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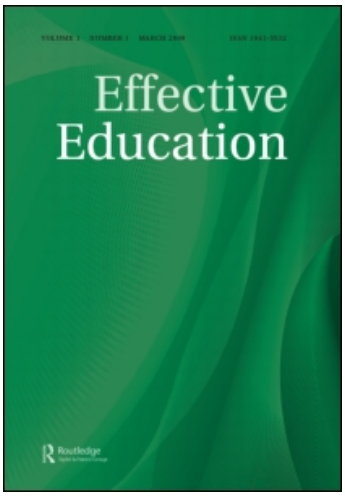

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Investigating the psychometric properties of three French language early reading measures

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Investigating the psychometric properties of three French language early reading measures

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Few empirical studies have examined the development of French reading skills in French immersion programs. The present study investigated the psychometric properties of three French early reading measures of phonological awareness and the alphabetic principle. The measures: Facilité à segmenter les phonemes (FSP), Facilité à lire des non-mots (FNM), and Facilité en lecture orale (FLO) are modeled after DIBELS (*Dynamic Indicators of Basic Early Literacy Skills*) English literacy measures recognized as strong predictors of later reading achievement. The purpose was to investigate the reliability and predictive validity of these measures. Participants were 51 students from a partial French immersion school. Results indicate Phase 1 FNM scores strongly correlated with later Phase 2 FNM and FLO scores. Phase 1 FLO scores are significantly correlated with later Phase 2 FLO scores. Findings indicate these two measures showed sufficient reliability and validity for measuring French reading skills. The third was not predictive for this specific population. Implications for practice and future research are suggested.

Keywords: French; early literacy assessment; biliterate reading achievement

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Since the inception of the first Canadian French immersion program in the mid-1960s, immersion education has expanded at a phenomenal rate. Language immersion programs offer an alternative way of learning a second language. The approach uses the second language, also known as the target language, as the medium of instruction to learn academic content. The goal is to gain a high level of target language competence while learning the subject content. Language immersion programs represent the most intensive form of content-based foreign language instruction (Snow, 1986). In a French immersion program a child who does not speak French as his or her first language receives academic content instruction in French.

A substantial number of students in Canada and in the USA continue to be enrolled in immersion programs. Early exposure to the target language includes exposure to print, and research interest in biliteracy is itself a growing phenomenon. The identification of a struggling bilingual reader is often difficult, and educators bear the burden of untangling complex issues (Lundberg, 2002). Are bilingual reading difficulties due to inherent student factors such as limited experience with the phonology of the second-language, first language delay, specific language impairment, or other specific

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literacy problem? Too often, students' educational needs are delayed due to a lack of useful assessment tools. Optimally, bilingual assessment tools of the same construct could help identify students needing support, but a lack of normed bilingual standardized tests makes identification difficult (Genesee, Paradis, & Crago, 2004). While research on all aspects of reading development in immersion programs using direct measures of reading outcomes is needed (Genesee, 2007), specifically, research related to the purpose of identifying, as early as possible, students who may be at-risk of not making sufficient reading gains in either language is imperative.

Theoretically, understanding developmental biliteracy would inform knowledge about factors contributing to reading success, and about preventing early reading failure among bilingual students. Such research is important because immersion programs remain a viable option for many parents across Canada and the USA, and also because attrition rates at the middle- and high-school levels continue to be a concern (Bonyun, Morrison, & Unitt, 1986; Cummins 1994; Halsall, 1994; Obadia & Thériault, 1997).

French immersion programs have been extensively researched (Johnson & Swain, 1997; Krashen, 1984; Rebuffot, 1993, Swain, 1984; Swain & Lapkin, 1982). Consistently, research studies evaluating immersion students' academic performance in reading and math indicate high outcome performance compared to monolingual peers (Rubio, 1998; Snow, 1990). What is not clear from the early research is whether or not *all* children performed equally well. Few empirical studies have examined the specific reading predictors contributing to early reading success among this population of students.

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Research in several alphabetic languages has shown that certain skills are important and play a substantial role in learning to read. Critical among these are the early skills of phonological awareness and the alphabetic principle (National Research Council, 1998; National Reading Panel, 2000). To address the need for literacy assessment tools for French immersion student populations, a battery of tests known as *Indicateurs dynamiques d'habiletés précoces en lecture* (IDAPEL) was developed in the French language. The measures were modeled after DIBELS *(Dynamic Indicators of Basic Early Literacy Skills)* (Kaminski & Good, 1996) English literacy measures, which were developed based on measurement procedures used for curriculum-based measurement (CBM). The DIBELS measures function as indicators of student progress toward reaching an outcome and are recognized as strong predictors of later reading achievement (Kaminski & Good, 1996). IDAPEL, like DIBELS, are designed to determine progress toward a goal. IDAPEL test materials are of equal difficulty and represent the general curriculum. They are sensitive to growth as the measures are designed to assess skill change over time. They are individually administered three times a year for screening, or more frequently for progress monitoring growth and to evaluate the effects of intervention. An additional utility of the IDAPEL battery of tests is that the measures allow reading skill assessment from Grade K to Grade 5.

This longitudinal study investigated the psychometric properties of three IDAPEL early literacy measures. The purpose of the study was to: (1) provide evidence regarding the measures' technical adequacy; and (2) evaluate their use as valid indicators of French reading skills.

As a stepping stone to future research, this study focused on three specific questions: (1) what is the predictive validity of each experimental measure on the early French reading skills of French immersion students?; (2) what is the criterion-concurrent

validity of the IDAPEL measures?, and to capture the amount of measurement error in the IDAPEL scores; and (3) are all IDAPEL alternate forms reliable?

Method

To investigate the psychometric properties of the three experimental reading measures, a two-phase correlational design was used. Phase 1 occurred in the fall of the school year. Data were collected during Week 1 and Week 2 of Phase 1. Phase 2 occurred in the spring of the same school year, whereby data were collected in Week 25 of the study. There were no control groups. All second-grade participants were administered all measures in French and in English and all participants were involved in all three waves of data collection.

Participants

Two second-grade classes from a medium-sized, partial French immersion school located in a mid-sized city in a Pacific Northwestern state in the USA were recruited for the study. Students enrolled in this partial immersion school usually enter the program in kindergarten at age six. The student population was predominantly white (83%), and 6% of the student body qualified for free and reduced lunch. All students received French and English instruction during their school day. In kindergarten, students were exposed to French oral language instruction and minimal English reading instruction. Students in this study began formal English reading instruction in the first grade and continued to receive English reading instruction in the second grade. In the first and second grade, students also received core-curriculum content instruction in French, math, social studies and science. The criterion for inclusion was that students come from homes whose first language was English. A total of 51 participants were identified for the study based on the inclusion criterion. Student characteristics by ethnicity, gender and eligibility for free and reduced lunch are presented in Table 1.

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Table 1. Student characteristics by ethnicity, gender and eligibility for free and reduced lunch as measured by proportion of students eligible for the United States Department of Agriculture's (USDA) Free and Reduced Lunch Programs.

Characteristic	Percentage
Ethnicity	
White, non-Hispanic	86.3%
Black, non-Hispanic	2%
Asian/Pacific Islander	7.8%
American Indian/Alaska Native	2%
Unknown	2%
Gender	
Female	50%
Male	50%
FRL	5%

Note: School-level data were taken from school district census data where study occurred.

Measures

Students were administered a total of six early literacy measures, three French IDAPEL measures and three English DIBELS measures. Two subtests of the French Immersion Achievement Test (FIAT) (Wormeli & Ardanaz, 1987) were used as criterion-related validity measures of word decoding and passage comprehension, and as comparison measures to evaluate the sensitivity of the IDAPEL measures. The names of the French IDAPEL measures are: Facilité à segmenter les phonèmes (FSP), Facilité à lire des non-mots (FNM), and Facilité en lecture orale (FLO). The English measure names are: Phoneme Segmentation Fluency (PSF), Nonsense Word Fluency (NWF), and Oral Reading Fluency (ORF). All fluency-based French and English measures are standardized, and timed for one minute, and all were administered individually in each language. Table 2 provides summary descriptions of the French (IDAPEL) and English (DIBELS) early literacy measures as well as a description of the FIAT subtest criterion measures.

Participant recruitment

Both the school principal and the second-grade French teacher were given a written description of the study and informed that their participation was voluntary. One month prior to the study, parents of subjects were informed about the study through the school newsletter. Two weeks before the beginning of the study, parents of all students in the participating classrooms were sent a description of the study with an accompanying consent letter. Fifty-one consent forms were sent out and all students returned signed parental consent forms and participated in the study.

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Training

The principal investigator, a native French speaker, and one graduate student who speaks French as a second-language, served as data collectors in this study. Both the principle investigator and the French-speaking graduate student had previously completed coursework and practical application in the assessment and in the administration of standardized tests, especially with English DIBELS tests.

The graduate student was trained in administration and scoring of the IDAPEL measures during a four-hour training session. This training was conducted prior to the start of the study and was provided by the principle investigator to assure reliability in scoring the French measures. Data collectors were provided with a binder of French and English administration procedures for each of the measures in both French and English. Data collectors were trained to: (a) follow procedures step-by-step as outlined in the directions; (b) read directions verbatim; (c) score accurately; and (d) time accurately. Data collectors were given opportunities to practice scoring each measure and practice adhering to testing guidelines by listening to and scoring tapes of children performing each measure until 90% inter-rater reliability was achieved for each data collector on each measure in both French and English.

Data collection

All data collection occurred at school. All students completed all measures in the designated sittings. In Week 1 of Phase 1, all participants were administered DIBELS

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Table 2. Summary descriptions of French and English literacy measures and French Immersion Achievement Test (FIAT) criterion measures.

1. Facilité à Segmenter les Phonèmes (FSP) Phoneme Segmentation Fluency (PSF)	In this task, a word was presented orally and the student was asked to verbally produce the individual sounds in the word (three to four phonemes in English and four to five phonemes in French). The number of correct phonemes verbally produced in one minute determined the score.
2. Facilité à Lire des Non-Mots (FNM) Nonsense Word Fluency (NWF)	In the French language, the student was presented with a letter-sized page having randomly ordered French CVCV, CVCVV, CVCVC, CVVCV, or CVCCVC nonsense words (C = consonant, V = vowel) (e.g., jonjin, tetou, doivi). Similarly, in English, the student was presented with randomly ordered English VC and CVC nonsense words (e.g., moz, pek, rej). In each language, the student was asked to read (produce verbally) each letter-sound in the nonsense word, or to read the whole nonsense word. The number of correct letter-sounds verbally produced or words read within the minute determined the score.
3. Facilité en Lecture Oral (FLO) DIBELS Oral Reading Fluency (DORF)	For each language, the student was directed to read aloud a reading passage for one minute. Words that were omitted and/or substituted were scored as errors unless self-corrected within three seconds. Hesitations of more than three seconds were also scored as errors. After one minute, the number of words read correctly determined the score. Students were directed to read aloud three randomly selected reading passages each for one minute. The median score from the three passages was selected as the oral reading fluency score.
4. FIAT	A French screening achievement test intended to evaluate individual performance of students whose first language is not French. The battery consists of four subtests. In this study, the word identification (Lecture de mots) and the passage comprehension (Compréhension de textes) subtests were used. The subtests were administered individually to students. For most subtests at most grades the reliability estimates are very close to or exceed 0.80 (Wormeli & Ardanaz, 1987).

Note: DIBELS, Dynamic Indicators of Basic Early Literacy Skills.

fall benchmark measures in English and IDAPEL French language measures. In Week 2 of Phase 1, all participants were administered an alternate form of all IDAPEL experimental measures. Scores on the Week 2 measures were used to establish the alternate-form reliability of the IDAPEL experimental measures. The FIAT word identification and passage comprehension reading subsets were administered to establish criterion-related validity. In Phase 2, all subjects were administered DIBELS spring benchmark measures, alternate-forms of all IDAPEL measures, as well as FIAT word identification and passage comprehension reading subtests. To counterbalance for practice and language effects, order of measure administration in both languages alternated at each data collection point. Data were analyzed to evaluate the technical adequacy of the French-language measures and examine the measures for: (a) concurrent and predictive criterion-related validity; and (b) alternate-form reliability. Table 3 summarizes the data collection timeline.

Results

The data presented describe students' French and English early reading outcomes. Descriptive statistics for each measure are reported first, with correlational coefficients following. At the first data collection point, 51 second-grade subjects participated in the study. At post-test, 48 subjects had complete data. Three subjects were dropped from the analysis because one left the program for six months, and two left the program completely. In Phase 1, the first-week data were collected during a one-week period in late September, and Week 2 data were collected the following week. In Phase 2, all post-test data were collected over a three-week period in early spring of the following year. Three research questions were posited in this study: (1) what is the predictive validity of each experimental measure on the early French reading skills of French immersion students?; (2) what is the concurrent validity of the IDAPEL measures?; and (3) are IDAPEL measures reliable across alternate forms?

The means and standard deviations for phoneme segmentation and nonsense word reading in both French and English Phase 1 (Week 1 and 2) and Phase 2 (Week 25)

Table 3. Data collection timeline.

	Phase 1 (Fall)		Phase 2 (Spring)
Monitor and control	Week 1	Week 2	Week 25
IDAPEL			
	FSP	FSP	FSP
	FNM	FNM	FNM
	FLO	FLO	FLO
		FIAT	FIAT
DIBELS			
	PSF		PSF
	NWF		NWF
	ORF		ORF

Note: IDAPEL, Indicateurs dynamiques d'habiletés précoces en lecture; DIBELS, Dynamic Indicators of Basic Early Literacy Skills; FSP, Facilité à segmenter les phonemes; FNM, Facilité à lire des non-mots; FLO, Facilité en lecture orale; FIAT, French Immersion Achievement Test; PSF, Phoneme Segmentation Fluency; NWF, Nonsense Word Fluency; ORF, Oral Reading Fluency.

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Table 4. Means and standard deviations for Phonemic Segmentation Fluency in French and English, and for Nonsense-Word Fluency in French and English Phase 1, Weeks 1 and 2, and for Phase 2, Week 25.

	Phase 1				Phase 2	
	Week 1 (n = 48)		Week 2 (n = 48)		Week 25 (n = 48)	
Measures	*M*	*SD*	*M*	*SD*	*M*	*SD*
IDAPEL French						
FSP	25.04	10.54	32.08	9.16	34.44	13.00
FNM	37.49	22.49	45.06	23.93	64.14	25.83
DIBELS English						
PSF	45.96	12.17			45.65	9.49
NWF	63.39	27.07			84.40	30.88

Note: IDAPEL, Indicateurs dynamiques d'habiletés précoces en lecture; DIBELS, Dynamic Indicators of Basic Early Literacy Skills; FSP, Facilité à segmenter les phonèmes; FNM, Facilité à lire des non-mots; PSF, Phoneme Segmentation Fluency; NWF, Nonsense Word Fluency; FSP and PSF means report the number of correct phonemes verbally segmented in one minute; FNM and NWF means report the number of correct letter-sounds verbally produced in one minute.

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are presented in Table 4. Results on French FSP and on French FNM indicate that participants made gains segmenting phonemes and reading nonsense words between pre- (Phase 1, Week 2) and post-test (Phase 2, Week 25) data collection periods. One-sample *t*-test analysis to capture pre–post-test difference for French FSP is reported as ($M = 9.06$), $t(48) = 4.74$*, $p < .05$, and for FNM, ($M = 25.60$), $t(48) = 7.33$*, $p < 0.05$. FNM and FSP results between Week 1 and Week 2 of Phase 1 may be caused by practice effect. Given the small *n,* and the lack of substantial data to establish benchmark goals or cut-off points for the French measures, it is difficult to interpret phoneme segmentation and nonsense word reading gains made between the beginning and end of year on these two measures.

Reading skill outcomes based on English PSF between Phase 1 and Phase 2 indicate no change. Monolingual English speaking peers who have reached 35 correct phonemes by end of first grade are considered established on this early reading skill. Reading skill outcome for English NWF indicate again a substantial improvement in nonsense word decoding skill between Phase 1 (Week 1) and Phase 2 (Week 25). The fall NWF mean was 63.39 indicating that most students were well established with this skill at the beginning of the second grade. The benchmark goal (cut-off point) for monolingual English speaking students is 50 correctly read phonemes by fall of second grade.

The means and standard deviations for English ORF and French FLO for the two-phases of the study are presented in Table 5. Overall, participants made reading gains in both languages from Phase 1 to Phase 2. While students' initial French reading skills were limited at the beginning of the study and certainly limited at the end of the study, subjects were able to read, on average, 20 more words per minute at the end of the study than they did at the beginning of the study. One-sample *t*-test analysis to capture pre–post-test difference for French FLO is reported as ($M = 18.52$), $t(48) = 9.45$, $p < 0.05$. The outcomes reflected between Week 1 and Week 2 of Phase 1 may again be caused by practice effect whereby we see on average a 10-point gain between the first two weeks of the study. Subjects' English reading mean performance

Table 5. Means and standard deviations for Oral Reading Fluency (ORF) and Facilité en lecture orale (FLO) for Phase 1, Weeks 1 and 2, and for Phase 2, Week 25.

	Phase 1				Phase 2	
	Week 1 (n = 48)		Week 2 (n = 48)		Week 25 (n = 48)	
Measures	*M*	*SD*	*M*	*SD*	*M*	*SD*
IDAPEL French						
FLO 1	22.4	18.38	31.28	13.32	38.73	20.22
FLO 2	23.8	19.46	29.84	14.52	40.46	20.06
FLO 3	18.51	14.36	34.45	18.08	45.92	19.11
Median	21.74	17.66	31.23	14.63	41.68	19.24
DIBELS English						
ORF 1	87.65	45.8			116.5	36.17
ORF 2	78.3	38.3			102.71	38.06
ORF 3	76.25	43.74			122.1	43.2
Median	79.78	41.85			114.77	38.16

Note: IDAPEL, Indicateurs dynamiques d'habiletés précoces en lecture; DIBELS, Dynamic Indicators of Basic Early Literacy Skills; FLO and ORF means report the number of correctly read words per minute.

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increased considerably from the beginning to the end of the study as well, whereby we see on average a 33-point gain between the beginning and end of the study. These substantial English reading gains are consistent with findings from average second-grade monolingual students who on average, read at a rate of 59.63 words per minute at the beginning of second-grade, and 118.53 words per minute at the end of second grade (Good, Wallin, Simmons, Kame'enui & Kaminski, 2002). These averages reflect slightly more reading growth than seen in this study, although participants' English reading scores were relatively high at the beginning of the second grade.

With respect to the early French reading skills of French immersion students, two types of evidence for the validity of IDAPEL test scores were examined, the concurrent, criterion-related validity, and predictive, criterion-related validity. The concurrent, criterion-related validity was examined to determine the extent to which a student's score on a new test corresponds to their score on an established test of the same construct. The Pearson product–moment correlation coefficient was used to examine the concurrent validity coefficients between IDAPEL experimental measures and FIAT criterion measures. The concurrent validity coefficients at Phase 1 and 2 between IDAPEL and FIAT measures are presented in Table 6.

To answer the first question concerning the concurrent criterion-related validity of the IDAPEL measures, a strong, positive correlation of 0.76 was found in both phases between IDAPEL FLO and the FIAT word identification subtest. Participants' scores on IDAPEL FNM correlated moderately with scores on the FIAT Word Identification and Passage Comprehension subtest at both Phase 1 and Phase 2. However, only limited evidence of a correlation was found between their scores on FSP and the FIAT measures.

Predictive, criterion-related validity evidence examines the extent to which scores on one test forecast or predict scores on measures of other constructs or later outcomes. To answer this second question, the Pearson product–moment correlation coefficient was used to examine the predictive validity of the measures with respect to the FIAT

Table 6. Concurrent validity coefficients at Phase 1 and 2, between Indicateurs d'habiletés précoces (IDAPEL) and French Immersion Achievement Test (FIAT) measures.

	Phase 1, Week 2 IDAPEL		
Phase 1, Week 2 FIAT	FSP	FNM	FLO
Word Identification	–0.06	0.61*	0.76*
Passage Comprehension	0.12	0.41*	0.58*
	Phase 2, Week 25 IDAPEL		
Phase 2, Week 25 FIAT	FSP	FNM	FLO
Word Identification	0.25	0.52*	0.76*
Passage Comprehension	0.52*	0.47*	0.52*

Note: FSP, Facilité à segmenter les phonèmes; FNM, Facilité à lire des non-mots; FLO, Facilité en lecture orale; *$p < 0.05$.

criterion measures. The predictive validity coefficients between Phase 1 IDAPEL experimental measures and Phase 2 criterion variables are presented in Table 7.

Overall, participants' Week 2 scores are more representative of their skills, while Week 1 scores reflect floor effects. One noteworthy finding pertains to subjects' scores on PSF in Phase 1. Results show these scores to be significantly correlated with Phase 2 French PSF and English PSF scores, but not strongly correlated with other French reading skills. Hence the predictive validity of this measure could not be ascertained in this study.

Conversely, French FNM scores are significantly and positively related to other, later French reading skills (e.g., FLO and Word Identification scores). Phase 1 FNM scores strongly correlated with later Phase 2 FNM (0.60), FLO (0.65), and FIAT Word Identification (0.60) scores. These strong correlations provide support for this French

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Table 7. Predictive validity coefficients between Phase 1 Indicateurs d'habiletés précoces (IDAPEL) experimental measures and Phase 2 criterion variables.

	Phase 1 IDAPEL experimental measures							
	FSP		FNM		FLO			
Phase 2 criterion variables	W1	W2	W1	W2	W1	W2	FIAT-WI	FIAT-PC
FSP	0.36*	0.67*	0.04	–0.02	0.28	0.30*	0.21	0.34*
PSF	0.26	0.61*	0.04	–0.02	0.08	0.06	0.00	0.13
FNM	–0.19	–0.18	0.50*	0.60*	0.67*	0.68*	0.55*	0.36*
NWF	0.07	0.23	0.25	0.36*	0.45*	0.51*	0.33*	0.28
FLO	–0.18	–0.11	0.52*	0.65*	0.73*	0.84*	0.70*	0.44*
ORF	–0.17	–0.19	0.54*	0.60*	0.68*	0.81*	0.53*	0.42*
FIAT-WI	–0.04	–0.02	0.42*	0.60*	0.72*	0.76*	0.83*	0.61*
FIAT-PC	0.25	0.23	0.35*	0.44*	0.54*	0.61*	0.50*	0.43*

Note: FSP, Facilité à segmenter les phonèmes; PSF, Phonemic Segmentation Fluency; FNM, Facilité à lire des non-mots; NWF, Nonsense Word Fluency; FLO, Facilité en lecture orale; ORF, Oral Reading Fluency; FIAT-WI, French Immersion Achievement Test – Word Identification; FIAT-PC, FIAT – Passage Comprehension; W1, Week 1; W2, Week 2; *$p < 0.05$.

measure (FNM) to be a strong predictor of students' overall later French word decoding and oral reading abilities. Similarly, Phase 1 FLO scores are significantly correlated with later Phase 2 FLO (0.84) and FIAT Word Identification (0.76) scores. These results provide evidence for the predictive validity of two French measures (FNM and FLO) in predicting future reading performance, and would also suggest that early French oral reading skills are important for later French oral reading fluency skills.

To determine whether or not the IDAPEL measures are reliable across alternate forms, alternative form reliability for each of the three different IDAPEL measures was examined using Pearson's product–moment correlation coefficient for reliability. In all, 18 FLO alternate-form reliability coefficients were computed and had a range of 0.83–0.94. To reach a reliability of at least +0.90, Spearman–Brown formula (Nunnally, 1978) calculated a need for two probes or two alternative forms. Reliability between total scores on each version of FNM measure during Phase 1 was 0.79 with three probes or three alternative forms necessary for a reliability of 0.90. Similarly, reliability between total scores on each version of FSP during Phase 1 was 0.48, with 10 probes necessary for a reliability of 0.90 (all correlations significant at $p < 0.05$). Table 8 summarizes IDAPEL measure technical information.

A sequential regression analysis was performed with FIAT Passage Comprehension subtest Week 25 as the dependent variable and FSP, FNM, and FLO Weeks 1, 2, and 25 respectively as the independent variables. The regression was run to determine the variance explained by FSPW1 variable and the additional variance explained by the subsequent variables added to the model. The sequential regression revealed that all of the variables explained 53% of the variance in passage comprehension scores on the FIAT at Week 25, F (9, 47) = 4.85, $p < 0.001$. The results of the analysis are detailed in Table 9. The table describes the additional variance explained by adding each variable to the model.

With regards to evidence of change across the year or size of observed effects, Cohen's d (standardized mean difference) was used to calculate effect size and capture student gains from Week 2 to Week 25. Calculated effect size for FSP is 0.89, for FNM 1.18, and for FLO across three reading passages administered at Weeks 1 and 25, the effect sizes are 0.88, 0.85, and 0.91.

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Table 8. Indicateurs dynamiques d'habiletés précoces en lecture (IDAPEL) measures description and technical adequacy information.

IDAPEL		Reliability		Criterion-related validity		
Measure	Description	Alternative form	Multi-probe	Concurrent	Predictive	Criterion measure
FSP	Assesses ability to segment words into individual phonemes	0.48	0.80	0.25 WI	0.52* PC	FIAT
FNM	Assesses knowledge about letter–sound correspondences and ability to blend letter-sounds into words	0.79	0.90	0.52* WI	0.47* PC	FIAT
FLO	Assesses fluency reading connected text and reading comprehension	0.83–0.94	0.90	0.76* WI	0.52* PC	FIAT

Note: FSP, Facilité à segmenter les phonemes; FNM, Facilité à lire des non-mots; FLO, Facilité en lecture orale; FIAT, French Immersion Achievement Test; WI, Word Identification; PC, Passage Comprehension; *$p < 0.05$.

Table 9. Percent of variance explained for French Immersion Achievement Test (FIAT) Passage Comprehension in Week 25.

Source	df	*SS*	*F*	Change in variance explained	Cumulative % of variance explained
FSPW1	1	3.59	5.26*	6	6%
FNMW1	1	6.30	9.25**	12	18%
FLOW1	1	8.27	12.13**	15	33%
FSPW2	1	2.16	3.17	4	37%
FNMW2	1	0.00	0.00	0	37%
FLOW2	1	4.46	6.55*	8	45%
FSPW25	1	3.70	5.43*	6	51%
FNMW25	1	0.92	1.35	2	53%
FLOW25	1	0.36	0.52	0	53%

Note: FSPW1, 2 and 25, Facilité à segmenter les phonèmes Weeks 1, 2 and 25 respectively; FNMW1, 2 and 25, Facilité à lire des non-mots Weeks 1, 2 and 25 respectively; FLOW1, 2 and 25, Facilité en lecture orale Weeks 1, 2 and 25 respectively; *$p < 0.05$; **$p < 0.01$

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Discussion

Summary of results

Results from this study indicate that the French measure FSP is not a strong predictor of later French reading skills for these older students. This may be due to participants having adequate English phonological awareness skill which contributed to French reading outcomes. Given the age of these second grade participants, it seems that the French phonological awareness measure (FSP) was not able to capture participants' skill because they were out of range or were beyond this initial early reading skill in their native language given that they were reading in English. There is a strong possibility that the measure would be related to other French reading skills for younger French immersion students or French language-first students. There is evidence that the French measure FNM is a very strong, robust predictive measure. Evidence of growth reading French nonsense words indicates participants were making progress in their knowledge of the French alphabetic principle from the beginning to the end of the study. Nonsense word decoding abilities in both French and English seem to be reliable and important predictors of differences in French and English reading ability at this grade level, and that the measure, in either language, makes important contributions to our understanding of French immersion students' early literacy skills. There is also evidence to support the third French measure FLO as being a strong, robust measure useful in predicting later French reading outcomes. Both English and French nonsense word and oral reading fluency measures appear to be strong predictors of initial and later French reading ability.

These findings are similar to current study findings which have examined predictors of reading development in French immersion students. Jared, Cormier, Levy and Wade-Woolley (in press) found that having a grasp of the English alphabetic principle placed students at an advantage in learning to read in French. Erdos, Genesee and Savage (2008) have found that phonological awareness and alphabetic principle knowledge are unique English predictors of French reading outcomes.

While results from this study indicate both English and French oral reading skills appear to be important for later French oral reading fluency, subjects' French reading performance increased from beginning to end of the study, but not as much as English reading skills. A possible reason for less French reading improvement skill may be attributed to the fact that this specific population of students did not receive formal, explicit French reading instruction during the school year and may have received less practice reading in French than in English. Exposure to a high-quality beginning French reading program implemented with fidelity and rigor should help all French immersion students become strong readers in the French language.

Strong, positive correlations between participants' IDAPEL scores and FIAT scores demonstrates the concurrent criterion-related validity of the IDAPEL experimental measures. The reliability coefficients of alternate-forms of the French experimental measure show that alternate-form reliability was highest for DIBELS ORF-French followed by NWF-French and PSF-French.

Limitations

The first limitation concerns the internal consistency and the construct validity of the measures given at pre and post test. Given that the tests were similar pre–post, students may show an improvement simply as an effect of their experience with the pretests. While no single item of evidence is sufficient to establish construct validity, multiple types of evidence as provided in this study (both predictive and concurrent validity) strengthens construct validity, leaving internal validity assumed.

With regards to the sample population limitation, second grade partial French immersion participants were recruited because it was felt that students at this grade level had sufficient understanding of the French language to comprehend the directions for the tasks given in French. Partial immersion students from a younger grade-level may not have had the necessary comprehension skills to complete the tasks in French.

The reliability and validity of the FSP measure could not be clearly ascertained in this study given that most English first-language participants were older and were established readers in English at the beginning of the study. Thus, most of the participants may have been out of the range in which you would expect a measure of phonological awareness to function well. The technical adequacy of the FSP measure should be tested with younger kindergarten and first-grade-level students from full immersion programs as well as with native kindergarten and first-grade-level French speakers.

Another important limitation pertains to the FIAT passage comprehension subtest which used a CLOZE procedure. In a CLOZE procedure, words are deleted from a passage of text and the student is required to verbally fill in the missing word. While students may have understood the context of the sentence, the challenge was producing the missing word in the French language. Second-grade partial French immersion students lacked the necessary expressive language skills to complete this task. Future IDAPEL studies should use other French reading comprehension tests. It will be beneficial to validate further IDAPEL subtests with other criterion measures as only moderate correlations were found with the FIAT subtests.

Implications for practice

Overall, the results of the study provide support for the reliability and validity of IDAPEL FMN. Word decoding ability may be a skill that is not well established by

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second-grade and the measure itself may be relevant in explaining differences in students' French reading skill. Overall, results also provide support for the reliability and validity of IDAPEL FLO. In addition, given that the number of alternate forms needed for reliability is low for both FNM and FLO, we would have confidence about the individual educational decisions teachers would make about student reading skill when using these measures.

Given these findings, the following suggestions for practice are proposed: as curriculum-based measures, the IDAPEL test materials are designed to be of equal difficulty in order to assess student skill growth and change over time. Their primary advantage is that they are 1-minute measures, easily administered, and repeatable. Given their ease of use and robustness, the measures could be administered to *all* students in order to identify the lowest performing students, and subsequently provide these students with additional instructional support. Further data on student early reading performance can be obtained directly and briefly using repeated progress-monitoring materials at any given point in time for student requiring additional instructional support.

Directions for future research

The technical adequacy of French phoneme segmentation should be tested with younger French immersion students from total French immersion programs, as well as with native French speaking students learning to reading in French. Findings from this study suggest that for most second-grade participants, phonological awareness may be a skill that is well established by second-grade. There is a possibility that FSP is a measure that is no longer relevant in explaining differences in reading skills at that grade level, but could be relevant in earlier grades. Also, since few studies have examined predictors of reading development in French immersion students (Jared, 2008), replicating this study would build our knowledge base about such predictors, and especially about individual differences in literacy acquisition skills for this population of students.

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Conclusion

Literacy assessments such as IDAPEL and DIBELS provide a tangible solution to assessing bilingual learners with special needs by: (1) accurately identifying students at risk of insufficient reading gains in either language: (2) providing a means to monitor student growth relative to critical early literacy skills; and (3) providing information about individual differences in biliterate reading outcomes. The availability and use of such tools are important first steps toward planning appropriate student instructional support.

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