Investigating the relationship between social behaviours and phonological awareness in preschool children

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Abstract

Purpose: This study examined the longitudinal effects of social behaviors in predicting phonological awareness outcomes in 4- year-old children.

Method: One hundred and two children (52 boys, 50 girls) were recruited from 11 schools serving low income neighborhoods in a large metropolitan city and were assessed at the beginning and end of the preschool year. All children received assessments of their phonological awareness skills, expressive vocabulary, non-verbal IQ, and teachers completed behavioral ratings at Pretest. At the end of the academic year, children participated in tests of phonological awareness using standardized assessments.

Results: The results of a multiple regression analysis indicated that being excluded by peers contributed up to 3% of the variance in negatively predicting phonological awareness outcomes after controlling for initial phonological awareness skills, expressive vocabulary, and cognition which is a small effect size.

Conclusion: Early peer exclusion can impact negatively on the acquisition of phonological awareness skills in 4-year-old children in preschool. The results of this study suggest that a child's overall behavioral competence and how they are treated by the peer group may play an important role in their ease of academic skill attainment. Given the link between peer exclusion and difficulties with phonological awareness outcomes, additional professional development programs that provide teachers with strategies to create inclusive classrooms may be warranted in preventing against the emergence of maladaptive behaviors at first entry into formal schooling.

Introduction

The primary purpose of this study was to examine two important areas of child development and their interrelationships. Specifically, this study considers the relationship between children's social behavioral competence and emergent literacy skills in typically developing 4-year old preschoolers from low-income neighborhoods. There have been few studies that have examined this relationship in children as young as 4-years of age. Further, no studies have focused exclusively on phonological awareness skills as the specific emergent literacy outcome measure. Therefore, this study has the potential to contribute to explanations of how social behaviors may impact upon children's phonological awareness outcomes.

The Development of Emergent Literacy Skills

An important focus in preschool is the development of emergent literacy skills, which encompass letter knowledge, phonological awareness, print concepts, and oral language (Phillips, Clancy-Menchetti, & Lonigan, 2008; Whitehurst & Lonigan, 1998). A conceptual model of emergent literacy developed by Whitehurst and Lonigan (1998) posits that the transition from emergent literacy to conventional literacy in childhood is contingent upon two processes, namely "inside-out" and "outside-in" skills. Inside-out skills consist of skills that children acquire which are not context dependent, such as phonological awareness, alphabet knowledge or phoneme-grapheme correspondence. These skills require children to have knowledge of the "rules" of translation from print to auditory and oral production (Whitehurst & Lonigan, 1998). However, children can have good understanding of alphabet knowledge and phonological awareness skills allowing them to read text but lack the ability to extract meaning from what they have read. The ability to extract meaning from text requires what Whitehurst and Lonigan (1998) define as outside-in skills. Outside-in skills are context dependent and require children to use knowledge outside the printed letters in text to understand the meaning. Such knowledge would include children's oral language (e.g., vocabulary), syntactic and semantic knowledge, narrative comprehension, and conceptual knowledge. Both inside-out and outside-in skills are necessary for children's future success with reading.

However, phonological awareness is the focus in the current study as it is considered to be a foundational skill necessary for future success with decoding (Ehri et al., 2001; Lonigan et. al., 1999; Savage et al., 2005). In addition, phonological awareness at age 5 has been found to predict later math and science outcomes at age 11 when decoding, letter-sound knowledge, and early reading skills are controlled (Savage, Carless, & Ferraro, 2007). Thus, variation in children's phonological awareness skills may provide explanatory insights into children's academic achievement in a number of subject domains that are dependent on reading skills.

Social Behavioral Competence and Emergent Literacy Outcomes

Another important objective for preschool children is the development of social behavioral skills (Ministry of Education, 2006). Social behaviors are defined as the physical and verbal acts that children exhibit while interacting with teachers and peers. It has been suggested that children's early social behavior can impact on learning, specifically on emergent literacy outcomes at the end of Kindergarten and into grade school (e.g., Doctoroff, Greer, & Arnold, 2006). A current theoretical perspective on the relationship between social behavior and emergent literacy posits that negative social behaviors can lead directly to impaired literacy achievement through a reduction in children's attention and motivation (Miles & Stipek, 2006). Further, when a teacher needs to interrupt teaching moments to address behavioral concerns, there is a shift in focus and the learning moment may be disrupted.

Moreover, children who are continually engaging in negative social behaviors are often less accepted by their peers. Poor peer acceptance has also been found to impact on engagement in classroom activities and learning (Buhs & Ladd, 2001; Ladd, Herald-Brown, & Reiser, 2008). For example, Buhs and Ladd (2001) measured the relationship between peer rejection and academic motivation in a sample of 399 kindergartens across the year. The results suggested that kindergarten children who were rejected and mistreated by the peer group were more likely to show decreases in classroom participation, performed worse on measures of academic achievement, and had higher levels of desire to avoid school entirely. Thus, engagement in

negative social behaviors and being rejected by the peer group may impact adversely on academic engagement and learning outcomes.

Additionally, high engagement in positive social behaviors (i.e., prosocial) may result in better acquisition and consolidation of phonological awareness skills over time. For example, a significant positive relationship has been found to exist between prosocial behaviors (e.g., helping a peer) and reading achievement in Kindergarten to Grade 3 (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Miles & Stipek, 2006). This positive impact of prosocial behavior on children's literacy skills may be due to the finding that children who are socially skilled receive more positive feedback and reinforcement from teachers during learning activities (Miles & Stipek, 2006). This may in turn increase their motivation to excel in academic tasks. However, there is a paucity of studies that have examined the relationship between prosocial behaviors and emergent literacy outcomes in very early childhood (Miles & Stipek, 2006). Therefore the aim of the current study is to examine the extent to which both negative and positive social behaviors impact the acquisition of phonological awareness skills in preschool children across the academic year.

Emergent Literacy and Children's Social Behavioral Competencies

Conversely, previous studies have found longitudinal relationships between low literacy achievement in Kindergarten and grade 1 to predict higher rates of engagement in negative social behaviors up to six years later (Bennett, Brown, Boyle, Racine, & Offord, 2003; Hinshaw, 1992; Jorm, Share, Matthews, & Maclean, 1986; McGee, Williams, Share, Anderson, & Silva, 1986; Miles & Stipek, 2006; Romano, Babchishin, Pagani, & Kohen, 2010). While the majority of these studies did not find a significant negative relationship between low literacy and negative social behaviors to exist as early as Kindergarten, one study did reveal a significant negative relationship (Bennett et al., 2003).

Theoretically, children who struggle with emergent literacy skills may become frustrated in the classroom context and resort to negative social behaviors such as aggression. Further, these children may withdraw from classroom activities, may internalize feelings of inadequacy, or may become disengaged,

inattentive and easily distractible during learning moments (Hagan-Burke et al., 2011). A plausible explanation for the limited findings between poor literacy and negative behaviors in Kindergarten children likely relates to the fact that most children in Kindergarten are not yet reading. Thus, there would be minimal variability in children's reading ability resulting in the need for extremely large sample sizes to detect any significant relationship. Therefore, the current study focuses on the relationship between social behaviors at the beginning of the year and the impact upon phonological awareness outcomes at the end of the year.

Methodological Differences in the Current Literature

Although previous studies posit a relationship between social behavior and literacy attainment in Kindergarten through Grade 5 (e.g., Lonigan et al., 1999; Bulotsky-Shearer & Fantuzzo, 2010; Doctoroff et al., 2006; Miles & Stipek, 2006; Trzesniewski, Moffitt, Caspi, Taylor, Maughan, 2006), the strength of the relationship varies across studies. This variation may be the result of methodological differences. These methodological differences include a) the limited scope of social behaviors assessed, b) the measures used to assess literacy outcomes (i.e., composite scores of oral language measures such as vocabulary and literacy skills), and c) lack of control of extraneous variables (i.e., cognition and children's baseline skills).

First, many studies have focused specifically upon the relationship between aggression and emergent literacy acquisition (Jorm et al., 1986; McGee et al., 1986; Miles & Stipek, 2006; Trzesniewski, Moffitt, Caspi, Taylor, & Maughan, 2006). However, in non-clinical samples aggressive behaviors often peak around the age of three and start to decline by the age of four to five (Alink et al., 2006; Tremblay, Gervais, & Petitclerc, 2008) when children begin their formal entry into school. Thus, it is important to increase the scope of social behaviors examined as aggressive behaviors may not be as prevalent in samples of 4-5-year old children such as in the current study. Further, increasing target social behaviors would provide a more comprehensive understanding of the social behaviors that contribute to emergent literacy outcomes in young children.

The current study extends past research by examining multiple social behavioral outcomes (i.e., externalizing, internalizing, and social competence). Externalizing behaviors include *Aggressive with Peers*

(e.g., hitting, kicking) and *Hyperactive/Distractible* (e.g., squirmy and fidgety, can't sit still). Internalizing behaviors include *Asocial with Peers* (e.g., solitary child) and *Anxious/Fearful* (e.g., cries easily). Social competence is measured in the current study as being *Prosocial with Peers* (e.g., helping a peer). Finally, *Excluded by Peers* (e.g., not chosen as playmate) was also examined. While exclusion by peers is not an internal action of the child such as being asocial with peers, it does reflect social-behavioral competencies as excluded children typically engage in prior negative social behaviors that lead to the subsequent rejection from the peer group.

These social behaviors were selected because the impact of internalizing and externalizing social behaviors in addition to social competence in relation to emergent literacy outcomes is under studied in 4-year olds. Further, the occurrence of these social behaviors in preschool children is likely to be observed (Bongers, Koot, van der Ende, & Verhulst, 2003; Doctoroff et al., 2006; Tremblay et al., 2008). Finally, previous studies have suggested that externalizing social behaviors (e.g., Dodge, Pettit, & Bates, 1994) and internalizing social behaviors (e.g., Kohen, Oliver, & Pierre, 2009) may be more prevalent in children from lower SES families such as in the current study.

A second challenge to interpreting the existing literature is how emergent literacy outcomes are defined. Composite scores of emergent literacy and oral language (e.g., expressive and receptive vocabulary) have been commonly employed as the emergent literacy outcome in several studies (e.g., Bulotsky-Shearer & Fantuzzo, 2010; Doctoroff et al., 2006; Miles & Stipek, 2008). The results of these studies indicate that a negative relationship exists between emergent literacy and aggression. While the inclusion of particular oral language skills such as vocabulary is theoretically motivated by the formal definition of emergent literacy by Whitehurst and Lonigan (1998), the inclusion of vocabulary adds a level of complexity to interpreting the relationship. For example, Dionne et al., (2003) and Estrem (2005) found a negative relationship between social behaviors (i.e., aggression) and expressive vocabulary. This raises the possibility that the relationship between social behavior and the broad definition of emergent literacy may be partially dependent on children's vocabulary skills. Thus, it remains unclear whether the relationship between social behavior and

emergent literacy would be robust if the emergent literacy measure focused on phonological awareness, a skill that is learned in preschool and most closely linked to decoding. The current study addresses this issue by entering children's expressive vocabulary scores into the regression analysis separately and predicting phonological awareness skills specifically.

A final limitation in the interpretation of previous studies is the lack of control of potentially confounding variables (e.g., cognition and baseline skills). The absence of cognitive measures makes findings challenging to interpret because the results may more accurately reflect a relationship between low cognition and emergent literacy outcomes. For example, cognition has been shown to contribute up to 17% of the child-level variance in predicting future literacy outcomes (e.g., Bulotsky-Shearer & Fantuzzo, 2010). Additionally, the absence of control of children's baseline skills in previous studies limits the ability to draw causal inferences and may overestimate the variance between predictor and outcome. These limitations were addressed in the current study by including (a) a measure of children's non-verbal IQ at Time 1 (i.e., fall of the academic year) and (b) children's baseline skills. In the current study a measure of non-verbal IQ was selected in an attempt to partial out any residual language ability that is captured in measures of overall cognition.

Objectives of the Current Study

The purpose of the current study was to determine if a relationship exists between social behaviors and phonological awareness outcomes in children as young as 4-years of age after controlling for initial phonological awareness skills, expressive vocabulary, and cognition. There is some support for the existence of a relationship between social behavior and emergent literacy in early childhood (Doctoroff et al., 2006; Miles & Stipek, 2006) however none of the existing studies have looked exclusively at phonological awareness skills. It is hypothesized that a relationship between social behavior and phonological awareness skills will be present as early as 4-years of age. Since phonological awareness skills are a core focus of preschool programs, it is believed that children's social behaviors in the classroom will affect the acquisition

of these skills. Further, it is predicted that social behaviors will contribute unique variance towards phonological awareness outcomes over and above the variance contributed by baseline skills, expressive vocabulary, and cognition.

Methods

Design

The current study is a within-subjects longitudinal correlational design (pretest-posttest). The pretest was conducted during the fall of the academic year, approximately 4 weeks after the academic year commenced. The posttest was conducted during the spring of the same academic year. The study took place in 11 elementary schools located in the North, East, South and West quadrants of a large metropolitan city that were located in low-income neighborhoods.

Recruitment

To qualify for inclusion in the current study, all schools had to hold half-day preschool programs and be taking part in the Model School for Inner Cities Initiative. The Model School for Inner Cities Initiative provides schools in impoverished communities additional funding to create support services for children and their families (e.g., hearing and vision screening, nutrition programs, after school programs, and parent workshops). Inclusion in the Model School for Inner Cities Initiative changes annually depending on fluctuation of the neighborhood income (e.g., increased neighborhood income resulting from new housing projects) therefore the first step of recruitment was to identify which schools were part of this initiative in 2010-11. Review of the Toronto District School Board website revealed a list of 19 schools meeting eligibility criteria.

Contact via telephone commenced with the principals of these schools based on random selection. All schools were randomly assigned a number and the invitation to participate began with schools assigned the lowest number. A total of 10 of 15 principals who were contacted agreed to participate in the current study. Reasons given for the schools that declined participation included (a) a high proportion of families who did not speak English, (b) involvement in other research initiatives, and (c) switched to the full day preschool

program and no longer met the inclusion criteria. Additionally, one principal of the Model Schools for Inner Cities in the East quadrant heard about the research project from a neighboring recruited school and expressed interest in participating. Thus, a total of 11 Model Schools for Inner Cities participated. All preschool teachers from these 11 schools were recruited for a total of 23 teachers. There were 9 teachers who contributed two classes (both their morning and afternoon classes), which resulted in a total of 32 preschool classes that participated.

All teachers assisted with recruitment of children and completed two questionnaires (i.e., a demographic form and the *Child Behavior Scale* (Ladd & Profilet, 1996). Teachers distributed consent forms and demographic questionnaires to all parents of children in their classrooms. The demographic questionnaire asked about child and family background information (e.g., parental education, languages spoken, history of speech-language-hearing problems). A total of 347 consent forms were distributed and 103 parental consents were returned, yielding a 30% return rate. The sole eligibility criteria for children recruited to participate was that they score within 1.5 standard deviations of the mean on the pretest measure of non-verbal IQ [i.e., the *Columbia Mental Maturity Scale*, (Burgemeister, Blum, & Lorge, 1972)]. Only one child of the 103 children with returned signed consent did not meet eligibility criteria resulting in a final sample of 102 children.

Participants

Teachers: Of the 23 participating teachers, 19 were female and four were male. Teachers ranged in age from 25-59 years with a mean age of 36.5 years. The primary language spoken for all teachers was English. Their years of post secondary education ranged from three to nine years and all teachers with the exception of two had completed a bachelor's degree in education. Their years of experience teaching preschool ranged from one to 21 years with a mean of five years.

Children: The characteristics of the 102 children are summarized in Table 1. Of the participating children, 27% identified by parents as White, 21% as Black, 42% as Asian, 4% as Latino, and 6% as Mixed. A one-way analysis of variance was conducted to test whether there would be any significant differences

between subjects based on ethnicity with phonological awareness outcomes as the dependent variable. The results of the one-way ANOVA revealed no significant differences $F(4,96) = 1.20, p = .32$. Fifty-two children were male (51%) and 50 were female. Twenty four percent of children were reported as also enrolled in childcare. Thus, approximately one third of children were exposed to an additional half day of childcare as compared to homecare. All children were typically developing as reported by parents on the demographic questionnaire. However, in the case of 12 children, the demographic forms sent home were not returned resulting in missing data for these children. However, the nonverbal IQs of these 12 children were within the normal range. Seven children scored below 1.5 standard deviations from the mean on the measure of expressive vocabulary falling into the low range. Inspection of demographic forms revealed that all seven children were exposed to another language in the home. Further, children's scores on the Columbia Mental Maturity Scale (a measure of non-verbal IQ) revealed that all children in the current sample fell within the average range. Reported maternal education ranged from elementary school to a graduate degree with the majority of mothers having completed some college courses. Median neighborhood income ranged from \$12, 401- \$28, 953 (Statistics Canada, 2011).

Procedure

Pretest assessments, conducted in the fall semester, took a total of six weeks to complete. The children were assessed individually in a quiet room outside the classroom. Assessment time varied between 30-60 minutes depending on the skill level of the child. The pretest assessments consisted of four measures, which included *The Expressive One-Word Picture Vocabulary Test* (Brownell, 2000), the *Wide Range Achievement Test-Early Reading Assessment* (Robertson, 2003), the *Comprehensive Test of Phonological Processing* (Wagner, Torgesen & Rashotte, 1999), and the *Columbia Mental Maturity Scale* (Burgemeister, Blum, & Lorge, 1972). Additionally, teachers completed the *Child Behavior Scale* (Ladd, 2010) for all children in the study at pretest and these scales were collected during the six week pretest assessment period following completion of testing of each child in a given classroom.

Posttest assessments were conducted at that end of the academic year (May) and were completed within a five week period. The assessment time was 20-30 minutes dependent on the skill level of the child and consisted of the *Wide Range Achievement Test- Early Reading Assessment* (Robertson, 2003) first followed by the *Comprehensive Test of Phonological Processing* (Wagner, Torgesen & Rashotte, 1999). The assessments occurred in the same order as the pretest to ensure a five month period between pretest and posttest assessments for each child.

Measures

The Wide Range Achievement Test-Early Reading Assessment (WRAT-ERA) (Robertson, 2003). The WRAT-ERA is a standardized norm-referenced achievement test for children ages 4.6-7.11 (Robertson, 2003). Only the *Letter/Sound Discrimination* subtest was administered to children at pretest and posttest. This subtest requires children to identify beginning and ending consonant sounds (i.e., single, blended, and diagraphs). Cronbach's alpha for this subtest is reported in the test manual as .83 (Robertson, 2003). Demographic characteristics of this sample included 41% of children whose parents had a high school education or less.

The Comprehensive Test of Phonological Processing (CTOPP). The CTOPP is a standardized measure that is normed for ages 5:0-6:11 (Wagner, Torgesen & Rashotte, 1999). Only three subtests were administered at pretest and posttest (i.e., *Elision*, *Blending Words*, and *Sound Matching*). These subtests require the children to recognize compound words, syllables within words, onset and rimes, combine different sounds to form words and finally to match the initial and ending sounds of target words with other words. The test manual reports Cronbach's alpha for the Elision subtest as .90, Blending Words as .88, and Sound Matching as .93 (Wagner, Torgesen, & Rashotte, 1999). Demographics characteristics of this sample include 28% of children from low SES backgrounds.

The Expressive One-Word Picture Vocabulary Test (EOWPVT) (Brownell, 2000). The EOWPVT was administered at pretest to assess the child's proficiency level in English vocabulary. The EOWPVT is a standardized measure that is normed for children ages 2-18 (Brownell, 2000). It consists of 170 pictures that

depict concepts, objects and actions that the child must label. Cronbach's alpha is reported in the test manual as .96 for 4 year olds (Morrison, 2000). Demographic characteristics of this sample included 32% of children whose parents had a high school education or less.

The Columbia Mental Maturity Scale (Burgemeister, Blum, & Lorge, 1972). The Columbia Mental Maturity Scale was administered as a measure of non-verbal IQ at pretest only. The CMMS is a standardized measure of general reasoning ability and is normed for children ages 3.6- 9.11. Cronbach's alpha is reported in the test manual as .86 for 4 year olds (Burgemeister, Blum, & Lorge, 1972). Demographics characteristics of this sample include 22% of children from low SES backgrounds.

The *Child Behavior Scale* (Ladd & Profilet, 1996). The CBS was completed by the teachers at pretest for all children enrolled in the study. This measure is a teacher report of children's social behavior in the classroom. It is comprised of 59 items and six subtests, which include a) *Aggressive with Peers*, b) *Hyperactive/Distractible*, c) *Asocial with Peers*, d) *Anxious-Fearful*, e) *Prosocial with Peers*, and f) *Excluded by Peers*. Behaviors were rated on a 3-point Likert scale ranging from 1 ("doesn't apply") to 3 ("certainly applies"). Cronbach's alpha ranges in the test manual from .77- .96. In the current sample Cronbach's alpha is reported as .87 for *Aggressive with Peers*, .89 for *Hyperactive/Distractible*, .89 for *Asocial with peers*, .71 for *Anxious/Fearful*, .82 for *Prosocial with Peers*, and .89 for *Excluded by Peers*.

Results

The results are presented in four sections: (a) factor analysis of the phonological awareness measures to ensure that they measured the same construct, (b) classroom comparisons on phonological awareness outcomes, (c) correlations between social behaviors and phonological awareness to determine whether relationships existed among the measures of interest and (d) multiple regression analyses to determine the degree to which social behaviors contributed unique variance to phonological awareness outcomes. All analyses conducted were two-tailed with an alpha set at .05. The distributional properties of all variables were first examined to ensure that all variables were normally distributed. Inspection of the behavioral scales revealed a positive skew for all six social behaviors measured. Thus, log transformations were conducted on

all behavioral measures to correct for the positive skew and to ensure the assumption of normality was not violated during analyses.

To ensure that the four subtests (i.e., *WRAT-ERA Letter/Sound Discrimination* subtest and the *CTOPP Elision, Blending Words, Sound Matching* subtests), were measuring one distinct construct (i.e., phonological awareness), the dimensionality of these subtests was submitted to a principal components factor analysis. Only one factor was extracted from the principal components analysis confirming our hypothesis that all four subtests loaded on the same factor accounting for 56.5% of the variable variance. A factor rotation was not conducted as only one factor was extracted. A composite score of phonological awareness was computed for each child by calculating z-scores for these four subtests and averaging them.

As a result of sampling children from 23 different classrooms across 11 schools located in all four quadrants of the metropolitan Toronto area, the next step in the analysis was to conduct a one-way analysis of variance between subjects with phonological awareness outcomes as the dependent variable and classroom as the fixed factor to determine whether hierarchical linear modeling or hierarchical regression analysis would be most appropriate. Results of the one-way between subjects ANOVA revealed no significant differences between classrooms $F(1,22) = 1.10, p = .39$ suggesting no shared variance that needed to be controlled for and rendering the use of hierarchical linear modeling inappropriate in the current study. Thus, hierarchical regression analyses were employed.

The main question of this study asked whether there was a significant relationship between social behaviors and phonological awareness outcomes in preschool children. The descriptive statistics for the six subtests of the *Child Behavior Scale* and all four measures of phonological awareness are presented in Tables 2 and 3. As a first step, a series of bivariate correlations were conducted among the 6 subtests of the *Child Behavior Scale* at pretest and the composite measure of phonological awareness at posttest. An inspection of the data in Table 4 reveals that four of the six correlations were statistically significant. These correlations remained significant after using the Bonferroni-Holms approach to control for Type 1 errors. All effect sizes were small to medium according to Green & Salkind (2008). No significant relationship was found between

Asocial with Peers and phonological awareness outcomes or *Anxious/Fearful* behavior and phonological awareness outcomes. Thus, these two subscales were excluded from all subsequent analyses. All significant correlations were in the expected direction, that is, negative social behaviors were related to poorer phonological awareness outcomes and positive social behaviors were related to higher scores in phonological awareness.

In the second step, a series of partial correlations were conducted on the four subtests of the *Child Behavior Scale* and phonological awareness while controlling for expressive vocabulary and non-verbal IQ. The results of these partial correlations are presented in Table 5. The results revealed that the correlations between phonological awareness outcomes and *Aggressive with Peers*, *Hyperactive/Distractible*, and *Excluded by Peers* were still significant after partialling out the variance contributed by expressive vocabulary and non-verbal IQ. The effect sizes of the partial correlations remained small to medium (Green & Salkind, 2008). In contrast, the significant relationship found between *Prosocial with Peers* and phonological awareness was no longer significant after controlling for expressive vocabulary and non-verbal IQ. Thus, *Prosocial with Peers* was dropped from the regression model.

In the final step, a hierarchical multiple regression analysis was conducted to predict phonological awareness outcomes at posttest using phonological awareness at pretest (Step 1), expressive vocabulary (Step 2), and non-verbal IQ (Step 3) as control factors, *Hyperactive* behaviors (Step 4), *Aggressive* behaviors (Step 5), and *Excluded by Peers* (Step 6) as the predictor variables. The results of the multiple regression analysis are displayed in Table 6. The results indicated that phonological awareness skills at pretest accounted for a significant amount of unique variance towards phonological awareness outcomes at the end of the year (i.e., 53%). This is a large effect size (Green & Salkind, 2008). Second, expressive vocabulary accounted for a significant amount of variance in phonological awareness outcomes (i.e., 2%) however the beta weight was not significant indicating shared variance with children's initial phonological awareness skills. This is a small effect size (Green & Salkind, 2008). Third, non-verbal IQ did not significantly contribute variance in phonological awareness outcomes in the current model. Fourth, *Hyperactive/Distractible* behaviors

accounted for a significant amount of variance in phonological awareness outcomes (i.e., 2%) however the beta weight was not significant indicating shared variance. This is a small effect size (Green & Salkind, 2008). Fifth, *Aggressive with Peers* did not significantly contribute to phonological awareness outcomes in the current model. Finally, *Excluded by Peers* accounted for a significant amount of unique variance in phonological awareness outcomes (i.e., 3%), which is a small effect size (Green & Salkind, 2008). These results suggest that children who are excluded by the peer group upon entry to Preschool perform more poorly on measures of phonological awareness at the end of the year. A post hoc power analysis for multiple regressions was conducted. With six predictors, an observed R^2 of .62, probability level of .05 and a sample size of 102, results revealed an observed statistical power of 1.0.

Discussion

The current study adds to the growing body of research looking at the relationship between social behaviors and emergent literacy by looking at phonological awareness outcomes exclusively while partialling out the effects of initial phonological awareness skills, expressive vocabulary and non-verbal IQ. In addition, this study extends the existing research by examining multiple social behaviors in addition to the commonly focused upon aggressive behaviors. While the results suggested that expressive vocabulary contributed shared and not unique variance to the relationship between social behaviors and phonological awareness outcomes, these results also support the contention that it is important to include expressive vocabulary as a control variable in future studies looking at the impact of social behaviors on phonological awareness. Of interest, in the current study, non-verbal IQ did not significantly account for any variance (shared or unique) in the relationship between social behaviors and phonological awareness. Perhaps using measures of general cognition or social-cognitive assessments such as looking at emotional regulation or rather than non-verbal IQ may yield different results. For example, children who are unable to self-regulate may engage in high levels of aggression, hyperactivity, and may be more inattentive and this may reflect mediation better than non-verbal IQ.

Previous studies have supported negative relationships between problematic social behaviors such as aggression and hyperactivity and emergent literacy outcomes (Doctoroff et al., 2006; Lonigan et al., 1999; Miles & Stipek, 2006), and peer exclusion and academic outcomes (Buhs & Ladd, 2001; Ladd et al., 2008). However this study is the first study to show a significant negative relationship with phonological awareness outcomes specifically. Moreover, the findings of the current study revealed that exclusion by peers can act as a risk factor in the acquisition of phonological awareness for children as early as preschool. The negative impact of exclusion by peers on children's academic outcomes is not surprising given that learning often occurs in whole group or small group activity centers in preschool classes. When children experience marginalization from classmates, there is an increased risk of reduced motivation to participate in group activities such as learning centers (Buhs & Ladd, 2001). Reduced motivation to participate increases the likelihood that these children will miss out on the academic skills being taught, such as phonological awareness. It is also possible that children who are excluded may withdraw from active engagement during lessons for fear of further exclusion.

While the results are consistent with previous studies that have found a negative relationship between peer rejection and academic outcomes (Buhs & Ladd, 2001; Ladd et al., 2008), a significant negative relationship was not found between externalizing behaviors such as aggression or hyperactivity and emergent literacy skills which is contrast to other studies (Bulotsky-Shearer & Fantuzzo, 2010; Doctoroff et al., 2006; Lonigan et al., 1999; Miles & Stipek, 2006). However, visual inspection of the data revealed that all children who scored high on the *Excluded by Peers* subscales were also rated by teachers as high on the *Aggressive with Peers* or *Hyperactive/Distractible* subscales. This suggests that rejection by peers encompassed children displaying aggressive and/or hyperactive behaviors. Of interest, previous studies that found a significant negative relationship between problem behaviors and emergent literacy outcomes did not measure exclusion by peers (Bulotsky-Shearer & Fantuzzo, 2010; Doctoroff et al., 2006; Lonigan et al., 1999; Miles & Stipek, 2006). It may then be possible that the relationship between problem behaviors and emergent literacy

outcomes occurs when children are also excluded by the peer group. Replication of this question measuring negative social behaviors in addition to exclusion by peers is warranted using larger samples.

Theoretically, children who struggle with phonological awareness skills in their first year of formal schooling may continue to struggle with phonological awareness and related skills such as decoding and word reading into grade school. Since there is a large focus on social behavioral development in the early years of school, it becomes important to understand how early behaviors, such as exclusion by peers, in a classroom setting may impact upon learning outcomes. This may help in creating additional professional development programs targeting strategies teachers can use to create inclusive classrooms. For example, Girard, Girolametto, Weitzman, and Greenberg (2011) found that in-service training for educators to encourage peer interactions through the use of verbal strategies such as prompting children to talk with peers, inviting peers to play together, alerting peers to common interests or praising children for peer interactions helped to increase preschool children's prosocial behaviors with their peers over time. Increases in children's prosocial behaviors may replace negative behaviors such as aggression towards peers and may consequently reduce the risk of being excluded by peers. This may have positive implications for children's social-behavioral adjustment and academic outcomes in their formal years of schooling.

A few limitations should be noted in interpreting the findings of the current study. First, the sample size of the current study was relatively small. As a result of the small sample size, there was minimal variability in the current data set on teacher rated social behaviors (i.e., low frequencies of reported negative social behaviors). This may have in part accounted for the small effect sizes found. Further, the initially significant positive relationship between prosocial with peers and phonological awareness outcomes may have remained significant had the sample size been larger. Replication of the current study is needed using larger samples to examine whether the effect size of the relationship between negative social behaviors and phonological awareness would increase and whether a positive relationship between prosocial behaviors and phonological awareness would be found. Additionally, the relatively small sample size resulted in a lack of power to conduct gender analysis. Replication of this study looking at the effects of gender should be

conducted as the relationships between social behaviors and phonological awareness outcomes may present differently for boys and girls. For example, Doctoroff et al. (2006) examined gender differences in the relationship between social behavior and emergent literacy outcomes and found a negative association for boys' aggressive misbehaviors and their emergent literacy outcomes whereas aggressive misbehaviors were not associated with emergent literacy outcomes for girls. Thus, replication of this study is warranted using large enough samples to control for the potential effects of gender. Future studies may also want to look at the relationship between social behaviors and phonological awareness outcomes longitudinally in early and middle childhood to see if this relationship is stable across time.

To conclude, the practical implications of the current study would suggest the importance of teachers modeling and emphasizing ways for children to engage in positive peer interactions to create a more inclusive classroom environment for all children. An inclusive classroom environment may help in reducing the likelihood of children being rejected by their peers. In service training programs for teachers that focus on ways to promote and facilitate peer interactions can be beneficial in increasing the use of positive social behaviors while simultaneously reducing negative social behaviors in preschool settings (Girard et al., 2011). Since phonological awareness skills have been found to be a unique predictor of not only future literacy outcomes such as word reading, spelling, and reading comprehension but additionally math and science outcomes (Savage et al., 2007; Savage et al., 2005), early struggles with the acquisition of these skills may place children at greater risk of falling behind in many different academic areas in later grades.

Further, the results suggested that early phonological awareness skills and expressive vocabulary contribute both unique and shared variance in predicting later phonological awareness outcomes. As a result, an early focus in the classroom on these skills is important in helping to prepare children for future success with phonological awareness. A holistic focus on both academic skills in addition to social behavioral competency which is the primary goal of preschool programs is important to the classroom environment.

References

- Alink, L. R. A., Mesman, J., Van Zeijl, J., Stolk, M. N., Juffer, F., Koot, H. M., et al. (2006). The early childhood aggression curve: Development of physical aggression in 10- to 50-month-old children. *Child Development, 77*(4), 954-966.
- Armstrong, M. B., & Nettleton, S. K. (2004). Attention deficit hyperactivity disorder and preschool children. *Seminars in Speech and Language, 25*(3), 225-232.
- Arnold, D. H. (1997). Co-occurrence of externalizing behavior problems and emergent academic difficulties in young high-risk boys: A preliminary evaluation of patterns and mechanisms. *Journal of Applied Developmental Psychology, 18*(3), 317-330.
- Bennett, K. J., Brown, K. S., Boyle, M., Racine, Y., & Offord, D. (2003). Does low reading achievement at school entry cause conduct problems? *Social Science and Medicine, 56*(12), 2443-2448.
- Bongers, I. L., Koot, H. M., van der Ende, J., & Verhulst, F. C. (2003). The normative development of child and adolescent problem behavior. *Journal of Abnormal Psychology, 112*(2), 179-192.
- Brownell, R. (Ed.) (2000). *Expressive One-Word Picture Vocabulary Test- 3rd Edition*. Novato, CA: Academic Therapy Publications.
- Buhs, E. S., & Ladd, G. W. (2001). Peer rejection as an antecedent of young children's school adjustment: An examination of mediating processes. *Developmental Psychology, 37*(4), 550-560.
- Bulotsky-Shearer, R. J., & Fantuzzo, J. W. (2010). Preschool behavior problems in classroom learning situations and literacy outcomes in kindergarten and first grade. *Early Childhood Research Quarterly, In Press, Uncorrected Proof*

- Caprara, G. V., Barbaranelli, C., Pastorelli, C., Bandura, A., & Zimbardo, P. G. (2000). Prosocial foundations of children's academic achievement. *Psychological Science, 11*(4), 302-306.
- Doctoroff, G. L., Greer, J. A., & Arnold, D. H. (2006). The relationship between social behavior and emergent literacy among preschool boys and girls. *Journal of Applied Developmental Psychology, 27*(1), 1-13.
- Dodge, K. A., Pettit, G. S., & Bates, J. E. (1994). Socialization mediators of the relation between socioeconomic status and child conduct problems. *Child Development, 65*(2), 649-665.
- Ehri, L. C., Nunes, S. R., Willows, D. M., Schuster, B. V., Yaghoub-Zadeh, Z., & Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the national reading panels meta-analysis. *Reading Research Quarterly, 36*(3), 250-283.
- Estrem, T. L. (2005). Relational and physical aggression among preschoolers: The effect of language skills and gender. *Early Education and Development, 16*(2), 207-231.
- Fantuzzo, J. W., Bulotsky-Shearer, R., Fusco, R. A., & McWayne, C. (2005). An investigation of preschool classroom behavioral adjustment problems and social-emotional school readiness competencies. *Early Childhood Research Quarterly, 20*(3), 259-275.
- Girard, L., Girolametto, L., Weitzman, E., & Greenberg, J. (2011). Training early childhood educators to promote peer interactions: Effects on children's aggressive and prosocial behaviors. *Early Education and Development, 22*(2), 305-305-323.
- Hagan-Burke, S., Kwok, O., Zou, Y., Johnson, C., Simmons, D., & Coyne, M. (2011). An examination of problem behaviors and reading outcomes in kindergarten students. *The Journal of Special Education, 45*(3), 131-148.

- Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin*, 111(1), 127-155.
- Jorm, A. F., Share, D. L., Matthews, R., & Maclean, R. (1986). Behavior problems in specific reading retarded and general reading backward children: A longitudinal study. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 27(1), 33-43.
- Kohen, D., Oliver, L., & Pierre, F. (2009). Examining the effects of schools and neighborhoods on the outcomes of kindergarten children in Canada. *International Journal of Speech and Language Pathology*, 11(5), 404-418.
- Ladd, G. W., Herald-Brown, S. L., & Reiser, M. (2008). Does chronic classroom peer rejection predict the development of children's classroom participation during the grade school years? *Child Development*, 79(4), 1001-1015.
- Ladd, G. W., & Profilet, S. M. (1996). The child behavior scale: A teacher-report measure of young children's aggressive, withdrawn, and prosocial behaviors. *Developmental Psychology*, 32(6), 1008-1024.
- Lonigan, C. J., Bloomfield, B. G., Anthony, J. L., Bacon, K. D., Phillips, B. M., & Samwel, C. S. (1999). Relations among emergent literacy skills, behavior problems, and social competence in preschool children from low-and middle-income backgrounds. *Topics in Early Childhood Special Education*, 19(1), 40-53.
- Lonigan, C. J., Burgess, S. R., & Anthony, J. L. (2000). Development of emergent literacy and early reading skills in preschool children: Evidence from a latent-variable longitudinal study. *Developmental Psychology*, 36(5), 596-613.

- McGee, R., Williams, S., Share, D. L., Anderson, J., & Silva, P. A. (1986). The relationship between specific reading retardation, general reading backwardness and behavioral problems in a large sample of dunedin boys: A longitudinal study from five to eleven years. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 27(5), 597-610.
- Miles, S. B., & Stipek, D. (2006). Contemporaneous and longitudinal associations between social behavior and literacy achievement in a sample of low-income elementary school children. *Child Development*, 77(1), 103-117.
- Phillips, B. M., Clancy-Menchetti, J., & Lonigan, C. J. (2008). Successful phonological awareness instruction with preschool children: Lessons from the classroom. *Topics in Early Childhood Special Education*, 28(1), 3-17.
- Robertson, G. J. (2003). *Wide Range Achievement Test- Early Reading Assessment*. Psychological Assessment Resources, Inc, Florida.
- Romano, E., Babchishin, L., Pagani, L. S., & Kohen, D. (2010). School readiness and later achievement: Replication and extension using a nationwide canadian survey. *Developmental Psychology*, 46(5), 995-1007.
- Savage, R., Carless, S., & Ferraro, V. (2007). Predicting curriculum and test performance at age 11 years from pupil background, baseline skills and phonological awareness at age 5 years. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 48(7), 732-739.
- Savage, R., Frederickson, N., Goodwin, R., Patni, U., Smith, N., & Tiersley, L. (2005). Relationships among rapid digit naming, phonological awareness, motor automaticity, and speech perception in poor, average, and good readers and spellers. *Journal of Learning Disabilities*, 38(1), 12-28.

Tremblay, R., Gervais, J., & Petitcherc, A. (2008). *Early childhood learning prevents youth violence*.

Montreal, QC: Centre of Excellence for Early Childhood Development.

Trzesniewski, K. H., Moffitt, T. E., Caspi, A., Taylor, A., & Maughan, B. (2006). Revisiting the association between reading achievement and antisocial behavior: New evidence of an environmental explanation from a twin study. *Child Development*, 77(1), 72-88.

Wagner, R. K., Torgesen, J. K., Rashotte, C. A. (1999). *Comprehensive Test of Phonological Processing*. Austin, TX: PRO-ED.

Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development*, 69(3), 848-872.

Zucker, T. A., Justice, L. M., & Piasta, S. B. (2009). Prekindergarten teachers' verbal references to print during classroom-based, large-group shared reading. *Language, Speech, and Hearing Services in Schools*, 40(4), 376-392.

Table 1
Demographic Characteristics of the Children

Variable		Children (<i>N</i> = 102)
Sex	Male	52
	Female	50
Age at Pretest ¹	Mean (<i>SD</i>)	51.6 (3.4)
	Min-Max	44-58
Age at Posttest ¹	Mean (<i>SD</i>)	57.8 (3.2)
	Min-Max	52-64
Expressive Vocabulary ²	Mean (<i>SD</i>)	95.9 (13.7)
	Min-Max	55-128
Non-verbal IQ ³	Mean (<i>SD</i>)	106.7 (12.6)
	Min-Max	80-137

¹ Children's age in months. ² Raw scores are presented for the *Expressive One Word Picture Vocabulary Test* (Brownell, 2000). ³ Age deviation scores are presented for the *Columbia Mental Maturity Scale* (Burgemeister, Blum, & Lorge, 1972).

Table 2
Descriptive Statistics of the Child Behavior Scale at Pretest

Variable		Pretest (<i>N</i> = 102)
Aggressive with Peers		
	Median	1.2
	Min-Max	1.2-2.8
Hyperactive/Distractible		
	Median	1.5
	Min-Max	1.0-3.0
Asocial with Peers		
	Median	1.7
	Min-Max	1.0-3.0
Anxious/Fearful		
	Median	1.0
	Min-Max	1.0-2.5
Prosocial with Peers		
	Median	2.0
	Min-Max	1.1-3.0
Excluded by Peers		
	M (<i>SD</i>)	1.0
	Min-Max	1.0-2.1

*Note: Behaviours are reported on the *Child Behavior Scale* range from 1 "doesn't apply" to 3 "certainly applies".

Table 3

Descriptive Statistics of Phonological Awareness Subtests

Variable		Pretest N= 102	Posttest N = 95
WRAT-ERA Letter/Sound Discrimination Subtest ¹	Mean (SD)	3.9 (4.3)	7.5 (5.6)
	Min-Max	0-18	0-22
CTOPP Elision ²	Mean (SD)	0.7 (1.2)	1.7 (2.0)
	Min-Max	0-6	0-8
CTOPP Blending Words ²	Mean (SD)	2.3. (2.2)	3.7 (2.8)
	Min-Max	0-10	0-13
CTOPP Sound Matching ²	Mean (SD)	3.2 (2.7)	4.6 (3.2)
	Min-Max	0-11	1-12

Note: Raw scores are reported for all subtests. ¹ There are a total of 25 items on this subtest of the *Wide Range Achievement Test-Early Reading Assessment* (Robertson, 2003) ² There are a total of 20 items on these subtests of the *Comprehensive Test of Phonological Processing* (Wagner, Torgesen & Rashotte, 1999).

Table 4

Zero-Order Correlations among Social Behaviors and Phonological Awareness Outcomes

Variables	Phonological Awareness Composite Scores (Posttest)
Phonological Awareness (Posttest)	—
CBS Aggressive with Peers (Pretest)	$r = -.262^*$ $p = .014$
CBS Hyperactive/Distractible (Pretest)	$r = -.398^{**}$ $p = .000$
CBS Asocial with Peers (Pretest)	$r = -.151$ $p = .162$
CBS Anxious/Fearful (Pretest)	$r = -.134$ $p = .214$
CBS Prosocial with Peers (Pretest)	$r = .264^*$ $p = .013$
CBS Excluded by Peers (Pretest)	$r = -.312^*$ $p = .003$

*Note: Composite scores for phonological awareness outcomes were calculated by combining the *Letter/Sound Discrimination* subtest from the *Wide Range Achievement Test-Early Reading Assessment (WRAT-ERA)*, Robertson, 2003) and the *Elision*, *Blending Words* and *Sound Matching* subtests from the *Comprehensive Test of Phonological Processing (CTOPP)*, Wagner, Torgesen & Rashotte, 1999) and averaging them. ** p value < 0.01 level (2-tailed). * p value 0.05 level (2-tailed).

Table 5

Partial Correlations among Social Behaviors and Phonological Awareness Outcomes Controlling for Expressive Vocabulary and Non-Verbal IQ

Variables	Phonological Awareness Composite Scores (Posttest)
Phonological Awareness (Posttest)	—
CBS Aggressive with Peers (Pretest)	$r = -.284^{**}$ $p = .008$
CBS Hyperactive/Distractible (Pretest)	$r = -.317^{**}$ $p = .003$
CBS Prosocial with Peers (Pretest)	$r = .153$ $p = .159$
CBS Excluded by Peers (Pretest)	$r = -.264$ $p = .014^{*}$

** p value < 0.01 level (2-tailed). * p value < 0.05 level (2-tailed).

Table 6
Hierarchical Regression Analyses on Social Behavior and Phonological Awareness

Step and Predictor	Phonological Awareness Outcomes (Posttest)				
	General Model Summary				
	R ²	ΔR ²	ΔF	SE B	β
Step 1 Phonological Awareness (Pretest)	.53	.53**	113.11	.64	.67**
Step 2 Expressive Vocabulary (Pretest)	.55	.02*	4.26	.06	.00
Step 3 Cognition (Pretest)	.56	.01	1.42	.14	.01
Step 4 Hyperactive/Distractible (Pretest)	.58	.02*	5.24	.01	.01
Step 5 Aggressive with Peers (Pretest)	.59	.01	1.24	-.04	-.12
Step 6 Excluded by Peers (Pretest)	.62	.03**	7.69	-.23	-.70*

** p value < 0.01 level (2-tailed). * p value < 0.05 level (2-tailed).