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# Using latent-class analysis to examine the influence of kindergarten children's perspectives of school on literacy and self-regulation outcomes

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#### ABSTRACT

In this study, we explored the influence of kindergarten children's perspectives of school on their literacy and self-regulation outcomes. Children's early perspectives were captured in a three-guestion, fingerpuppet interview. Responses to the interview questions were coded thematically as being academic and/or social in nature, and were analysed using latent-class analysis. Once children's responses were characterized into classes, further analyses were conducted to understand the application of these perspectives to direct assessments of early reading and writing and self-regulation abilities. Children with less clear perspectives, who mixed academic and social responses, had the lowest performance on all academic measures. Findings add to the existing literature while offering an innovative analytic strategy for perspectives examining relationships between children's and kindergarten outcomes.

#### ARTICLE HISTORY

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#### **KEYWORDS**

Children's perspectives; child interviews; kindergarten perspectives; latent-class analysis

# Introduction

This paper reports on kindergarten children's perspectives of school and the influence of these perspectives on early literacy and self-regulation outcomes. Children's perspectives were captured in a finger-puppet interview designed to understand what children enjoy most about kindergarten (their favourite things), what they think is important about kindergarten and their perspectives of what their teachers do. The importance of capturing children's perspectives continues to be featured in international research in early learning (Di Santo & Berman, 2012; Dockett & Perry, 2001, 2005, 2007a, 2007b; Duncan et al., 2007; Isaacs & Magnuson, 2011); however, there is limited research exploring how these early perspectives may influence academic outcomes using direct assessments. This paper captures children's early perspectives to these interview questions and organizes children's responses to the open-ended interview questions using latent-class analysis (LCA). Once children's responses were characterized into classes, further analyses were conducted to understand how these perspectives related to direct assessments of early reading and writing and self-regulation abilities. Results highlight the importance and validity of young children's perspectives of school, and the ways in which these perspectives are reflected in learning outcomes.

# **Children's perspectives of school**

Research exploring children's perspectives in relation to their school experiences often focuses on children's expectations of themselves as learners through the lens of expectancy-value theory,

self-efficacy theory and self-concept. According to expectancy-value theory (Eccles et al., 1983; Eccles & Wigfield, 2002), expectations about success are a critical component influencing achievementrelated outcomes which are assumed to be influenced by perceptions of competence and goals held by individuals. Specifically, individuals' expectations of their own previous achievements are influenced by their perceptions and goals. For example, individuals' expectations of success or achievement are influenced by their achievements, while at the same time their achievements are further influenced by their future expectations, thus demonstrating a cyclical influence (Liu, Cheng, Chen, & Wu, 2009). This is particularly relevant when thinking about students' educational self-expectations. In keeping with the feedback mechanism of the expectancy-value perspective, adolescents are expected to have enhanced long-term academic outcomes when they have higher educational expectations for themselves during earlier periods (Liu et al., 2009). That is, through the feedback mechanisms operating over time, educational expectations influence current and future academic outcomes.

Similar to the expectancy-value theory, the self-efficacy theory centres on an individual's beliefs about his/her abilities (Bandura, 1986). Self-efficacy beliefs influence how people think, feel and behave (Bandura, 1993). Individuals' beliefs in their own capabilities are central to their actions. For example, if people feel as if they cannot produce desired effects by their actions, they have little motivation to act (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996). Bandura et al. (1996) used the self-efficacy theory to explore the influence of self-efficacy on children's academic achievement. Similarly, Henk and Melnick (1995) used this theory to understand how individuals perceive themselves as readers. Their work suggests the relationship between individuals' perspectives, in this case as readers, and whether they would actively choose to read or to avoid reading. Findings from such studies have demonstrated the relation between children's perceived competence in a particular area as well as their achievement. Ladd and Price's (1986) study of 114 children aged 8–11 demonstrated a 0.43 correlation between children's perceived competence in reading and their actual reading achievement. Similarly, Grolnick and Slowiaczek's (1994) study demonstrated a relation between 11- and 14-year-old children's beliefs about themselves and actual school success.

Another study investigated the relation among gender, children's self-perspectives of reading and their actual reading achievement (Lynch, 2002). Findings revealed that children's perspectives of reading were related to their overall reading achievement. This study adds value to the self-efficacy literature in that it highlights the importance of young children's perspectives of previous reading performance in relation to their current reading achievement levels.

Clark and De Zoysa (2011) found that reading perspectives are related to attainment both directly and indirectly through its relationship with reading behaviour. This was the first study that explored the interrelationships between these variables in detail. McCabe and Margolis (2001) research on domain-specific self-perspectives focused specifically on student's self-perspectives of reading competence as an essential variable within overall self-perspectives of school competence. Twist, Schagen, and Hodgson (2007) research with 10-year-old students demonstrated that children at the high level of positive attitudes towards reading had higher reading achievement scores than those at the medium and low levels. Furthermore, a 2010 meta-analysis demonstrated that the strength of the relationship between attitudes and attainment is stronger for primary children compared with older students (Petscher, 2010).

Correlational analyses have been used to explore children's self-perspectives and outcomes as measured by mandated achievement tests in the elementary years. In a 2011 study 336 fourth and sixth grade students' self-perspectives were correlated with their performance on state-mandated achievements tests (Pershey, 2011). Results demonstrate that higher self-perspectives of ability and confidence are correlated with higher test scores, whereas lower self-perspectives are correlated with lower test scores. A consistent trend over the years demonstrates that children with lower scores hold more negative attitudes towards reading compared with their higher performing peers (Ofsted, 2004; Sturman & Twist, 2004; Twist et al., 2007).

As in the literature on self-efficacy, research on self-concept has attempted to explain why students with differing self-concepts have varying experiences and difficulty in school (Black, 1991; Guay, Marsh, & Boivin, 2003; Hattie & Marsh, 1996; Linnenbrink & Pintrich, 2003; Swann, 1996). Campbell, Assanand, and Di Paula (2003) suggest that individuals develop a set of self-perceptions of competence on the basis of accumulating information of success and failure experiences in various areas. The significance of self-concept in education was particularly influenced by Coopersmith's (1967) research comparing the characteristics of students with high and low self-concept. He concluded that students with high self-concept were more engaged in classroom discussion, were more confident, liked by peers, persistent in performing tasks, had less anxiety and set higher long-term goals more often than their counterparts with low self-concept. Despite the use of systematic and detailed questionnaires and observation procedures, this work was criticized for methodological weakness, including a lack of generalizability due to a demographic focus on white middle-class children, and a lack of reliability in the self-esteem inventory (Hattie & Marsh, 1996; Hay, Ashman, & Van Kraayenoord, 1998; Wylie, 1974). To further investigate the contribution of self-concept in educational contexts, Hay et al. (1998) reexamined Coopersmith's finding that students with high self-concept have more positive characteristics in various domains than those with low self-concept by comparing educational characteristics of fifth-grade students with high and low self-concept on standardized tests of reading, spelling and mathematics. In keeping with Coopersmith's work, findings showed a relationship between students' level of self-concept and their academic outcomes. As expected, students' high self-concept was associated with positive psychological and educational variables. In contrast, students with low self-concept were more likely to be easily led, be withdrawn, have increased difficulty with academic concepts and show few leadership characteristics. The findings are consistent with the notion of an interactive relationship between achievement and self-concept of students.

#### Capturing children's voices

Although several scholars have studied the relation between child perspectives and expectations and learning outcomes, most of that body of research explores children's expectations of their school experiences in late primary (grades 2–3), junior (grades 4–6), and intermediate grades (Black, 1991; Guay et al., 2003; Hattie & Marsh, 1996; Swann, 1996; Zhang, 2012). There is a lack of research exploring the relationship between children's very early experiences of schooling and their current outcomes, specifically children's experiences entering school. Since experience, not age, is increasingly recognized as important in children's perspectives on their experiences as they enter school.

The research that does exist on children's early perspectives of their experiences in school is dominated by issues related to school readiness and transitions to school (Di Santo & Berman, 2012; Dockett & Perry, 2001, 2005, 2007a, 2007b; Duncan et al., 2007; Isaacs & Magnuson, 2011). For example, in Di Santo and Berman's (2012) study, pre-school children's perspectives about starting kindergarten were explored in focus-group discussions. These discussions demonstrated that children formulate ideas regarding starting kindergarten even prior to starting school. Children's responses to the focus-group questions were presented under three themes: play versus academic activities and homework, getting bigger but still needing help, and rules (Di Santo & Berman, 2012). Other researchers who have considered young children's perspectives of their early experiences in school have explored children's beliefs and ideas about work and play. Findings from such studies indicate that kindergarten students consistently report 'play' as activities that are voluntary, selfchosen and student-centred (Ceglowski, 1997; Robson, 1993). When children are asked to elaborate on their definitions of play and work, children often described play as a self-chosen activity that takes place after the completion of teacher-directed work (Howard, 2002). Over time play is perceived as a reward for working, as opposed to a vehicle for learning. Children consider play and work to be mutually exclusive; more specifically, 'play' occurs when children initiate a task by choice, and 'work' is defined as undertaking a task required by an adult (Robson, 1993). Thus, the more control a child has over a specific activity, the more likely he or she will be to classify it as play (King, 1979).

Children's perspectives of play at school reflect their teachers' approaches to instruction within the classroom (Dickinson & Smith, 1991, Pelletier, 1998; 1999), and in traditional half-day kindergarten (HDK) classrooms, teachers are rarely seen as play partners (Robson, 1993). Educators in half-day programmes report that the pressure to complete curriculum expectations within a restricted timeline inhibits both the time available for play and adult involvement in play (Keating, Fabian, Jordan, Mavers, & Roberts, 2000). Research is needed to explore children's perspectives within a variety of kindergarten programmes (half-day and full-day).

Within this area of research capturing children's perspectives, researchers such as Dockett and Perry (2001, 2005) have demonstrated the importance of kindergarten as a context in which children begin to draw conclusions about school, specifically, whether school is a place they want to be, and how they see themselves as learners within this system (Dockett & Perry, 2001). These scholars highlight the importance of families and teachers in supporting their children's transition to school to ensure children have a positive view of school and that they see themselves as competent learners. Dockett and Perry's (2005) study demonstrated the importance of including children in the research process as a way of truly understanding children's views and perspectives of their own experiences. The authors describe a range of appropriate strategies when working with young children to ensure that their perspectives and experiences are understood. Docket and Perry (2005) move away from the notion that children are incapable of being meaningfully engaged in research and towards the notion that research with children can be both challenging and rewarding. They stress the idea that research outcomes rely not on the capabilities of children, but instead on the willingness of researchers to take into account the competence and agency of young children.

Other scholars, including the more recent work of Di Santo and Berman (2012) have framed their research with young children under the perspective 'the new sociology of childhood', (Christensen & Prout, 2005) highlighting the importance of children's active participation in research, particularly on matters that affect them. This perspective reflects a movement away from the dominant paradigm in social science, which focuses on conducting research on, rather than with children (Di Santo & Berman, 2012). Several other scholars have explored this idea that children are in fact capable, competent and effective in communicating their own perspectives when the research context is appropriate and sensitive to their developmental needs (Clark, 2005; Dockett & Perry, 2007b; Einarsdóttir, Dockett, & Perry, 2009; Epstein, Stevens, McKeever, Baruchel, & Jones, 2008; Merewether & Fleet, 2014; Smith et al., 2005). The validity of children's accounts in responding in research settings, specifically within an interview context has been demonstrated through children's sharing of diverse perspectives and competent and reliable accounts of their own experiences (Dockett & Perry, 2007b; Smith et al., 2005).

Young children's ability to express themselves effectively is highly dependent on context; therefore researchers need to create a supportive framework that includes children in the research process (Smith et al., 2005). When implemented appropriately, interviews have been found to be an effective way to elicit information from children (Clark, 2005). When interviewing children it is important to create an environment in which the child feels comfortable to share openly. Research suggests the need for ingenuity in designing interviews appropriate to the child's developmental level (Langstead, 1994). Puppets have shown to be an effective strategy to reduce the power of authority between adult and child, creating a play-based interview process where children feel more comfortable sharing their experiences and ideas (Di Santo & Berman, 2012; Epstein et al., 2008). Puppet interviews with young children can provide rich data by allowing children to verbalize and express their views in a comfortable environment (Epstein et al., 2008). Children feel more comfortable sharing their perspectives in environments where their ideas are valued; therefore, researchers should seek to provide positive feedback during the interview (Clark, 2005). Children need to be engaged and interested in the interview process if they are expected to provide detailed and honest accounts of their experiences (Smith et al., 2005); therefore the use of child-friendly measures within the research design allows for this.

An additional research strategy with young children is the use of open-ended questions that allow children to share a more diverse range of opinions; this acknowledges that children have their own interpretations and ideas (Di Santo & Berman, 2012). This is particularly important as previous research examining children's perspectives stresses the importance of considering that children's experiences differ across contexts and between individuals (Dockett & Perry, 2007a).

Irwin and Johnson (2005) identify challenges when working with young children. They highlight the use of strategies to enhance children's comfort including the use of props, such as puppets, mentioned above. Creating rapport with children is particularly important in helping children feel comfortable in the environment where they are open to share their ideas. An effective strategy for building rapport is to react to the children and to follow the children's lead throughout the process (Cosaro, 1997; Punch, 2002).

#### Purpose of the current investigation

In summary, the current research on children's early perspectives of school focuses on: (1) children's expectations of themselves as learners (self-efficacy and self-concept), (2) children's experiences transitioning from pre-school to kindergarten and (3) children's understanding of work and play. There is a need to explore children's perspectives of other facets of their school experience including what they enjoy (their favourite thing about school), their perspectives of their teachers and what teachers do, as well as what they think is important about school. The goal of the present study was to build on the previous literature on children's perspectives of their early experiences in school by providing a broader understanding of children's perspectives in kindergarten, while also demonstrating what children' perspectives may mean with regard to early literacy and self-regulation abilities. We were interested in early literacy and self-regulation skills as both of these areas are shown to be predictors of school success (NAEYC, 1998; Shanker, 2011). Although the research on children's self-concept and self-efficacy has explored the connection to outcomes, studies were based on children's expectations of themselves as learners; in contrast, this study explores children's broad perspectives of kindergarten and considers how their responses to three open-ended questions apply to learning outcomes. The goals of the paper are twofold: (1) to examine latent-class memberships of kindergarten children based on their responses to three interview questions and (2) to compare student outcomes on tasks of early reading, writing and self-regulation abilities among these classes.

#### Methods

The data used in this study are drawn from a larger longitudinal study examining the implementation and impact of full-day kindergarten (FDK) and HDK programmes on kindergarten children, parents and staff teams. For more information about the larger study, see Pelletier (2014). For the purpose of this paper, participants include 233 junior (4-year-old) and senior (5-year-old) kindergarten children from FDK and HDK programmes. The data were collected in the spring term of the kindergarten programme.

#### Setting and participants

Two hundred and thirty-three children (109 girls, 124 boys) from HDK and FDK were included in the current study. The sample was composed of 138 FDK children and 95 HDK children from elementary schools in the western part of the Greater Toronto Area in Ontario, Canada. Data collection took place in the spring of 2013; at this time 52% were enrolled in junior kindergarten (4-year-olds), and the remaining 48% in senior kindergarten (5-year-olds). Kindergarten programmes in Ontario are two years in length. The mean age of the children was 5 years, 4 months. Just over 50% of participants

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spoke English as an additional language (ELL); the predominant languages of these ELL children included Punjabi, Urdu, Tamil and Spanish. Information collected on mothers education level indicated that 60% of the mothers had obtained a university degree (15.8% of this percentage had also obtained graduate degrees). Although information on individual socioeconomic status (SES) was not collected, neighbourhood SES was available and split into three categories: (1) \$20,000–\$29,000 (22.9%), (2) \$30,000–\$39,000 (47.5%) and (3) \$40,000–\$49,999 (29.6%).

#### Measures

#### Interviews

Finger-puppet interviews were completed with the kindergarten children in both HDK and FDK classrooms in the spring of 2013. Although the programme type was not the main focus of this paper, we do report the demographic make-up of the latent classes, including the number of children from each programme. During the puppet interview, the children were asked interview questions aimed to elicit their perspectives and experiences of kindergarten. Findings from the interview questions are reported in this paper. The three interview questions include: (1) what is your favourite thing about school? (2) what do your teachers do? and (3) what is important about kindergarten? In addition to the interview task, children were administered achievement measures that assessed their early reading, writing and self-regulation abilities.

The finger puppets were used to engage children in a playful way during the interview process. Finger puppets were used by both the participant and the researcher to engage the children during the interview procedure. The answers to the interview questions were transcribed verbatim by the researcher. Data were coded by trained Masters and PhD graduate students. Qualitative data from the child interviews were coded thematically and scored for the presence or absence of the themes. In response to the three interview questions reported here, children's transcripts were coded for presence/absence of academic or social responses (important to note that some children responded with examples of both). Social activities included responses that related to playing, helping and peer interactions. Academic responses included a focus on work and specific academic curriculum areas. Inter-rater reliability of 95% was obtained for the coding of children's interviews.

# Early reading

The Test of Early Reading Ability 3rd edition (TERA-3) (Reid, Hresko, & Hammill, 2001) was used to assess three components of early English reading: alphabet knowledge, conventions of print and meaning. The alphabet subtest measures children's knowledge of the alphabet, including letter recognition, names, and sounds, as well as syllables. The conventions of print subtest measures children's understanding of conventions, including spelling, punctuation and capitalization, as well as children's book handling and familiarity with books. The meaning subtest measures children's ability to infer meaning from printed letters, words, sentences and paragraphs. The TERA-3 provides individual raw and standardized scores of children's early reading ability in each of the three areas, in addition to a total raw and standardized score of early reading. Subtests are individually administered. For each subtest, children start with the appropriate test item according to their age and continue through each subtest until they either complete all items in the subtest or until three consecutive items (within a subtest) are answered incorrectly. The authors suggest that the test is an appropriate measure of early reading for children between the ages of 3.5 and 8.5 years. In the present study, the overall reading quotient was used in the analyses. The overall reading quotient is computed using the scores from all three subtests.

# Early writing

The early writing task (Pelletier & Lasenby, 2007) is an experimental task which measures children's early writing development along a continuum as children move from using pictures to using letters and words to represent meaning. It was designed to measure the early writing development of pre-

school and kindergarten-aged children. The experimenter asks each child individually to write a sentence involving people, objects and number. For example, the experimenter says to the child, 'Please write – teacher has five little red crayons.' The child is given a selection of different coloured markers and a blank piece of paper. Responses are coded based on the child's written representation of number (how the child represents the number of objects in the sentence) and based on the children's representation of words (how the child represents the rest of the sentence). Children receive a number score and a word writing score. Number scores can range from 0 for no response, 1 for drawing the number of objects, 2 for use of the numeral and 3 for writing of the number word. It is important to note that the number score is an indicator of early writing skills not an indicator of number sense or numeracy skill. Writing scores can range from 0 for no response, 1 for scribble and so on as children move from drawing to writing and finally to a score of 12 for correct spelling. The total score is the sum of the number and word writing scores. The psychometric functioning of the task is beyond the scope of this paper, additional information regarding the properties and use of this measure can be found in an earlier publication (Pelletier & Lasenby, 2007).

#### Self-regulation

The head, toes, knees, shoulders task (HTKS) (McClelland & Cameron Pontiz, 2012) was used to assess the children's self-regulation. The HTKS task is a measure of inhibitory control (a child must inhibit the dominant response of imitating the examiner), working memory (a child must remember the rules of the task) and attention focusing (must focus attention to the directions being presented by the examiner) (Cameron Pontiz et al., 2008). The procedure for this task is similar to the game 'Simon says'. Children are asked to play a game in which they must do the opposite of what the researcher says. The researcher instructs the children to touch their head (or their toes), but instead of following the command, the children are supposed to do the opposite and touch their toes (or their head). An additional subset was administered in which the knees and shoulder commands are added. The total score composed of each subset of the task was used in the analyses.

#### Results

#### Latent-class analysis (LCA)

Prior to modelling the data under study to understand the application of children's perspectives to direct assessments of early reading, writing and self-regulation, we first had to model the data by conducting separate latent-class analyses to determine the best fitting and most meaningful data. A brief description of LCA is included below.

Conceptually, LCA is similar to a factor analysis in that it assumes that there exists an underlying latent variable that explains the relationships among a set of observed variables. However, unlike factor analysis, the latent variables and observed variables are categorical and there are no assumptions made about the underlying distribution of the observed variables. The only assumption about the observed variables is that of local independence, which suggests that indicators within each latent class are independent of each other (Lanza, Collins, Lemmon, & Schafer, 2007). It is important to understand that indicators within the context of LCA are sets of responses (e.g. from people) rather than items from a survey or interview. In this paper three separate latent-class analyses were conducted to determine the best fitting and most meaningful model that represents the data under study. When choosing between models, both theoretical and empirical evidence is used. Theoretical evidence includes the results of previous research suggesting the number of classes as well as an understanding of what each class may mean. Empirical evidence involves testing several models and comparing them to see which model fits best and which model makes practical sense. For example, if theory suggests that a 3-class model best represents the outcome of interest then also testing 2 and 4 class models may be beneficial. Two statistics are estimated to assist in model selection: the Akaike information criterion (AIC) and the Bayesian information criterion (BIC). The AIC and BIC are both log-likelihood statistics with a penalty factor incorporated. The AIC and BIC are used to compare and assess relative fit of model (Table 1). Item-response probability parameters comprise the measurement part of the latent-class model and express the probability of an individual endorsing an item given latent-class membership (Bray, 2007).

The analysis started with the simplest model, a 2-class model, followed by 3- and 4-class model. The best model was chosen by comparing the values of the BIC and AIC estimates across models and by examining the item-response probabilities (results summarized in Table 1). Examination of the AIC and BIC estimates across all models, demonstrates that there was a decrease in the AIC and BIC estimates. These results suggest that a 3 or 4-class model was more appropriate. However, in selecting the final model, it was important to also examine the item-response probabilities ( $\rho$ ) to determine whether the model made substantive sense. The item-response probabilities for the 3- and 4-class models were examined to determine which model was most interpretable given the variables under investigation (Table 2). We used Mplus and full information maximum-likelihood estimate with robust standard errors (MLR) for all models.

An item-response probability is the probability of a response to an item given class membership. In the case of the present study, item-response probabilities refer to the probability of endorsing (inclusion of the theme in their response to the interview question), or not endorsing (no mention of the theme in their response to the interview question) to an item given class membership. The results in Table 2 present only the results of the probability of endorsing a theme, which is students responding to the interview questions in a way that was coded to represent that theme. When exploring these values, we were interested in an example where probabilities are higher for an item in one class relative to other classes, allowing for more interpretable solutions. Further examination of the item-response probabilities of the 3- and 4-class models indicated that the 4-class model was more meaningful and interpretable. For example, the 4-class model, included 3 classes that were similar, theoretically, as the 3-class model, however, also included an additional class (class 1).

In the 3-class model (Figure 1), class 1 was made up of children who more often responded to all three interview questions with an academic focus, class 2 represented mixed responses, in that students responded that their favourite thing about school was something academic, and yet had a social focus for what was important about school and what they thought their teachers did. An interesting observation of class 2 shows that in addition to having a mixture in terms of the responses to the three questions, when each question is examined separately, there is no overwhelming majority for one response over the other; in class 2 the percentage of academic and social responses to each question is quite close suggesting that these students have not yet developed a clear perspective. Finally class 3 was made up of all social responses. These three classes appeared in the 4-class model (Figure 2); however, an additional class (class 1) was also represented. In this class students responded with an academic focus for their favourite thing about school and what their teachers did; however, their responses to what was important about school were social in nature. Therefore, the 4-class model proved to be the best model fit and the most interpretable.

Prior to conducting further inferential statistics, descriptive statistics were carried out to explore the demographic information within each class. Student gender, age and type of kindergarten

| 1 5              |                 |                 |                 |
|------------------|-----------------|-----------------|-----------------|
|                  | 2 Class         | 3 Class         | 4 Class         |
| AIC              | 1505.25         | 1399.35         | 1373.80         |
| BIC              | 1550.12         | 1468.36         | 1466.98         |
| LCA              | Class 1 = 113   | Class $1 = 74$  | Class 1 = 16    |
|                  | Class 2 = 120   | Class 2 = 97    | Class 2 = 80    |
|                  |                 | Class $3 = 62$  | Class 3 = 62    |
|                  |                 |                 | Class 4 = 75    |
| Entropy          | .81             | .94             | .96             |
| Lo-Mendell-Rubin | <i>p</i> < .001 | <i>p</i> < .001 | <i>p</i> < .001 |

Table 1. Comparing models.

| Types of responses | 3-class model |         | 4-class model |         |         |         |         |
|--------------------|---------------|---------|---------------|---------|---------|---------|---------|
|                    | Class 1       | Class 2 | Class 3       | Class 1 | Class 2 | Class 3 | Class 4 |
| Favourite academic | 1.000         | 1.000   | 0.000         | 1.000   | 1.000   | 0.000   | 1.000   |
| Favourite social   | 0.000         | 0.370   | 1.000         | 0.099   | 0.429   | 1.000   | 0.000   |
| Teachers academic  | 0.896         | 0.637   | 0.177         | 1.000   | 0.565   | 0.177   | 0.892   |
| Teachers social    | 0.066         | 0.742   | 0.984         | 0.000   | 0.905   | 0.984   | 0.058   |
| Important social   | 0.000         | 0.874   | 0.952         | 1.000   | 0.859   | 0.952   | 0.000   |
| Important academic | 0.836         | 0.610   | 0.258         | 0.000   | 0.736   | 0.258   | 0.829   |
| % of students      | 32%           | 42%     | 26%           | 7%      | 34%     | 27%     | 32%     |

Table 2. Item-response probability estimates for 3-class models across three interview questions and six response-results of the probability of endorsing the theme.

programme were of particular interest. 75% of class 1 was made up of girls, the mean age in months was 67.5 and 50% were enrolled in FDK. Sixty-six percent of class 2 was made up of boys, the mean age was 63 months and 62% were in FDK. Sixty percent of class 3 was made up of girls, the mean age was 65 months and 61% were enrolled in FDK. Finally, 58% of boys were in class 4, the mean age was 65 months and 58% were in FDK. This demographic breakdown by classes reveals few differences with regard to programme make-up (FDK versus HDK), particularly when considering the larger sample of FDK children (138 in FDK, 95 in HDK). There were some gender differences seen in the latent-class memberships. Girls made up most of class 1 and 3, with boys being more prevalent in class 2 and 4.

In addition to exploring demographic information of each class, we characterized each class based on their endorsement patterns. Class 1 consisted of students who responded with an academic focus for their favourite thing about school and what teachers do, however, with a social response for what



Figure 1. 3 Class Model



is important about school. Class 2 consisted of students who were most likely to report both academic and social responses to all three of the interview questions. Class 3 included students who responded to all questions with a social focus, whereas class 4 was made up of students who responded to all questions with an academic focus.

# Comparing achievement outcomes of latent-class memberships

Additional inferential statistics were conducted to further understand the 4 class memberships by comparing student outcomes among the classes. A series of one-way ANOVAs was conducted to evaluate the relationship between students' latent-class membership and their scores on assessments measuring early reading and writing skills, and self-regulation ability. The overall reading quotient score was used for the TERA.

# TERA reading quotient (early reading)

The ANOVA was significant, F(3, 228) = 3.21, p = .02, partial  $\eta^2 = .041$ . Follow-up tests were conducted to evaluate pairwise differences among the means. There was a significant difference in the means of the TERA RQ between class 2 (M = 95) and class 3 (M = 103), p = .02 (the lowest and highest means). That is, children who answered all of the interview questions with social responses (class 3) had higher reading scores than students with mixed responses to the questions (class 2). There were no other significant differences.

# Early writing task

The ANOVA was significant, F(3, 225) = 5.8, p = .001, partial  $\eta^2 = .072$ . Follow-up tests were conducted to evaluate pairwise differences among the means. There were significant differences in the means on the writing task between class 1 (M = 12.4) and all other classes, class 2 (M = 8, p < .001), class 3 (M = 9, p = .04) and class 4 (M = 9.3, p = 0.4). That is, children who were more likely to respond with an academic focus for their favourite thing about school and what teachers do and with a social response for what is important about school had higher early writing scores.

# HTKS task (self-regulation)

The ANOVA was significant, *F* (3, 224) = 4, *p* = .009, partial  $\eta^2$  = .050. Follow-up tests demonstrate significant differences in the means on the HTKS between class 1 (*M* = 26) and class 2 (*M* = 15.4), *p* = .02 (the highest and lowest class memberships) and between class 2 and class 4 (*M* = 21.3), *p* < .05. That is, children who were more likely to respond with an academic focus for their favourite thing about school and what teachers do, and with a social response for what is important school (class 1) had the highest self-regulation scores. Furthermore, students who responded to all three interview questions with an academic focus (class 4) also had significantly higher self-regulation scores compared with students with less of a clear perspective (class 2).

# **Discussion/conclusion**

The results of the LCA reveal that kindergarten children's responses to three interview questions fit best into a 4-class model. Reviewing the item-response probabilities for the 4-class model provided the best theoretical interpretation of the children's responses. Class 1 was made up of children who reported that their favourite thing about school and what their teachers do were academic in nature, whereas what was important about school was social in nature. Class 2 responses were not as straightforward as several of the students reported academic and social responses to each of the questions. For example, when asked about their favourite thing about school 100% of the children's responses included academic aspects of school, however, 42.9% of these children also reported social aspects as being their favourite. There was an even greater mixture of responses to the question, 'what do your teachers do?' in that 56.5% reported something academic in nature, and 90% reported

social aspects of school. The greatest mixture of responses was found in the final question about what is important about school; 85.9% reported social aspects and 73.6% reported academic characteristics. Therefore, it is clear that in class 2 there is more of a mixture of responses to each of the questions, in contrast to students having a clear academic versus social response to the three interview questions. There was no overwhelming majority for one response over the other. Class 3 and class 4 were the most straightforward to interpret. Class 3 responses to all interview questions had a social focus, whereas class 4 had an academic focus to all three of the interview questions.

Results of the LCA demonstrate an alternate way of analysing children's perspectives. The previous research on children's perspectives has focused on analysing children's scripts from a qualitative paradigm (Di Santo & Berman, 2012; Dockett & Perry, 2001, 2005, 2007a, 2007b; Duncan et al., 2007; Isaacs & Magnuson, 2011). In this study, children's responses were first coded thematically, and then analysed into classes in order to further explore their responses. This study has shown that for mixed-methods research that aims to capture children's perspectives, LCA provides an innovative method of analysis. LCA also provides the opportunity to explore the connection between perspectives and academic outcomes using further exploratory statistics that would not be possible in a purely qualitative study.

Overall, the findings of the LCA add to the literature on the importance of capturing children's voices. The results are in keeping with the work of Dockett and Perry (2001, 2005) who have demonstrated the importance of kindergarten as a context in which children begin to draw conclusions about school, and in this study, their conclusions about what they enjoy about school, their understanding of what teachers do and what is important. The results demonstrate that children in the study were capable and competent in communicating their own perspectives within the research context. Much of this can be explained through the creation of an appropriate and sensitive environment that met their developmental needs (Clark, 2005; Dockett & Perry, 2007b; Smith et al., 2005) similar to that of previous research showing a child-friendly environment, the use of finger-puppet interviews and the rapport between the researcher and child supported children in sharing their perspectives (Di Santo & Berman, 2012; Epstein et al., 2008).

In addition to understanding how children's perspectives broke down into latent-class memberships, this study showed that children's class responses were related to their outcomes on direct assessments of early reading, writing and self-regulation abilities (Table 3). Although our study differs from previous research on children's perspectives in that it does not examine specific perspectives of academic competence and instead explores children's global perspectives of their educational experiences, it is in keeping with previous research in that a relationship between perspectives and outcomes is revealed. Previous researchers have explored the relationship between perspectives and outcomes using children's domain-specific perspectives of themselves such as self-perspectives of themselves as readers on reading outcomes (Clark & De Zoysa, 2011; Henk & Melnick, 1995; Lynch, 2002; Petscher, 2010). A consistent trend in the findings from previous studies is that children who hold more negative attitudes or perspectives of themselves have lower

| Table | 3. | Summar | y of | findings |
|-------|----|--------|------|----------|
|-------|----|--------|------|----------|

|                         | Class 1  | Class 2   | Class 3                                       | Class 4   |
|-------------------------|--|---|---|---|
| Achievement<br>measures | Favourite = Academic<br>Teacher = Academic<br>Important-social | Students more likely to report both<br>academic and social to all three questions<br>(percentages closer than any other class –<br>not overwhelmingly one or the other) | Social responses<br>to all three<br>questions | Academic<br>responses to all<br>three questions |
| TERA RQ                 | <i>M</i> = 102   | M = 95  | $M = 103^{a}$                                 | M = 101   |
| Early Writing           | $M = 12.4^{\rm b}$   | <i>M</i> = 8  | <i>M</i> = 9                                  | <i>M</i> = 9.3                                  |
| Task<br>HTKS Task       | $M = 26^{\rm a}$   | <i>M</i> = 15.4   | <i>M</i> = 20                                 | $M = 21.3^{a}$                                  |
| 3                       |  |   |   |   |

<sup>d</sup>Sig. more than class 2.

<sup>b</sup>Sig. more than class 2, 3 and 4.

scores in that domain, and children with more positive attitudes and self-perspectives have higher scores in that area (Clark & De Zoysa, 2011; Lynch, 2002; Ofsted, 2004; Petscher, 2010; Sturman & Twist, 2004; Twist et al., 2007). Our research extends on these findings by demonstrating that children's global perspectives of what is important about kindergarten, what their favourite thing about school is and what their teachers do, specifically in relation to social and academic connections, is related to children's outcomes in early reading, writing and self-regulation. Findings demonstrate that children in class 1 had the highest self-regulation and writing scores, and the second highest early reading scores; these were children who reported that their favourite thing about school and what teachers do was academic in nature. However, when answering what was important about school they focused on social dimensions. The demographic make-up of this class included 75% girls and a 50/50 split of FDK and HDK children. Class 2 had the lowest scores on all measures of achievement. This was the class in which children's responses did not clearly project an academic or social focus; this finding may be interpreted as a group of students who had not developed a strong orientation yet. It appears that children who did not articulate a clear response about having a focus on academic or social aspects of school had the lowest scores on all measures. Sixty-six percent of class 2 was made up of boys, and 62% were in FDK. Class 3 included responses that were mostly social in nature, these children had the highest early reading scores. Sixty percent of class 3 was made up of girls, and 61% were enrolled in FDK. Finally class 4 was made up of academic responses to all interview questions; these children had the second highest self-regulation and early writing scores. Fifty-eight percent of class 4 was made up of boys and 58% were in FDK. The demographic breakdown by classes did not seem to demonstrate programme differences (particularly in light of having more FDK children in the sample). However, there were some gender differences. This is particularly interesting in relation to outcome scores for class 2, which was made up of mostly boys. Furthermore, there appeared to be a relation between self-regulation and early writing scores, as class 1 included children who had the highest scores in the assessments of these two areas; class 4 had the second highest scores in these two areas.

Although there were differences in the scores of each class, most of the significant differences are seen in relation to the lowest class, class 2. In interpreting the findings, it is important to think about the children's responses to the interview questions in this class. This class was made up of mostly boys whose responses included both academic and social aspects; therefore, it appears that children who responded to such questions in a mixed way had not fully developed a clear orientation yet and were achieving lower than children who answered with a more focused academic or social response. In considering previous research on children's perspectives and its relationship to outcomes, it appears that children in class 2 are most similar to children with low perspectives of themselves in a specific domain. For example, Pershey (2011) study revealed a correlation between children's perspectives and outcomes as measured by mandated stated achievement tests in the elementary years. Results demonstrated that high self-perspectives were correlated with high test scores, whereas lower self-perspectives were correlated with lower test scores. Our study adds to these findings by demonstrating that children who have not yet developed a clear orientation for their perspectives about what is important about school, what their favourite thing about school is, and what their teachers do, are similar to children who have low self-perspectives of themselves in relation to a specific domain in that these children perform the lowest on the outcome measures.

A possible explanation for this finding is that children who responded in a mixed way have a more difficult time expressing their perspectives within the interview procedure. It is possible that additional probes would have allowed these children to explain more about the academic and social factors that they discussed. Furthermore, because the outcome measures used were early literacy in nature (reading and writing), with the addition of a self-regulation measure, it is possible that these children's lower literacy skills are interfering with their abilities to express their ideas verbally in the interview. Therefore, future research should seek to measure children's perspectives with a wider variety of outcome measures.

It should be noted that some of the strengths of this study might also be seen as possible limitations. For example, kindergarten children were asked broad questions about their experiences in kindergarten, rather than being asked specific questions about themselves as learners as is in the case of self-concept (Black, 1991; Guay et al., 2003; Hattie & Marsh, 1996; Swann, 1996), and self-efficacy research (Bandura, 1986; 1993; Bandura et al., 1996; Lynch, 2002). Therefore, although it is a strength to understand children's perspectives from a broad perspective, it may serve to limit our understanding of how children's perspectives influenced specific outcomes. Further research should aim to ask broad questions in addition to specific questions about children's perspectives of themselves as learners in connection with the outcome measures being assessed, in this case literacy and self-regulation. The presentation of children's responses in the form of quotations was beyond the scope of this paper but are described elsewhere (Heagle, Timmons, Hargreaves, Pelletier 2015).

In summary, the findings from this study have practical implications for educators in understanding that children's perspectives of their school experiences do translate to academic outcomes, specifically in the case of class 2, where children have mixed perspectives of their experiences and demonstrate lower outcomes. In addition to offering an innovative way to analyse children's interview data, this paper adds to the existing literature on the importance and value of capturing young children's perspectives on their own experiences. Finally, this paper highlights the importance of using child-friendly measures such as finger-puppet interviews with young children and taking the time to understand and build rapport with children. In these optimal contexts, young children enjoy letting us know what they think and feel about school.

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