order to gain knowledge about the formatting of the measure. The practice items involve pictures of food. The child is asked to pick the three foods he/she likes the most and the three foods he/she likes the least. Once it becomes clear that the child understands the format, the interviewer will again show the child pictures of his/her classmates. For each item, the child is asked to nominate to three classmates who fit that particular description (e.g., point to the picture of a kid who pushes and shoves other kids). Once both sessions are complete for each child, scores for each child nominated are added and then standardized (Crick et al, 1997).

Cronbach’s alpha showed that the scales were all reliable ($\alpha = 0.71, 0.77, 0.68$, for overt aggression, relational aggression, and prosocial behaviors scales respectively). After a factor analysis, it was concluded that the three different scales accounted for 57% of the variance in
scores (Crick et al., 1997). Although the scales have been shown to be reliable, one weakness of this measure could be the potential problems with internal validity due to the interview being conducted in two separate sessions. Children could experience something that would change how they answer the items in their second session (e.g., if a child who completed session A tells a child who has completed session B how they answered the items, that could taint the way the child answers the items when they complete session A).

Peer nominations are useful because peers are typically going to be more aware of relationally aggressive behaviors than anyone else. It is also possible that children will be more honest about their ratings because they are being interviewed by an outside person who is not affiliated with the school (Crothers & Levinson, 2004).

One limitation to peer nominations, especially with young children, is that they may not fully understand relational aggression. They also may not see it as bullying behavior (McEvoy et al., 2003).

**Observations**

Observations have been used more frequently in recent research on relational aggression (e.g., Crick et al., 2006; Fanger et al., 2012; Harrist & Bradley, 2003; Ostrov et al., 2009.) The observational system that is utilized in studies of relational aggression in young children is the Early Childhood Observation System (Ostrov & Keating, 2004).

In the Early Childhood Observation System undergraduate research assistants conduct observations during free play times (Ostrov & Keating, 2004). Observers utilized a paper and pencil method for recording their observations rather than videotaping the children. It was noted that videotaping was more of a distraction to the children being observed. Parents and teachers also reported that they were more comfortable with having written records rather than videos.
Ostrov and Keating (2004) developed coding forms for the research assistants to utilize while observing children. In this method of observation, one child at a time is randomly chosen and is observed for a ten-minute period. Each child is observed five times, for 50 minutes of total observation. Observers noted when the child engaged in relationally aggressive behavior (e.g., exclusion, spreading rumors, ignoring peers), physically aggressive behavior (e.g., hitting, pushing, forcibly taking objects) and verbally aggressive behavior (e.g., teasing, name calling, verbal threats, insults). Typically, at least two research assistants would observe the same child as to check for inter-rater reliability (Ostrov & Keating, 2004). The Early Childhood Observation System was found to have strong inter-rater reliability (.96 for physical aggression, .83 for verbal aggression, .88 for relational aggression). When observations were completed, the various behaviors were summed and scored to get a physical, verbal, and relational aggressiveness score. Children also receive a score of how often these behaviors occurred to them, a victim score (Ostrov & Keating, 2004).

Observations are beneficial because they are typically completed by a research assistant or researcher who has no bias towards the children in the classroom, as the teachers or other school personnel might. Although the observers do not have bias about the participants, it is possible that they will still have bias when looking for specific behaviors of the study, so it is important to be aware of this when analyzing results from these types of studies. To ensure reliability, it is necessary to have more than one observer. Observations could be inexpensive because many times the research assistants utilized are trained undergraduates, rather than paid research staff or school personnel (Crothers & Levinson, 2004).

A potential weakness of this assessment method is that researchers may not be able to gather the full scale of relational aggression if observation is the only method used. It is possible
that observers will not detect all relational aggression because it is covert in nature (McEvoy et al., 2003). It is also likely that observers will not be able to observe settings where relational aggression may take place, such as a restroom. Another weakness is that relational aggression is largely verbal in nature. Observers, because they are trying to be unobtrusive, may not be able to hear a lot of what children say (Crothers & Levinson, 2004).

One study was conducted to fix the problem of not being able to hear children during the observation. An observation study was conducted utilizing microphones in vests and backpacks (Fanger et al., 2012). The researchers of this study utilized a focal individual sampling method originally developed by Altman (1974). In this method, a particular child is observed for all of the behaviors of interest (in this case, relationally aggressive behaviors). The researchers used a randomly ordered list in order to determine which children in a classroom would be observed each day. The researchers were able to hear what was happening while observing on the playground with the use of microphones (Fanger et al., 2012). This method may allow for observations to become an even stronger assessment method in future research.

**Intervention and Prevention Programs**

There are many intervention and prevention programs that exist for relational aggression. However, the vast majority of these programs are developed for school aged children, ranging from elementary to middle school. There has only been one program developed for use with preschool aged children at this time. In the following section, various relational aggression prevention and intervention programs are reviewed. The programs reviewed were chosen because they were found to have promising results. The programs are categorized by age range, beginning with the youngest age group.

**The Early Childhood Friendship Project**
There has only been one study conducted on this program at this time (Ostrov et al., 2009). The Early Childhood Friendship Project is a classroom based intervention program. It is intended to help decrease aggressive behaviors, while increasing prosocial behavior and building friendship-making skills. This program is intended for children ages 3 through 5. Eighteen classrooms were used from three public schools and four community centers. The classroom was the unit being measured for this study, rather than the individual students (Ostrov et al., 2009).

This program is conducted in a short 20-40 minute sessions one time per week for 6 weeks. These sessions include a puppet show, a participatory activity often utilizing role plays where children would practice steps that would help them make a friend, such as smiling at each other, saying hello, and inviting the other child to play. These sessions also include a concept rehearsal activity, such as small group projects where children would complete an art project or read a book together. The content of these small group activities would contain content similar to the puppet shows. A trained team member leads these sessions. The program also includes praise by the classroom teacher when a child exhibits use of the weekly skills. This is intended to reinforce the newly learned skills (Ostrov et al., 2009).

One strength of the Early Childhood Friendship Project is that it is manualized. It is easily conducted and inexpensive. Although it takes away from class time, teachers rated the program positively and were engaged throughout. This was measured through teacher evaluations at post-test. The measure utilized a five-point Likert scale ranging from “strongly disagree” to “strongly agree.” Another strength of this program is that it is very brief. It has also been shown to be efficacious during this initial study. It has been shown to reduce both physical ($M=7.89, SD=4.59$ at pre-test; $M=4.33, SD=1.58$ at post-test) and relational aggression ($M=6.55, SD=2.79$ at pre-test; $M=3.78, SD=2.64$ at post-test) and increase prosocial behavior in children.
(\(M=24.63, \text{SD}=3.25\) at pre-test; \(M=26.25, \text{SD}=3.01\) at post-test). These results were not statistically significant. However, Ostrov et al. (2009) attributed this to low statistical power and noted that all of the initial outcome effects were in the predicted directions. This seems plausible considering the study only utilized a sample of 18 classrooms.

Relational aggression and physical aggression were measured through observations during free play by two female research assistants. They utilized a revised version of the Early Childhood Observation System (Ostrov & Keating, 2004). This system utilized specific coding forms for observations rather than cameras or other recording devices. They also utilized a focal child that was chosen at random for each observation. In the original system, children’s interactions were observed for 10 minutes. However, in order to save time due to the large amount of children and because individual children were not the focus of this study, each child was only observed for 3 minutes. Ten observations were done for each of the 18 classrooms pre-intervention and post-intervention, for a total of 20 observations for each classroom (Ostrov et al., 2009). The prosocial behavior was measured using the Preschool Social Behavior Scale-Teacher Form (\(\alpha=.79-.85\); Crick et al., 1997).

One weakness of this particular study is that the researchers looked at the classroom unit as the measurement for change. Teachers rated the impact of the program on the whole classroom, rather than on individual students. Another weakness is that the program is led by a team member, rather than a teacher or school staff. However, because it is manualized, the researchers believe that with some training, the program may be able to be led by school staff.

**You Can’t Say You Can’t Play**

The You Can’t Say You Can’t Play program was designed for use within kindergarten classrooms. This program was based on the children’s book of the same name by Vivian Paley
(1992). The book discusses social exclusion and the disruptions that excluding children can have on the learning environment. It sets up a classroom rule of “you can’t say you can’t play,” that bans social exclusion within the classroom (Harrist & Bradley, 2003).

Ten classrooms in three schools were utilized for this study, 6 experimental and 4 controls. There were 144 children total that participated (71 girls and 73 boys). Whole classrooms were randomly assigned to either the experimental or control groups (Harrist & Bradley, 2003).

Teachers conducting this program are initially asked to read Paley’s book. Teachers meet with the research team once a week to discuss the program and how it is progressing. They are able to address any concerns during this time as well (Harrist & Bradley, 2003).

In the first 3 weeks, two research assistants come to the classroom and read Paley’s (1992) story to the children. They then conduct a group discussion and facilitate role-plays in small groups. There are 8-10 sessions per classroom. After these initial 3 weeks, the “you can’t say you can’t play” rule is introduced to the students. The research assistants facilitate a discussion about this rule with the students. Colorful banners with the rule written on them are displayed throughout the classroom. The research assistants revisit the classroom once per week following the introduction of the rule for 6-8 weeks. They continue to discuss the rule and how it has been used within the classroom (Harrist & Bradley, 2003).

One strength of this program is that it was not just for those children that were excluded, but was designed to be used with all children. It is also easy to implement and it does not take up much class time. The original study also utilized not only report by the teacher, but also child self-reports, child interviews, and observations. The teachers completed the Preschool Socioaffective Profile ($\alpha=.86$; LaFreniere, Dumas, Capuano, & Dubeau, 1992) and the Teacher’s
Checklist of Peer Relationships ($\alpha=.87$; Dodge, 1986). Children were interviewed by research assistants and verbally completed the Children’s Social Acceptance Profile ($\alpha=.73-.78$; Harter & Pike, 1984) and the Loneliness and Social Dissatisfaction Scale ($\alpha=.72-.79$; Asher, Hymel, & Renshaw, 1984). Children were given scales verbally because not every child could read. During the interviews, children also rated three of their peers that they “liked the most” and three of their peers that they “liked the least.” Once every child was interviewed, these scores were compiled and standardized to make a “Peer Accepted” group and a “Peer Excluded” group. Observations were conducted of the children in the Peer Excluded group. Another strength of the study is that children participating in this program reported during their interviews that they liked to play with each other more at the end of the program than the children in the control group, who did not receive the program.

One weakness of the program is that teacher report measures were not specifically about exclusion. It was also unclear if behavior actually changed, and if children actually played together more at the end of the program. The researchers also did not look at how closely the program was followed by each teacher when the research assistants were not in the classrooms.

I Can Problem Solve (ICPS)

ICPS is a curriculum based prevention program for children in kindergarten and elementary school. It was designed as a group intervention for children ages 4-12 (Boyle & Hassett-Walker, 2008). The goal of ICPS is to reduce aggressive behavior, increase effective problem solving skills, and increase prosocial behavior (Shure, 1992). ICPS is implemented by classroom teachers. The sessions are meant to be done in small groups, multiple times per week, for about 4 months. These groups involve games and discussion intended to increase knowledge of problem solving vocabulary, build problem solving skills, think of potential consequences of
actions, and build empathy. The goal of this is to help children resolve conflicts and understand what the other child is feeling during the conflict (Shure, 2001).

One strength of ICPS is that it is manualized. Classroom teachers, reported that the manual is easy to utilize. Another strength is that, although the intervention is manualized, teachers are allowed some flexibility with the lessons and the content, as long as the main concepts are maintained throughout. There is also a broader program that can be used by parents or caregivers. This was originally found to be effective with low-income African-American mothers (Shure, 1996).

One weakness of ICPS is that it is very long. The program is intended to last 83 sessions, with multiple sessions each week. This takes a very large commitment on the part of the teacher who is implementing the program (Boyle & Hassett-Walker, 2008). Another weakness is that, though ICPS has been studied and implemented many times since its inception, there are very little data on effectiveness of the program. It is also unclear what measures were used to assess the program outcomes.

Walk away, Ignore, Talk, and Seek help (W.I.T.S.)

The W.I.T.S. program is a school-based and community intervention program for 1st through 3rd graders (Leadbeater, Hoglund, & Woods, 2003). The program’s goals are to reduce school and classroom levels of peer victimization, enhance adult responsiveness, enhance conflict resolution skills and social competencies, and increase awareness (Hoglund, Hosan, & Leadbeater, 2012). The program is designed to be implemented by teachers and school personnel (Leadbeater et al., 2003).

W.I.T.S. involves a school police liaison program where students are “deputized” at the beginning of their first grade year to help keep the school and their peers safe. The program also
involves written classroom and library curriculum, a playground peer helpers program, a parent manual, and activity books for the students (Leadbeater et al., 2003). These books are integrated into language arts curriculum and focus on bullying and introduce children to W.I.T.S. Police officers, emergency service personnel, and university athletes also visit the classrooms monthly to reinforce that the strategies taught in W.I.T.S. are important outside of school as well as in school. These presentations take about 10 minutes (Hoglund et al., 2012).

There is no specific number of sessions for this program, but teachers are encouraged to read one book and complete complementary activities per month. Post reading activities include role-playing and creative writing (Hoglund et al., 2012).

One strength of the W.I.T.S. program is that it is designed to be used at school and out in the community. It can also be used at home. There is a parent manual that describes utilizing W.I.T.S. to help resolve conflicts between siblings (Leadbeater et al., 2003). It was found to be moderately related to a decrease in classroom levels of relational (mean=.57 at time 1, mean=.47 at time 6; Hoglund et al., 2012) and physical victimization (mean=.57 at time 1, mean=.37 at time 6; Hoglund et al., 2012). This was measured using students’ self-reports on the Social Experiences Questionnaire (Crick & Grotpeter, 1996). There was also found to be an increase in classroom levels of social competence (mean=2.11 at time 1, mean=1.80 at time 6), as rated by the teachers’ completion of the Early School Behavior Rating Scale at times 1-4 (Caldwell & Pianta, 1991) and the Behavior Assessment Scale for Children (Reynolds & Kamphaus, 2002) at grades 5-6. This program is also easy to implement and all of the materials are free and can be found online. Another strength is that this program focuses on victimization rather than perpetration of relational aggression. This is a much more atypical intervention. It is unique in that it specifically focuses on victimization and attempts to build students’ social responsibility.
By increasing social responsibility, students ideally become more aware and active with regard to relational victimization when they see it happening. It is designed to decrease the amount of bystanders and increase the reporting of relational aggression to teachers or other adults. More typical intervention programs focus on the aggressor and improving their behaviors.

One weakness of the program is that only self-reports were utilized to measure the outcomes, rather than including observations and interviews. Another weakness of this program is that the researchers utilized different measures of social competence for grades 1-4 and grades 5-6. This could result in a problem with internal validity, specifically an instrumentation threat. Use of different measures could result in differences between groups solely because the measures were different, rather than actual differences existing.

**Friend to Friend (F2F)**

Two studies have been completed on this program since its inception (Leff et al., 2007; Leff et al., 2009). Both studies were conducted by the creators of the program. The details of the studies are described below.

The F2F program is a school-based intervention program for relationally aggressive girls. Specifically, the program is designed for African American, third through fifth grade girls in urban schools (Leff et al., 2007). The goals of this program are to decrease both relationally and physically aggressive behaviors, increase the use of effective problem solving skills, and improve social skills (Leff et al., 2007).

The F2F program was designed using a reformulated social information processing theory of aggression. This theory hypothesizes that a child’s ability to process sequential social cues within their environment will determine if they respond aggressively or non-aggressively to a given situation (Crick & Dodge, 1994). Crick and Dodge (1994) developed six steps that lead
from processing social cues to a behavioral response. Step one involves encoding both internal and external cues. Step two involves the interpretation of those cues. Step three is the clarification or selection of a goal. Step four is response access or construction. Crick and Dodge hypothesized that children would recall possible responses to situations based on similar previous experiences. They also hypothesized that if the child experienced a novel situation they would construct a response based on social cues. Step five is deciding on a response. The final step involves the behavioral response. This reformulated theory was developed utilizing two different models. The first model assumes that various aspects of social information processing are independent of each other. This was tested using an ANOVA and simple regression. The second model assumes that the various aspects of social information processing are not independent. This was tested using multiple regression. The authors concluded that the second model would predict better overall because multiple variables would be assessed at once (Crick & Dodge, 1994).

Eight to ten girls are involved in the F2F program. Groups ideally consist of six to eight relationally aggressive girls, and two non-aggressive peers who are used as positive role models. The girls are chosen for the program based on peer nominations (Terry, 2000). Peer nomination scores are standardized and girls with relational aggression scores above .50 are deemed as relationally aggressive. Girls who are deemed as relationally aggressive are randomly selected to participate in the group.

F2F involves 20 group sessions that are led by a trained member of the research team, as well as one of the classroom teachers. The first four sessions consist of an introduction to the program and information about the types of problems that can occur within friendships. Sessions five through nine include information on physiological arousal related to feelings and coping
mechanisms to deal with those feelings. Coping mechanisms taught to the students involve deep breathing, talking to themselves calmly, or imagining themselves in a different setting. Sessions 10-14 are designed to teach students to assess their peers’ intentions within a conflict and produce different ways to handle that conflict situation. Sessions 15-18 are designed to let girls practice the skills they have learned with specific conflict situations, such as gossip at school. The last two sessions are a review of the previous sessions, designed to help the girls retain the knowledge they have learned (Leff et al., 2007).

After these initial group sessions, the members of the group then help co-facilitate eight classroom sessions. These classroom sessions are similar in content to the small group sessions. They are designed to help everyone gain knowledge about how to handle social conflicts, while also allowing those girls within the group to have a positive leadership role within the classroom (Leff et al., 2007). Outcome measures from the initial study (Leff et al., 2007) included self-report measures of relational and physical aggression, teacher and parent reports of relational and physical aggression, and self-reports of depression and loneliness. Outcome measures of this program from a follow-up study (Leff et al., 2009) include The Children’s Social Behavior Questionnaire-Teacher Form (Crick, 1996), a measure of aggression and social behavior, the Asher and Wheeler Loneliness Scale (Asher & Wheeler, 1985), and the Children’s Depression Inventory (Kovacs, 1985). The researchers also utilized hypothetical vignettes (Crick, 1995) in both the original and follow-up studies in order to determine a percentage of hostile attribution biases made (Leff et al., 2007; Leff et al., 2009).

In the Leff et al. (2009) follow-up study, it was found that girls who participated in the F2F program received lower teacher ratings of relational aggression at post-test ($M=2.26$, $SD=.49$) than those girls in the control group ($M=2.57$, $SD=.80$). This result was found to have a
large effect size (.74). Researchers also found that the girls in the F2F program had decreased teacher ratings of relational aggression from pre-test ($M=2.86; SD=.90$) when compared to post-test ($M=2.26; SD=.49$). Girls in the F2F program also had greater decreases in hostile attribution biases from pre-test ($M=6.19; SD=1.94$) to post-test ($M=5.00; SD=2.14$) than the controls (pre-test, $M=6.00, SD=2.14$; post-test, $M=6.00, SD=2.53$). This result was found to have a large effect of .61. Finally, the researchers also found that girls in the F2F program showed decreases in loneliness from pre-test ($M=30.86, SD=12.47$) to post-test ($M=25.57, SD=9.69$) when compared to the controls (pre-test, $M=26.73, SD=8.58$; post-test, $M=27.09, SD=8.63$). This result was found to have a moderate effect of .45.

One of the strengths of this program is that it was developed using a participatory action research (PAR) framework. PAR involves people within the organization being studied participating with the researchers. Members of the organization are involved from the initial development of the study through the final analyses. This makes the program more relevant for those who are participating (Whyte, Greenwood, & Lazes, 1991). Specifically for the F2F program (Leff et al., 2007; Leff et al., 2009) the researchers utilized cartoons of African American girls that were culturally relevant. They also utilized videotapes of past group members talking about their experiences and demonstrating some of the learned skills. This theoretically allowed for the girls to more effectively imitate and utilize the skills of the program. Another strength of this program is the use of both relationally aggressive and non-aggressive students. This allows for positive role modeling as well as reducing any negative effects that may have stemmed from having a group of solely aggressive youth (Leff et al., 2007). Another strength of the program is that the initial groups are conducted during students’ lunch or recess time so that there is less classroom disruption.
The main weakness of this program is the generalizability. It was an important program to develop because of the underrepresentation of programs for minority youth in urban settings. However, this program may not generalize to suburban settings, other ethnicities, or to boys. Although specific scales were given for the follow-up study (Leff et al., 2009), it is problematic that the authors do not report which measures they used to assess the outcomes of the program in the initial study (Leff et al., 2007). There are also no outcome data presented for the original study. Another weakness of the original study is that there is no reported relational aggression score for those peers deemed “non-aggressive.” This in itself could be problematic because there may be a girl considered non-aggressive who has behaviors similar to someone considered aggressive (e.g., a score of .45 vs. a score of .50). It is also unclear how the researchers picked the .50 cutoff to differentiate between relationally aggressive and non-aggressive. There also is no information given on how the teacher information is utilized or whether or not the initial goals of the program were met.

**Preventing Relational Aggression in Schools Everyday (PRAISE)**

To this date, there is only one study that has been completed on the PRAISE program (Leff et al., 2010). The PRAISE program was developed based on the F2F program. The authors reported that they built on the F2F program due to teachers’ desire to have a program that could be used with the whole class and “recent literature illustrating the importance of the school classroom and the impact of relational aggression on boys (Leff et al., 2010, p. 527).” It was designed to be more encompassing and comprehensive than the F2F program. It is a classroom-based program for boys and girls, grades three through five (Leff et al., 2010).

PRAISE contains many of the same aspects of the F2F program. It is intended to decrease both relational and physical aggression, improve social skills, and increase the use of effective
problem solving. However, it also strives to increase empathy awareness, build perspective, and increase the responding of bystanders of aggression. The authors chose to add these goals due to the nature of other effective bullying programs (Frey, Nolen, Van Schoiack-Edstrom, & Hirschstein, 2005; Lochman & Wells, 2004; Olweus, 1991). PRAISE consists of 20 classroom sessions, rather than group sessions and classroom sessions. The first two sessions include an introduction to the program. Sessions three through eight contain information on social-cognitive retraining, including information on identifying feelings, assessing and interpreting others’ intentions, and developing appropriate coping skills. Sessions nine through eleven are designed to help the students apply the previously learned skills to situations such as rumors and gossip within the classroom. Sessions 12-15 are designed to help build empathy by reviewing feelings and exploring others’ feelings and to identify other student’s perspectives in common situations. Sessions 16-20 are designed to help students realize that everyone has a role in reducing relational aggression. This is done through discussion about bystanders and exploring the feelings of the bystanders and the challenges they may face in intervening. These sessions are also used to develop a classroom plan to help reduce relational aggression and reviewing the skills that were previously learned (Leff et al., 2010).

One strength of this program was that it was viewed as enjoyable and acceptable post-test by the youth that participated ($M=1.72, SD=.59$ for girls; $M=1.65, SD=.56$ for boys; $\alpha=.93$ for students; $M=1.69, SD=.27; \alpha=.71-.92$ for teachers). This was measured using acceptability questionnaires for students and teachers that were developed for the program. Possible answers on these questionnaires ranged from strongly agree (1) to strongly disagree (4). Teachers also rated it post-test as being feasible to conduct within the classroom setting. This was a 4-point scale, similar to the acceptability measure ($M=1.97, SD=.66$). Another strength was that
PRAISE was found to be beneficial to girls that were highly relationally aggressive. An aggression suppression effect was seen in these girls in post-test measurement ($M=2.11$, $SD=1.22$) compared to controls in post-test measurement ($M=3.42$, $SD=1.42$). This was measured using the teacher completed Children’s Social Behavior Questionnaire scale (Crick, 1996) at pre- and post-test. It was previously found that children respond reliably to this measure and that it has high internal consistency (Crick, 1996; $\alpha=.94-.95$). They also had an increased knowledge of anger management techniques and social information processing ($M=7.69$, $SD=2.59$ at baseline; $M=10.46$, $SD=2.37$ at post-test for intervention; $M=5.14$, $SD=1.77$ at baseline; $M=6.29$, $SD=2.06$ at post-test for controls; Leff et al., 2010). This was measured using a 15-item multiple-choice test, the Knowledge of Anger Problem Solving (Crick & Dodge, 1994).

One weakness of this program was that it did not seem to be very effective for boys. Although boys reported that they enjoyed the program, an aggression suppression effect was not seen in highly aggressive boys. This was also measured using the teacher completed Children’s Social Behavior Questionnaire scale at pre- and post-test (Crick, 1996; $\alpha=.94-.95$). However, they did show an increased knowledge of anger management techniques and social information processing ($M=6.41$, $SD=2.31$ at baseline; $M=8.18$, $SD=2.82$ at post-test for intervention; $M=5.84$, $SD=2.19$ at baseline; $M=6.11$, $SD=2.42$ at post-test for controls; Leff et al., 2010). The Knowledge of Anger Problem Solving (KAPS) measure was utilized to measure this. This measure was created by Leff et al. (2010) for this study based on the social information processing theory of aggression discussed previously (Crick & Dodge, 1994). Leff et al. (2010) found in an initial study of the psychometrics of the KAPS that the measure had high 2-week test-retest reliability ($r=.85$) indicating that children would not change responses over a short
period of time. They also completed an item-level analysis. However, further psychometrics on the reliability and validity of the test are not available.

**Indirect Aggression: Violence Unseen**

There is only one study that has been done on Indirect Aggression: Violence Unseen since its inception (Verlaan & Turmel, 2010). Indirect Aggression: Violence Unseen is a school-based program, designed for fourth through sixth grades. This program was developed to improve knowledge and awareness of relational aggression, enhance empathy, and develop alternative skills to decrease the risk of engaging in aggressive acts (Verlaan & Turmel, 2010).

The program begins with a 2-hour information session with the school staff, including teachers, school counselors, and administrators. This session is designed to promote the relevance of the program to the school staff. During this session, a video of both children’s and adults’ experiences is shown to increase knowledge and awareness of relational aggression (Verlaan & Turmel, 2010).

After this initial session with school staff, a school committee is formed to ensure that the program is implemented accurately. This committee consists of school counselors, classroom teachers, the school principal, and one of the research assistants. The research assistant also conducts 3 teacher trainings. Each of the classroom teachers involved in the Indirect Aggression: Violence Unseen program receives a 50-minute training before conducting each session with students. Each training focuses on how best to implement the upcoming student session and is meant to help empower the teacher before they implement the program with students (Verlaan & Turmel, 2010).

Indirect Aggression: Violence Unseen consists of three student sessions/workshops that are each 90 minutes. The teachers conduct each of these workshops within the classroom. The
school mental health professionals also assist in these workshops. The main themes of these three workshops are indirect aggression, the different roles of relational aggression, and how to react when witnessing relational aggression. The first workshop utilizes a video similar to the one shown to school staff but only includes children’s experiences. The following two workshops involve building knowledge about relational aggression and the negative outcomes that it may cause (Verlaan & Turmel, 2010).

The last piece of this program includes homework assignments. These assignments are intended to help the children practice their skills and help build parental awareness. These assignments are estimated to take 30 minutes each (Verlaan & Turmel, 2010).

Verlaan and Turmel (2010) found a slight, though not statistically significant, increase in student knowledge of relational aggression after this program’s implementation compared to controls (M=9.34, SD=.79 for intervention group at post-test; M=9.61, SD=1.05 for control group at post-intervention; higher score indicates more incorrect answers). Students in the intervention condition were found to recognize relational aggression more than students in the control classrooms. This was measured through the students’ pre- and post-test self-report as well as an evaluation questionnaire completed by the teacher. The students utilized a measure that was developed by Verlaan and Turmel (2010) for this study, entitled Et toi qu’ en penses-tu? (And what do you think?). The authors utilized a exploratory factor analysis in order to evaluate construct validity (α=.38-.61). The teachers evaluated the program using a four-point Likert scale of satisfaction with the program ranging from very satisfied to not satisfied (Verlaan & Turmel, 2010). Although student knowledge increased, actual aggressive behavior was not significantly decreased (M=1.67, SD=.71 at pre-test; M=1.60, SD=.91 at post-test).
One of the strengths of this program is that it is easily incorporated into the classroom setting because it is being taught by the teachers. There is also a step-by-step scripted manual that makes administration easier. Another strength of this program is that it includes booklets for students and parents to utilize. Another strength of this program is that it can be used in multiple settings, both at school and at home.

One weakness of this program is that it takes up considerable class time. It is also unclear as to how close each workshop needs to be to one another. Another weakness of the program is that it was initially conducted in French. It is not clear whether the scripts would translate and generalize to English speaking communities. It is possible that the cultural differences would make the program less acceptable. A final weakness of this program is that it increases knowledge and recognition of relational aggression, but it does not decrease the frequency of aggressive acts.

**Social Aggression Prevention Program (SAPP)**

SAPP is a school-based program designed for 5th grade girls. It is intended to be conducted in small groups. Ideally, four to seven girls would be in each group. The goal of this program is to reduce the perpetration of social aggression, and increase empathy, social problem-solving and prosocial behaviors (Cappella & Weinstein, 2006).

SAPP is conducted over ten 40-minute sessions. Each group has one group leader. Group leaders receive a 3-hour training and have group supervision with a supervisor each week. It is a manualized, but flexible, curriculum. The program places an emphasis on the varied roles a student can take within a conflict. Various activities are used in this program. They are designed to increase emotional awareness of self and others in a situation that may trigger social aggression, increase cognitive understanding of the motivation and consequences that surround
social aggression, increase problem solving skills, and teach assertive and respectful communication. Role-playing, discussion, modeling and games are used to reinforce these skills (Cappella & Weinstein, 2006).

Students were randomly assigned to either the experimental condition, where they participated in the SAPP program or the control condition. The control condition was a small-group reading club that was formatted in the same way as SAPP. The goals of this group were to increase students’ reading abilities. Students read aloud one novel and participated in activities such as writing assignments and discussions. The book choices involved a female protagonist and did not involve peer relationships as a major theme (Cappella & Weinstein, 2006).

One strength of SAPP is that effective problem solving increased for all students in the experimental group. This was measured by the social aggression problem-solving scenarios (SAPSS-I and SAPSS-II) that were created for this study (Cappella & Weinstein, 2006). Students were presented with four different scenarios and instructed to either problem solve as the victim, the potential perpetrator, or a bystander. Raters of this measure were research assistants (Cohen’s kappa of .75-.83 for inter-rater reliability). Students were also able to articulate more prosocial strategies. This was measured using the Children’s Social Behavior Scale-Teacher Form (CSBS; \( \alpha =.86-.96; \) Crick, 1996) and the Children’s Social Behavior Scale-Peer Report (\( \alpha =.91-.95; \) Crick, 1995). It was also found that students in the program who were initially rated as high in social aggression were found to have slightly more empathy (\( F(1, 129)=2.91, p<.10, d=.60 \)) and slightly less social aggression perpetration (\( F(1,129)=2.76, p<.10, d=.29 \)) than comparable control students. These findings were all measured through self-report measures completed by the students and the teacher reports.
One weakness of SAPP is that only self-report measures were utilized, rather than also including interviews and observations. Another weakness is that the program was not as effective for those students that were rated as only moderately aggressive or low in aggressive behavior. Another potential problem is that students in this study came from the same school and there were both controls and intervention participants in the same classrooms. This could lead to possible contamination of the data. It is possible that students within the experimental group would talk with students in the control group about the skills they were learning. This could lead to unintentional changes in the behaviors of the control group. It is also problematic that the controls also received small group interactions through the reading club. It is possible that positive or negative group interactions could lead to different results than if the controls had not participated in any activities. It is impossible to know if these interactions were involved in the resulting outcomes. It is also unclear if this program can generalize to non-urban settings.

**Creating a Safe School (CASS)**

At this time, there has only been one study conducted on the CASS program (Nixon & Werner, 2010). CASS is based on the hypothesis that students having normative beliefs about relational aggression play a part in the development and maintenance of relational aggression within a school setting. The goal of this program is to reduce relational aggression by challenging these normative beliefs and positive evaluations of relationally aggressive behaviors (Nixon & Werner, 2010).

The CASS program was created using sixth graders in schools across the United States. The large majority (92%) of the initial study participants were White. CASS is intended to be a whole school, mentor-based intervention. Because the CASS program is intended for the entire school, the program involves not only mentorship for the students, but also teacher trainings and
a school task force. It is designed to help promote socioemotional competence and decrease relationally aggressive behaviors. It does this through raising awareness and increasing knowledge on relational aggression, building empathy, and challenging students’ normative beliefs surrounding relational aggression (Nixon & Werner, 2010).

The CASS intervention begins with each participating school being assigned consultants. Consultants are staff who have been trained for 16 hours on relational aggression and adolescent development. School administrators meet with the consultants to develop a more socially safe school environment. School administrators along with teachers and school staff complete a 7-hour training. This is intended to increase knowledge and provide strategies that can be used within the school to reduce relational aggression (Nixon & Werner, 2010).

The next step in the CASS intervention involves work in the classroom. CASS consultants train school counselors and parents to be facilitators that work with high school students. The high school students are used as mentors for the sixth graders in the program. The idea is for the children in the program to be able to talk with someone who is closer to their age that they can look up to. The high school students and facilitators plan a schedule for each mentoring session. Mentors typically meet with their mentees once or twice per month. Other activities in which students participate are role-playing, story-telling, and small group activities. These activities are intended to build empathy and help the students explore behaviors they believe are acceptable and are willing to tolerate (Nixon & Werner, 2010).

The third step in the CASS program involves developing a school task force. The task force is comprised of school administrators, teachers, and school staff. The goal of this task force is to organize and implement the previously decided upon methods for reducing relational aggression (Nixon & Werner, 2010).
The researchers found that those students who were rated as high in relational aggression at pre-test had decreased scores at post-test ($M=2.33, SD=.42$ at pre-test; $M=1.80, SD=.59$ at post-test; Nixon & Werner, 2010). They also found that those students who were rated as high in relational victimization at pre-test had decreased scores at post-test ($M=2.51, SD=1.04$ at pre-test; $M=2.18, SD=.90$ at post-test; Nixon & Werner, 2010). These scores were based on an unnamed self-report measure of aggression and victimization ($\alpha=.77-.89$; Werner & Nixon, 2005). Students were rated as either non-aggressive/victimized, average, or high aggressive/victimized based on their scores on this measure at pre-test and post-test. Students were placed in the non-aggressive/victimized category if their self-report score for relational aggression was 1, indicating they were never victimized or aggressors of relational aggression. Students were considered high aggressive/victimized if their self-report score was more than one standard deviation above the mean of the sample. The remaining students were placed in the average category.

The authors also found that those students who were rated as engaging in an average level of aggression had increased self-reports of aggression ($M=1.47, SD=.23$ at pre-test; $M=1.67, SD=.61$ at post-test) and victimization ($M=1.94, SD=.76$ at pre-test; $M=2.05, SD=.83$ at post-test). Those students in the non-aggressive/victimized category at the beginning of the study also had increased self-reports of aggression ($M=1.00, SD=.00$ at pre-test; $M=1.42, SD=.44$ at post-test) and victimization ($M=1.59, SD=.76$ at pre-test; $M=1.89, SD=.82$ at post-test; Nixon & Werner, 2010).

One strength of the CASS program is that a decrease in relationally aggressive behavior is seen in those students who engaged in high levels of relational aggression initially. This program also shows decreases in the amounts of relational victimization for those students who
were high in levels of victimization initially. These are measured using the previously mentioned self-report measure of aggression and victimization (Nixon & Werner, 2010).

A weakness of this particular study was the lack of a control group. It is unclear whether the results of the study were due to the mentorship, teacher trainings, or a combination of factors. A control group, or a group consisting of just mentoring or just teacher training, would help to see if the improvements are being made due to the program or some individual factor. By separating out the various aspects of the study and having a control group, the researchers would be able to say determine if the program, as a whole, is causing the improvement, or if the improvement is due to another factor, such as individual attention from an older student or teachers being more aware. Another weakness was the increase in reported relational aggression and victimization among those students who initially reported low levels. This might be due to actual increased aggression and victimization, or it might be due to increased knowledge and awareness on the part of the students. Without further research it is impossible to know which is true (Nixon & Werner, 2010).

**Relational Aggression and Physiological Reactions to Stress**

**Physiology**

Physiological reactions to stress are moderated by the autonomic nervous system (ANS). The ANS is a quick acting system that becomes activated when the body is presented with stressful stimuli (Chrousos & Gold, 1992). The autonomic nervous system is composed of two different parts, the sympathetic nervous system and the parasympathetic nervous system (Boucsein, 1992).

The sympathetic nervous system becomes activated when a stressful situation is encountered. This typically involves increased heart rate and increased oxygen flow to the brain
and body. These physiological increases help the body to engage in the fight or flight response. This response allows for the body to prepare to either fight or flee a potentially dangerous situation (Boucsein, 1992). In a normal person, the sympathetic nervous system will activate and increase when stressful stimuli is encountered. This response can be measured by heart rate reactivity, blood pressure, or skin conductance reactivity (Lorber, 2004). Heart rate reactivity is typically measured through an electrocardiogram. Blood pressure can be measured using a basic blood pressure cuff, or a more advanced machine that can measure multiple vital signs such as heart rate and blood pressure (Gower & Crick, 2011). Skin conductance reactivity involves the electrophysiological activity related to the activity in the sweat glands. This is typically measured through skin conductance levels (Connor, 2002; Erath, El-Sheikh, & Cummings, 2009).

In contrast to the sympathetic nervous system, the parasympathetic nervous system works to help the body calm down. It slows the body’s heart rate and oxygen flow. The parasympathetic nervous system engages in the rest and digest functions of the body. A normal reaction to stress will typically involve a decrease or withdrawal in this response so that the body can engage in the fight or flight response of the sympathetic nervous system (Boucsein, 1992). However, sometimes in a stressful situation the body will react by increasing the parasympathetic nervous system response. This results in a fainting or freezing response. Like the sympathetic nervous system, the parasympathetic nervous system can be measured by heart rate reactivity. It can also be measured through respiratory sinus arrhythmia reactivity. This involves the measure of vagal regulation and the “vagal brake.” Vagal regulation involves control of instinctive processes, such as breathing, swallowing, and heart rate (Porges, Doussard-Roosevelt, Portales, & Greenspan, 1996). Removal of the vagal brake increases heart rate and oxygen intake. It allows for the body to conserve energy. The vagal brake is typically removed in
times of stress when the body is preparing to engage in the fight or flight response (Porges et al., 1996).

**Physiology and Relational Aggression**

It has been found that relational aggression is associated with lower levels of physiological arousal (Woods & White, 2005). More specifically, girls who engage in relational aggression have a diminished fight or flight response, indicated by sympathetic nervous system inactivity, and increased parasympathetic nervous system activity (Sijtsema, Shouldberg, & Murray-Close, 2011). Sympathetic nervous system inactivity was found based on diminished skin conductance and heart rate reactivity. Parasympathetic nervous system activity was found based on increased respiratory sinus arrhythmia reactivity (Sijtsema et al., 2011).

The girls who were found to be most relationally aggressive were those that had a diminished parasympathetic nervous system withdrawal; specifically, they did not have an increased heart rate or skin conductance. In other words, the girls that were most relationally aggressive were those that had lower levels of physiological arousal and remained calm when presented with stressful stimuli (Sijtsema et al., 2011). The authors found that girls who engage in relational aggression more frequently have higher levels of peer rejection sensitivity and heightened reaction to social exclusion. This was measured using the Angry Expectations of Rejection subscale of the Children’s Rejection Sensitivity Questionnaire (α=.91; Downey, Lebolt, Rincon, & Freitas, 1998). The authors hypothesized that girls engage in relational aggression as a response to real or perceived rejection by their peers (Sijtsema et al., 2011).

Children who were more relationally aggressive also had slightly lower heart rate reactivity, which is a demonstration of lower sympathetic nervous system activity (Gower & Crick, 2011). There was also an inverse relationship between children’s blood pressure and
engagement in relational aggression. Specifically, children with lower blood pressure had increased relationally aggressive behaviors (Gower & Crick, 2011).

These results are consistent with the fearlessness theory as well as the stimulation seeking theory. Fearlessness theory hypothesizes that a low heart rate, or low levels of arousal are indicative of a lack of fear in a situation that would be moderately arousing to the average person (Raine, 1993). It is hypothesized that fearlessness leads to relationally aggressive behaviors because a certain level of fearlessness is necessary to engage in behaviors of this sort (Raine, 2002). Stimulation seeking theory hypothesizes that low levels of autonomic nervous system arousal is an aversive physiological state. People engage in aggression in order to increase their arousal levels and remove themselves from this uncomfortable situation (Eysenck, 1977; Raine, 1993, 2002). It is thought that the fearlessness theory and stimulation seeking theory compliment each other, given that low levels of arousal may be a risk factor for aggressive behaviors because engaging in these behaviors not only involves a lack of fear but also sensation seeking (Raine, 2002). Many times these theories are utilized in research to explain behavior, but not directly studied. It would be beneficial to have more research on the application of the theories themselves. Though it is not explicitly stated which of these two theories is more supported, there has been more research done on sensation seeking theory (e.g., Crapanzano, Frick, & Terranova, 2010; Lynne-Landsman, Graber, Nichols, Botvin, 2011; Sijtsema et al., 2010; Woods & White, 2005).

**Conclusion**

Relational aggression has been studied a great deal, with various age groups and genders. It has been found relationally aggressive behaviors can begin as early as preschool (Crick et al., 1997). It has also been found that those children who engage in relational aggression tend to
have lower levels of physiological arousal (Woods & White, 2005). This leads researchers to believe that children engage in relational aggression because they are sensation seeking (Eysenck, 1977; Raine, 1993, 2002). It appears as though those children who engage in relationally aggressive behaviors may have been predisposed to this because of lower levels of arousal, as well as having other risk factors (Woods & White, 2005; Herrenkohl et al., 2007). It will be important to continue to study these factors so preventative measures can be utilized in order to halt the relational aggression before it creates adverse outcomes.

Future research should be done on development of new prevention and intervention programs for preschool aged children or adapting the current programs for the younger age group. It may be easiest to adapt a program that has already been developed for a younger age group, especially the programs that are currently intended for kindergarten or elementary school aged children. This process could involve creating adaptations of the program based on the developmental level of preschool children and then performing a pilot study to assess how those adaptations are received. Because relational aggression has been found to begin in preschool, it is important to develop or adapt prevention programs so that relational aggression can not progress into elementary and middle school. This will be important to prevent adverse effects that are present for both the aggressor and victim of relational aggression.

Future research should also involve more detailed examination of physiological arousal levels and how exactly this plays a role in relational aggression so that prevention can begin before a child becomes relationally aggressive. If it is understood exactly which physiological factors are related to relational aggression and whether or not relational aggression begins because of the physiological aspects, relational aggression might be better prevented in the future. Specifically, future research could focus on the sympathetic and parasympathetic nervous
systems separately, rather than conjointly, and assess which systems are more involved with relationally aggressive children. It may also be beneficial to perform a study where children are assessed for low levels of physiological arousal before they become relationally aggressive and then studied in following years. This would allow for further assessment on the predictive value of arousal levels in relational aggression and whether children become relationally aggressive because of these low levels of arousal.
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