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### *Relationships Between the IDAPEL and the ÉCOLE Measures*

The present study provided us an opportunity to investigate the construct validity of the IDAPEL measures by investigating their relationships with other tests designed to measure the same constructs. We examined concurrent, criterion-related validity of the IDAPEL measures by reviewing at student performance on the IDAPEL assessments along with their performance on the criterion ÉCOLE measures both taken at the end of the school year. These relationships were assessed by computing the Pearson Product-Moment correlation among conceptually related scores for K and Grade 1. Grade 2 data were discarded from these analyses because the student sample size was insufficient for estimating reliability coefficients. Relevant correlations are reported in table 13.

Table 13

*Concurrent Criterion-Related Validity of IDAPEL and ÉCOLE Measures in Kindergarten and Grade 1.*

IDAPEL Measure	ÉCOLE Measure	Kindergarten		Grade 1	
		<i>n</i>	<i>r</i>	<i>n</i>	<i>r</i>
FSP	IIP	49	.54**	37	-.09
FSP	PHS	49	.54**	37	.18
FSP	PHE	49	.50**	37	.25
FDL	GRS	49	.68**		
FNM	GRS	49	.65**	37	.52**
FNM	WRead	49	.62**	37	.58**
FNM	NWRead	49	.68**	37	.44**
FNM	TXTRed	48	.70**	37	.63**
NMR	WRead	49	.33*	37	.17
NMR	NWRead	49	.28*	37	.10
NMR	TXTRed	48	.32*	37	.21
FLO	GRS			37	.71**
FLO	WRead			37	.87**
FLO	NWRead			37	.66**
FLO	TXTRed			37	.74**
FLO	WPM			37	.60**
FLO	SPM			37	.68**
ROR	WRead			26	.61**
ROR	NWRead			26	.52**
ROR	TXTRed			26	.66**
ROR	WPM			26	.60**
ROR	SPM			26	.63**

*Note.* FSP: Facilité à segmenter les phonèmes; FDL : Facilité à dénommer les lettres; FNM : Facilité à lire les nonmots; FLO : Facilité en lecture orale; ROR : Rapport oral du récit; IIP : Identification of initial phoneme; PHS : Phonemic Segmentation; PHE : Phonemic Elision; GRS : Grapheme Sounding; WRead : Word reading; NWRead : Nonword reading; TXTRed : Text reading; WPM : Word-Picture matching; SPM : Sentence-picture matching. Symbol \* means  $p < .05$ ; \*\* means  $p < .01$ .

By design, IDAPEL assessments measure specific reading-related skills and the fluency of their deployment. By contrast, a large proportion of the ÉCOLE measures used in this study are self-paced and focused on response accuracy only. Therefore, several of the correlation coefficients reported in Table 13 exclude the common variance that would be attributable to method similarity (i.e., in relating two fluency measures). Although this exclusion was expected to lower the observed correlation coefficients, most were found to be equal or above .50.

Most IDAPEL measures that tapped phonological awareness, decoding or reading skills were positively and significantly correlated with conceptually related ÉCOLE measures. The two exceptions to this pattern are found among the measures used at the end of Grade 1. For instance, FSP was not significantly correlated with any of the phonological awareness measures of the ÉCOLE battery in Grade 1; whereas a clear linear relationship was observed at the end of Kindergarten. Since the same ÉCOLE measures were used in both grades, the evidence suggests that the FSP test at the end of Grade 1 needs further examination and possibly some improvement. The second exception to the general pattern pertains to NMR. However, as noted earlier, the reliability of both FSP and NMR have been found to be a cause for concern. The magnitude of the mean scores and standard deviations reported in Tables 7 and 9 seem to rule out the possibility of a ceiling effect in Grade 1 performance on these measures. These results suggest that the FSP and NMR measures used at the end of Grade 1 require closer analysis.

### *Predicting Year-End Outcome*

The IDAPEL measures were primarily designed to track student progress over the school year. They could also serve to predict future success or failure in learning to read. This study permits us to explore the predictive validity of the IDAPEL measures by examining the



relationship between measures taken at the beginning of the school year and those taken at year end. In this section we report for Kindergarten and Grade 1 the correlations between measures taken at the beginning and the end of the school year. The correlations that pertain to Kindergarten and Grade 1 are reported in tables 14 and 15, respectively.

Table 14  
*Correlations Among the Measures Taken at The Beginning and The End of Kindergarten*

Measures taken at year end	Measures taken in the Fall			
	FPS		FDL	
	<i>r</i>	<i>n</i>	<i>r</i>	<i>n</i>
FDL	.61**	84	.76**	84
FSP	.55**	84	.50**	91
FNM	.60**	84	.67**	84
NMR	.40**	84	.45**	84
IIP	.55**	79	.41**	79
PHS	.53**	79	.36**	79
PHE	.56**	79	.57**	79
GRS	.57**	79	.61**	79
WRead	.59**	79	.50**	79
NWread	.58**	79	.46**	79
TXTread	.58**	65	.65**	65

*Note.*FSP: Facilité à segmenter les phonèmes; FDL : Facilité à dénommer les lettres; FNM : Facilité à lire les nonmots; FLO : Facilité en lecture orale; ROR : Rapport oral du récit; IIP : Identification of initial phoneme; PHS : Phonemic Segmentation; PHE : Phonemic Elision; GRS : Grapheme Sounding; WRead : Word reading; NWRead : Nonword reading; TXTRead : Text reading. Symbol \* means  $p < .05$ ; \*\* means  $p < .01$ .

The pattern of these results is clear and consistent: measures of FPS and FDL taken at the beginning of Kindergarten are positively and significantly correlated with all measures taken at year end (i.e., IDAPEL as well as ÉCOLE measures). All coefficients except for one are equal to

or greater than .40. These results strongly suggest that FPS and FDL are useful predictors of future performance in Kindergarten and they could be used to screen children at risk for difficulties in phonological analysis, letter learning, letter-string decoding, and single word reading.

The general pattern observed in the Grade 1 data is similar to that observed in the Kindergarten data: Measures taken at the beginning of the school year are positively and significantly correlated with most measures taken at year end. The significant correlations range from .19 to .74. The largest coefficients are found between early FDL and FNM and the late measures of oral reading (e.g. FLO, WRead). An unexpected finding is that the measure of NMR taken in the fall is not significantly correlated with the same measure taken in the spring. The dubious reliability of this measure has been noted earlier in this report. We now provide further evidence that it requires further analysis and adjustment. Overall, the results strongly suggest that FDL, FSP, and FNM are useful predictors of future performance in reading as indexed by multiple outcome indicators. According to Hopkins (2002) standards for predictive validity, correlations smaller than .09 indicate a very small relationship, .10 to .29 a small relationship, .30-.49 a moderate relationship, .50-.60 a moderate-strong relationship, and above .70 a strong relationship. The coefficients reported in Table 15 cover the entire range of these nominal categories. For the purpose of predicting future reading performance, FDL and FNM clearly are the best IDAPEL indicators.

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Table 15  
*Correlations Among the Measures Taken at The Beginning and The End of Grade 1*

Measures taken at year end	Measures taken in the Fall							
	FDL		FSP		FNM		NMR	
	<i>r</i>	<i>n</i>	<i>r</i>	<i>n</i>	<i>r</i>	<i>n</i>	<i>r</i>	<i>n</i>
FSP	0.17	86	.59**	86	.19*	86	0.14	86
FNM	.63**	86	.28**	86	.64**	86	.47**	86
NMR	.28**	86	.30**	86	.29**	86	0.07	86
FLO	.64**	86	.33**	86	.74**	86	.60**	86
ROR	.42**	58	0.06	58	.25*	58	.25*	58
IIP	0.04	51	0.05	51	.29*	51	.23*	51
PHS	0.16	51	.41**	51	.24*	51	.25*	51
PHE	.37**	51	.32*	51	.51**	51	.47**	51
GRS	.62**	51	.43**	51	.46**	51	.38**	51
WRead	.63**	51	.28*	51	.70**	51	.60**	51
NWread	.57**	51	0.16	51	.47**	51	.40**	51
TXTread	.68**	51	.24*	51	.47**	51	.36**	51
WPM	.48**	51	0.21	51	.41**	51	.37**	51
SPM	.51**	51	.35**	51	.42**	51	.31*	51

*Note.* FSP: Facilité à segmenter les phonèmes; FDL: Facilité à dénommer les lettres; FNM: Facilité à lire les nonmots; NMR: Nombre de mots recodés; FLO: Facilité en lecture orale; ROR: Rapport oral du récit; IIP: Identification of initial phoneme; PHS: Phonemic Segmentation; PHE: Phonemic Elision; GRS: Grapheme Sounding; WRead: Word reading; NWRead: Nonword reading; TXTRead: Text reading; WPM: Word-Picture matching; SPM: Sentence-picture matching. Symbol \* means  $p < .05$ ; \*\* means  $p < .01$ .

## Discussion

The primary purpose of the present study was to investigate the psychometric properties and usefulness of IDAPEL. Four general issues were considered: a) How sensitive are these indicators to changes in reading-related abilities over a school year? b) How reliable are these measures? c) How do these measures relate to an independent set of measures that tap the same constructs? And d) Can the measures taken at the beginning of a school year predict reading-related performance at year end? The results reported here provide fairly clear answers to these questions.

The main strategy for addressing the first question consisted of verifying if statistically significant change was detected from one measurement point to the next. The results indicate that most IDAPEL measures are sensitive to the change that occurred between the three time points at which data were collected (i.e. Fall, Winter, and Spring). The only measure that showed non-significant sensitivity is ROR in Grade 2. Grade 2 test results must be interpreted with caution as its sample size was exceedingly low, resulting in deflated statistical power. The same analyses were carried out on the ÉCOLE data to verify that these measures were also sensitive to changes in knowledge and skills from one year end to the next. Except for IIP, all measures were sensitive to change from the end of Kindergarten to the end of Grade 1. From Grade 1 to Grade 2, only measures of reading were found to be sensitive to skill growth; measures of phonological awareness and alphabetic knowledge were not. Again, the low sample size in Grade 2 may have prevented us from ascertaining real differences. Beyond these analyses Grade 2 data were not considered further.

The reliability of IDAPEL measures was investigated via the administration of alternate forms of the same test over a two-week time interval. Test-retest correlations and the application of

the Spearman-Brown Prophecy Formula confirmed that the reliability of most IDAPEL measures is satisfactory for mostly screening decisions and some for making important educational decisions at the individual student level. Weaker results were found for NMR and FSP in Grade 1. Although the current state of FSP is within the range of acceptability, NMR does require further attention and improvement. A similar analysis indicated that the correlations among alternate forms of FLO and ROR are typically very high ( $r \geq .80$ ), but lower at the end of Grade 1 ( $r$  between .66 and .75).

Construct validity was examined by inspecting the linear relationship between the IDAPEL measures and conceptually related ÉCOLE measures, both taken at the end of Kindergarten and Grade 1. Most IDAPEL measures were positively and significantly correlated with conceptually related ÉCOLE measures. FSP and NMR in Grade 1 were less strongly correlated with the outcome measures but this pattern is not entirely surprising since we found evidence that the reliability of these particular measures are on the low side of the spectrum. Such a condition is expected to lower the upper bound of their correlation with other measures and this is what was observed.

One desirable function of IDAPEL would be to help screen children at risk for future reading difficulty. Although the ideal time for such a screening operation is still an open question, there is fairly strong agreement that it should be done early, either in Kindergarten or early in Grade 1 (Fréchette & Desrochers, 2011; Rathvon, 2004). A required feature of screening tools is demonstrated predictive validity. To explore this feature we examined the correlation between all IDAPEL measures taken at the beginning of the school year and all measures taken at year end. In Kindergarten, early FPS and FDL were found to be strongly correlated with year-end measures of phonological awareness, letter knowledge and reading. In Grade 1 FDL and FNM were found to

be the most potent and consistent predictors of year-end measures of single-word and sentence reading.

To sum up, the present study permitted us to investigate several aspects of the IDAPEL measures: their sensitivity to change in student skills, their reliability, their construct validity, and their predictive validity. Even though some of these measures displayed some weaknesses, we report clear initial empirical evidence that the IDAPEL battery can serve several useful purposes (e.g. progress monitoring, screening children at risk of reading difficulty) and justify important screening decisions on individual students' standing.

As with any empirical study, continued study replication with similar sets of students remains important. The importance and need to replicate and extend findings with larger samples of student participants as well as with additional criterion measures cannot be understated.

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