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The influence of being ready to learn on children’s early school literacy and numeracy achievement.

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The influence of being ready to learn on children’s early school literacy and numeracy achievement.

This study investigated the extent to which learning readiness, prior-to-school experiences, and child and family characteristics influence children’s literacy and numeracy achievement across the first year of primary school. A sample of 104 kindergarten children were recruited from 16 classrooms and followed from the beginning to the end of their first year of primary school. At the start of school, parents provided information on children’s prior-to-school experiences and their preparedness for school; teachers provided ratings of children’s self-directedness and cooperative participation; and children’s cognitive ability was assessed using the PPVT-III (Dunn & Dunn, 1997). Classroom quality was observed and rated mid-year. Children’s literacy and numeracy achievement was assessed at the end of the school year, using the Who Am I? (WAI?) (De Lemos & Doig, 1999). Regression analyses indicated that WAI? scores were predicted by child age, gender, cognitive ability and teacher-rated learning readiness at the start of school. Discussion focuses on the importance of the ‘ready child’ for early academic success.

Keywords: Learning readiness; academic achievement; literacy and numeracy; first year of school; school transition.
Introduction

There are many reasons why the first year of school is widely held to be a critical time in the lives of children, not the least of which is that early school experiences establish academic competencies essential to later school achievement (Alexander & Entwisle, 1988; Raver, 2003). A large body of research evidence has shown that early academic competencies set the foundation for school performance in the middle and upper years of primary school (National Centre for Early Development and Learning, 2002). Six studies from the United States, Canada, and Great Britain showed a consistent pattern of ability in mathematics, reading and attention skills at the start of school being the strongest predictors of achievement in Years 3, 5 and 7 (Duncan, Dowsett, Claessens, Magnuson, et al., 2007). Similar results have been reported by Claessens (2009) in her analysis of the Longitudinal Study of Australian Children (LSAC) dataset indicating children’s language ability, as measured by the Peabody Picture Vocabulary Test IIIA (Dunn & Dunn, 1997), and achievement in early literacy and numeracy, as measured by the Who Am I? (de Lemos & Doig, 1999) at age 4 to 5 years, were the main predictors of teacher-rated abilities in literacy and numeracy at age 8 to 9 years. Importantly, Claessens (2009) also showed that these results held equally well for specific sub-groups (e.g., low income, language other than English spoken at home, Indigenous families, immigrant families, single parent families, boys and girls) as for the whole sample of 3,200 children.

Research studies such as these have prompted far-reaching government policy initiatives focusing on children’s early learning and the importance of starting strong in the early years of school (Organisation for Economic Co-operation and Development, OECD, 2006). In the United States, the National Education Goals Panel determined that “by the year 2000 all children in America would start school ready to
learn” (Bohan-Baker & Little, 2002, p. 1). This was followed by the No Child Left Behind Act of 2001 (U.S. Department of Education, 2002, p. 15), the purpose of which was “to ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education”. In Australia, the Council of Australian Governments (COAG) declared a commitment to supporting all young Australians to become ”successful learners; confident and creative individuals (and); active and informed citizens” (MCEETYA, 2008, p. 3), a vision that is enacted through the National Early Childhood Development Strategy (COAG, 2009a). These directions also build on Australian State and Territory programs, such as the Best Start Kindergarten Initiative (NSW DET, 2009) and the Early Years Curriculum Guidelines (Queensland Studies Authority, 2006), that emphasise the importance of children’s prior-to-school learning in literacy and numeracy for supporting academic achievement in the first year of school.

Whilst these types of policies and initiatives increase parents’ and educators’ awareness of the importance of children’s prior-to-school learning and their preparedness for the academic challenges of formal schooling, they do not necessarily bring about measurable change. What is needed, according to Australian government authorities, is ”good Australian data and evidence...to monitor outcomes, complement international evidence and advance early childhood development policy, investment and service provision in the Australian context” (COAG, 2009a, p. 21). The generation of an evidence base requires not just large-scale datasets or national testing (e.g., AEDI: the Australian Early Development Index, Sayers, et al., 2007; NAPLAN: National Assessment Program for Literacy and Numeracy, Curriculum Corporation, 2009), but also small-scale school-based studies that explore and test the contribution of diverse influences on children’s early literacy and numeracy learning readiness.
The current study provides the latter form of evidence, by examining children’s learning readiness, how this might be supported by children’s prior-to-school experiences, and how it influences achievement in literacy and numeracy.

**Learning readiness**

‘Readiness’ describes two overlapping areas: school readiness, which includes the cognitive and language skills children need to perform as a school student (NSW Department of Community Services, 2003), and learning readiness, which refers to the child’s ability to manage the academic demands of school and engage and participate in classroom activities (Carlton & Winsler, 1999). Thus, learning readiness encompasses non-cognitive areas, including dispositions, social abilities and behavioural skills, as well as other broad areas of cognitive competence such as following directions, communicating needs, and organising belongings. However, as noted by Ackerman and Barnett (2005, p. 1), ”whether a child is ‘ready’ will always depend on the demands kindergarten places on the child and the supports it provides, as well as the child’s knowledge and skills”.

Readiness has been tied to parents’ decisions, teachers’ advice, and government policies about the age at which a child is considered eligible to be enrolled in school. In broad terms, children are considered to be school-ready when they reach a specified age (Stipek, 2002); however, the age determined by the government varies enormously from country to country and within countries, from state to state. Furthermore, parents have considerable flexibility within the recommended ages, including the option to postpone school entry.

Decisions about ‘readiness’ are also tied to the identification of children’s competencies and specific abilities deemed necessary for school. For example, in the United States, holding a child back a year (‘redshirting’) is linked to the use of
readiness tests or screening instruments that schools apply before the child is enrolled (Ackerman & Barnett, 2005). In Australia, it is more typical that in-class assessments are used in the early weeks of kindergarten. For example, in the Best Start Kindergarten Assessment program teachers use hands-on tasks and structured questions to assess children's early reading and writing skills, as well as their ability to communicate with others and recognise and work with numbers, groups and patterns (NSW Department of Education and Training, 2009). In reviewing teachers’ perceptions of readiness, Ackerman and Barnett (2005, pp. 6-7) note that teachers were more inclined to identify broad areas of competence, such as “being able to follow directions and communicate both needs and thoughts”, as more essential for readiness than counting or knowing the letters of the alphabet. Similar views have been expressed by preschool and pre-service teachers (Cuskelley & Detering, 2003) as well as parents (Dockett & Perry, 1999), who rate academic knowledge and skills lower than other areas of readiness.

Predictors of children’s early academic performance also include learning behaviours and dispositions. For example, a positive approach to learning (e.g., task persistence and attentiveness) has been associated with higher reading skills in kindergarten (Denton, West & Walston, 2003); approaches to learning have been related to achievement outcomes in early schooling (Mägi, Häidkind & Kikas, 2010); and children’s motivation and interest in learning have been linked to mathematics and reading achievement (Nelson, 2005).

**Prior-to-school learning experiences and learning readiness**

Large scale studies in the United States (Magnuson, Ruhm & Waldfogel, 2004; Nelson, 2005; NICHD ECCRN & Duncan, 2003), United Kingdom (Sylva, Melhuish, Sammons, Siraj-Blatchford & Taggart, 2010), and Australia (Harrison et al., 2009)
have shown that children who had attended a preschool program had better literacy and numeracy skills than children who did not attend preschool programs.

Preparation for school is also supported by the transition and orientation programs schools offer to familiarise children and parents with the expectations of school. In Margetts’ (1997) study of school transition, adjustment was found to significantly improve when schools conducted a higher number of transition activities, such as providing opportunities to experience the school environment prior to the beginning of school, and giving parents information about the school. Similar results were reported by Schulting, Malone and Dodge (2005) who note the “number of school-based transition practices was associated with more positive academic achievement scores at the end of kindergarten, even controlling for family socioeconomic status (SES) and other demographic factors” (p. 1).

Child and family influences on learning readiness

Studies in the United States, Canada and Australia have shown that children’s learning readiness and subsequent academic performance in mathematics, literacy and reading are strongly influenced by characteristics of the child, including gender (Kohen, Oliver & Pierre, 2009), age (Margetts, 2002), temperament (Schoen & Nagle, 1994), and English language ability (Harrison, Clarke & Ungerer, 2007; NICHD ECCRN, 2004), and the family, including maternal education (Denton et al., 2003; West, Denton & Reaney, 2000; NICHD ECCRN, 2004), language spoken at home, socio-economic status (Margetts, 2002) and the home literacy environment (Denton et al., 2003).

Learning readiness and the classroom environment

Children’s learning occurs within the context of the school and classroom and is influenced by the characteristics of these environments. The classroom context
includes two main dimensions: the learning environment (how teaching and learning occurs) and the supportiveness of the environment (emotional, academic and social climate). The quality of the classroom environment can influence how children cope with adjusting to school and, subsequently, how well they do academically (Richardson, 1997). The NICHD Early Child Care Research Network (ECCRN) (2004, p. 16) has shown that “classrooms higher in instructional support yielded higher reading scores in first grade”. Similarly, LSAC results at age 4 to 5 years show that, for the group of children who had commenced the first year of school, scores on Who Am I? test of early literacy and numeracy were higher in classrooms that were organised for more time in teacher-supported small group activities and less time in child-initiated activities (Harrison et al., 2009).

**Study Aims**

This study uses a short-term longitudinal design to investigate the influences of children’s prior to school learning experiences and readiness to learn, along with child, family, and classroom factors on literacy and numeracy achievement in the first year of formal schooling as assessed by the Who Am I? (WAI?) test (de Lemos & Doig, 1999, p. v). The WAI? is an Australian measure designed to assess the “cognitive processes that underlie the learning of early literacy and numeracy skills” in children aged four to seven years. It has been used widely as an outcome measure of early literacy and numeracy in large-scale longitudinal research such as the Longitudinal Study of Australian Children (Harrison et al., 2009) and National Longitudinal Study of Canadian Youth (Statistics Canada, 2008; Thomas, 2009), and in informal school-based testing in Australia (de Lemos, personal communication). The WAI? has been shown to predict teacher-rated achievement in language/literacy and mathematical thinking in middle childhood (Claessens, 2009).
Method

Participants

Participants included teachers, children and parents from eight Department of Education and Training (DET) schools and 16 kindergarten classes in a regional area of New South Wales, Australia. The kindergarten teachers (15 female, 1 male) who agreed to participate were primarily from an Anglo-Celtic Australian cultural background (n = 15) and one teacher was an Indigenous Australian. Schools assisted with recruitment by notifying parents via the school newsletter that the school was participating in the research project, inviting parents of all children who were enrolled in kindergarten to participate, and distributing information letters, consent forms and questionnaires to parents. Additionally, the first author facilitated information sessions in the second and third week of school for all parents with children who had just started kindergarten.

Parent consent was given for 104 kindergarten children (52 girls, 52 boys) at the beginning of the school year. Most children (85.6%) were from an Anglo-Celtic Australian cultural background, 12.4% were Indigenous Australians, and 2% were from a non-Indigenous and non-Anglo-Celtic Australian background and spoke a language other than English at home. Five children were identified as having additional needs: 1 had a diagnosis of Global Developmental Delay, 1 had Attention Deficit Hyperactivity Disorder, 1 had Autism Spectrum Disorder, 1 had Asperger’s Syndrome, and 1 child had Down Syndrome. Children ranged in age from 4.67 years to 6.25 years (M = 5.43, SD = .39).

Procedures

Recruitment of teacher, parent and child participants took place in the first five weeks of Term 1 (February - March). Data were collected at two intervals during the school
year: Time 1 – weeks 6 to 10 of Term 1 (March - April) and Time 2 – weeks 2 to 6 of Term 4 (October - November). Each child participated in a 30-minute one-on-one interview in a quiet space close to the classroom. Teachers were asked to complete questionnaires during both of these data collection periods. Parents were asked to provide information at Time 1 only. Of the 91 parents who completed questionnaires, two were fathers. Data on the classroom environment were collected in Term 3. Each classroom was observed in the morning over the duration of a 1.5 to 2 hour literacy or mathematics session during formal teaching time.

Measures

Literacy and numeracy assessment

Who Am I? The WAI? (de Lemos & Doig, 1999) consists of an 11-item task booklet which the child completes with an interviewer. The WAI? assessment combines three dimensions of early literacy and numeracy which provide a general indicator of intellectual development: copying which assesses children's ability to conceptualise geometrical figures (circle, cross, square, triangle, diamond- 5 items); symbols which assesses children’s understanding that there are different symbols and that these have different names and particular meanings (write name, numbers, letters, words, sentence - 5 items); and drawing a picture of self (1 item). The three subscales are combined to generate a total score of the children’s overall achievement. Items on the WAI? are scored on a scale of increasing competence (0 = no response to 4 = high level of accuracy and complexity). The authors report a high level of internal consistency for the tasks: Cronbach’s alpha of .87 (Rothman, 2007).

The WAI? was administered at Time 2 and scored by an expert rater at the Australian Council for Educational Research (ACER). Tests of internal reliability indicated a moderate to high level of internal consistency: copying subscale $\alpha = .75$;
symbols subscale $\alpha = .82$; total scale $\alpha = .86$. The subscales and total scale scores were moderately to highly correlated, as shown in Table 1. Based on these results, only the WAI? total score was used in the analyses. Scores in the current sample ranged from 18 to 43.

[INSERT TABLE 1 ABOUT HERE]

Child and family characteristics

Child temperament. Parents completed the Short Temperament Scale for Children (Sanson, Smart, Prior, Oberklaid, & Pedlow, 1994) which is a 30-item questionnaire designed to assess four dimensions: approach (7 items), rhythmicity (7 items), inflexibility (9 items), and persistence (7 items). Parents rated items on a 1-6 scale (1 = almost never; 6 = almost always), indicating the extent to which they are characteristic of the child. The authors report moderate to high levels of internal consistency for each of the four subscales: approach ($\alpha = .84$), rhythmicity ($\alpha = .66$), inflexibility ($\alpha = .82$), persistence ($\alpha = .85$). Three subscales (approach, inflexibility and persistence) are combined to produce an easy/difficult score, with higher scores indicative of a more difficult temperament. In the current study, ratings were available for 90 children. Each of the scales achieved a moderate to high level of internal consistency: approach ($\alpha = .83$), rhythmicity ($\alpha = .72$), inflexibility ($\alpha = .75$), persistence ($\alpha = .79$), easy/difficult ($\alpha = .81$). The easy/difficult score was used in analyses, with a sample range from 14.76 to 36.67.

Cognitive ability was assessed using the Peabody Picture Vocabulary Test (PPVT IIIA), which is a standardised measure of receptive vocabulary shown to correlate well with other standardised measures of verbal ability and mental age (Dunn & Dunn, 1997). The PPVT generates a raw score that can be converted into age-referenced normative scores, with a normative (standard) score of 100 being the
average score. The PPVT was administered at Time 1 in the current study. Standard scores were recorded, with a sample range from 40 to 124.

**Parental education.** Data on parental education showed that 41 (46.6%) participants had completed Yr 11 or less, 34 (38.6%) had completed Year 12 (final year of secondary school) and/or a TAFE diploma/certificate, and 13 (14.8%) had completed a university degree. Three parents did not respond to this question. Three categories of parental education were constructed: 1 = less than Year 12; 2 = Year 12 and/or TAFE certificate; 3 = university degree.

**Prior-to-School Experiences**

**Preschool/childcare attendance.** Parent data for this question were available for 90 children of whom 85 (94.4%) had attended preschool/childcare the year before starting school. Fifty-eight children (64.4%) attended 1 or 2 days per week, 27 (30%) attended 3 or more days/week, and 5 (5.6%) did not attend preschool/childcare. Three categories of preschool/childcare attendance were constructed: 0 = did not attend preschool/childcare, 1 = attended 1 or 2 days per week, 2 = attended 3 or more days per week.

**Transition activities.** Parents were asked to complete a number of questions about the transition practices undertaken by children in preparation for beginning school. Eleven questions were adapted from Pianta and Kraft-Sayre’s (2003) Kindergarten Transition Activities Questionnaire to ensure that terms were relevant for the Australian context. Parents were asked if their child participated in particular activities (e.g., did the child visit a kindergarten classroom; did they have a tour of the school) and to give a rating of the extent to which each activity was helpful on a 3-point scale (1 = activity not helpful, 2 = activity somewhat helpful, 3 = activity very helpful). A score of 0 was given if the child did not participate in the activity. Total
scores were created based on the number of transition activities attended and the degree of helpfulness, with a range from 0 to 33.

*Support from family and friends.* The parent questionnaire also asked parents about the child’s peer relationships prior to school and the amount of support the child had from family and friends when beginning school. Four questions were asked: 1) Did your child know other children who were starting at the same school? If yes, how many?; 2) Did your child have close friends who were going into the same kindergarten class? If yes, how many?; 3) Does your child have any family (siblings or cousins) that attend the same school? If yes, how many?; 4) How many friends in the same kindergarten class does your child see regularly outside of school? Responses were coded on a 3-point scale (1 = no or none; 2 = yes, 1-2 children/friends/family; 3 = yes, 3+ children/friends/family). Responses to these four questions were combined to create a total social support variable for each child, with a range from 4 to 12.

*Preparedness for school.* Parents were asked to write a short answer to the question ‘In general, how well prepared do you think your child was for kindergarten?’ Responses were coded on a 4-point scale (1 = not prepared at all; 2 = somewhat prepared, 3 = well prepared, 4 = very well prepared).

*Learning readiness*

*Teacher Rating Scale of School Adjustment (TRRSA).* Two subscales from the TRSSA (Birch & Ladd, 1997) were used to assess children’s learning readiness: the 9-item self-directedness subscale (e.g., ‘seeks challenges’, ‘works independently’, ‘easily makes transition from one activity to another’) and the 8-item cooperative participation subscale (e.g., ‘listens carefully to teacher’s instructions and directions’, ‘accepts responsibility for a given task’). Teachers rate the extent to which each of the
given descriptions applies to the child using a 3-point scale (0 = doesn’t apply, 1 = applies sometimes, 2 = certainly applies). Birch and Ladd (1997) report a high level of internal consistency for self-directedness (α = .91) and cooperative participation (α = .92). In the present study reliability was also high; α = .93 and α = .89, respectively.

**Classroom environment**

The quality of the classroom learning environment was observed and rated on items drawn from two existing measures: the Early Childhood Classroom Observation Measure (ECCOM) (Stipek & Byler, 2004) and the NSW Quality Teaching Classroom Observation Guide (QT) (Ladwig & King, 2003; NSW Department of Education, 2003). Four items from the ECCOM assessed the use of positive and negative discipline strategies, the degree of teacher warmth and responsiveness, the encouragement of children’s communication skills, and the support given by the teacher for interpersonal skills. Six items from the QT assessed the teacher’s use of explicit criteria for tasks/activities given to children, the degree of children’s engagement throughout the lesson, the extent to which high expectations are communicated to children, the degree of social support within the classroom, students’ self-regulation, and the amount of student direction of the learning activities being undertaken in the classroom. Each item was rated on a 1-5 scale, as per the ECCOM and QT criteria and instructions. The 10 items achieved a high internal reliability (α = .89), and were combined to form a total scale of classroom quality.

**Plan of analyses**

Preliminary analyses examined the distributions and means/standard deviations for the WAI? and each of the measured variables. Correlation analysis was used to examine within- and across-time relationships among the major variables. Regression analyses
were then conducted to identify the best set of predictors of children’s literacy and numeracy achievement.

Results

Descriptive statistics and correlations between the WAI? and predictor variables

Table 2 presents Means and Standard Deviations for each of the variables and the correlation coefficients between the WAI? total score (assessed at Time 2), child and family variables (5 measures reported or assessed at Time 1), prior-to-school experiences (4 variables reported by parents at Time 1), learning readiness (2 variables assessed by teachers at Time 1) and classroom quality (1 variable assessed by observation mid-way between Time 1 and Time 2).

[INSERT TABLE 2 ABOUT HERE]

Results presented in Row 1 showed children’s scores on the WAI? were significantly correlated with all five variables in the child and family set (Columns 2 – 6). Higher WAI? scores were associated with children being older (r = .20, p < .05), being female (r = -.32, p < .10), having a higher receptive vocabulary (r = .59, p < .01), a less difficult temperament (r = -.24, p < .05), and having a parent with a higher level of education (r = .22, p < .05). Also notable were the significant inter-correlations within this set of variables; for example, receptive vocabulary scores were higher in children who had a less difficult temperament (r = -.40, p < .01) and whose parent had a higher level of education (r = .30, p < .01).

Fewer associations with WAI? scores were noted for the set of variables describing prior-to-school learning experiences (Columns 7 – 10). There was no relationship between the WAI? and children’s attendance at preschool/childcare before starting school, their experience of school transition activities, or the presence of support from family and friends on entry to school (rs = -.06, .03, .01, ns,
respectively). Only parents’ ratings of their child’s preparedness for school were significantly correlated with the WAI? \((r = .30, p < .01)\). Within the variable set, experience and helpfulness of transition to school activities were significantly correlated with ratings of support from family/friends \((r = .25, p < .05)\) and marginally correlated with parent reports of preparedness \((r = .18, p < .10)\).

Strong correlations were noted between WAI? scores and teachers’ ratings of children’s learning readiness (Columns 11 and 12): self-directedness \((r = .71, p < .01)\); cooperative participation \((r = .56, p < .01)\). Not unexpectedly, these two variables were highly inter-correlated \((r = .69, p < .01)\), and showed significant correlations with child and family characteristics and children’s preparedness for school. Correlation analyses showed that learning readiness scores were higher for girls \((rs = -.21 \text{ and } -.36, ps < .05)\); higher in children with a larger receptive vocabulary \((rs = .62 \text{ and } .50, ps < .01)\); lower in children with a more difficult temperament \((rs = -.35 \text{ and } -.27, ps < .01)\); higher when the child’s parent had completed a higher level of education \((r = .25, p < .05)\); and higher when parents described children as being more prepared for school \((rs = .46 \text{ and } .35, ps < .01)\). The final column of Table 2 (Column 13) showed that children’s WAI? scores were not correlated with observer ratings of the classroom environment.

**Regression analyses**

Hierarchical regression analysis was used to test the effects of each set of predictor variables on children’s WAI? scores using a four step model: Step 1 examined the effects of child and family characteristics; Step 2 added children’s prior-to-school experiences; Step 3 tested the effects of children’s learning readiness; Step 4, added classroom quality. This technique tests the overall variance explained by the model \((R^2)\), the effects of each set of predictors when entered into the regression equation.
The statistics reported for each variable are unique in that the effects have taken account of the other variables included in the model. At each step a reduction process was used to identify and retain the best set of predictors. This process of removal also ensured that the regression equations met statistical expectations for the number of variables per number of cases. The full set of predictors were tested at each step, followed by ‘backward stepwise’ testing to remove non-significant variables. Only the significant variables were then included in the next steps in the analysis. The sequence of testing and removal is shown in Models 1 to 4 of Table 3.

Step 1 entered child gender, age, receptive vocabulary (PPVT), temperament, and parental education. Results showed that the set accounted for 46.7% of the variance ($R^2 = .467$) in children’s WAI? scores. Three of these variables were significant predictors of WAI? performance: age of child ($\beta = .31$, $p < .01$); gender ($\beta = -.22$, $p < .01$); and receptive vocabulary ($\beta = .47$, $p < .01$). After accounting for the effects of child age, gender and receptive vocabulary, child temperament and parental education were not significant. This was confirmed in the stepwise procedure and these two variables were dropped from the subsequent Models.

At Step 2, the addition of the full set of prior-to-school variables did not contribute a significant amount of explained variance ($\Delta R^2 = .017$) in WAI? scores. Following confirmation of non-significance through stepwise regression procedures, preschool amount, transition activities, family/friend support and children’s general preparedness were dropped from the subsequent Models.

At Step 3, the two learning readiness measures were entered, and accounted for an additional 12.2% of the overall variance ($\Delta R^2 = .122$). Of the two measures,
only self-directedness in the classroom achieved significance ($\beta = .42, p < .01$). Following the stepwise procedure, cooperative participation was dropped from the final step. Also of note at this step was the reduction in the effects of child age ($\beta = .14, p < .10$) and gender ($\beta = -.14, p < .10$) suggesting that children’s learning readiness partially overrides the predictive effects of age and gender. At Step 4, classroom quality was entered but made no additional contribution ($\Delta R^2 = .005; \beta = -.07, ns$).

The results in the final model identified four main predictors of children’s literacy and numeracy outcomes at the end of kindergarten: child characteristics of age, gender and receptive vocabulary, and teachers’ ratings of children’s self-directedness at the beginning of kindergarten (learning readiness).

**Discussion**

This study sought to examine a wide range of factors that were expected to be predictive of children’s early literacy and numeracy achievement, as measured by the WAI? (de Lemos & Doig, 1999). The main findings underline the importance of child-related factors on WAI? scores, in particular, children’s cognitive ability as measured by receptive vocabulary, and learning readiness, as seen in the extent to which they showed self-directedness in the classroom at the beginning of the kindergarten year. Results also indicated that, with the exception of children’s general preparedness for school as rated by parents, children’s prior to school experiences and the quality of the classroom environment were not significantly associated with early literacy and numeracy outcomes.

**Importance of child factors**

As has been identified in previous studies (e.g., Hindman, Skibbe, Miller & Zimmerman, 2010; Kohen, Oliver & Pierre, 2009), literacy and numeracy competence
in kindergarten was most strongly influenced by characteristics of children themselves: their early cognitive development (as measured by receptive language skills on the PPVT), their age at entering school, and their gender. These results accord with findings from large scale studies such as the Longitudinal Study of Australian Children (LSAC; Harrison, et al. 2009) and the Head Start FACES longitudinal study (Hindman, et al., 2010). In the LSAC, child characteristics (gender, age, Indigenous status, and language spoken at home) were key predictors of children’s literacy and numeracy outcomes, as measured by the WAI?. Similarly, Hindeman, et al. (2010) report that a significant amount of the variance of literacy and mathematics development from preschool to first grade was explained by child characteristics such as gender, disability status and child age.

In the current study, while bivariate tests showed a significant correlation between all five child and family variables and children’s WAI? score, regression analyses showed that temperament and parental education did not achieve significance. We suspect that this is likely due to the mediating effect of the PPVT, which was included as a measure of children’s cognitive ability and was moderately correlated with temperament and parent education. Previous research has suggested that children’s early language skills act as a “funnel” which mediates other possible predictive influences and contributes to one “common pathway” to define children’s school readiness (NICHD ECCRN, 2005, p. 28). This ‘pathway’ also seems apparent in the current study, evidenced not only from the results of the regression analyses but also in the positive correlation between PPVT and parents’ ratings of their children’s preparedness for school. Therefore, as Hindman et al. (2010) propose, it is possible that parents’ (and others’) influences on children’s learning readiness prior to school may be detected primarily through the child’s vocabulary.
The significant influence that children’s early vocabulary has on literacy and numeracy outcomes in kindergarten has implications for families, teachers and early childhood programs. Families and early childhood programs in particular have an important role to play in providing opportunities for children to develop and extend their language before they transition to school. Moreover, child factors such as age and gender need to be taken into account by schools and educational policy, with regard to the age children start school and support offered for boys in early education. In line with the OECD (2006) idea of starting strong, current findings point to the importance of providing support for children, parents and teachers during the transition period.

**Importance of being ‘ready to learn’**

Children’s learning readiness at school entry, as described by self-directedness in the classroom (e.g., ability to work independently, interested in seeking challenges), was found to be a strong predictor of literacy and numeracy scores at the end of the first year of school. These results are consistent with previous research showing that positive approaches to learning (Denton, West & Walston, 2003), motivation and interest in learning (Nelson, 2005) are associated with higher reading skills in kindergarten.

The learning skills and dispositions that were assessed by teachers were also captured by parents in their descriptions of their child’s preparedness for school. Although this measure did not achieve statistical significance as a predictor of early literacy and numeracy achievement, correlation analyses identified a significant relationship between preparedness for school and the WAI? and teachers’ ratings of learning readiness. Significant relationships were also identified between preparedness and age, receptive vocabulary and temperament, which suggest that this
variable is likely to be representing a number of ecological influences on children. These results also indicate parents’ ability to identify children’s confidence and readiness to learn.

Important implications for teachers, early childhood policy and transition to school programs can be drawn from these findings. It is expected that children’s experiences prior to school provide opportunities for children to develop confidence in seeking challenges and working independently. Australia’s adoption of a national Early Years Learning Framework (EYLF) (COAG, 2009b) includes provisions for early childhood educators and early childhood programs to encourage children to be autonomous, resilient and confident learners. Promoting these learning skills at home and in children in prior to school settings is a positive step towards setting the foundation for children’s self-directedness and confidence in their first experience of school.

**Prior to school experiences**

In the present study, prior to school experiences were described by children’s preschool attendance, participation in transition activities, and social support. Although these measures were associated with parents’ report of general preparedness, they did not make a significant contribution to children’s literacy and numeracy achievement on the WAI?. These findings differ from other research which has reported that preschool attendance is linked to better literacy and numeracy skills (NICHD ECCRN & Duncan, 2003; Sylva et al., 2010; Harrison et al., 2009). The smaller sample size and the high proportion of children who had attended preschool for 3 days/week or more in the present study may account for the differences in findings.
Other research has reported that children’s adjustment to school and academic achievement were enhanced when schools provided a high number of transition activities (Margetts, 1997; Schulting, Malone & Dodge, 2005). The non-significance of the findings for the current study are difficult to explain, but may be due to our use of a different method of data collection, in which parents reported on their perceptions of the usefulness of the transition activities their child attended. Transition experience was weakly correlated with parents’ descriptions of preparedness for school, and the availability of social support, but not to measures of learning readiness.

Classroom Quality

The classroom environment was observed and rated in relation to aspects of teacher support, classroom climate, and engagement in learning. This overall measure was not associated with children’s literacy and numeracy outcomes at the end of the kindergarten year, or with any other child or family characteristic. These results are unlike some previous research, which has linked classroom environment with children’s early academic outcomes (NICHD ECCRN, 2004; Hamre & Pianta, 2005), but accord with other research that has reported no relationship between classroom factors on Head Start children’s early academic outcomes (Hindman et al., 2010). Differences in results may be due to methodological variations in the types of measures used to assess classroom practices, but may also reflect limitations due to the small number of classrooms that were assessed (N = 16).

Limitations and directions for future research

Some limitations to the current study need to be identified. Whilst this study provided clear evidence for child characteristics and learning readiness as significant predictors of literacy and numeracy outcomes over the first year of school, the restricted timeline
for the study did not allow an examination of the extent to which these factors may forecast academic trajectories into future years of schooling. Further studies might also include a more holistic view of the classroom environment, including characteristics of the teacher, teacher-child relationships and peer relationship status, on children’s academic performance. A further limitation was the high rate of preschool attendance in the study sample, which limits the generalisability of the findings to children who do not attend a prior to school program.

**Conclusions**

The importance of children starting school ready to learn has been confirmed by the results of this study. The knowledge children bring with them to school and the dispositions they show towards learning are important predictors of their subsequent achievement in literacy and numeracy in their first year of formal schooling. Parents’ ability to recognise and report children’s preparedness for school has important implications for research and practice. Similarly, the interest families and children have in school and learning is an important factor in setting children on the right track for success in the key areas of literacy and numeracy.
References


