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DIFFERENCES IN SKIN CONDUCTANCE LEVELS AMONG HIGH-RISK  
AGGRESSIVE KINDERGARTEN STUDENTS

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## Abstract

Children who present early signs of chronic aggressive and violent behavior are at heightened risk for a number of negative developmental outcomes including conduct disorder. However, high-risk aggressive children cannot be generalized into one distinct group. This study examined the role that electrodermal activity measures play in differentiating highly aggressive kindergarten children in terms of parent and teacher reports of behavior, as well as physiological response to different emotional stimuli. Findings reveal that both tonic period and nonspecific skin conductance level relate to differences in teacher report of child emotion regulation, social competence, and internalizing behaviors as well as emotional response to happiness and anger.

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## Introduction

Early-onset aggressive behavior in children is important to study for several reasons. First, the presence of chronic aggressive and oppositional behavior in childhood is associated with a number of negative developmental outcomes later in life. Children, especially those with comorbid depression, exhibiting early signs of conduct problems are at greater risk for later substance use disorders (Tuvblad et al., 2009, Offord & Bennett, 2004, Shannon et al., 2007). The symptoms of aggression manifest differently across the lifespan, and when aggressive and violent children enter adolescence their behavior can take on the form of truancy, deviant peer group formation, school failure and dropout, and eventually criminality (Offord & Bennett, 2004). The earlier chronic behavioral aggression emerges, the higher the risk is that the behaviors will remain stable and the child will eventually be diagnosed with conduct disorder, one of the most prevalent externalizing behavioral disorders among adolescents (Tuvblad, Zheng, Raine, & Baker, 2009). Conduct disorder is characterized by patterns of aggressive, violent, and callous-unemotional behaviors that consistently violate social norms (Hawes & Dadds, 2005). Not all aggressive children go on to receive a diagnosis of conduct disorder, but the stability of chronic aggression is remarkable. According to Campbell's 1991 review, at least 50% of preschool aged children identified as the most aggressive in their cohort continued to show moderate to severe externalizing problems as they entered school the next year. Of those children, 67% met the DSM criteria for attention deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), or conduct disorder (CD) by age 9 (Campbell, 1991). There is clearly a need for early identification of children at risk for escalation of aggressive risk behavior in order to best direct intervention efforts. However, prevention is not an exact science. Children who appear to present the same psychopathological symptoms may have arrived at that place from very different

starting points. Similarly, their developmental pathways may diverge along the way resulting in vastly different outcomes (Beauchaine et al., 2008). A universal approach to treatment might not reflect the heterogeneous etiology of early-onset aggression. More needs to be understood in order to refine current treatment strategies.

When identifying children at risk for early-onset conduct problems, there are three main categories of risk- child risk variables, parenting risk variables, and family risk variables. Child risk factors include temperament or high rates of aggressive and impulsive behaviors. Parenting risk factors refer to parenting styles and attitudes, while family risk factors refer to a myriad of stressors from parental psychopathology to socioeconomic status (Webster-Stratton, 1996). It is important to recognize these environmental risk factors for chronic externalizing behavioral problems, as they appear to be somewhat cross-cultural. Extant research shows that children who exhibit the same externalizing problems in childhood, but who diverge developmentally later in life present many of the same environmental risk factors including neighborhood and family level risks (Barker & Maughan, 2009, Webster-Stratton, 1996). Exposure to violence in the home environment is one family level risk factor that is continually present in many children with early-onset aggression. Environmental risk factors for aggression in children have been well characterized, but the presence or absence of these risk factors does not appear to determine which children will desist from a life course trajectory of violent and aggressive behavior. There must be some individual level factors that would be important variables to consider. There may be inherent differences in the nature and motivation behind children's aggressive tendencies that are not easily viewed from an observer's perspective. One of the most consistent suppositions is that aggression can arise in children through two distinct emotion dysregulation deficits, reflected in how these individuals react to negative emotional stimuli. Some individuals characterized by chronically high levels of aggression and violence demonstrate callous-unemotional traits and a distinct lack of empathy (Herpertz et al., 2008). These individuals appear to have a restricted

range of emotions, with shallow expressions of fear and sadness, although normative to exaggerated expressions of anger. Alternatively, another group of aggressive children appears to be characterized by impulsive, angry outbursts, highly distinctive from the callous motivations of other high-risk children (Herpertz, et al., 2008). These children appear to be acutely sensitive to negative emotional stimuli, and may act inappropriately with aggression to a broader range of negative emotions including fear and sadness as well as anger.

Differences in highly aggressive children may not only be accounted for by emotion dysregulation. There is a very high rate of comorbidity among children with early-onset chronic externalizing behaviors, meaning they also exhibit symptoms of other disorders or problem behavior (Demb, 1995). Many children who exhibit aggressive and oppositional behaviors also show signs of concurrent internalizing behaviors, namely anxiety disorders and depressive disorders. These comorbid externalizing and internalizing behaviors are another individual level risk that may differentiate children in a high-risk aggressive sample.

Due to the heterogeneity of chronic aggressive and externalizing behavior, some of the differences in a high-risk sample may be better explained by biological measures rather than behavioral measures. The dysregulation of emotions, whether manifested through the callous-unemotional traits or violent, impulsive traits of different subsets of high-risk aggressive children can be traced back to the basic biological systems of the human body. The fight or flight response is highly affected by the ability to conform to socially appropriate methods of social-emotional processing. When socially appropriate behavioral strategies fail or are unavailable to a child, the response shifts back to fight or flight- a highly aggressive and anxious trait (Beauchaine, Gatzke-Kopp, & Mead, 2007).

The fight or flight response is controlled by the sympathetic nervous system, which can be indexed by electrodermal activity (EDA), or skin conductance. For this reason, EDA is a valid physiological measure when looking at emotional processing in aggressive children. EDA is the

change in the conductance level in the skin as a result of variations in the level of sweat released from the eccrine sweat glands. The changes in skin conductance represent responses to external psychological stimuli (Christie, 1980). EDA remains today one of the most popular measurements for sympathetic nervous system activity. Low resting skin conductance level has been linked to aggression in children and more severe outcomes such as conduct disorder and antisocial personality in adolescence (van Bokhoven et al., 2005). Skin conductance is a marker of increased arousal, most commonly sensitive to fear or anxiety stimuli, and is thus a good measure of reactivity to stress or emotion inducing tasks (van Bokhoven et al., 2005).

The presence of biological risk factors may also affect the significance of environmental risk factors for some children. The children who exhibit these biological risk factors may prove to be more at risk in high risk environments (Beauchaine et al., 2008). Another aspect of biological processes that makes them so important to observe is the fact that an individual's neurobiological makeup can moderate the effects of treatment (Beauchaine et al., 2008). People with different biological foundations do things for different reasons. For example, a 2006 study by Conrod and colleagues found that people high on impulse and sensation-seeking traits use substances for the reward properties, while people high on trait anxiety use substances for the relief of their anxiety (Conrod et al., 2006). The most effective interventions should tailor its program curriculum to better suit the biological needs of its unique sample. However, very few programs aimed at the prevention of conduct disorder focus on autonomic underarousal or the expression of callous-unemotional traits, despite the fact that this high-risk group does not benefit from traditional approaches to treatment (Beauchaine et al., 2008). Low levels of resting skin conductance and low levels of skin conductance response to negative emotional stimuli would reflect a low range of emotional processing. Callous-unemotional traits limit the impact that intervention programs have on the child (Hawes & Dadds, 2005). The lack of response to the fear of punishment and emotional stimuli creates a unique challenge for intervention scientists, but physiological reports

like skin conductance can help to refine a sample population to better tailor a program's curriculum. Becoming more aware of an individual's biological processes can help to ensure program effectiveness and positive outcomes for the target population.

### *The Present Study*

The present study was designed to examine physiological differences among a group of highly aggressive kindergarten students, and how these differences related to parent and teacher reports of child behavior as well as child response to positive and negative emotional stimuli. Fifty-six children ranked in the top 20% of their class for aggressive behavior by their teachers were divided medially by two measures of skin conductance during a two minute baseline period- tonic period and nonspecific skin conductance response (SCR). Both measures were chosen because they report slightly different interpretations of skin conductance. While both measures are valuable I was not sure which would better divide the children into meaningful groups. The children with high levels of skin conductance at baseline were grouped into a high EDA group for tonic period and for SCR. I hypothesized that these would be the children who reacted impulsively and aggressively to multiple negative emotions. The children with low levels of skin conductance at baseline were grouped into a low EDA group for tonic period and for SCR. I hypothesized that these would be the children more likely to be characterized with callous-unemotional traits and a low range of emotional responses. The study was based on the following research questions. First, do the children in the groups differ in their level of exposure to violence in the home? Second, how does the grouping of the children into high EDA and low EDA groups affect the significance of the parent and teacher report variables? Third, how does the grouping of the children affect their physiological responses to positive and negative emotions?

## Method

### *Participants*

The participants for the present study were kindergarten children from the Harrisburg School District. Each year approximately 700 kindergarteners enter the school district across ten elementary schools. The Harrisburg School District is composed of a high percentage of minority students. Seventy-five percent of the students are African American, 18% are Latino, and only 5% are European American. Fewer than 25% of the students in the district are rated as proficient in reading and math achievement. 86% of the students in the district qualify for free or reduced priced lunches.

During the fall of 2008, all kindergarten teachers rated their students on levels of aggression and violence. The top 20% of each class were selected for recruitment into the study. Fifty-six families agreed to participate in this study. In order to gain perspective on the characteristics of the particular children in the study, Table 1 shows the demographic statistics for the sample.

Table 1 Demographic Statistics

Total N = 56		
Ethnicity	African American	69.7%
	Caucasian	7%
	Latino	19.6%
	Other	1.7
Sex	Male	66%

\*Ethnicity and sex data were missing for one child

### *Procedures*

Once the children were recruited and parents had given their permission for their child to participate in the research study, the team conducted a home visit for parent and child assessments. Both the parents and child's kindergarten teacher completed reports of the child's behavior. Children in this study were randomized to a clinical intervention; however the analyses in this study derive from the initial assessments prior to randomization. Physiological measures were collected prior to intervention onset, between the months of October and January, in the 2008-2009 school year. All physiological assessments took place at the school during the normal school day to ensure maximum completion of assessments. Parents were interviewed in their own homes.

### *Measures*

#### *Conflict tactic scale*

In order to assess exposure to aggression and violence in the household environment, parents filled out the Conflict Tactic Scale. Questions were designed to measure self-to-partner respect, partner-to-self respect, self-to-partner verbal aggression, partner-to-self verbal aggression, self-to-partner physical aggression, partner-to-self physical aggression, and overall violent relationship. The informant is reporting on their own behavior as well as victimization. This can create a biased report of the self-to-partner relationship and of the level of aggression and violence typical in the family household.

#### *Child behavior questionnaire*

The Child Behavior Questionnaire assessed five components of the child's behavior profile: ability to regulate emotions, prosocial behavior, social competence, aggressive and oppositional behavior, and internalizing behavior. The Child Behavior Questionnaire was filled out by both the child's parent and teacher. The multiple informants were able to give perspectives on the child's behavior at home as well as in the school environment.

### *EDA*

The physiological assessments took place during the school day to avoid any conflicts with parent schedules and to avoid participant attrition. The portable lab equipment was set up in an RV outside of the school and the children came to the RV to complete the tasks. Two separate measures of EDA were examined for the purpose of this study, nonspecific skin conductance response and tonic period. Skin conductance response (SCR) is the number of responses to external stimuli in a given amount of time. During this study, the children were divided into groups based on SCR during a two minute baseline period. The tonic period is the amount of time that an individual is not in an active response period, again measured during a two minute baseline. The two phenomena are different in that SCR reflect phasic EDA measurement rather than tonic EDA measurement (Christie, 1980). Both measurements are valuable for different reasons. You cannot always compare two individuals simply by the number of SCR he or she has in a given period of time. Two people may have the same *number* of events, but one person is characterized by quick recovery times and quick reaction times while the other takes longer to recover. For this reason, tonic phase is valuable in looking at recovery from stimuli.

Children were escorted to the bathroom prior to the start of the physiological sessions, where they were instructed to wash their hands with soap and water. Electrodes were placed on the hypothenar and thenar eminences of the non-dominant hand. In young children electrode placement on distal fingertips is often not possible due to the small size and potential for skin abrasions.

Before the task began each child was asked to sit as still as possible while watching a screen filled with stars for a two minute baseline period. During the baseline, measures of tonic period and SCR were recorded. After the baseline the child began the Lion King Task. The Lion King Task was designed specifically to evoke certain emotions during short segments of video clips taken from the Disney movie The Lion King.

A total of four emotions were presented in the video clips- fear, sadness, happiness, and anger- each lasting between two and three minutes depending on the natural ending point of the scene. The fear epoch showed Simba the lion and his friends being chased through an elephant graveyard by a group of hungry hyenas. During the sadness epoch Simba finds his father's dead body and, unable to revive him, curls up in his arms to cry alone. The happiness epoch shows Simba after having found two new friends singing about his new life motto- no worries. Finally, during the anger epoch Simba battles his murderer uncle. For clarity, the scenes were shown in chronological order for all participants. Baselines were collected between each clip to facilitate baseline correction individually for each emotion to adjust for potential drift in electrodermal activity. Each video clip was followed by a thirty-second video clip that occurred chronologically between the two scenes but which had no emotional content. The neutral clip also provided resolution to the preceding emotion clip by showing the characters in a positive situation (such as showing Simba safe after the end of the fear clip). The neutral clip was then followed by a thirty-second fixation baseline before the next clip began. Skin conductance was examined in thirty-second epochs through each emotion, but for the analyses average scores for each emotion were used. Then, they were baseline corrected to the immediately preceding baseline. The entire task lasted approximately twelve minutes. The child was encouraged by the research assistant to sit as still and quietly as possible throughout the task. The data collected was then sent from Harrisburg to The Child Brain Development Lab at the Pennsylvania State University where it was cleaned and analyzed using Mindware software

#### *Group creation*

Because each measure of EDA (tonic period and SCR) is believed to reflect different aspects of emotion processing, it was unclear which one would best differentiate between subgroups of aggressive individuals. Therefore groups were created for both measures by performing a median split based on SCR and tonic period. The resting baseline prior to the

emotion induction task was used as the measure with which to create groups. The median value for SCR was 9.0 with a range of 20 and a mean of 9.09. The median value for tonic period was 22.65 with a range of 49.58 and a mean of 23.65. The groups were then compared using one-way ANOVA on parent and teacher report of behavior and child response to negative emotions. Groups were also examined on the Conflict Tactic Scale to determine if exposure to violence was associated more strongly with one group than the other.

## Results

### *Conflict Tactic Scale*

There was no significant relationship found between the high and low EDA groups and the parent report Conflict Tactic Scale indicating that both groups appear equally likely to have been previously exposed to violence and hostility in the home. This was found for the grouping variables created both by tonic period and by SCR.

### *Parent/Teacher Reports of Child Behavior*

#### *Tonic period*

In order to test the second research question, whether or not the grouping variables of high and low EDA during baseline are associated with differences in parent and teacher report variables, a series of one-way ANOVA tests were run. A statistically significant difference was found between the high EDA group and low EDA group divided by tonic period for kindergarten teacher report of child emotion regulation,  $F(1, 35) = 5.86, p < .05$ . The low EDA group scored higher in emotion regulation ( $M = 3.34, SD = .87$ ) than the high EDA group ( $M = 2.67, SD = .73$ ). A statistically significant difference was also found between the high and low EDA groups for kindergarten teacher report of child social competence,  $F(1, 35) = 5.72, p < .05$ . The low EDA group also scored higher in teacher reports of social competence ( $M = 3.23, SD = .67$ ) than the high EDA group ( $M = 2.80, SD = .57$ ). These statistically significant differences mean that the kindergarten teachers reported different levels of emotion regulation abilities and social competence skills between the groups of high and low EDA children based on tonic period. There was no significant relationship found between the grouping variables and teacher report of child prosocial behavior, internalizing behavior, or aggressive and oppositional behavior. Notably,

there was no significant relationship found between the grouping variables and the parent reports of the Child Behavior Questionnaire. This means that parents did not differ in their reports of child internalizing and externalizing or aggressive behaviors based on division into the high and low EDA groups.

*Skin conductance response*

The analysis of variance revealed a statistically significant difference between the low EDA group and the high EDA group on kindergarten teacher report of child internalizing behavior,  $F(1, 35) = 5.59, p < .05$ . The children in the high EDA group scored higher on teacher reports of internalizing behavior ( $M = 3.09, SD = .68$ ) than the low EDA group ( $M = 2.52, SD = .76$ ). The kindergarten teachers were able to distinguish children in the high and low EDA groups on internalizing behaviors, but not on emotion regulation, social competence, aggressive and oppositional behaviors, or prosocial skills. Parents were not able to distinguish between children in the high and low EDA groups on any measures of the Child Behavior Questionnaire.

*Emotion Induction*

*Tonic period*

In order to test the relationship between the grouping variables and the children's response to the Lion King Task a series of one-way ANOVA tests were run. First, the grouping variables were tested when divided by tonic period. The dependent variables were the amount of time spent in tonic phase for each of the emotion epochs (fear, sadness, happiness, and anger), the mean skin conductance for each epoch, the number of SCR for each epoch, and the mean skin conductance level for each emotion epoch. Only the amount of time spent in tonic phase during the happy epoch reached significance,  $F(1, 79) = 7.56, p < .05$ . The children in the high EDA group spent more time in tonic phase during the happy epoch ( $M = 3.99, SD = 5.68$ ) than the children in the low EDA group ( $M = .33, SD = 6.30$ ). There was no significant relationship found for any other emotion epoch.

*Skin conductance response*

Repeated with SCR, a statistically significant relationship was found for the number of nonspecific skin conductance responses during the anger epoch,  $F(1, 82) = 4.18, p < .05$ . The children in the high EDA group had a higher number of SCR during the anger epoch ( $M = .7, SD = 2.71$ ) than the children in the low EDA group ( $M = -.39, SD = 2.16$ ). There were no statistical relationships found for any other dependent variable or for any measure of happiness, fear, or sadness.

## Discussion

The current study examined whether or not differences at the child level of risk, namely risk for internalizing comorbidity/anxiety indexed by electrodermal activity, were associated with differences in behavioral report by teachers and parents, as well as differences in how the aggressive children process different emotions. Neighborhood level risk for aggression is constant across the sample, and parent reports of aggression and hostility in the home were examined to verify that all participants were equally likely to be exposed to family level risk. The only difference between the groups was their individual physiological make-up. The children were divided into a high and low EDA at baseline group based on two measures of skin conductance- tonic period and SCR. The findings show that there were significant differences between the high and low EDA groups in terms of teacher report of child behavior, as well as child response to emotional stimuli. The kindergarten teachers rated children with low tonic baseline EDA as higher in social competence and emotion regulation, suggesting that despite the fact that these children are highly aggressive, they are also more in control of their social-emotional world than their high EDA counterparts. The kindergarten teachers rated children with high SCR baseline EDA as higher in internalizing behaviors, perhaps recognizing comorbid anxious traits that contribute to these children's inability to regulate themselves or respond to external stimuli in socially appropriate manners.

I believe that the major difference between the high-risk children is the presence of comorbid trait anxiety in the children with high EDA at baseline. Although the presence of anxiety and chronic externalizing and aggressive behaviors can seem rather counter-intuitive there is evidence to show that this comorbidity could be the distinguishing factor between different types of highly aggressive children (Bubier & Drabick, 2009). Lack of anxiety can

represent a risk factor for aggression, but may not be the sole risk factor represented in all aggressive children. Some theories have attempted to characterize heterogeneity in aggression on a behavioral level by examining the contexts in which aggression is used. Reactive aggression is characterized by the presence of angry, explosive responses to the presence of danger or provocation. Alternatively, proactive aggression is characterized by the use of aggression and violence for a deliberate purpose (Bubier & Drabick, 2009). Children utilizing proactive aggression can be more manipulative and aware of the demands of the social world, perhaps explaining why the children in the tonic low EDA group were rated as more socially competent by their teachers. Children exhibiting early signs of conduct disorder along with the presence of reactive aggression are more likely to have comorbid anxiety than children who exhibit externalizing behaviors combined with proactive aggression (Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999). Proactive aggression is associated with the presence of callous-unemotional traits, whereas reactive aggression is associated with higher levels of internalizing behaviors and trait anxiety (Bubier & Drabick, 2009). However, these differences are difficult to distinguish and reactive and proactive behaviors are extremely highly correlated (Fite, Raine, Stouthamer-Loeber, Loeber, & Pardini, 2010). Thus, biological differences may be useful in elucidating more clearly demarcated groups when parents or teachers have difficulty identifying distinct motivations behind observed aggression, such as whether or not there was a goal or if there was a threat perceived by the child.

Lower basal skin conductance level is associated with increased risk for the magnitude of aggressive behaviors as well as the stability of aggression across the lifespan and is thought to underlie the callous-unemotional traits characteristic of proactive aggression. However, high EDA may be reflective of the underlying threat reactivity and high emotional arousal characteristic in reactive aggression. Interestingly, parents did not identify any behavioral domain which distinguished these two subgroups, underscoring the difficulty in identifying emotional

processes as an outside observer. However, teachers did report children in the low EDA group as more able to regulate their emotions and more socially competent.

The findings show that the only statistically significant relationships between the grouping variables and the parent and teacher report variables exist in the teacher report of child behavior. The teachers are able to recognize the fact that there are differences in the children, despite the fact that the teachers themselves rated the children as highly aggressive. The teachers reported differences between the high and low EDA groups in terms of emotion regulation and social competence for the tonic period and internalizing behaviors for the SCR. Because the children are different physiologically and in the nature of their aggressive behaviors, it makes sense that there would be differences reported in the levels of positive behavioral tendencies and internalizing behaviors. The similarity between the groups in regards to reports of aggressive and oppositional behaviors is expected given that these symptoms made up the screening measure for study entry.

Interestingly, the parents of the children were not able to differentiate between the children in the high EDA group versus the low EDA group, whereas the teachers were for certain behavioral constructs. In other words, they rated the behaviors of their children the same regardless of whether or not their child was categorized as high or low EDA at baseline. I believe that the inability of the parents to recognize the slight distinctions that differentiate the high and low EDA children is due to the interactive relationship between parents and the behaviors of their children. Parents of children with anxiety disorders and children with disruptive behavior disorders tend to exhibit the same parenting practices (Bubier & Drabick, 2009). Poor parenting practices may have an effect both on the observation of chronic externalizing disorders and comorbid anxiety as well as the ability of the parent to be an unbiased informant of the child's behavior. The parent may see behaviors motivated by fear and anxiety as very similar to the calculated aggressive tendencies of children with callous-unemotional traits. The relationship

between parent and child is often one of the most telling risk factors for externalizing behavioral disorders, and the dual reciprocity can influence the presence of disorders in children and punitive, unresponsive parenting (Chase & Eyberg, 2008). Based on the findings of this study, the teachers may be better able to provide an unbiased perspective of the child's behavioral profile.

The Lion King task is designed to measure reactions to psychological stimuli from the children. In general, children in the high EDA group were more emotionally reactive. The high tonic EDA group spent more time in tonic period during the happy epoch than did the low EDA children, and the high SCR EDA group had a higher number of responses during the anger epoch than did the low EDA group. This follows the notion that children with low baseline EDA have a lower emotional range and shallow expressions of negative emotions. I was surprised by one thing in particular. I expected the differences between the groups to be during the same emotional epoch, regardless of physiological measure of EDA. The division of the groups by tonic and SCR should not change the type of emotion that stimulates a physiological reaction in the children.

#### *Limitations & Directions for Future Research*

Despite the significance of findings, it is important to recognize the limitations of this study. First, the small sample size (N = 56) limits the generalizability of the findings to other samples of aggressive children. Also, while the EDA data was available for all 56 children there was data missing for many of the other variables. The Conflict Tactic Scale was not completed by all of the parents. For most of the constructs of the scale the data was available for only 39 of the children. The lack of data available about the exposure to violence limits the strength of the statistical analyses used to evaluate it. Perhaps if all children had a completed Conflict Tactic Scale the findings would have shown a different relationship between the grouping variables and the Conflict Tactic Scale.

The fact that there are significant findings that differentiate highly aggressive children based on basal tonic period and nonspecific skin conductance response is very important for the

future of intervention science. The fact that the children act aggressively for different reasons should influence the treatment of conduct disorder. Physiological differences between highly aggressive children can help to divide children into different treatment groups that would better treat their individual behavior excesses and motivations for aggression.

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## CURRICULUM VITAE

### SHANNON O'NEIL

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### EDUCATION

The Pennsylvania State University, State College PA  
The Schreyer's Honors College  
**B.S. in Human Development and Family Studies** **2010**  
Life Span Development Science Option  
Honors Thesis: Differences in Skin Conductance Levels  
Among High Risk Kindergarten Children

### AWARDS

The President's Freshman Award 2007  
Dean's List 2006 –2010  
Attendee of the 3<sup>rd</sup> Annual Professional Development Conference at  
Arizona State University 2009

### RELATED EXPERIENCE

Bucks County Housing Group, Morrisville, PA **2006 – 2010**

#### **Volunteer**

Worked with the volunteer coordinator at multiple branches of the non-profit housing continuum to provide childcare, collect food, clothing, and household necessities, and to make transitional living complexes more inhabitable spaces

Prudential Fox and Roach Realty, Langhorne, PA

#### **Administrative Assistant**

**2004 – 2006**

Managed the front desk of a large real estate company, greeted costumers, scheduled appointments, and managed the office when the manager was not present.

The Pennsylvania State University Child Study Center, State College, PA

#### **Friendship Group Coach**

**2009-2010**

Worked with children with social, emotional, and cognitive difficulties to develop cognitive abilities, problem solving skills, and social-emotional coping mechanisms, developed a developmentally appropriate curriculum, ran parent conferences

The Pennsylvania State University Child Brain Development Lab, State College, PA

#### **Undergraduate Research Assistant**

**2009-2010**

Worked on the PATHS to Success project to examine the neurobiology of conduct disorder in children, uploaded and

cleaned daily participant files using Mindware© software  
program

#### MEMBERSHIPS

Phi Kappa Phi Honors Society

Penn State LGBTQA Student Resource Center Straight Talks Pro Peer Facilitator

Penn State Dance MarATHON Rules and Regulations Committee Member

Undertones Student Group for LGBTQA Students of Color- Committee Member

Health and Human Development Honors Society