

**Effects of a Culturally Responsive Speech and Language
Intervention for Students of Indigenous and Non-Indigenous
Heritage**

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Abstract

This study explored the effectiveness of a speech and language intervention that was designed to be culturally responsive and adapted to provide explicit language instruction. Participants included all 774 kindergarten students from a mid-sized rural school district in British Columbia. Seventy-seven students screened as at risk received the intervention, and the remaining students participated in the regular kindergarten curriculum. Results indicated statistically significant effects of the intervention on language and vocabulary skills. No differential effects were observed between students of Indigenous and non-Indigenous heritage. Results are discussed in terms of culturally responsive and explicit instruction for early language development.

Key words: early intervention, language intervention, cultural responsiveness, Aboriginal education

Résumé

Cette étude a examiné l'efficacité d'une intervention orthophonique et linguistique conçue pour être culturellement adaptée et permettre un enseignement explicite des langues. 774 élèves de maternelle d'un district scolaire rural de taille moyenne en Colombie-Britannique ont participé à cette étude. Parmi eux, 77 étudiants, sélectionnés comme étant à risque, ont participé à l'intervention, tandis que les autres étudiants ont participé au programme de maternelle habituel. Les résultats ont montré des effets statistiquement significatifs de l'intervention sur le langage et le vocabulaire. Aucune différence n'a été observée entre les étudiants ayant un patrimoine culturel autochtone ou non autochtone. Ces résultats sont débatus en termes d'enseignement explicite et culturellement adapté pour le développement précoce du langage.

Mots clés: intervention précoce, intervention linguistique, sensibilisation à la culture, éducation des Autochtones

Effectiveness of a Culturally Relevant Speech and Language Intervention for Students of Indigenous and Non-Indigenous Heritage

Educators and the Canadian public agree that success in school is critical for important life outcomes for all students (Environics, 2008). Yet universal barriers, such as lack of school readiness, absenteeism, and mobility, affect the acquisition of important skills needed to be successful (Canadian Council on Learning, 2009). Moreover, unique barriers also affect the schooling experience of Indigenous students, which include the lack of awareness of Indigenous approaches to learning and a sense of discrimination or insensitivity toward non-dominant cultures (Aikenhead, 2002).

Although standards for education, health, and income for Indigenous children and youth have improved over the past years, a significant discrepancy is still evident when compared to non-Indigenous youth. Statistics in British Columbia for the 2008-09 school year showed that under half of all students of Indigenous heritage (49%) graduated from secondary school on time, as compared to their non-Indigenous peers (74%), a stable trend across previous years. Concerning academic achievement, Indigenous students were less likely to achieve adequate marks on exams required for graduation (BC Ministry of Education, 2010). In addition, Aman and Ungerleider (2008) noted that student mobility among Indigenous students adversely affected school success, as each school change in a student's academic career further increases the risk of school dropout. Consequently, Indigenous students who never changed schools had a higher high school completion rate (56%) when compared to students who changed school four times or more (11%).

Barriers to educational success stem from the historical and continuing marginalization of Indigenous culture and oppression of Indigenous individuals (Castellano, 2008). Land displacement, depleted resources, and the mandatory separation and placement of Indigenous children in residential schools have contributed to the suppression and subsequent loss of language and cultural traditions, and have created the intergenerational trauma that is deeply embedded within the cultural identity of Indigenous peoples. Thus, the rich diversity of the more than 50 languages found within Indigenous cultures — representing history, traditions, and cultural identity — has declined in transmission across generations, leaving a small and shrinking minority of the Indigenous population in Canada who are fluent in their mother tongues (Norris, 2008).

Targets for Enhancing Success

Education is a critical target for enhancing success for Indigenous students. Some inequities between Indigenous and non-Indigenous individuals, such as employment and income, are higher for those with lower levels of education, but more equitable for those with a university degree (Hull, 2008). As a result, enhancing both school completion and achievement sufficient for university entry are valued targets for enhancing outcomes for Indigenous students. Two keys to enhancing student success for both Indigenous and non-Indigenous students are (a) improving critical academic skills, such as language and communication, that predict success (Coyne, Kame'enui, & Carnine, 2007), and (b) incorporating culturally responsive curricula into education (Canadian Council on Learning, 2009).

Early language intervention. A critical area to target for enhanced student outcomes in early literacy is language skills. Vocabulary knowledge is critical in gaining meaning from oral language exchanges and written text, and young students with vocabulary deficits are at significant risk of future reading difficulties related to reading comprehension (Coyne, McCoach, & Kapp, 2007).

The importance of early intervention is highlighted by research conducted by Juel (1988), which indicated that strong readers in Grade 1 have 87% chance of staying strong readers in Grade 4, when compared to poor readers, who have 88% chance of remaining poor readers. Thus, early intervention for students at risk of future learning problems can begin in kindergarten to ensure that all students become literate and experience early school success (Daly, Chafouleas, & Skinner, 2005; Foorman, Breier, & Fletcher, 2003), and more intensive and explicit curricula reduce risk more effectively than typical literacy curricula (Torgesen, 2002).

Critical components of effective early language instruction include explicit and systematic instruction, integrating spoken language activities with reading and writing tasks, and direct instruction about and incidental exposure to vocabulary through reading or oral listening activities (National Reading Panel, 2000). Oral language experiences, such as shared storybook reading, provide young, unskilled readers important opportunities to develop print awareness, vocabulary, and comprehension skills (Coyne, Simmons, Kame'enui, & Stoolmiller, 2004; Cunningham & Stanovich, 1991).

Culturally responsive curricula. In addition to instruction that targets critical skills, the cultural responsiveness of the instruction is important in order to enhance outcomes for Indigenous students. Klingner and colleagues define cultural responsive instruction as instruction that is based on the principle “that all students can excel in academic endeavors when (a) their culture, language, heritage, and experiences are valued and used to facilitate their learning and development; and (b) when they are provided access to high-quality programs, services, and supports” (Klingner et al., 2005).

Cultural responsiveness can involve incorporating Indigenous approaches to learning into teaching practices (Canadian Council on Learning, 2009). In Indigenous Canadian cultures, oral narrative or storytelling, used to preserve and transmit Indigenous knowledge, can be used in early literacy instruction to develop reading and language skills by accessing knowledge and skills in a culturally valued manner (Castellano, 2008). Providing access to elders when possible is also important. In addition, cultural responsiveness can be enhanced through native language revitalization, including teaching Indigenous languages as second languages (Norris, 2008). Developing fluency in an Indigenous language leads to enhanced self-esteem and cultural identity, as well as allowing individuals to connect, experience, and participate within the Indigenous community (Tulloch, 2008).

Results from a study of Indigenous students from Grades 1 to 8 indicated that incorporating their language and cultural beliefs into the development of leadership, social skills, and study skills resulted in increased academic success and sense of identity (Baydala et al., 2009). In addition, results from an educational intervention that incorporated cultural values (e.g., importance of family, cooperation) into teaching practices led to increased student confidence, self-efficacy, and academic engagement in Maori students aged 7 to 10 (Rubie, Townsend, & Moore, 2004).

Purpose of the Study

Though targeting language and literacy skills in kindergarten and implementing culturally relevant curricula have separately been established as important areas for enhancing Indigenous student success, little research has been conducted on the effectiveness of curricula targeting early language skills using culturally responsive practices for Indigenous students (McKeough et al., 2008). Consequently, the purpose of this study was to examine the effectiveness of a culturally responsive early language development curriculum on the language skills of Kindergarten students of both Indigenous and non-Indigenous heritage. Seven analyses were conducted to investigate the extent to which language skills improved as a result of intervention. Administrators in the participating school district were also interested in ensuring that both Indigenous and non-Indigenous students benefited from the curriculum. Three research questions were addressed:

1. For students who received the intervention, were there statistically significant increases in general language skills, receptive vocabulary, and expressive vocabulary?
2. What were the effects of the intervention on students' general language skills, when compared to other kindergarten students in the district?
3. Were there differential effects of the intervention for Indigenous students?

Method

Setting

The setting for this study was a school district serving a mid-sized rural community located in British Columbia. Total district enrolment during the 2008-2009 school year was 13,718. The school district contained 20 elementary schools, and 90 of these students (11%) were reported as Aboriginal, or of Indigenous heritage (primarily from the Sto:lo and Metis Nations). The average number of students per kindergarten class was 17.6.

Participants

The sample from the school district included 774 students, all of the students starting in Kindergarten in the year studied. Of these students, 77 students received a culturally responsive early speech and language intervention, and 697 received the regular kindergarten curriculum and served as a "business as usual" comparison group. Students in the intervention group were 60% male, and 29% were of Indigenous heritage. Students in the comparison group were 52% male, and 9% were of Indigenous heritage. Demographic data were not available for 2% of students in the study.

Measures

General language skills. The Kindergarten Language Screening Test, 2nd Edition (KLST-2) is an individually administered, norm-referenced screening tool for early language challenges in students aged 4 to 6. The test is comprised of 17 items assessing the student's verbal abilities and one overall performance rating (e.g., attention, communicativeness, response rate). Internal consistency estimates ranged from .81 to .90, and inter-rater reliability was reported to be .99 (Gauthier & Madison, 1998). Test-retest reliability based on 1 to 3-week time intervals ranged from .83 to .98. In addition, the KLST-2 was reported to have moderate to high

correlations with the Pre-school Language Scale-3, the Test of Language Development-Primary-3rd Edition, and the Clinical Evaluation of Language Fundamentals-Pre-school, indicating evidence for criterion-related validity. In addition, all item-point bi-serial correlations were over .30, providing strong evidence for content validity. Stanine scores were used in analyses.

Receptive vocabulary. The Receptive One-Word Picture Vocabulary Test (ROWPVT) is an individually administered, norm-referenced measure for assessing vocabulary development using a non-verbal response format for students aged 2 to 18. The examiner presents words verbally, and the student points to one of four illustrations that that best portrays the meaning of the word. Internal consistency estimates show adequate reliability, with co-efficient alphas ranging from .95 to .98, and split-half reliabilities ranging from .97 to .99 (Gardner, 2000b). Moreover, test-retest reliabilities with a test-retest interval of 20 days range from .78 to .93. The ROWPVT was correlated with 12 other tests measuring receptive language, including the Stanford-Binet 4 vocabulary section ($r = .97$), Peabody Picture Vocabulary Test-Revised ($r = 0.64$), and the Vocabulary section from the Wechsler Intelligence Scale for Children, Third Edition ($r = 0.93$), indicating adequate concurrent validity. Standard scores ($M = 100$, $SD = 15$) were used in analyses.

Expressive vocabulary. The Expressive One-Word Picture Vocabulary Test (EOWPVT) is an individually administered, norm-referenced test developed to assess the expressive vocabulary development of students aged 2 to 18. The examiner presents the student with a series of illustrations representing objects, concepts, and actions. The child must then correctly name the item the illustration is depicting. Coefficient alphas ranged from .93 to .98 and the median of split-half coefficients was .98 (Gardner, 2000a). Moreover, inter-rater reliability and test-retest estimates with a 20-day time interval were reported as high. Content validity was assessed through item discrimination indices where item-point bi-serial correlations ranged from .93 to .98. The EOWPVT was correlated with twelve other measures of vocabulary development, with a median correlation of .79, indicating adequate concurrent validity. Standard scores ($M = 100$, $SD = 15$) were used in analyses.

Intervention

The intervention was adapted from the Moe the Mouse® Speech and Language Development Program (Chesterman & Gardner, 2008), a program designed to teach speech and language skills for preschoolers that is distributed by the BC Aboriginal Child Care Society. As described by the creators, the program is used to teach early literacy skills through culturally relevant teaching practices and activities. The skills taught in the curriculum include basic speech sounds and vocabulary. These skills are introduced through modeling, shared story reading, storytelling (both teachers and students), songs, crafts, and unstructured play.

The cultural education component takes place through three aspects of the program. First, the important role that animals play in Indigenous cultures is highlighted through the use of animal puppets in the program. An animal mouse puppet named Moe is introduced as a member of the Nuu-Chah-Nulth First Nation, from the West Coast of British Columbia. Moe is used with other animal puppets that were selected as culturally relevant symbols of Indigenous cultures. Each of the 13 animal puppets is paired with a specific phoneme or speech sound. For example, the wolf is associated with the /oo/ sound (to mimic howling).

Second, the program contains a DVD of videos from elders and other members of the Nuu-Chah-Nulth First Nation. In these segments, speakers share samples of their songs, stories, culture, language, and history. In addition, each segment is paired with an additional student activity (e.g., arts and crafts), which provide students the opportunity to learn important concepts (e.g., positional vocabulary, such as above, below, and through) and exposes them to the history and culture of an Indigenous culture.

Third, the curriculum includes a home and home language component. Each student has the opportunity to bring Moe home for a sleepover. The family is requested to partake in their cultural practices, in addition to helping the student compile a list of the vocabulary (e.g., animal names) in their traditional language. Teachers also have the option of using their traditional or local language for instruction in the program, particularly if students and families are not fluent in their own or local Indigenous languages.

The curriculum is provided as a box of resources for instruction, including the puppets, the storytelling DVD, a book of lessons and activities, and four storybooks for shared reading with students. Although the DVD segments can be shown in sequence, no additional timelines are provided (e.g., the DVD can be shown over several days or weeks). Upon receiving training, teachers are provided with all of the materials and are recommended to create their own curriculum based on their resources and needs (M. Chesterman, personal communication, May 9, 2009).

Because the Moe the Mouse® Program was developed for students in preschool, the speech pathology team at the district modified the program to provide a stronger focus on explicit instruction and practice in specific language targets, including basic vocabulary concepts, memory, sentence length storytelling, and speech sounds for Kindergarten students. The content was organized into a set of 70 clearly sequenced lessons, with structured lesson plans and a suggested script. Lessons were spiraled to provide review and practice of previously taught skills. Unstructured play components were minimized, and the DVD was not shown in favour of more interactive activities. Due to screening results indicating first language acquisition difficulties, native language instruction was not used.

Procedures

The KLST-2 was administered to all students in the district in September of Kindergarten as a screening tool to identify students in need of additional support in speech and language. Students who met two at-risk criteria (a stanine score of 3 or below and enrolment in a school serving low-income neighbourhoods) were identified for supplementary support. The intervention was implemented by educational aides and First Nations support workers for 30 minutes daily from October to February. Students in the intervention group were also administered the ROWPVT and EOWPVT directly before and upon completion of the intervention. Finally, the KLST-2 was administered to all students again in May of Kindergarten.

Fidelity of Implementation

During intervention, authors five through eight conducted extended observations of the intervention implementation to assure that the intervention was implemented as intended. Following observations, the observers provided performance feedback to the implementers. In addition, the scripted nature of the program provided implementers with clear guidance for implementation.

Analyses

To investigate the research questions, a number of statistical analyses were performed. First, three pre post paired sample *t*-tests were conducted to assess whether the intervention led to statistically significant increases in general language skills (KLST-2), receptive vocabulary (ROWPVT), and expressive vocabulary (EOWPVT) from fall to spring. Pre post paired sample *t*-tests involve the comparison of individual pre and post intervention scores to evaluate whether a statistically significant difference occurred from one time period to the next. To correct for family-wise error, the alpha level was adjusted with a Bonferroni correction to $\alpha = .017$. Effect sizes were calculated using Cohen's *d* (Cohen, 1988), with .2 or more indicating a small effect, .5 or more indicating a medium effect, and .8 or more indicating a large effect.

Second, a mixed model ANOVA was conducted to compare growth in language skills (KLST-2) between students who received the intervention and students in the comparison group. Mixed model ANOVAs are used to investigate research questions involving a between-subjects or grouping variable (i.e., intervention vs. comparison group) and a within-subjects or repeated measures variable (fall and spring KLST-2 scores). Effect sizes were calculated using partial η^2 , with .01 or more indicating a small effect, .06 or more indicating a medium effect, and .14 or more indicating a large effect.

Third, three mixed model ANOVAs were conducted to assess differential effects of the intervention by Indigenous heritage (heritage by time). These analyses were used not to assess group differences in capacity for learning or learning trajectories, but rather to identify whether Indigenous students benefited from the intervention to the same degree as non-Indigenous students on all three measures. In these analyses, we hypothesized a non-significant result, indicating similar response to the intervention for students from both groups. The alpha level for these analyses was also adjusted to $\alpha = .017$.

Results

Missing Data Handling

Two datasets were used in this study. One dataset contained KLST-2 scores for administered to all 774 kindergarten students in the district in the fall and spring of the 2008-2009 school year. Overall, 417 participants had complete data, and the missing data included 196 students (25% of total cells) in the fall and 162 students in the spring (21%) from the comparison group. The second dataset contained complete data specific to the intervention group, including expressive and receptive vocabulary scores measured in the fall and spring. Overall, 69 participants had complete data, and the missing data included one student (1% of total cells) in the spring for general language scores, eight students in the fall (10% of total cells), and seven students (9% of total cells) in the spring for receptive or expressive vocabulary scores. Visual analysis of missing data suggested that the data were missing at random. Multiple imputation was used to address missing data issues and provide a more precise and accurate model of data while avoiding the statistical challenges associated with listwise deletion (Baraldi & Enders, 2010). The NORM software program (Schafer, 1999) was used for multiple imputation.

Improvement in Skills

Table 1 presents descriptive statistics for students in the adapted Moe intervention and control groups for the variables of interest (i.e., general language skills, receptive vocabulary,

expressive vocabulary). Results of the pre post paired samples *t*-test conducted on KLST-2 scores for students in the intervention showed statistically significant improvements in general language skills as a result of intervention, $t(76) = 9.77$ ($p < .001$), with a large effect ($d = 1.15$). Students in the intervention showed a statistically significant increase in receptive vocabulary scores as measured by the ROWPVT from the fall to the spring, $t(76) = 4.06$ ($p < .001$). The associated effect size was small ($d = .40$). When measured on the EOWPVT, students in the intervention also showed a statistically significant increase in expressive vocabulary scores as a result of intervention, $t(76) = 7.96$ ($p < .001$). The associated effect size was medium ($d = .60$).

Table 1.

Descriptive Statistics for Intervention and Comparison Groups

	n	Mean (SD)	
		fall	spring
Kindergarten Language Screening Test (stanine scores)			
Intervention Group	77	2.51 (1.21)	4.10 (1.56)
Comparison Group	697	4.92 (1.59)	5.27 (1.31)
Receptive One Word Vocabulary Test (standard scores)			
Intervention Group	77	90.75 (11.87)	95.17 (10.37)
Expressive One Word Vocabulary Test (standard scores)			
Intervention Group	77	88.32 (12.54)	95.49 (11.52)

Improvement Relative to Comparison Group

Table 2 presents results from the mixed model ANOVA comparing KLST-2 growth between the intervention and comparison group. Results showed a statistically significant interaction between group (intervention and comparison) and time (pre-intervention and post-intervention), $F(1,722) = 50.29$ ($p < 0.001$), with a medium effect size (partial $\eta^2 = .06$). These results document significantly greater growth in general language skills for students in the intervention group than for students in the comparison group, which had relatively little growth (see Figure 1).

Table 2.

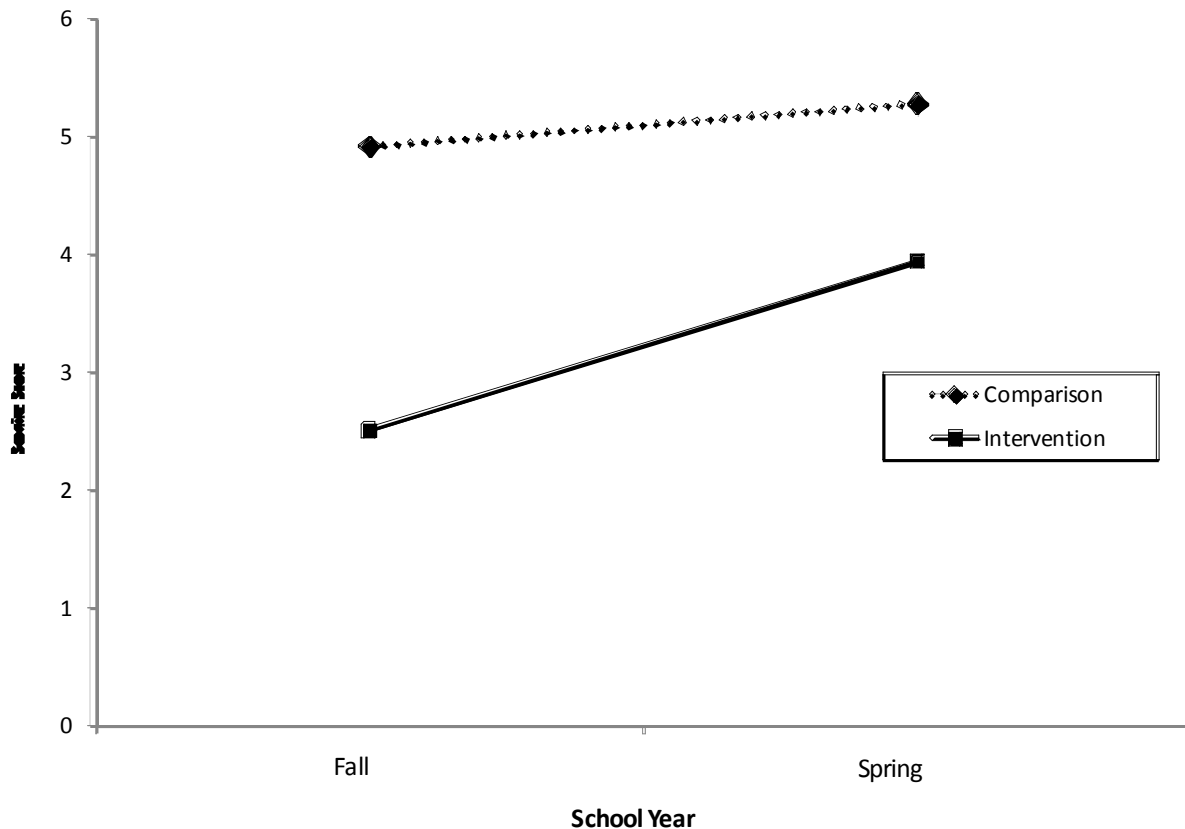
Results of Mixed Model ANOVA Assessing Differences in General Language Skill Growth by Condition, as Measured by the KLST-2

	Type III	df	Mean	F	<i>partial</i>
	Sums of		Square		η^2
	Squares				
<hr/> Tests of Within-Subjects Effects <hr/>					
Time	110.21	1	110.21	138.536***	.15
Time*Group	40.01	1	40.01	50.29***	.06
Error	614.163	772	.796		
<hr/> Tests of Between-Subjects Effects <hr/>					
Intercept	9587.63	1	9587.63	2835.14***	.79
Group	486.61	1	486.61	143.89***	.16
Error	2610.68	772	3.38		

Note. *** = $p < 0.001$

partial $\eta^2 = .01$ (small), partial $\eta^2 = .06$ (medium), partial $\eta^2 = .14$ (large)

Figure 1.

Growth in General Language Skills by Condition**Differential Effects**

Three mixed model ANOVAs were conducted to identify interactions between heritage and response to intervention for KLST-2, ROWPVT, and EOWPVT scores for students in the intervention group. Results of all three analyses indicated no significant interactions between heritage (Indigenous and non-Indigenous) and time (pre-intervention to post-intervention). These results indicate that the intervention had similarly strong effects for students regardless of their heritage.

Discussion

This study explored the effects of an explicit, culturally responsive intervention on the language and vocabulary skills of kindergarten students from both Indigenous and non-Indigenous backgrounds. Results of pre post *t*-tests showed statistically significant effects on general language skills, receptive vocabulary, and expressive vocabulary. In addition, results of a mixed model ANOVA showed a statistically significant increase in general language abilities for

students in the intervention group when compared to other kindergarten students in the district, who showed stable scores. There were no differential effects based on heritage, indicating that the intervention had similar, positive effects for students regardless of their background.

The results show that the adapted Moe the Mouse® program, with its explicit instruction and practice in memory, sentence length, storytelling, speech sounds, and basic vocabulary, was effective in improving skills for students who were at risk for language and communication challenges. Statistically significant improvements were seen in all three variables, indicating a broad effect in important areas for positive language development. In general language skills, the mean score was above the at-risk criterion, indicating a significant decrease in risk, though scores were not yet equivalent to the comparison group by May of kindergarten. These results indicate that language skills improved to within the normal range, but that these students still lagged behind students not at risk and deserve further monitoring.

Research has clearly identified the development of speech and language skills as being critical to future academic outcomes, in addition to the necessity of early intervention to enhance success, remediate challenges, and prevent the need for more intensive intervention (Juel, 1988). Although the use of culturally relevant practices was a central focus in developing the original curriculum, a core goal was to improve early language and literacy outcomes. The students in this study were kindergarteners identified to be at-risk of future speech and communication difficulties. Although the original program, designed for preschool settings, provided implementers with culturally relevant curriculum ideas and materials, the sequencing and delivery were left to the discretion of individual implementers. To enhance its effectiveness with a kindergarten population, the intervention was made more explicit and scripted. These adaptations provided the implementers (e.g., educational assistants, First Nations support workers) with a clear set of sequenced lessons based on key features of effective instruction (e.g., explicit instruction and practice in speech sounds) that could be delivered systematically to students across the district.

The intervention was equally effective for all students, regardless of heritage. We did not expect to see differences by heritage, primarily because the intervention targeted speech and language skills, which are critical academic skills for all students. Targeting these pivotal skills early in education is likely to benefit students from all backgrounds. As a result, educators can feel more confident that this curriculum can be used to ameliorate academic gaps for all students in kindergarten. However, there may have been other effects, such as in the area of cultural pride, which were not measured but may have varied by heritage.

Limitations

There are four important limitations that are worth considering. First, there was no at-risk control group that did not receive the intervention. Though it would have enhanced the design, withholding needed support for an extended time during a critical developmental window made the use of a true control group unethical. As a result, it is not clear how much at-risk student performance would have improved with exposure to the regular curriculum, without additional intervention. Second, though the intervention included content and instructional strategies that reflect cultural responsiveness in the literature, the cultural responsiveness of the intervention was not assessed. Perceptions of the appropriateness and social validity of the measure from educators and students would have been helpful in assessing this area. Third, there was no quantitative measurement of fidelity of implementation. Although the intervention was scripted and observation and performance feedback were used, measuring the average percent of critical

features implemented per session would have strengthened the study. And fourth, the study was an extant analysis of student outcomes data, completed at the request of the local school district, but with no direct involvement of representatives or elders from the local First Nations communities. Including these stakeholders in the original design of the study would likely have strengthened it.

Implications for Research

The results of this study add to the minimal existing research investigating the effectiveness of curricula using culturally responsive strategies and practices to target early language skills. Future research may investigate school personnel's perceptions of the social validity of this intervention in promoting culturally relevant practices when instructing Indigenous students. In addition, future studies can assess the effect of culturally appropriate practices in enhancing variables such as self-efficacy, school engagement, and a sense of cultural identity, all of which are variables hypothesized to facilitate Indigenous student success.

Implications for Practice

School personnel are increasingly responsible for responding to the various skill levels, backgrounds, and experiences of their students. Culturally responsive instruction shows promise in facilitating student success by honoring their diverse culture, language, heritage, and experiences. Results of this study indicated improved outcomes for speech and language skills when implementing an early language development curriculum, which was developed to incorporate culturally relevant practices and adapted to include effective instructional practices. Effective, research-validated early language instruction is essential in improving outcomes for students from both Indigenous and non-Indigenous backgrounds, and results from this study indicate the benefits of creating a structured, systematic, and scripted intervention that communicates critical features of effective instruction to its implementers. Moreover, all students may benefit from culturally relevant practices through the inclusion and acceptance of the range of diverse and unique cultures prevalent in today's schools.

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