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FRIENDS ON THE PLAYGROUND: ASSOCIATIONS WITH PHYSICAL ACTIVITY
LEVELS IN A PRESCHOOL SAMPLE

A Thesis

Presented in partial fulfillment of requirements

For the degree of Master of Arts

In the Department of Psychology

University of Mississippi

By

KEVIN F. KARL

May 2011

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ABSTRACT

Child obesity rates have reached an all-time high in the United States; with rates doubling over the past 30 years for children ages 2-5 (Institute of Medicine of the National Academies, 2004). This increase in obesity rates has led to increased research directed at understanding the causes in order to begin to reverse the trend and prevent our children from becoming obese. The literature shows that several key variables, including child physical activity level, parent physical activity level, and peer influences on the playground are related to childhood obesity (Epstein, 2005; Salvy, 2008; Trost, et al., 2003). Much of this research however has been on older children that are past the key age range for effective early intervention and prevention. Because there has been very little attention to very young children, it is important to begin to look at whether or not the relationships seen for older children also occur in younger samples. The current study attempted to extend the finding that the presence of adolescent friends on the playground increases physical activity level in a preschool sample (Salvy, 2008). In order to better understand the peer influences at work, sociometric interviews were conducted with the children both at the beginning and end of the study in order to assess preschoolers' social relationships. Playground observations were conducted throughout the study to determine which children are physically more or less active, assess changes in level of physical activity over time, and determine whether or not play is occurring in the presence of friends. After all data was collected, sociometric interviews were analyzed to determine correlations between variables, and a one-way analysis of variance was used to determine if friends' presence on the playground

increased physical activity level. No significant relationship was found between level of physical activity and friendship presence on the playground. Possible explanations and implications for further research are discussed, along with pertinent limitations of the study.

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I. INTRODUCTION

According to the Center for Disease Control and Prevention in the United States, the past 20 years have shown a dramatic increase in obesity rates across all 50 states. Where most states in 1985 showed obesity rates below 10% of their populations, only one state had a rating below 20% in 2007. Mississippi in particular has the highest current rate of obesity at 32%, an increase from less than 10% in 1990 (CDC, 2007). This national increase in adult obesity has many health professionals concerned, as obesity can have profound health effects, such as increased risk of developing Type 2 diabetes, hypertension, coronary heart disease, and some types of cancer (CDC, 2007). Childhood obesity has also increased dramatically, having doubled in the past 30 years (Institute of Medicine of the National Academies, 2004). Events within several distinct developmental periods have been shown to make significant contributions to the onset of obesity, including early infancy, adiposity (~5-7 years of age), and adolescence (Dietz, 1994). Obesity among children is related to several environmental and genetic variables such as parent weight, socioeconomic status, and high birth weight (Danielzik, et al., 2004). Health education, dietary habits, and physical activity level have also been identified as additional factors important to the development of obesity on children (Cole, Waldrop, D'Auria, & Garner 2006; Salvy 2008). Because obesity is such a pressing problem, it is not surprising that interventions targeting the variables known to be important in its development have been described in the literature with varying degrees of success

Variables Affecting Child Obesity

Studies investigating the effectiveness of school-based interventions for obesity have reported several interesting findings. When analyzing the effectiveness of health education programs, researchers have noted marked reductions in Body-Mass Index (BMI) longitudinally for school-based programs which promote and educate the practice of healthy dieting and exercise (Gortmaker, et al., 1999). Several studies have also found that increasing physical activity has similar effects on BMI (e.g. Brownell & Kaye, 1982; Davis, 2002; Marshall, & Bouffard, 1997). Though the above studies examined the effects of health education and physical activity separately, these variables have been shown to effect more change when put together than when implemented individually (Gortmaker, et al., 1999). Unfortunately, the programs described in these studies are not practically applicable, as they require large amounts of time and changes in curricula to accommodate the proposed interventions. To streamline the combined approach, which has been shown to be maximally effective, analyzing the components of change is warranted.

For the three variables proposed to influence child obesity (i.e. health education, changing dietary habits, and increasing physical activity level) the components of change are intuitively evident. For health education, observational learning and reinforcement are key as parents and teachers both model and directly teach lessons in hygiene and exercise and reinforce children's successes and behavior change. The same is true for dietary habits, where only those foods presented by parents, teachers, or related individuals are consumed. Studies that find high correlations between parent and child weight help to emphasize the point that the dietary habits of parents play a role in determining child dietary habits (e.g. Danielzik, et al., 2004; Hesketh, et

al., 2005; Magarey, Daniels, Boulton, & Cockington, 2003). Physical activity level, however, is modeled somewhat differently than health education or dietary habits. Whereas health education is usually taught by parents or teachers, and dietary habits are modeled based on adult food schedules, physical activity can be seen as modeled and reinforced at least partially by peers (Salvy, 2008). In effect, peers have an influence on how physically active their classmates are. This finding is not surprising. However, while no less important, peer influence is much harder to change than are the influences of observational learning and reinforcement evident in health and dietary education provided by adults. Many programs that are currently in place address the first two variables, as they are relatively easy to control. Peer influence is much harder to manipulate however, and requires some special attention.

Peer Influence

Much of the research in the realm of peer influence has been directed at understanding peer pressure and the use of illegal substances. Peer pressure has been shown to have moderate to strong effects on participation in such risky behaviors as binge drinking and adolescent sexual activity (Jaccard, Blanton, & Dodge, 2005). Peer influence also has many positive effects that are far less documented. When considering how a peer will affect another, six issues have been found as key: characteristics of the influencing peer, characteristics of the influenced peer, the relationship between peers, developmental differences, isolation of the peer influence variables, and generalization from selected behavior to similar behaviors (Hartup, 2005). Keeping these six considerations in mind, the positive effects of peer influence in research will be discussed.

Fantuzzo, Sekino, & Cohen (2004) conducted a study investigating the effects of peer play in the classroom at an urban Head Start center for children ages 3-5, and established several

interesting findings. The study focused on naturalistic observation of the children over an entire school year and relied mostly on teacher reports of peer interaction. The authors found that children who were observed as more interactive with peers early in the year had better “cognitive, social, and movement/coordination outcomes,” (p.323). For those children who exhibited disruptive or disconnected behavior, negative emotional and behavioral outcomes were more often seen. According to these findings, peer influence in the classroom can have a profound effect on youth; however, this study did have several limitations. The purely naturalistic design of the study does not help tease apart the hows and whys of what affected these youth. With no intervention in place, no variables can really be identified as important. However, other researchers also have investigated this issue.

Felmlee, Elder, and Tsui (1985) assessed the variable of classroom attentiveness in a 1st grade classroom. Their study assessed the degree to which a distracter (i.e. a student making a disrupting comment in class) would affect attentiveness to presented material. The study found student inattentiveness tripled in magnitude after a disturbance in the classroom. The implication of this on peer influence is intriguing, as peer influence has consistently shown that peers emulate one another. The most interesting piece of this study is that individual and group characteristics were controlled, allowing for minimal differences between subjects. With this kind of result, peer influence looks to be a much larger piece in the puzzle than previously thought when trying to understand the behavior of children.

Peer pairing is another method that further defines how peers interact and influence one another. One study used this method to pair aggressive 2nd graders to nonaggressive friends and non-friends. This study used a 6 week summer school program to assess if the presence of an

aggressive or non-aggressive friend or the presence of an aggressive or nonaggressive non-friend would increase the number of aggressive behaviors seen during playing games of partnered foosball. The study found that aggressive children had fewer instances of aggressive behavior when they were paired with a nonaggressive partner. Nonaggressive participants showed elevated rates of disruption when paired with aggressive non-friends, but not with aggressive friends. At a one year follow-up, researchers also found that no increase in aggression was found on a general scale of aggression for either group, supporting the hypothesis that a long term, generalized effect is possible, or at least that this type of intervention will not increase the frequency of unwanted behaviors (Hektner, August, & Realmuto, 2002). These findings support the postulation that peer influence can be utilized to affect change in individuals. Although the variables are hard to isolate, the ability to change the pairings of peers and considering their individual characteristics may be the keys to formulating effective interventions for many behaviors.

Gifford-Smith, Dodge, Dishion, & McCord (2004) wrote a commentary which emphasizes these inferences in our current intervention programs of today. The research points out that the segregation of disruptive individuals is the primary remedy of such behaviors in our current system. According to their findings however, the peer influences at work in such segregated settings only reinforce the behaviors that have been previously exhibited. This calls for a change in how interventions are formulated, as positive peer influences are needed to effect change in the youth of today. For peers with specific individual differences, collaborating may show a better outcome.

Several researchers have investigated peer collaboration exercises in schools, the place in which peer influences in children can be assessed most readily. These studies have investigated a variety of topics, including academic and social variables. Results of these studies suggest that those involved in peer collaboration exercises were more likely to be cooperative and helpful over the long term (two year study; 3rd to 5th grade) (Gillies, 2002), had increased problem-solving abilities over control non-cooperative groups for 6-7 year olds (Fawcett & Garton, 2005), and, in preschool, friendships would reliably arise following cooperative task pairing (Blau & Rafferty, 1970). These findings all point toward a possible use for cooperative task pairing in the classroom being useful for formulating an intervention that utilizes the qualities of friendship. Child obesity is a prime candidate in this case as it is more likely for children to participate in physical activity when in the presence of friends (Salvy, 2008), however since the previous research only demonstrated these effects with an adolescent population, replication with a preschool population is needed to fully support this kind of intervention with children this young.

Statement of Purpose

The purpose of the current study was to replicate the finding that physical activity increases in the presence of friends with a preschool sample. With this information, the last piece of the puzzle in forming an intervention would be in place to increase physical activity levels in children with the goal of helping to reduce children's weights over the long term. Without knowing if Salvy's research is applicable to preschool populations, this connection cannot be made. With this in mind, the hypothesis that was tested is that a child, when playing in the presence of one friend or more, is more likely to be physically active than when the child is not playing in the presence of one or more friends

II. METHODS

Participants

Participants were 35, 4-5 year old preschool children. Twenty-five children were 4 years old and ten were 5 years old, with 46% female and 54% male. Subjects were 94% European American, 3% African American, 3% Asian American and ranged from middle-low to middle-high socioeconomic status, as determined by number of bedrooms reported in their home. Consent forms were sent home with the children that described the research and requested that the parents sign and return them to the school if they would have liked their child to participate. Participants were assigned ID numbers in order to maintain confidentiality.

Research Design

The study was designed to compare child physical activity levels, the physical activity levels of their friends, and whether or not the presence of others on the playground in a play group influences their physical activity level. As such, naturalistic observation of participants was used in order to avoid unintended manipulation. Naturalistic observations were used both to determine whether or not friends were present while a child was playing and also to determine physical activity levels of each child. In addition, to further investigate group and friendship dynamics, sociometric interviews were conducted with each child.

Measures

Two forms of measurement were used to address the study hypothesis: sociometric interviews and playground observations. Peer-nomination sociometric interviews were conducted individually with each child to assess sociometric status (popular, neglected, rejected, or controversial), current friendships, and other social characteristics of each child both in the Fall and Spring semesters of a single school year. During the Spring semester playground observations of child activity levels and the number of other children each child was playing with were also assessed.

Sociometric Interview. The sociometric interview was a peer nomination measure in which participants nominate classmates for a number of social categories. Sociometric interviews were orally administered to each participant individually. Examples of questions included: “Who are your best friends?”, “Who in your class do you like the most?”, and “Who in your class do you like the least?” These types of questions have been successfully used to assess friendship status, preference, and liking in other studies (e.g. Dodge & Coie, 1987; Denham & McKinley, 1993; Shin, 1997; Werner & Crick, 2004; de Guzman, et al., 2004). The questionnaire used also included additional items that are indirectly related to current friendships, which provided a degree of insight into friendship preferences and liking. These items included questions such as: “Who in your class is popular?” and “Who in your class gets picked on the most?” The questionnaire also included several ‘distracter’ questions such as ‘What is your favorite movie or TV show?’ which were included to make the task more interesting for the children. See Appendix A for full questionnaire.

Playground Observations. Playground observations were utilized to assess participants' physical activity level, as they have been shown as a reliable measure of activity level in several previous studies (e.g. Trost, et al., 2003; Reilly et al., 2003; Jago et al., 2001), and to determine if play was occurring individually or in a group. For the current study, an adapted form of an observation system for recording activity in preschools was used (Brown, 2006). This method involved observing a child for 15 seconds at a time, and recording pertinent variables such as their interactivity to other children and a rating of current physical activity level. Ratings of physical activity were recorded on a 5 point scale, 1 corresponding to the participant being stationary or motionless, 2 to stationary with limb movement, but no chest movement, 3 to slow translocation (slow walk), 4 to fast translocation (fast walk), and 5 very fast translocation (running). A sample record form is provided in Appendix B.

Procedure

Several graduate and undergraduate students assisted in data collection. Prior to interacting with the children, all researchers completed the CITI program training in the ethical conduct of research with children and were trained in how to conduct the sociometric interview and playground observations, including how long to observe, ratings of physical activity, and how to determine with whom the child was playing.

Participants were recruited from four- and five-year old children attending a preschool program at a local elementary school. A cover letter describing the study was sent to parents along with a consent form. Children were only allowed to participate in the study once informed

consent was obtained from their parents. Also to insure confidentiality, children were assigned an identification number at that time.

Graduate students or undergraduate research assistants orally administered the sociometric questionnaire to the children individually. During a class period, students were called out of class to a separate room to be interviewed. The interviewer conducted the sociometric interview, which often began with some rapport building activities (e.g. coloring a picture, small talk, block play) and continued on with the scripted sociometric questionnaire presented in Appendix A as well as recording each child's height and weight. Boards with the pictures of each child in the classrooms studied were used for the child to point to in order to facilitate communication between the interviewer and child. The ID number of each child was recorded on the back of each picture, which only the interviewer could see, to ensure accurate recording of each child's nominations. Each child's responses were recorded on the form verbatim. ID codes were used for both the interviewed children and the children that they nominated for the various categories in order to protect the confidentiality of all children in the study.

Researchers also observed child interactions on the playground. During the classes' normal playground recess time, experimenters positioned themselves on the edge of the play area in order to be able to observe the entire playground with minimal interaction. Once there, the experimenters would begin recording their observations. Three researchers were present at all observations, in which two researchers were conducting independent observations of different children, and the third was collecting reliability data on the observations of the other two. All researchers would conduct simultaneous 15 second scan observations of target participants. At

the end of the 15 seconds, the researchers would record and rate activities based on physical activity level observed, defined as the level of physical activity which took up the largest proportion of the 15 second observation, and how many children they were interacting with on the form provided. Upon completion of this observation a new target was selected for observation, allowing 45 seconds to record previous child data, and locate the next child. Each child was observed multiple times by multiple observers throughout the course of the study. From these observations, an average physical activity rating was calculated for each observation period for each child, and an overall physical activity level average was also obtained.

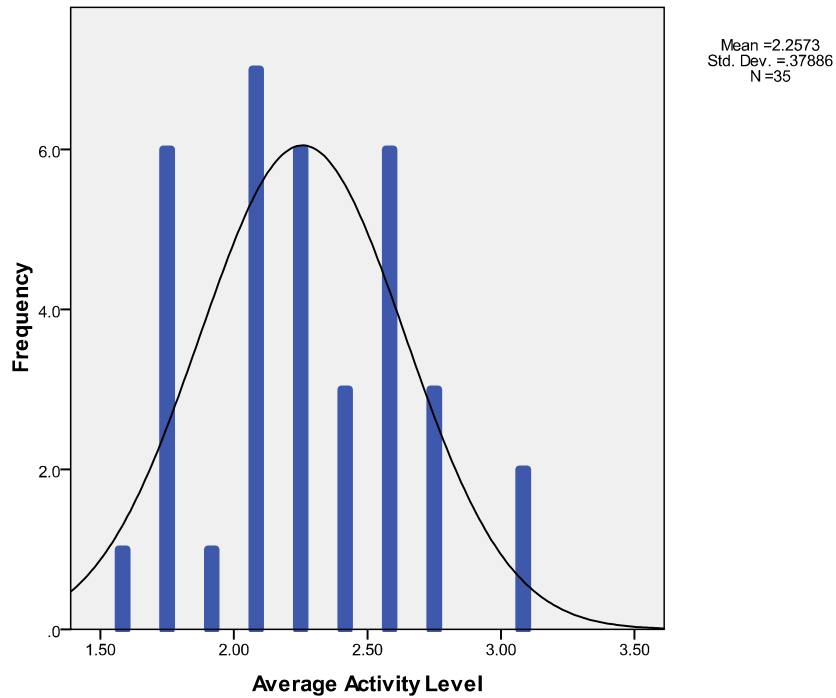
After all playground observation sessions, with a range of 6-18 sessions per child completed, data collection concluded with a final sociometric interview. The sociometric interview was conducted using the same procedures as the sociometric interview at the beginning of the study, with the exemption of some questions and height and weight recording. These follow-up data were used to assess changes in friendship status since the beginning of data collection.

III. RESULTS

Physical Activity Data

Descriptive statistics on observed activity levels were obtained to determine the distribution of playground observation scores. Skew was examined to determine whether the data were normally distributed, and results are displayed in Figure 1. With a mean of 2.26, participants averaged a low level of physical activity, with scores between 2, which is some limb movement, and 3, which is a slow walk. With a standard deviation of 0.38 these data also indicate that 95% of child ratings for physical activity level fell between 1.12 and 3.4, showing little variability between child physical activity levels. Although some skew is present, the amount of skew is not significant ($ss=.046$; $ses=.398$) and the data can be considered to be normally distributed.

Figure 1



BMI Data

Descriptive statistics were also calculated for percentile BMI scores to determine if the sample is representative of the population of preschoolers in Mississippi. Results are presented in Figure 2 and 3. With a mean of 69.7, the percentile BMI scores of the children fall within the healthy range according to the CDC. The distribution of percentile BMI scores is heavily negatively skewed, showing a preponderance of scores toward the higher end of the scale.

Figure2

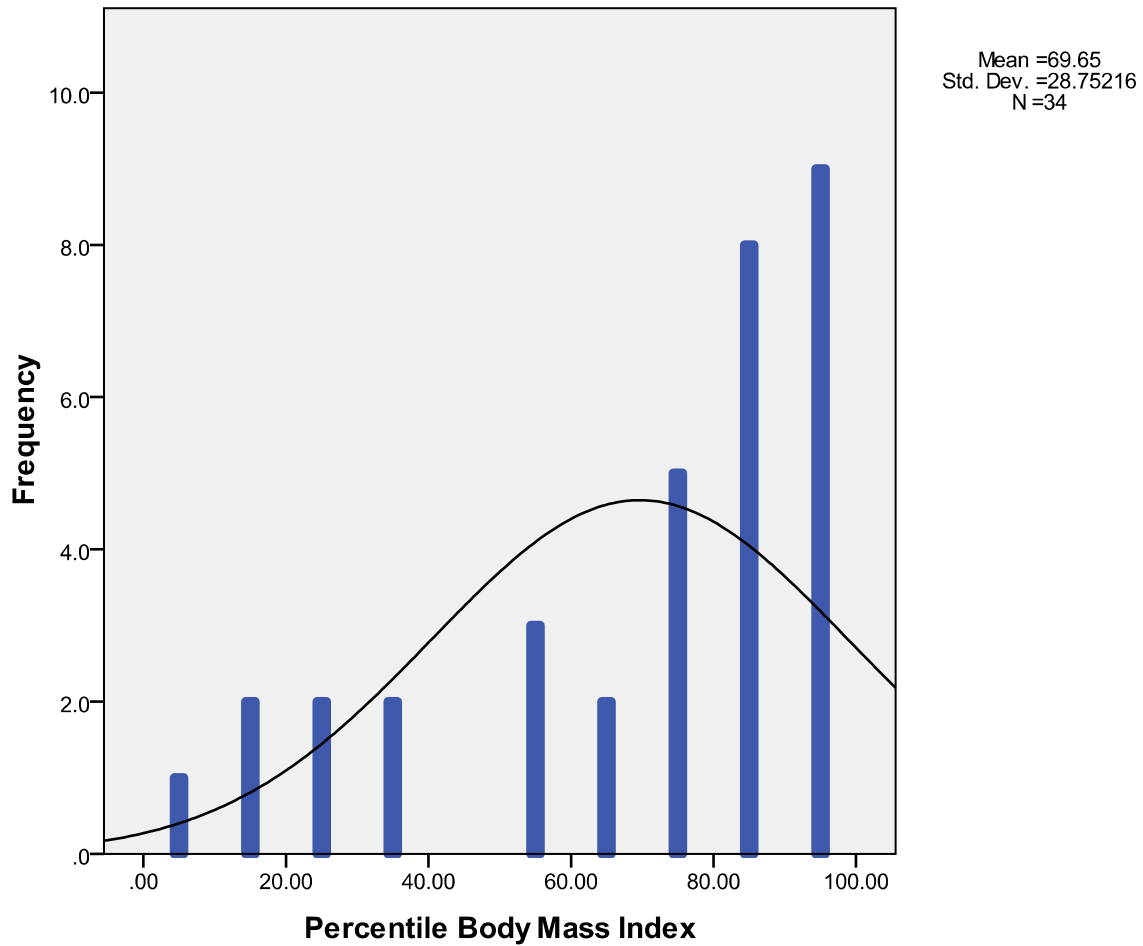
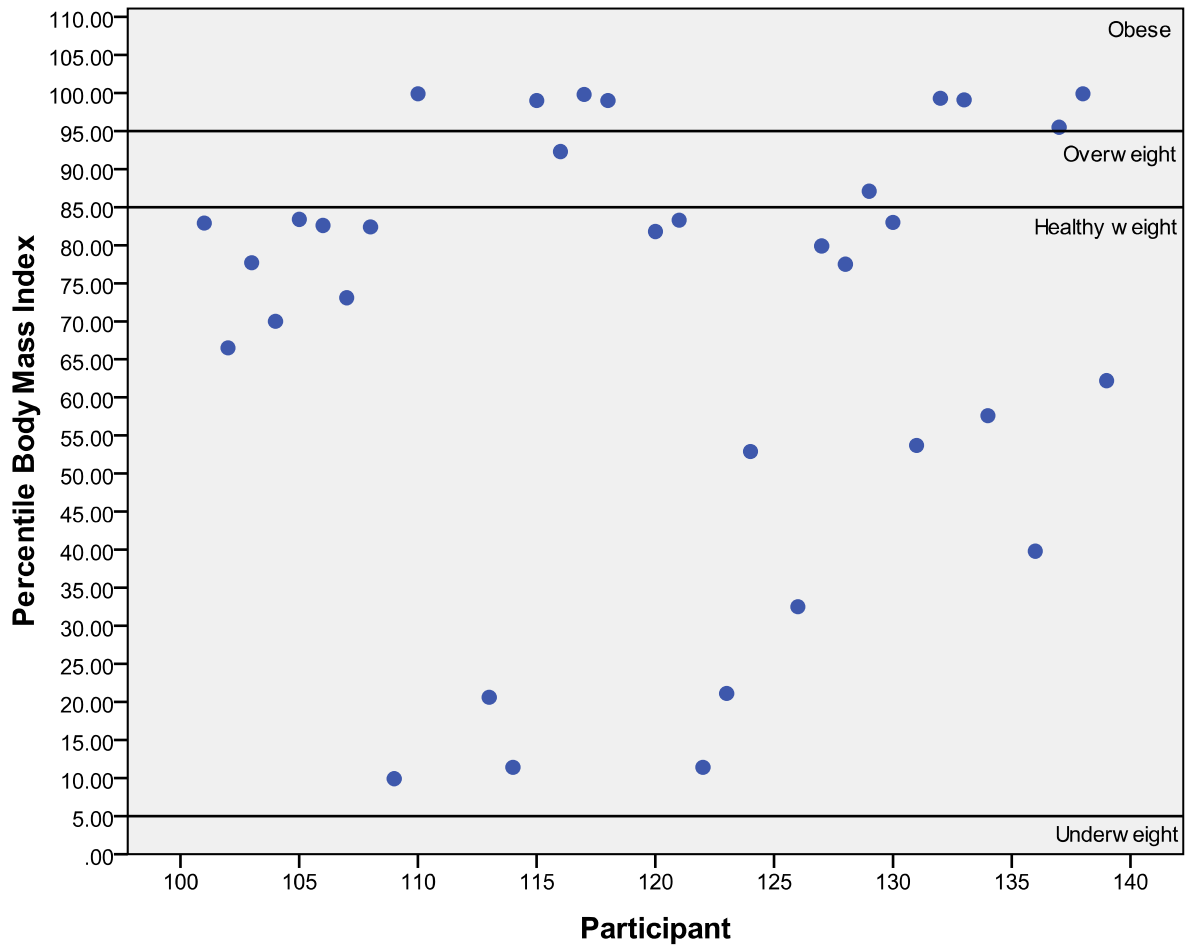


Figure 3 shows the number of participants within each category of the body mass index as defined by the CDC. Eight children studied were obese, two were overweight, and twenty-five were within the healthy range. As the CDC reports child obesity and overweight rates in Mississippi at 30.1%, the current sample, with 28.6%, can be considered a good representation of children in Mississippi for this variable.

Figure3



Effects of the Presence of Peers on Activity Levels

In order to test the hypothesis that physical activity in the presence of friends increases in a preschool population, several analyses were conducted. The first was to determine if physical activity ratings increased when a child was playing in the presence of others. To measure this, averages of observed physical activity level, and a solitary vs. peer play average was calculated from which correlations were computed to determine if any significant relation exists. A non-significant correlation ($r(33) = -.141, p > .05$) was found. Similarly, when comparing the average

number of children played with for each participant and average physical activity level a non-significant correlation was also found ($r(33) = -.005, p > .05$).

A second analysis was conducted in an attempt to determine if children play with other children who exhibited approximately the same activity level at times we could not observe. Several sociometric questions were considered that tap these variables, including "Who are your best friends?" (pre and post observation) and "Who do you play with most on the playground?". Using the average activity level ratings for each child, and comparing them, via correlational analysis, with the average of physical activity levels of those they nominated for each question, non-significant correlations were found for both questions ($r(33) = -.144(\text{pre}); -.111(\text{post}); -.033, p > .05$).

The third analysis conducted was an independent-samples t-test comparing physical activity level observations grouped by the absence or presence of friends during play. No significant difference between groups ($t(556) = .541, p > .05$) was found however, suggesting no difference in physical activity level based on classmate presence during play. When split by gender, a independent-samples t-test comparing male and female physical activity levels found no significant difference between groups ($t(16) = .289, p > .05$).

To further analyze any relations between physical activity level and peer nominations, paired t-tests were also conducted comparing physical activity level to best friend nominations and nominations for playmates on the playground. No significant relations were found among study variables. In addition a one-way ANOVA compared physical activity level observations to

the number of children each participant was observed playing with. Again, no significant relations were found among study variables $F(3, 554) = .628, p = .597$.

To better understand the dynamics of the sample, further correlational analyses of reported peer nominations were conducted. The findings are reported in Tables 1, 2, and 3.

Table 1

Correlations among Study Measures - All Participants

	1	2	3	4	5	6	7	8
1. (SI)Play With								
2. (SI)Like Most	.184							
3. (SI)Like Least	.375*	.486**						
4. (SI)Best Friend	.539**	.440**	.091					
5. (SI)Most Popular	-.073	.094	-.344*	.157				
6. (SI)Picked On	.082	-.134	.076	.049	.010			
7. (SI)Healthiest	.675**	.475**	.311	.580**	-.047	-.003		
8. (C)PercentileBMI	-.086	.042	.080	-.141	.010	.077	-.132	
9. (Ob)PAL	.196	.181	.206	.250	-.101	-.171	.155	-.351*

Note. SI=Data obtained from the Sociometric Questionnaire; O=Calculated on site; Ob=Data obtained from the Physical Activity Observation Form BMI= Body Mass Index; PAL=Average Physical Activity Level. N = 35. * $p < .05$. ** $p < .01$.

Among study variables in Table 1, seven significant positive correlations were found between: child nominations of who he/she plays with, and likes least; child nominations of who he/she plays with, and reported best friends; child nominations of who he/she plays with, and nominations for the healthiest children in their class; like most and like least nominations; like

most and best friend nominations; like most nominations and nominations for the healthiest children in their class; and best friend nominations and nominations for the healthiest children in their class. Two significant negative correlations were also found between: like least nominations and most popular nominations, and percentile BMI and average physical activity level.

Table 2

Correlations among Study Measures - Male Participants Only

	1	2	3	4	5	6	7	8
1. (SI)Play With								
2. (SI)Like Most	.284							
3. (SI)Like Least	.636**	.430						
4. (SI)Best Friend	.410	.624**	.255					
5. (SI)Most Popular	.005	.202	-.406	.189				
6. (SI)Picked On	-.115	-.255	.033	-.063	.042			
7. (SI)Healthiest	.764**	.551*	.609**	.539*	-.040	-.248		
8. (C)PercentileBMI	.017	.296	.156	-.135	.202	.139	.062	
9. (Ob)PAL	.036	-.155	.056	-.079	-.273	-.239	.034	-.454

Note. SI=Data obtained from the Sociometric Questionnaire; O=Calculated on site; Ob=Data obtained from the Physical Activity Observation Form BMI= Body Mass Index; PAL=Average Physical Activity Level. N = 35. * $p < .05$. ** $p < .01$.

Among study variables in Table 2, which presents correlations between variables for just male participants, six significant positive correlations were found between: child nominations of who he/she plays with, and likes least; child nominations of who he plays with, and nominations for the healthiest children in their class; like most and best friend nominations; like most nominations and nominations for the healthiest children in their class; like least nominations and

nominations for the healthiest children in their class; and best friend nominations and nominations for the healthiest children in their class.

Table 3

Correlations among Study Measures - Female Participants Only

	1	2	3	4	5	6	7	8
1. (SI)Play With								
2. (SI)Like Most	.117							
3. (SI)Like Least	.261	.543*						
4. (SI)Best Friend	.632**	.312	.065					
5. (SI)Most Popular	-.189	.122	-.111	.061				
6. (SI)Picked On	.365	.021	.045	.246	.086			
7. (SI)Healthiest	.604*	.462	.211	.595*	-.173	.366		
8. (C)PercentileBMI	-.205	-.296	.016	-.164	-.176	-.027	-.367	
9. (Ob)PAL	.330	.425	.233	.531*	.090	-.175	.293	-.282

Note. SI=Data obtained from the Sociometric Questionnaire; O=Calculated on site; Ob=Data obtained from the Physical Activity Observation Form BMI= Body Mass Index; PAL=Average Physical Activity Level. N = 35. * $p < .05$. ** $p < .01$.

Among study variables in Table 3, which presents correlations between variables for just female participants, five significant positive correlations were found between: child nominations of who she plays with, and reported best friends; child nominations of who she plays with, and nominations for the healthiest children in their class; like most and like least nominations; like most nominations and nominations for the healthiest children in their class; and best friend nominations; and best friend nominations and average physical activity level.

IV. DISCUSSION

Previous literature has investigated physical activity level and its relation to child obesity and has yielded interesting and compelling findings. These findings point us in the direction of formulating interventions that can help significantly with the problem of child obesity in Mississippi and the United States today. The current study strove to add the final link between these studies, and aid in creating a possible effective intervention for a preschool population. The results, however, were somewhat underwhelming.

Representativeness

Given the data provided, the sample used was fairly representative of the general population in a university town and of Mississippi's child population. Although the sample is heavily European in ancestry, socioeconomic status, physical activity level, and weight are representative of the population as a whole. To determine whether or not a child fits into a category of obese, overweight, healthy, or underweight, percentile body mass index scores are proscribed to be used by the CDC rather than the more familiar adult BMI scores (CDC, 2007). These percentile ranks are based on CDC data collected specifically on children stratified by age. As such, they are seen as a reliable comparison, even more so than adult BMI scores, to peer weight and fat levels. The current sample also showed similarity to what literature has shown, as a significant negative correlation exists between the average physical activity levels recorded, and the percentile BMI scores obtained. With this in mind, this relation lends support to the

validity of the physical activity observation measure used, and to the representativeness of the sample to the general population, despite its small size (n=35).

Physical Activity and its Association to Friend Presence on the Playground

The primary method of assessing whether or not children were playing in the presence of friends on the playground, and whether physical activity levels were affected by this interaction, was a comparison of youth physical activity levels to number of peers played with in a given observation period. In other words, how active was each child, and was that child playing with others. The results of this comparison found no significant relations. This can be explained a number of ways.

This method relied on quite a few variables falling into place, and perhaps a few too many assumptions as well, most notably that the children were actually playing with friends, not just classmates. Friendship nomination reliability within a preschool population is much lower than in an adolescent population (Asher, Singleton, Tinsley & Hymel, 1979; Busk, Ford & Schulman, 1973). In the current sample, when comparing peer best friend nominations, 47.6% remained the same between the two administrations of this question, which were administered 5-6 months apart. Of note within this similarity is the fact that this number is based off of nominations of three friends per child, where a child who only nominated one friend as stable between administrations would still add that one nomination to the percentage. Only 2 participants nominated the same three best friends for both administrations. This leaves over 50% change between administrations, and with the same degree of validity for each, using these friendship nominations as a guideline when conducting playground observations would most

likely have shown little to no difference from what was recorded in the current study, which relied mainly on peer play observations. Also due to how fluid friendship is in preschool, the postulation that friendship presence increases child physical activity level may be in question as well, as the definition for a friend is much different in preschool than it would be for an older population. In preschool samples, mutual activities are shown as the primary predictor of friendship, whereas in adolescent samples "loyalty, commitment, and empathy" are the primary attributes that predict friendship (Bigelow and La Gaipa, 1980). In further studies this relation should be explored more fully, as the definition for a friend in preschool could be just as likely "we both like _____" as "we both are wearing red". As an extension of previous research conducted with an adolescent sample, this difference needs to be accounted for in future research as permanence of friendship is much different between these two populations.

The second way that was used to help determine if physical activity level increases in the presence of friends was depending on peer nominations of playground play, and comparing the physical activity levels of those nominated and the nominator. Again, no significant relation was found. This does provide further evidence that in this sample, the hypothesis may not hold true. This method though has its own flaws to consider.

Peer nominations have been shown to be valid in many other studies (Dodge & Coie, 1987; Denham & McKinley, 1993; Shin, 1997; Werner & Crick, 2004; de Guzman, et al., 2004). However, for the current sample the interview characteristics seem to suggest some possible unreliability. One example of this is the abnormal correlation between Like Most and Like Least nominations ($r(33) = .486^{**}, p < .01$). These two categories, which at different times may change, would be considered by many to be mutually exclusive. This sample however showed

particular ability to choose many of the same children for both categories on a fairly consistent basis. Also, the current sample displayed a reduced understanding of other questions on the sociometric interview, particularly the Most Popular nomination category. In many cases, children simply would not answer the question, opting to skip the question, with a sheepish look at the researcher as if we were asking them to lie. In others, children would try to clarify the meaning, asking questions such as "like who gets in trouble?" and "like who people don't like?". This misunderstanding of queries cannot be assumed to be limited to these questions, and although there are several correlations that are supported by literature on the subject, relying on this sample's data as a valid measure of child preference may be unsound.

Despite the hypothesis having neither confirming nor disconfirming data, the sociometric interview, if taken as valid, did yield several interesting findings when considering the study hypothesis. As would be expected from the literature, nominations for peer play partners showed a high positive correlation with best friend nominations. Taken alone, this lends support to the claim that children in a preschool population are playing with friends, not just peers. Also, results show that best friend nominations are highly positively correlated to like most nominations, adding support to the claim of participants understanding questions asked. In order for the sociometric interview to fully support the study hypothesis several other correlations should have been present including between most popular and like most, picked on and like least, and healthiest with physical activity level. Despite their lack, the correlations that were found are impressive, and do demonstrate child understanding of at least some of the subject matter, and adds support for further study in this area.

When splitting the data by gender, several other interesting findings arise. Particularly, in support of study hypotheses, for female participants best friend nominations correlate positively with physical activity level. This association however cannot be considered as strong support for study hypothesis, as the number of females in the study was quite low (n=17). In addition, males were not found to be significantly more physically active than females in the sample. This result is somewhat surprising as the majority of research with children shows males with significantly higher physical activity levels.

Physical Activity Observation System

The observation system used to record both child physical activity level and number of children each child was playing with in the given time frame could be improved in future studies. Although this kind of measure has robust support within physical activity research circles, the results for the present study did not suggest a high degree of sensitivity to change. With a mean of 2.26, and a standard deviation of 0.38, 95% of the samples mean scores fell between 1.12 and 3.4. Also, the lack of a significant difference in physical activity level between male and female participants in an otherwise representative sample lends further support to a lack of sensitivity in the measure. With a more thorough rating system, which could break down physical activity levels specifically in this range to help differentiate subjects, the current study could have perhaps found some significant differences between those playing with or without friends. Despite this, if taken as a valid measure, the physical activity levels obtained do shed some light on how active Mississippi preschool children really are. If play on the playground is limited 95% of the time to little to no walking then change is definitely needed to increase the physical activity levels of this population.

Accuracy of the Model and Further Research

The hypothesis that physical activity on the playground increases in the presence of friends was not supported by the current study. As such, revision of the model in formulating an intervention may be necessary. As previous research found this relation in an adolescent sample (Salvy, 2008), assuming this result would occur for a preschool sample, given the differences between the respective populations, especially in how friendships are formed, may have been a scientific stretch. Several issues need to be addressed before further research on this topic can be conducted.

First, flaws in the current study would need to be addressed. Among these, foremost is the fact that a larger sample is necessary. Although this study's sample was fairly representative of the population, the number of participants needs to be larger in order to form any reasonable conclusions that can be brought to further our understanding of peer influences at work. Next, a measure of student understanding (especially for younger participants within a sample) should be used. The degree of validity should be assessed when sociometric interviews are used to assess specific variables, as the meaning of terms such as "popular" or "gets picked on" may be misunderstood. Last, the observation method used needs to have a higher degree of sensitivity. Without being able to differentiate between the finer points of physical activity level, the current study was severely hindered. Future researchers should perhaps investigate alternative means of physical activity assessment, as this may remedy the problems experienced.

Second, replication of the Salvy article is necessary. With replication of this particular study, the model can be strengthened at its base, and give further evidence for study in the future.

Without knowing if the original finding is replicable, further study, especially where hypotheses are drawn from and expounded from the original finding, would possibly be a waste of researcher time.

Third, after these replications have been conducted, and if they show corresponding results, adaptation of the model for a preschool population would be needed. In order to accomplish this, several variables would need to be controlled for areas where these population seem to differ, including friendship differences, measures of physical activity level, and gender play differences.

V. CONCLUSIONS

With dramatic increases over the past 20 years in obesity rates in Mississippi and the United States, significant change is necessary in multiple areas. For children, these areas especially focus in on parent influences, health education, and peer influences. When comparing the hefty amount of research going into health education and expensive programs to alter eating habits, parent training sessions, and expanding physical education classes, the lack of research into peer interventions was apparent. But inventing peer interventions is difficult as well. Due to the lack of research, groundwork must be laid before an effective intervention can be implemented. The current study attempted to bridge this gap, drawing on previous research findings pointing out that friends have and can affect the physical activity level of others, but at an age where some would consider intervention too late. If this finding could be replicated in a preschool sample, perhaps some degree of change could be promoted at an age early enough to impact the rest of a child's life at little to no cost.

Although the current study did not demonstrate an extension of previous findings to a preschool population, it did provide valuable data in understanding population differences and how best to address this model in the future. With this in mind, further research into the specific claim that friendship presence on the playground increases child physical activity level is warranted and in fact should be encouraged, as an effective peer influence based intervention has not yet been formulated.

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LIST OF APPENDICES

Appendix A

Script for Sociometric Interviews

Interviews will be conducted individually with children in the preschool. You can spend a bit of time “rapport building” with each child: introduce yourself, ask the child’s name, and tell the child that you will be asking questions about her/his classmates because we are trying to learn about ways in which children relate to/interact with each other. Ask the child if he or she is willing to help you out by answering a few questions and having their height and weight measured. If the child says ‘no’ thank them for talking with you and escort them back to the classroom. If you want, you can engage the child in a bit of “small talk” conversation by asking questions, perhaps about activities, school, or anything else that comes to mind.

Talk about confidentiality. Tell each child that it is important that they not talk about their interview with the other kids in the class. Tell them that we will be interviewing all kids, and we need to have each one give us her/his own independent answers to the questions. This is one reason why it is important that they not discuss their answers among themselves. Also point out that some kids feelings might get hurt if they know they were or were not named for various questions so it is best that no one talk about what they told you. Ask the child if he or she will help out by reminding classmates not to talk about it if they bring the subject up.

Use the following script pretty much verbatim (since this isn’t really a standardized procedure, strict adherence isn’t critical, but do follow the outline). Complete one data sheet for each child you interview. Fill in the child’s ID number at the top and write in the ID numbers of the names s/he gives you to each of the questions you ask:

I am going to give you photos of your classmates to help you remember them, and you can use the photos to help you think of the children who best fit the questions I will ask you.

Do you have any brothers or sisters? How many? Y _____ N

How many bedrooms are there in your house? _____

Point to the three kids you play with most on the playground?

_____, _____, _____

Point to three kids in your class that you like the most.

_____, _____, _____

What is your favorite movie?

Point to the three kids in your class that are the most popular.

_____, _____, _____

Point to three kids that get picked on the most.

_____, _____, _____

What do you like to watch on TV?

Point to three kids that are the healthiest.

_____, _____, _____

Point to three kids in your class who you like the least.

_____, _____, _____

Point to your three best friends.

_____, _____, _____

What is your favorite thing to do for fun?

Do you have any questions? Remember, do not talk about the interview with any of your classmates.

Appendix B

Observer _____ Location _____ Date _____ Start time _____ Stop
Time _____

Observations are designed for 1 minute intervals with 45 seconds to locate the child, 10 seconds to observe and 5 seconds to record. All observers will start their stop watches at the same time and reference each subsequent interval/child from that start time (use italicized times in top left of each observation box).

Record Activity level by circling the appropriate number, circle the number of other children that the observed child is playing with during this interval, fill in the codes for the other child/children in the space provided, and move on to the next child. Continue observing until the recess period ends, using additional sheets as needed.

Fill in code	Child 1 Code: _____	Child 2 Code: _____	Child 3 Code: _____	Child 4 Code: _____
Circle:	<i>0:00</i>	<i>1:00</i>	<i>2:00</i>	<i>3:00</i>
Activity Level	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Number of Children	0 1 2 More	0 1 2 More	0 1 2 More	0 1 2 More
Circle:	<i>4:00</i>	<i>5:00</i>	<i>6:00</i>	<i>7:00</i>
Activity Level	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Number of Children	0 1 2 More	0 1 2 More	0 1 2 More	0 1 2 More
Circle:	<i>8:00</i>	<i>9:00</i>	<i>10:00</i>	<i>11:00</i>

Activity Level	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Number of Children	0 1 2 More	0 1 2 More	0 1 2 More	0 1 2 More
Circle:	<i>12:00</i>	<i>13:00</i>	<i>14:00</i>	<i>15:00</i>
Activity Level	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Number of Children	0 1 2 More	0 1 2 More	0 1 2 More	0 1 2 More
Circle:	<i>16:00</i>	<i>17:00</i>	<i>18:00</i>	<i>19:00</i>
Activity Level	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Number of Children	0 1 2 More	0 1 2 More	0 1 2 More	0 1 2 More
Circle:	<i>20:00</i>	<i>21:00</i>	<i>22:00</i>	<i>23:00</i>
Activity Level	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Number of Children	0 1 2 More	0 1 2 More	0 1 2 More	0 1 2 More

Physical Activity Level:

- 1=stationary or motionless
- 2=stationary with limb movement but no chest movement
- 3=slow translocation (slow walk)
- 4=fast translocation (fast walk)
- 5=very fast translocation (running)

VITA

Kevin F. Karl

April 26, 2011

A. Personal History

Graduate College Address:

University of Mississippi

University, Miss. 38677

Undergraduate College Address:

University of Memphis

Memphis, Tenn. 38152

B. Educational History

1. University of Mississippi (2007 - Present)

Major: Clinical Psychology

Degree: Ph.D., projected graduation May 2014

2. University of Memphis (2004 - 2007)

Major: Psychology

Degree: B.A. in Psychology, May 2007, magna cum laude

Honors:	Dean's List	(2004-2005)
	Honors Program	(2004-2007)
	Psychology Honors Program	(2006-2007)

Honors Upon Graduation:

Research Scholar

Graduation with Honors and Thesis

Graduation with Psychology Honors

Honors Thesis: Family Factors as Predictors of the Discrepancy Between
Youth and Parent Reports of Psychopathology

Mentor: Dr. Gilbert Parra, Ph.D.

C. Professional Positions

1. Clinical Psychology Therapist, Psychological Services Center, University of Mississippi,
(2010-2011).

Duties: Assessment, diagnosis, and treatment of mental disorders,
including Post-Traumatic Stress Disorder, Generalized
Anxiety Disorder, and Major Depressive Disorder. Involves intake
interviews, therapy sessions, progress analysis, and behavioral
planning.

Supervisor: Dr. Karen Christoff, Ph.D.

Clinical Psychology Faculty

Psychology Department

University of Mississippi

2. Psychology Department Instructor, University of Mississippi (2010-2011)

Duties: Teach two semesters of an undergraduate introductory psychology course, including planning and implementing instruction to meet course goals.

3. Psychology Department Ph.D. Student Intern and Counselor, North Mississippi Regional Center, Oxford, MS, (2009-2010).

Duties: Conducting group and individual therapy sessions for individuals diagnosed with mental retardation. Also writing, reviewing, and revising behavioral programs; data collection for intensive treatment teams; and assessment of clients' adaptive skill levels, IQ levels, and motor functioning.

Supervisor: Dr. Kim Sallis, Ph.D.

Director of Psychology Department

Psychology Department

North Mississippi Regional Center

4. Clinical Assessment Specialist, Psychological Assessment Center, University of Mississippi,(2009-2010).

Duties: Specialized assessment and diagnosis of learning disabilities, ADHD, and mental disorders. Involves administration of comprehensive assessments, detailed analysis and interpretation of test results, report writing, and feedback sessions.

Supervisor: Dr. Stefan Schulenberg, Ph.D.

Clinical Psychology Faculty

Psychology Department

University of Mississippi

5. Verification Specialist, Office of Student and Disability Services, University of Mississippi, (2009-2010).

Duties: Review of documentation concerning student applications for disability services, especially those concerning learning disabilities, ADHD diagnoses, and psychiatric diagnoses.

Supervisor: Stacey Reycraft

Director of the Office for Student Disability Services

University of Mississippi

6. Clinical Psychology Therapist, Psychological Services Center, University of Mississippi, (2008-2009).

Duties: Assessment, diagnosis, and treatment of mental disorders, including Post-Traumatic Stress Disorder, Generalized Anxiety Disorder, and Major Depressive Disorder. Involves intake interviews, therapy sessions, progress analysis, and behavioral planning.

Supervisor: Dr. Todd Smitherman, Ph.D.

Clinical Psychology Faculty

Psychology Department

University of Mississippi

7. Teaching Assistant, University of Mississippi, (2007-2008).

Duties: Facilitate learning of class members through tutoring students in groups and individually; holding regular office hours; proctoring exams; managing day to day operations of the class; fielding questions; and grading exams and quizzes.

Supervisor: Dr. Karen Christoff, Ph.D.

Clinical Psychology Faculty

Psychology Department

University of Mississippi

8. Research Assistant, University of Mississippi, (2007-2008).

Duties: Help in data collection for relevant projects in the lab environment, including research into body image of self and others. Also participate in discussions of other lab related research projects.

Supervisor: Dr. Karen Christoff, Ph.D.

Clinical Psychology Faculty

Psychology Department

University of Mississippi

D. Membership in Professional Associations:

Association for Behavioral and Cognitive Therapies

(Member)

American Psychological Association

(Member)

Mississippi Academy for the Sciences

(Member)

Mississippi Psychological Association

(Member)

Psi Chi

(Member)

E. Statement of Professional Interest

My current professional interests lie in completing my graduate education with a broad range of experiences to draw from in order to join the military. In doing so I hope to be able to use the training I have received to benefit not just individuals, but my country as a whole.

F. Other activities

Poster Presenter at the Mississippi Academy of the Sciences

Therapies (2011) Hattiesburg, MS. Winner of Best Graduate Poster Award.

Poster Presenter at the Association for Cognitive and Behavioral

Therapies (2010) San Francisco, CA.

Poster Presenter at the Association for Cognitive and Behavioral Therapies (2009)

New York, NY.

Poster Presenter at the Mississippi Psychological Association Conference (2009)

Tunica, MS.

Poster Presenter at Society for Research in Child Development Conference

(2007) Boston, MA.

Works in Progress Symposium (2006) University of

Memphis.

Symposium Presenter in National Undergraduate Research Conference (2007)

Dominican University, San Francisco, CA.

Participant in the Student Research Forum (2007) University of Memphis.

Working knowledge of SPSS, Excel, and Access, SAS, and various word
processing programs.

Professional References

Dr. Karen Christoff, Ph.D. University of Mississippi

Dr. Stefan Schulenberg University of Mississippi

Dr. Kim Sallis, Ph.D. North Mississippi Regional Center

Dr. Scott Gustafson, Ph.D. University of Mississippi

Dr. Michael Allen, Ph.D.

University of Mississippi

Dr. Todd Smitherman , Ph.D.

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