Abstract Title Page
Not included in page count.

Title:

From Head to Toes: Preliminary findings from a pilot self-regulation intervention over the pre-kindergarten year.

Author(s):

Shauna L. M. Tominey, MS, Oregon State University; Shannon B. Wanless, PhD, University of Virginia; Megan M. McClelland, PhD, Oregon State University

Abstract Body

Limit 5 pages single spaced.

Background/context:

Every year, thousands of children transition from preschool to kindergarten as a rite of passage into the formal education system. Although most children navigate this transition successfully, a significant number of children enter kindergarten without skills necessary to succeed in the classroom (Blair, 2002; Rimm-Kaufman, Pianta, & Cox, 2000). In one study, forty-six percent of kindergarten teachers reported that at least half of the children in their classrooms lacked skills that they considered necessary for functioning effectively in the classroom, and that self-regulation, rather than academic skills, were critical for success in kindergarten (Rimm-Kaufman, Pianta, & Cox). Recent research has also confirmed that self-regulation is a key predictor of children's success in early academic achievement (Blair, 2002; Cooper & Farran, 1988; McClelland et al., 2007). Recently, in the United States, there has been an increasing emphasis on accountability through standardized testing in the public education system (U.S. Department of Education, 2008). This emphasis has put additional pressure on teachers of children at all grade levels to adopt a strong academic focus. Without adequate self-regulation, however, children may not be able to benefit from and succeed in this environment (Howse, et al., 2003; McClelland, Morrison, & Holmes, 2000). Skills learned early are often cumulative and children who fail to acquire the skills necessary for academic success may have increasing difficulty throughout their schooling (Entwisle & Alexander, 1993), making the development of self-regulation prior to school entry vital. Especially relevant is research documenting that children in preschool can strengthen their self-regulation in individual laboratory training sessions (Dowsett & Livesey, 2000). Few studies, however, have focused on self-regulation interventions in classroom settings. It is critical for researchers to develop interventions promoting self-regulation in preschool that could be translated to classroom curricula so that all children have the opportunity to develop skills necessary for academic success. Moreover, it is essential to identify children who are most likely to benefit from these interventions. The present study examines characteristics of children participating in a pilot self-regulation intervention that predict self-regulation growth over the pre-kindergarten year.

Purpose/objective/research question/focus of study:

The central research questions of the study were:

1) Can a pilot intervention using classroom games effectively improve children's self-regulation?

The first study goal is to test a pilot intervention that targets specific aspects of self-regulation (i.e., attention, working memory, and inhibitory control). It is expected that children who participate in the intervention will show significantly greater gains in self-regulation over the pre-kindergarten year than children in the control group.

2) What characteristics of children, who are participating in a pilot self-regulation intervention, relate to spring self-regulation scores and to growth in self-regulation over the pre-kindergarten year?

The second study goal is to identify child and family characteristics that facilitate self-regulation growth over the pre-kindergarten year for children participating in a pilot self-regulation intervention. Results are expected to help research and future interventions identify children who are most likely to benefit from intervention participation.

Setting:

The majority of children in the study attended preschool at classrooms located in a university child development center and laboratory school (n = 61). The child development center (Site #1) holds six half-day classrooms. Placement in the center is available to children paying tuition and also available at no cost to children enrolled in the Head Start program. Approximately half of the children in each classroom pay tuition and half receive care at no cost because of enrollment in Head Start. A small number of children participating in the study (n = 13) were attending a full-day program at a second child development center (Site #2). All of the classrooms emphasized play during children's free-choice time, but most of the teacher-facilitated activities were academically focused (e.g., learning letters, counting).

Population/Participants/Subjects:

Participants in the study were seventy-four children from nine classrooms within two child development centers in Oregon. Children were selected based on age (4-years-old) and kindergarten eligibility in the following year. Half of the children from each classroom were randomly assigned to participate in the intervention playgroups (n = 37) and half were assigned to the control group. Approximately half of the children in each group were low-income, as determined by Head Start enrollment (n = 34). The average age of children at the beginning of the study was 54.5 months (range: 48-60 months). Forty-two of the children were female, and 31 were male. Children enrolled in Head Start had parents with an average education level of 12.4 years with a range of 6-16 years. Children who were not enrolled in the Head Start program had an average parent education level of 17.1 years with a range of 12-21 years. Three of the children had Spanish as a first language and were administered the tests in Spanish by a native Spanish-speaker.

Intervention/Program/Practice:

Procedure. In the fall of the pre-kindergarten year (September), an invitation to participate in the study was mailed to parents of all four-year-olds. Consent forms were collected from seventy-four families. The study was divided into three phases: pretest, intervention, and posttest.

Pretest. The first phase (Time 1) took in the fall (November – December). During this time period, standardized assessments were administered to all children assessing their self-regulation and academic outcomes over a four-week period of time (see Measures below). Teachers and parents completed demographic questionnaires at this time.

Intervention. The second phase (Time 2) took place over winter term (January-March). During this phase, half of the children in each classroom were randomly assigned to participate in the intervention group. Children in the intervention group participated in a total of sixteen playgroups over eight weeks. The playgroups were held twice weekly and each session was approximately 30 minutes. Previous research has found significant improvement in children's self-regulation and social competence in interventions of this duration (Pears, Fisher, & Bronz, 2007). The sessions were held on the same days and times each week as part of the regular preschool day. Each playgroup session had 5-7 children and 2-3 assistant teachers. The same researcher led all of the playgroup sessions to ensure fidelity. The playgroup leader developed the games and had previous experience as an early childhood education teacher (Tominey & McClelland, 2008).

Playgroup attendance was recorded for each child. Out of the sixteen sessions, children in the intervention group attended 5-16 sessions, with an average attendance of 11.3 sessions. The most common reason for a child missing a session was an absence due to illness or vacation.

Playgroup sessions were designed to resemble classroom circle times. At the beginning of each session, children sat on mats in a circle and participated in a greeting song that was intended to help children transition to the playgroup setting as well as practice aspects of self-regulation. Following the greeting song, the circle leader introduced and led children in the playgroup activity. At the end of each playgroup session, children sat on mats in a circle and sang a "good bye song" before returning to their classrooms. A total of six activities were presented over the 16 sessions. The activities were designed to help children develop and practice integrating attention, working memory, and inhibitory control in an ecologically-valid and engaging environment (Tominey & McClelland, 2008). As the playgroup sessions progressed, additional rules and instructions were added to the activities, making the games increasingly complicated. During the playgroup sessions, children were given ample time to learn the rules of each activity. Each game was repeated at multiple sessions to ensure that all children had multiple opportunities to practice and learn the increasingly complicated versions of the games as the playgroups progressed.

Posttest. Phase three of the study (Time 3) occurred during spring term (April – May) During this time, assessments were re-administered to all children to measure self-regulation and academic outcomes. Research assistants were blind to intervention participation; those who assisted with the intervention phase of the study did not test children from classrooms in which they had previously assisted.

Research Design:

The present study used random assignment to divide children into control and treatment groups for intervention. Measures were primarily quantitative (see *Measures* section), however, qualitative field notes were also collected during intervention sessions.

Data Collection and Analysis:

Measures

Parent and teacher demographic questionnaire. In the fall of the pre-kindergarten year, parents completed a background questionnaire in their native language (English or Spanish) containing questions about children's age, gender, and parent education level. Teachers completed a questionnaire containing questions regarding teaching experience and education.

Direct measure of self-regulation. At Time 1 and Time 3, the Head-Toes-Knees-Shoulders Task (HTKS) was used to assess children's self-regulation (Ponitz et al., in press). The HTKS includes 20 test items and possible scores range from 0 to 40. High scores indicate higher levels of self-regulation. Recent research has shown that the HTKS is a reliable and valid measure of children's self-regulation in diverse populations and in English and Spanish (Ponitz et al.,2008; McClelland, Cameron, Connor et al., 2007; Ponitz et al., in press).

Academic skills. Children were assessed in the fall and spring using three subtests of the Woodcock Johnson Psycho-Educational Battery-III or The Batería III Woodcock- Muñoz: Letter-Word Identification, Picture Vocabulary, and Applied problems subtests (Muñoz-Sandoval et al., 2005; Woodcock & Mather; 2000).

Observational data. At the end of each playgroup session, field notes were recorded (Emerson, Fretz, & Shaw, 1995). The notes included descriptions of the session activities,

descriptions of each child's behavior, including how well the child paid attention, how they interacted with other children and teachers, whether or not they appeared to be engaged in the activities, and how well they were able to follow the directions of the activities.

Analyses

To answer the first research question, t-tests and multiple regression were used to examine differences in HTKS scores for children in the control and treatment group.

Descriptive statistics (age, gender, socioeconomic status, parent education, number of intervention sessions, and academic outcomes) were examined and tested using ANOVAs for three groups of children. The first group consisted of children with the lowest HTKS scores, defined as children who had spring HTKS scores that were more than one standard deviation below the mean (0 points in the fall and fewer than 10 points in the spring).The second group included children who scored in the middle range, defined as ± 1 standard deviation around the mean (between 1 and 25 points in the fall and 23 and 36 point in the spring). Finally, the third group consisted of children with the highest HTKS scores, defined as greater than 1 standard deviation above the mean (greater than 23 points in the fall and greater than 36 points in the spring) (see Table 1).

Descriptive statistics were also compared and tested using ANOVAs for three groups of children defined by their HTKS scores across both time points. The first group consisted of children with the lowest HTKS scores at both time points, including scores that were at least 1 standard deviation below the mean (0 points in the fall and fewer than 10 points in the spring). In the second group were children whose HTKS scores increased by 1 standard deviation over the year (increased by more than 13 points). Finally, the third group included children whose HTKS scores increased greater than 2 standard deviations over the year (increased by more than 26 points) (see Table 2).

Findings/Results:

Research Question #1: Because children participated in varying numbers of intervention sessions, multiple regression was used to determine if the number of sessions predicted gains in HTKS scores for children participating in the intervention. In the overall sample, differences in HTKS gains based on intervention participation were not significant, however, significant differences were found for children with low HTKS scores in the fall based on intervention participation. Regressions indicated that for the children with low self-regulation (fewer than 5 points on a 40 point scale) in the fall (n = 31), the number of intervention sessions attended significantly predicted gains in HTKS scores over the year (controlling for fall scores). T-tests found that there were no significant differences in HTKS scores between children in the control and treatment group in the fall or the spring.

Research Question #2: A number of statistically significant trends related to the second research question were present in the descriptive statistics. Analyses revealed that socioeconomic status (Head Start enrollment) was negatively related to self-regulation. Table 1 shows that 76% of children who had fewer than 10 points on the HTKS in the spring (1 standard deviation below the mean) were from disadvantaged backgrounds. Of the children who had scores that were 1 standard deviation above the mean in the spring (36 points), 0% were enrolled in Head Start, $F(2, 63) = 8.96$, $p < 0.01$.

Table 2 shows that of the children who remained one standard deviation below the mean

across the school year (0 points in the fall and < 10 points in the spring), 80% were low-income; of the children who gained 1 standard deviation over the year (13 points), 50% were low-income; and of the children who gained 2 standard deviations over the year (26 points), 20% were low-income, $F(2, 63) = 5.82$, $p < 0.01$. Previous research has also supported that children from disadvantaged backgrounds are more likely than their more advantaged peers to have low self-regulation (Howse et al., 2003). This study provides additional support that children from low-income backgrounds may be an especially important population to target for self-regulation intervention.

In addition, fall HTKS scores were significantly related to spring HTKS scores. In other words, children who began the pre-kindergarten year with high HTKS scores had higher scores than their peers at the end of the year. As seen in Table 1, children who had fewer than 10 points in the spring also had low HTKS scores in the fall ($M = 4.5$ points); children with between 10-36 points in the spring had an average score of 12 in the fall; and children with greater than 36 points in the spring had an average score of 26.8 in the fall, $F(2, 63) = 11.21$, $p < 0.01$. Numerous studies have found that children who enter school with high self-regulation are better able than their peers to take advantage of learning experiences, which was also evident in a trend toward higher academic scores over the year for children who had high HTKS scores in the fall (see Table 2).

In addition, though not statistically significant, there was a trend for the number of intervention sessions in which children participated to significantly predict higher spring HTKS scores. Table 1 shows that children who had fewer than 10 points on the HTKS in the spring participated in an average of 3.7 sessions, whereas children who had greater than 36 points in the spring participated in an average of 8 sessions. Table 2 also shows a trend for a higher number of sessions for children with greater gains in self-regulation. Children whose HTKS scores were one standard deviation below the mean across the year participated in an average of 2.6 sessions, whereas children who gained two standard deviations over the year participated in an average of 7.8 sessions.

Conclusions:

For children with low fall self-regulation scores, the number of intervention sessions attended predicted higher gains in spring self-regulation, providing preliminary evidence for the effectiveness of the intervention, especially for children attending more sessions. Moreover, the results suggest the need to target children from disadvantaged backgrounds and those who enter pre-kindergarten with low levels of self-regulation. Results also show that children's self-regulation scores at the beginning of the pre-kindergarten year predict both academic scores and self-regulation at the end of the year. This suggests that helping children develop self-regulation skills over the pre-kindergarten year may help children enter kindergarten with skills that facilitate classroom behavior and learning.

Together, these results, although preliminary, support future studies that expand and refine the intervention to help children practice self-regulation over the pre-kindergarten year. Such research can lead to the development of preschool curricula emphasizing self-regulation as a means of facilitating school readiness, especially for children from disadvantaged backgrounds. Many preschool curriculums focus on emergent literacy and math skills and strengthening self-regulation with intervention may help children acquire these skills and help ensure that all children enter school ready to learn.

Appendixes

Not included in page count.

Appendix A. References

References are to be in APA format. (See APA style examples at the end of the document.)

Blair, C. (2002). School Readiness. *American Psychologist, 57*(2), 111.

Cooper, D. H., & Farran, D. C. (1988). Behavioral risk factors in kindergarten. *Early Childhood Research Quarterly, 3*(1), 1-19.

Dowsett, S. M., & Livesey, D. J. (2000). The development of inhibitory control in preschool children: Effects of 'executive skills' training. *Developmental Psychobiology, 36*(2), 161-174.

Emerson, R., Fretz, R. & Shaw, L. (1995). *Writing Ethnographic Fieldnotes*. Chicago: University of Chicago Press.

Entwisle, D. R., & Alexander, K. L. (1993). Entry into school: The beginning school transition and educational stratification in the United States. *Annual Review of Sociology, 19*, 401-423.

Howse, R. B., Lange, G., Farran, D. C., & Boyles, C. D. (2003). Motivation and self-regulation as predictors of achievement in economically disadvantaged young children. *Journal of Experimental Education, 71*(2), 151-174.

Jacobson, L. (2000). Don't Skimp on Preschool, Early-Childhood Study Urges. *Education Week, 19*(42), 6.

McClelland, M. M., Cameron, C. E., Connor, C. M., Farris, C. L., Jewkes, A. M., & Morrison, F. J. (2007). Links between behavioral regulation and preschoolers' literacy, vocabulary, and math skills. *Developmental Psychology, 43*(4), 947-959.

McClelland, M. M., Cameron, C. E., Wanless, S. B., & Murray, A. (2007). Executive function, behavioral self-regulation, and social-emotional competence: Links to school readiness. In O. N. Saracho & B. Spodek (Eds.), *Contemporary perspectives on social learning in early childhood education* (pp. 83-107). Charlotte, NC: Information Age.

McClelland, M. M., Morrison, F. J., & Holmes, D. L. (2000). Children at risk for early academic problems: The role of learning-related social skills. *Early Childhood Research Quarterly, 15*(3), 307-329.

Muñoz-Sandoval, A. F., Woodcock, R. W., McGrew, K. S., & Mather, N. (2005). *The Bateria III Woodcock- Muñoz: Pruebas de aprovechamiento*. Itasca, IL: Riverside Publishing.

Pears, K. C., Fisher, P. A., & Bronz, K. D. (2007). An intervention to facilitate school readiness in foster children: Preliminary results from the Kids in Transition to School pilot study. *Manuscript submitted for publication.*

Ponitz, C. C., McClelland, M. M., Connor, C. M., Jewkes, A., M., Farris, C. L., & Morrison, F. J. (2008). Touch your toes! Developing a direct measure of behavioral regulation in early childhood. *Early Childhood Research Quarterly, 23,* 141-158.

Ponitz, C. C., McClelland, M. M., Matthews, J. M., & Morrison, F. J. (in press). A structured observation of behavioral self-regulation and its contribution to kindergarten outcomes. *Developmental Psychology.*

Rimm-Kaufman, S. E., Pianta, R. C., & Cox, M. J. (2000). Teachers' judgments of problems in the transition to kindergarten. *Early Childhood Research Quarterly, 15*(2), 147-166.

U.S. Department of Education. (2008). Retrieved July 6, 2008, from http://www.ed.gov/nclb/landing.jhtml

Tominey, S., & McClelland, M. M. (2008). "And when they woke up... they were monkeys!" Using classroom games to promote preschoolers' self-regulation and school readiness, *Conference on Human Development.* Indianapolis, IN.

Woodcock, R. W., & Mather, N. (2000). *Woodcock Johnson Psycho-Educational Battery-III.* Itasca, IL: Riverside Publishing Company.

Appendix B. Tables and Figures

Not included in page count.

Table 1

An examination of age, gender, socioeconomic status, parent education, intervention participation, and fall HTKS scores on children's spring HTKS scores.

	Spring HTKS: < 10 points (n = 17)	Spring HTKS: 10 < & < 36 points (n = 40)	Spring HTKS: < 36 points (n = 9)	Overall sample (n = 66)
Gender	35% male	45% male	33% male	41% male
Child age (months)	54.4	54.7	54.3	54.5
SES (% low-income)	76%*	40%*	0%*	44%
# of intervention sessions	3.7	4.55	8	4.8
Fall HTKS	4.5*	12*	26.8*	12.1
Mother education (years)	15.3	14.7	17.9	15.4
Fall reading	5.7	8.5	11.3	8.1
Spring reading	7	11.7	16	11.1
Fall math	8.8	13.4	16.4	12.6
Spring math	11.9	16	19.8	15.5
Fall vocabulary	13.8	16.2	17.1	15.7
Spring vocabulary	15.3	17.2	19.4	17

* $p < 0.01$.

Note. HTKS is the Head-Toes-Knees Shoulders task.

Table 2

Descriptive statistics including gender, age, socioeconomic status, number of intervention sessions, self-regulation, and mother education based on HTKS score stability and change over the pre-kindergarten year.

	Children with HTKS scores 1 standard deviation below the mean fall and spring. (n = 10)	Children who gained 1 standard deviation from fall to spring (n = 16)	Children who gained 2 standard deviations from fall to spring (n = 10)	> 1 standard deviation above mean fall and spring (n = 7)
Gender	50% male	63% male	40% male	29% male
Child age (months)	55	54.4	54.9	54.6
SES (% low-income)	80%*	50%*	20%*	0%*
# of intervention sessions	2.6	3.4	7.8	6.3
Fall HTKS	0*	5.9*	0.9*	30.9*
Spring HTKS	1.3	26.7	32.2	36.8

Mother education (years)	13.5	14.7	15.9	18.4
Fall reading	4.4	8.2	7.9	11.14
Spring reading	5.6	11.4	11.5	16
Fall math	6.6	13.3	13.6	16.6
Spring math	10.6	15.6	17.4	19.7
Fall vocabulary	13.1	14.8	16.5	18.1
Spring vocabulary	14.6	16.8	13.6	19.9

* $p < 0.01$.

Note. HTKS is the Head-Toes-Knees Shoulders task.

APA Reference Style Examples

Sample Citation: Journal Article

Hypericum Depression Trial Study Group. (2002). Effect of Hypericum perforatum (St John's Wort) in major depressive disorder: A randomized controlled trial. *JAMA, 287,* 1807–1814.

Sample Citation: Newsletter/Newspaper Article

Brown, L. S. (1993, Spring). My research with oranges. *The Psychology Department Newsletter*, *3*, 2.

Sample Citation: Book

American Psychiatric Association. (1990). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.

Booth, W. C., Colomb, G. G., & Williams, J. M. (1995). *The craft of research.* Chicago: University of Chicago Press.

Sample Citation: Chapter or Section in a Book

Stephan, W. G. (1985). Intergroup relations. In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology* (3rd ed., Vol. 2, pp. 599–658). New York: Random House.

Sample Citation: Web Page

Dewey, R. A. (2004). *APA Style Resources by Russ Dewey.* Retrieved September 8, 2004, from http://www.psywww.com/resource/apacrib.htm