J. Disability Stud. 2021, 7(2), 64-74

Research Article

JOURNAL OF DISABILITY STUDIES

Teachers' Differentiated Assessment Practices for Secondary Students with Exceptionalities: The More, the Better?

Pei-Ying Lin

University of Saskatchewan, Canada

Received on: February 26, 2021 Accepted on: November 15, 2021

ABSTRACT

A majority of the students with special needs who wrote the large-scale assessments received multiple test accommodations (e.g., assistive technology, computer, scribe) that change the regular test administration conditions in ways that support these students in demonstrating their knowledge and skills. This study examined bundled accommodations by conducting a comprehensive review of 11 groups of students with special needs writing large-scale math and literacy assessments in Ontario, Canada. We concluded that receiving complex bundled accommodations did not necessarily mean better math or literacy achievements. However, we found that teachers may offer more accommodations to students for a high-stakes literacy test than they did for the low-stakes math assessment. Furthermore, the results of this study show that high percentages of bundled accommodations were provided with only one student in a given group with special needs. Directions for future research and implications for education are also discussed in this paper.

Keywords: accommodations, disabilities, large-scale assessment, literacy, math

INTRODUCTION

There have been increasing concerns about the equity or fairness of classroom and large-scale assessments for students with special needs placed in inclusive classroom settings due to the school accountability and promotion of opportunity to learn for these diverse student populations. Students with special needs who are educated in the general classroom are required to take the provincial or statewide assessments such as math or literacy tests. Schools of students with special needs have been under pressure to improve their passing rates on high-stakes assessments, especially for those tests that are required for a high school diploma. There is a need for appropriate test accommodations that change the regular test administration conditions in ways that support students with special needs in demonstrating their knowledge and skills, but do not change what the test is intended to measure (e.g., American Educational Research Association et al., 2014; National Research Council, 2004; Principles for Fair Student Assessment Practices for Education in Canada, 1993). For example, imagine a student who cannot read the usual printed version of a literacy test because he has a visual impairment. Without an accommodation, this student will probably receive a score of zero on the test, even though he may in fact have the knowledge and skills required to answer the questions. Because the purpose of the test is to measure students' literacy knowledge and skills, not their ability to read small printed text, providing a large-print version or a Braille version of the test would be an appropriate accommodation.

It is not surprising that states have increased the numbers of allowed accommodations for these students and continually modify the assessment policies over time (Christensen, Braam, Scullin, & Thurlow, 2011; Christensen, Lazarus, Crone, & Thurlow, 2008; Clapper, Morse, Lazarus, Thompson, & Thurlow, 2005; Lazarus, Thurlow, Lail, Eisenbraun, & Kato, 2006; Thurlow, House, Boys, Scott, & Ysseldyke, 2000; Thurlow, Lazarus, Thompson, & Robey, 2002). There are diverse accommodation options, and the current literature often classifies these into four or five categories. Timing, setting, presentation and response modalities are four common categories in the previous studies (Bolt & Thurlow, 2004; Cawthon, Kaye, Lockhart, & Beretvas, 2012; Gregg, 2012; National Research Council, 2004; Ysseldyke, Thurlow, McGrew, & Shriner, 1994). Other researchers such as Fuchs, Fuchs, and Capizzi (2005) discussed timing, setting, test format for presentation or responding, technological supports (e.g., assistive communication device, word processor, adaptive pencils or other writing aids). The American flagship institute, the National Center on Educational Outcomes (NCEO), has adopted the five-category system: scheduling (timing), setting, presentation, response, and equipment and material accommodations (Christensen et al., 2011; Christensen et al., 2008; Thurlow, Rogers, & Christensen, 2010; Thurlow, Lazarus, Thompson, &

*Corresponding Author Email: pei-ying.lin@usask.ca

Cite as: Lin, P. Y. (2021). Teachers' differentiated assessment practices for secondary students with exceptionalities: The more, the better?. *Journal Disability Studies. 7*(2), 64-74.

©IS Publications ISSN: 2454-6623 http://pubs.iscience.in/jds

Morse, 2005). In reality, teachers offer varied bundles of accommodation packages to a majority of students with special needs (e.g., extended time, setting, computer, read aloud), instead of a single subtype of accommodation (e.g., computer)(Cawthon, Kaye, Lockhart, & Beretvas, 2012; Fletcher et al., 2009; Fuchs, Fuchs, & Capizzi, 2005; Kettler, 2012); each bundled package consists of different subtypes of accommodations. However, there is still limited research on the relationships between various bundled packages, math and literacy outcomes for students with special needs. Most accommodation studies primarily focus on a few major accommodations such as extended time and real-aloud accommodations (Phillips, 2011; Sireci et al., 2005; Tindal & Anderson, 2011). Critics have argued that it is critical to examine bundled accommodations, instead of just studying a particular accommodation in isolation, to better reflect the reality of assessment practices (Elliott, Kratochwill, & McKevitt, 2001).

It is recommended that the accommodations used for large-scale assessments should be consistent with regular classroom practices, including an Individual Education Plan (IEP), teaching and classroom assessment. Researchers also suggest that decision-making stakeholders should connect instructional and test accommodations to ensure students are familiar with the accommodations prior to using them in testing (Cox, Herner, Demczyk, & Nieberding, 2006; Johnson, Kimball, & Brown, 2001). It has been mandated to monitor accommodations availability and use by examining the link between IEP-determined instructional and test accommodations (Christensen, Lazarus, Crone, & Thurlow, 2008; Christensen, Thurlow, & Wang, 2009; Thompson, Morse, Sharpe, & Hall, 2005; Thurlow, Christensen, & Lail, 2008). Therefore, it is critically important to understand teachers' accommodation practices for students educated in inclusive classroom settings.

Regarding teachers' accommodation practices, Tindal, Lee, and Ketterlin-Geller (2008) found primary and middle school special education and general education teachers rated very highly or highly the potential benefits of accommodations for math. Lin and Lin (2015) also found that a group of teachers favored accommodations for students with special needs and English language learners rather than using other assessment practices (assessment *for*, *as*, *of* learning). However, in an earlier study, Fuchs et al. (2000a) indicated that teachers were over-accommodating students with learning disabilities for a reading comprehension test. Similar findings were also found in mathematics (Fuchs, Fuchs, Eaton, Hamlett, and Karns, 2000b). Researchers suggest that providing unnecessary accommodations may jeopardize student achievement because these accommodations may actually confuse or distract the students (Helwig & Tindal, 2003; Ketterlin-Geller, Alonzo, Braun-Monegan, & Tindal, 2007). Given that findings from previous studies on multiple accommodations were practical and useful, it is unclear whether they apply to broader and larger student populations- other than students with learning disabilities- in more recent years. The present study adds updated empirical results to the limited body of current literature about bundled accommodations by conducting a comprehensive review of different groups of students with special needs writing large-scale math and literacy assessments.

The present study examines two main research questions: (a) What do patterns in teachers' use of bundled accommodations suggest?; (b) Do teachers' accommodation practices of provincial assessments differ for high-stakes versus low-stakes testing?; and (c) What are the relationships between the number of subtypes in a bundled package and the math and literacy outcomes of students with special needs?

METHODS

Participants

The participants in the present study were Canadian students with special needs who wrote the English version of the Grade 9 math assessment (N = 11,406) and the Ontario Secondary School Literacy (OSSLT) for Grade 10 (N = 19,653) in 2012-2013. The assessments are developed and administered annually by the Educational Quality and Accountability Office (EQAO). Compared with the Grade 9 math assessment, the OSSLT is a high-stakes literacy assessment, the passing of which is a graduation requirement for high school students in Ontario. The present study analyzed all groups of students with special needs who IEPs and/or formally identified by the Identification, Placement, and Review Committee in Ontario (Ontario Ministry of Education, 2009) placed in the general classroom, including autism spectrum disorders (ASD), visual impairments (VI), hearing impairments (HI), developmental disabilities (DD), emotional or behavioural disorders (EBD), intellectual disabilities (ID), language impairments (Language), learning disabilities (LD), multiple disabilities (Multiple), physical disabilities (Physical), and speech disorders (Speech). Given that this study was conducted at a macro level, one cannot assume that participants of the present study represent homogenous groups as their level of needs may vary on an individual basis.

The descriptive statistics suggest that the percentages of accommodated examinees were higher for the high-stakes assessment, the OSSLT, than for the Grade 9 math assessment for all students with special needs except for those with speech disorders (ranging from 50.00% to 98.40%, 50.00% to 88.91%, respectively)(Table 1). A complete list and definitions of accommodations allowed for math and literacy tests is presented in Table 2 (EQAO, 2012, 2013). Note that the definitions of the accommodations were given by the testing agency.

It is worth noting that the accommodation assignment decisions were made at the local level, and therefore, it is not possible to investigate the decision-making process for each individual with special needs in this large-scale population-based research. There is no publicly available report that offers an answer to why a student received a specific bundled package for the math and literacy assessments. The investigation of teachers' decision-making process for a student with special needs is outside the scope of this study.

Data Analysis

Several statistical methods were employed in this study to address the research questions. First, the processes of data management were performed separately for math and literacy datasets by coding each bundled accommodation package one by

Table 1 ***Frequencies of Student Groups with and without Accommodations for Math and Literacy***

Grade	Group	Accommodated		Non-Accommodated		Total
Grade 9 Math	ASD	494	83.16%	100	16.84%	594
	VI	51	87.93%	7	12.07%	58
	HI	89	68.99%	40	31.01%	129
	DD	15	53.57%	13	46.43%	28
	EBD	458	78.16%	128	21.84%	586
	ID	484	83.30%	97	16.70%	581
	Language	497	88.91%	62	11.09%	559
	LD	6954	84.69%	1257	15.31%	8211
	Multiple	437	84.36%	81	15.64%	518
	Physical	101	74.26%	35	25.74%	136
	Speech	3	50.00%	3	50.00%	6
	Total	9583	84.02%	1823	15.98%	11406
Grade 10 Literacy	ASD	802	95.20%	40	4.80%	842
	VI	63	98.40%	1	1.60%	64
	HI	150	84.70%	27	15.30%	177
	DD	140	84.80%	25	15.20%	165
	EBD	887	93.90%	58	6.10%	945
	ID	1980	96.40%	74	3.60%	2054
	Language	1022	97.80%	23	2.20%	1045
	LD	12690	96.20%	497	3.80%	13187
	Multiple	922	96.20%	36	3.80%	958
	Physical	180	93.80%	12	6.30%	192
	Speech	12	50.00%	12	50.00%	24
	Total	18848	95.90%	805	4.10%	19653

Note. autism spectrum disorders (ASD), visual impairments (VI), hearing impairments (HI), developmental disabilities (DD), emotional or behavioural disorders (EBD), intellectual disabilities (ID), language impairments (Language), learning disabilities (LD), multiple disabilities (Multiple), physical disabilities (Physical), and speech disorders (Speech).

one in SPSS 20 (IBM Corp., 2011). The codes created in this study are mutually exclusive; in other words, no examinee was assigned to more than one package. For instance, 'extended time' was coded as one package and 'extended time and scribing' was coded as another. Using the same example, the former was counted as one subtype in the package and the latter was counted as two subtypes in that package. Once the coding procedures were completed and further checked by authors and a graduate research assistant, the number and percentage of examinees using a given bundle package for math and literacy was computed separately for further group analysis (Tables 3 and 4). The number and percentage of subtypes provided by teachers for math and literacy were also analyzed separately for each student group (Figures 1 to 11). To examine the relationships between the number of subtypes in each bundle of packages and students' literacy and math achievements, a statistical method- polyserial correction- was applied to both math and literacy datasets (Table 5). This method is appropriate for analyzing the association between an ordinal (number of subtypes) and a continuous variable (literacy or math scores) (Fernandez & Moldogaziev, 2013; Olsson, Drasgow, & Dorans, 1982).

RESULTS

The percentages of one to twelve subtypes in bundled packages offered by teachers for their students with special needs, as well as the percentages of subtypes used by the students were plotted in Figures 1 to 11. These percentage curves produced rich information regarding teachers' accommodation practices and 11 groups of students' use of accommodations for math and literacy. These curves allow us to compare and contrast (1) teachers' accommodation practices for low-stakes (math) versus high-stakes (literacy) tests (green curves versus red curves in all figures), (2) students' use of bundled accommodations for low- versus high-stakes assessments (grey dash curves versus black dash curves in all figures), and (3) teachers' versus students' uses of accommodations for low- and high-stakes tests. We also carried out these three sets of comparisons within a group and across 11 disability groups.

In the first set of comparisons, there is a consistent pattern across 11 groups showing that the peaks of green curves (teacher's math practices) always occurred before the peaks of red curves (teacher's literacy practices). For example, approximately 23% of teachers offered three types of accommodations for their students with multiple disabilities writing the math assessment (the green curve in Figure 9), whereas about 24% of teachers offered six types of accommodations for test takers with multiple disabilities participating in the literacy test (the red cure in Figure 9).

In the second set of comparisons, there are heavy tailed frequency distributions of students' use of accommodations for math, where the frequently used types are clustered at the lower end (e.g., 2 or 3 types) and heavy tails point towards the higher end (grey dash lines). In contrast, the frequency distributions of accommodations for literacy have relatively thin tails pointing

Table 2 ***Accommodation Allowed for Math and Literacy (EQAO, 2012, 2013)***

Allowed Accommodation	Definition	OSSLT	Grade 9 Math
Setting	An individual or small-group setting or an individual study carrel	X	X
Seating	Preferential seating within the regular classroom	X	X
Assistive Devices	Assistive devices or adaptive equipment	X	X
Prompts	Prompts to draw the student's attention back to the test	X	X
Time	Additional time, to a maximum of double the time allotted	X	X
Breaks	Periodic supervised breaks	X	X
Sign Language	Sign language or an oral interpreter	X	X
Braille	Braille version	X	X
Large Print	Large-print version	X	X
Coloured Paper	Coloured-paper version	X	X
Large Coloured Paper	Large-print, coloured-paper version	X	X
Audio Recording	Audio version (CD)	X	X
Reading	Verbatim reading of writing prompts and tasks	X	
Assistive Technology	Assistive technology (an electronic version used with technology such as text-to-speech software)	X	X
Instructions	Verbatim reading of instructions and/or questions		X
Computer	Use of computer, word processor or assistive device and technology for recording responses	X	X
Audio	Audiotaping of responses	X	X
Videotape Response	Videotaping of responses (reading component only)	X	X
Scribing	Verbatim scribing of responses	X	X
Double Time	More than double the time allotted (with the written permission of the Chief Assessment Officer, EQAO)	X	X
Special Permission Temporary Conditions	This student has no IEP but has received the appropriate supervisory officer's permission for accommodations owing to temporary circumstances.	X	X
Special Permission from Principals	This student has recently arrived from another school and has no IEP but has received the appropriate supervisory officer's permission for accommodations.	X	X

Note: *n* = The number of bundled packages used by one to nine students; % = the percentages of bundled packages used by one to nine students; autism spectrum disorders (ASD), visual impairments (VI), hearing impairments (HI), developmental disabilities (DD), emotional or behavioural disorders (EBD), intellectual disabilities (ID), language impairments (Language), learning disabilities (LD), multiple disabilities (Multiple), physical disabilities (Physical), and speech disorders (Speech).

towards the higher end (black dash lines), whereas the frequently used types are clustered at the higher end (6 or 7 types). For instance, nearly 33% of students with hearing impairments used two types of accommodations for math, while 5% of students with hearing impairments used two types of accommodations for literacy (the grey dash line in Figure 3). However, approximately 11% of students with hearing impairments used seven types of accommodations for literacy (the black dash line in Figure 3), whereas no students with hearing impairments used seven types of accommodations for math (the grey dash line in Figure 3).

In the last set of comparisons, there is a clear trend showing that teachers tended to offer more subtypes of accommodations (four subtypes per bundled package for math, see green curves in Figures 1 to 11; four to six subtypes per package for literacy, see red curves in Figures 1 to 11), whereas more students received fewer subtypes of accommodation in their accommodation packages (two to four subtypes per package for math, see grey dash curves in Figures 1 to 11; three to four subtypes per package for literacy, see black dash curves in Figures 1 to 11). We investigated these discrepancies and found that teachers often offered a very wide range of bundled accommodations. For example, students with ASD received 96 bundled packages for math and 188 bundled packages for literacy (Tables 3 and 4). A total of 69 and 188 bundled packages were offered to test takers with EBD for math and literacy, respectively. For examinees with ID, teachers offered 84 and 307 bundled packages in total for math and literacy. The groups with language impairments used 87 and 183 bundled packages while writing math and literacy

assessments. Moreover, 323 bundled packages for math and 574 packages for literacy were offered to students with LD (Tables 3 and 4). Examinees with multiple disabilities wrote math and literacy assessments with 91 and 238 bundled packages, respectively. Our findings from further analyses suggest that these apparent discrepancies were due to the fact that a large number of bundled packages were only used by one student (ranging from 44% to 75% for math; 36% to 91% for literacy)(see first row of Tables 3 and 4). It is also striking to find that teachers provided a bundled package that contained up to 11 or 12 subtypes of accommodations (see green and red cures in Figures 1 to 11). Overall, our results show that more students were accommodated for the high-stakes literacy test; at the same time, more bundled packages were offered than for the low-stakes math assessment.

Most of the results from polyserial correlation analyses indicate that there were slightly negative correlations between the number of subtypes per bundled package and math outcomes although they did not reach the statistical significance level and the magnitudes of relationships were small and negligible (Table 5). These results were also true for the literacy test. The findings suggest that more accommodations in a bundle package did not necessarily result in better math or literacy performances for students with special needs

Table 3 Number of Students Received a Distinct Bundled Accommodation Package for Math

	ASD		VI		HI		DD		EBD		ID		Language		LD		Multiple		Physical		Speech	
No.	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
1	50	52	24	75	21	64	9	75	40	58	41	49	40	46	142	44	45	49	31	70	1	50
2	18	19	3	9	5	15	3	25	4	6	15	18	14	16	43	13	14	15	6	14	1	50
3	2	2	3	9	1	3	0	0	5	7	2	2	10	11	28	9	6	7	1	2	0	0
4	7	7	0	0	1	3	0	0	5	7	7	8	7	8	14	4	6	7	0	0	0	0
5	3	3	1	3	0	0	0	0	4	6	2	2	2	2	13	4	3	3	2	5	0	0
6	2	2	1	3	1	3	0	0	0	0	0	0	1	1	6	2	2	2	1	2	0	0
7	2	2	0	0	1	3	0	0	1	1	2	2	1	1	6	2	1	1	0	0	0	0
8	0	0	0	0	1	3	0	0	1	1	3	4	3	3	9	3	2	2	1	2	0	0
9	2	2	0	0	1	3	0	0	1	1	0	0	0	0	3	1	2	2	0	0	0	0
Subtotal of Bundled Packages Listed Above																						
	86	90	32	100	32	97	12	100	61	88	72	86	78	90	264	82	81	89	42	95	2	100
Total of Bundled Packages Used by a Group																						
	96	100	32	100	33	100	12	100	69	100	84	100	87	100	323	100	91	100	44	100	2	100

Table 4 Number of Students Received a Distinct Bundled Accommodation Package for Literacy

	ASD		VI		HI		DD		EBD		ID		Language		LD		Multiple		Physical		Speech	
No.	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*N*	%	*n*	%	*n*	%	*n*	%	*n*	%
1	95	51	43	86	36	55	46	61	93	49	128	42	96	52	206	36	113	47	59	68	10	91
2	26	14	3	6	13	20	14	19	31	16	49	16	28	15	74	13	35	15	10	11	1	9
3	13	7	2	4	6	9	9	12	14	7	28	9	13	7	41	7	20	8	7	8	0	0
4	14	7	2	4	4	6	1	1	17	9	13	4	10	5	28	5	14	6	3	3	0	0
5	6	3	0	0	2	3	1	1	6	3	14	5	6	3	10	2	9	4	3	3	0	0
6	5	3	0	0	1	2	2	3	4	2	10	3	3	2	18	3	10	4	1	1	0	0
7	4	2	0	0	2	3	1	1	2	1	6	2	3	2	12	2	7	3	0	0	0	0
8	8	4	0	0	0	0	0	0	0	0	6	2	2	1	18	3	5	2	1	1	0	0
9	1	1	0	0	0	0	0	0	1	1	10	3	2	1	4	1	3	1	0	0	0	0
Subtotal of Bundled Packages Listed Above																						
	172	91	50	100	64	98	74	99	168	89	264	86	163	89	411	72	216	91	84	97	11	100
Total of Bundled Packages Used by a Group																						
	188	100	50	100	65	100	75	100	188	100	307	100	183	100	574	100	238	100	87	100	11	100

Note. No.= N**o.** of Students *n* = The number of bundled packages used by one to nine students; % = the percentages of bundled packages used by one to nine students; autism spectrum disorders (ASD), visual impairments (VI), hearing impairments (HI), developmental disabilities (DD), emotional or behavioural disorders (EBD), intellectual disabilities (ID), language impairments (Language), learning disabilities (LD), multiple disabilities (Multiple), physical disabilities (Physical), and speech disorders (Speech).

Table 5 Polyserial Correlations Between the No. of Subtypes in Each Bundle of Packages and Students' Math & Literacy Achievements

Group	Math ρ	Literacy ρ
ASD	-0.13**	-0.06
VI	-0.20	-0.12
HI	-0.07	-0.10
DD	-0.12	-0.02
EBD	0.08	-0.04**
ID	-0.09	0.06
Language	-0.13**	-0.02**
LD	-0.02**	0.03**
Multiple	-0.18	0.10
Physical	0.11	-0.16
Speech	–	-0.09

**$p < .01$

Note 1. As the sample size of students with speech disorders, the algorithm for polyserial correction for this group did not converge. *Note 2*. Autism spectrum disorders (ASD), visual impairments (VI), hearing impairments (HI), developmental disabilities (DD), emotional or behavioural disorders (EBD), intellectual disabilities (ID), language impairments (Language), learning disabilities (LD), multiple disabilities (Multiple), physical disabilities (Physical), and speech disorders (Speech).

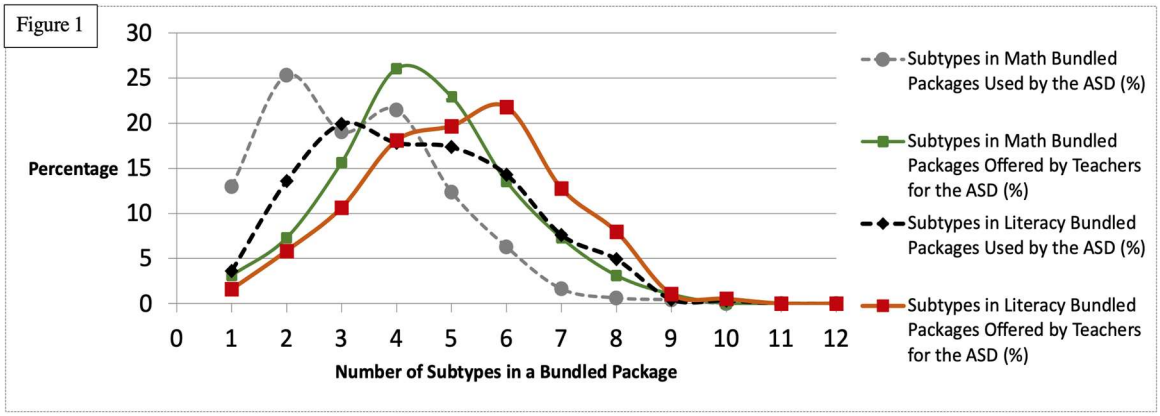
P = Polyserical Correlation Coefficient

Discussion

Based on our three sets of comparisons and further analyses, we revealed consistent and interesting patterns in accommodation practices for different groups of students with special needs. Using these findings, we discuss teachers' beliefs and practices of accommodations for low-stakes math and high-stakes literacy tests in the following section. It is worth noting that we employ a population-based approach to study the accommodation practices at the provincial level. It is important to keep in mind that each group of students studied in the present study are not homogenous, and therefore, the results should be interpreted with caution. Although one may be interested in knowing why a student received a particular bundle package, we wanted to point out that each accommodation decision was made at the local level and the reasons for each are not available, and the question is also out of the scope of our investigation.

A clear pattern was observed across different groups of students with special needs: Although more test takers received two, three, or four kinds of accommodations when taking the Grade 9 math assessment and used three or four accommodations for the Grade 10 literacy test, teachers more often offered four types of accommodations for math and five to six kinds of accommodations for literacy (Figures 1 to 11). Furthermore, teachers included up to twelve accommodations in their students' accommodation packages. That is, compared with the patterns

Figures 1 to 11 Percentages of subtypes in bundled packages used by the students and offered by teachers for math &literacy



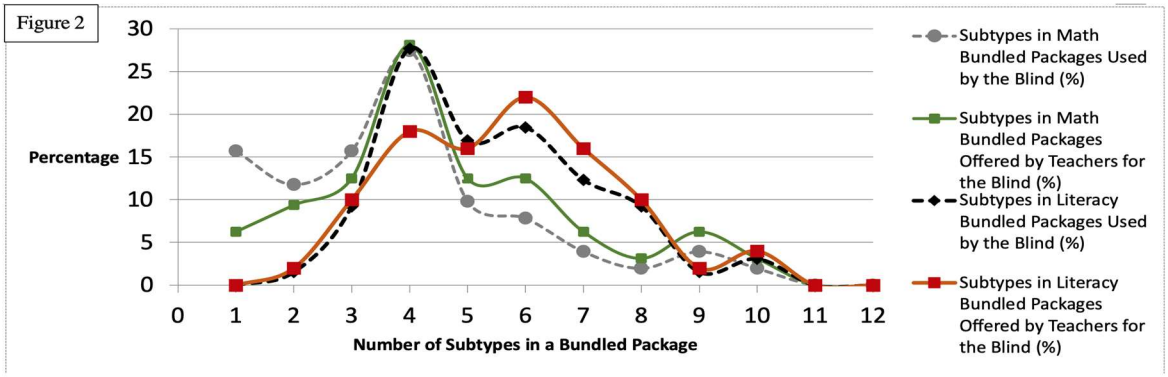


Figure 3

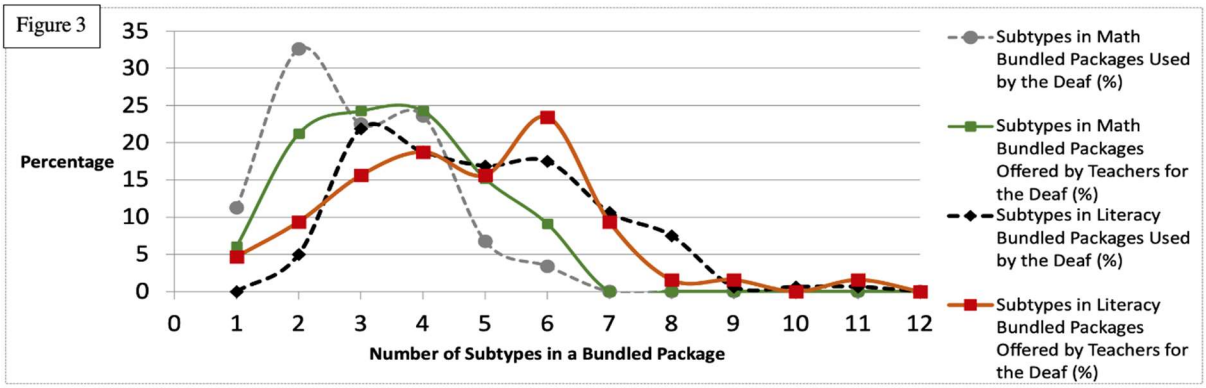


Figure 4

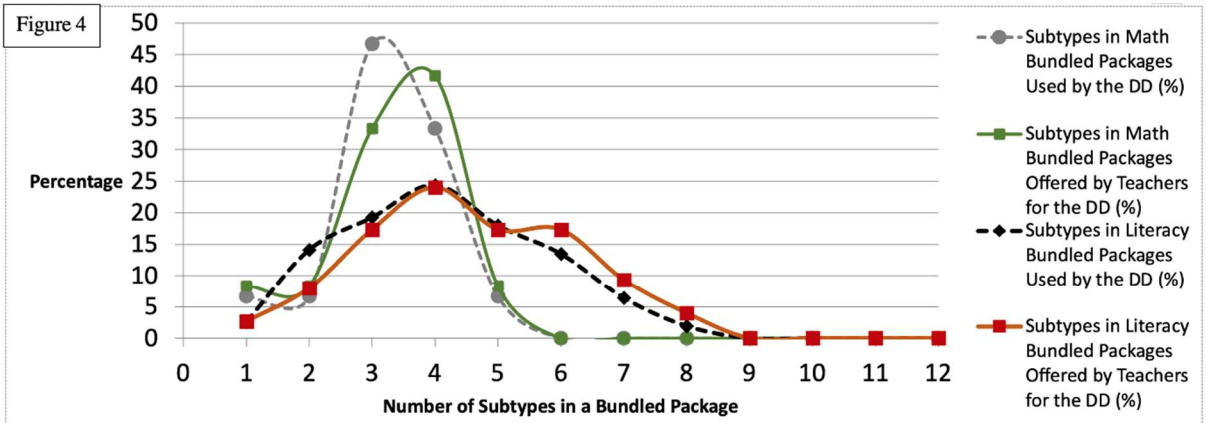


Figure 5

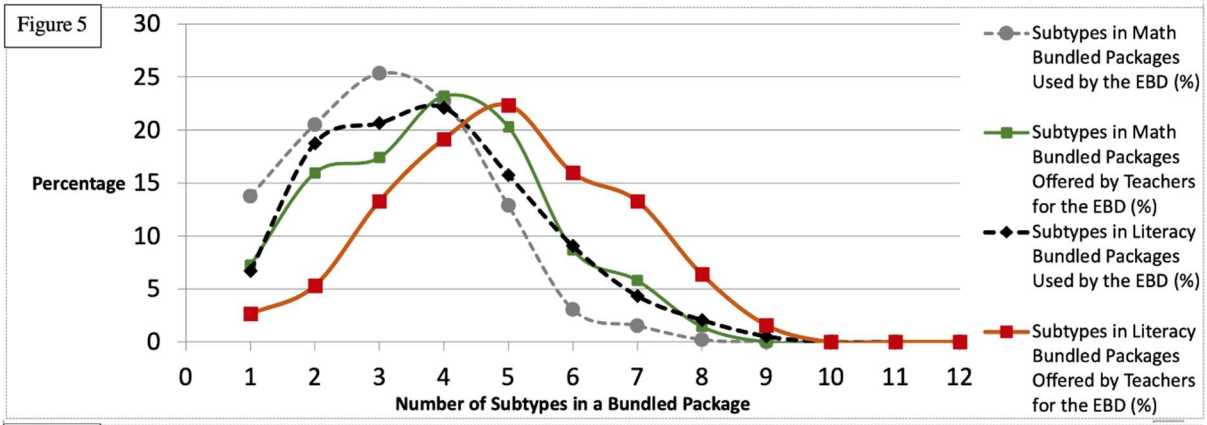


Figure 6

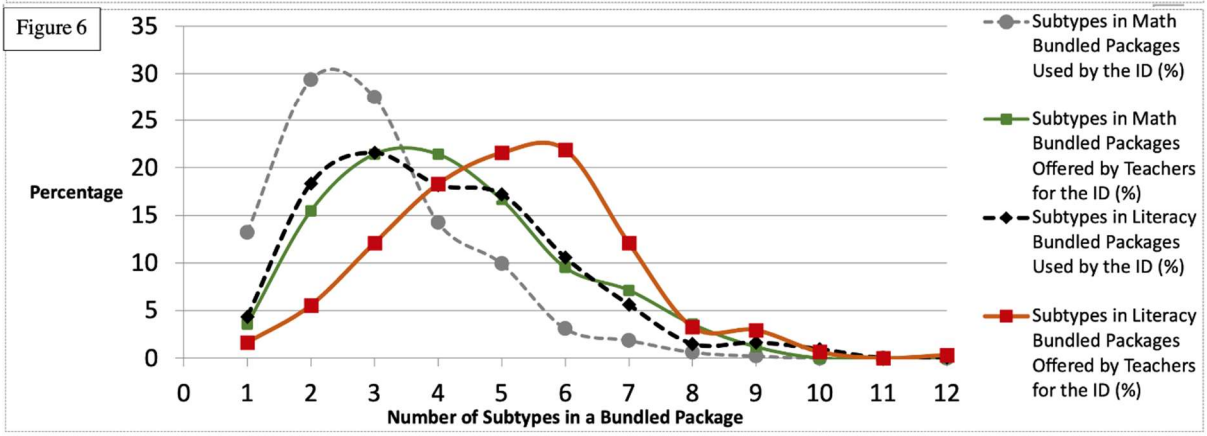


Figure 7

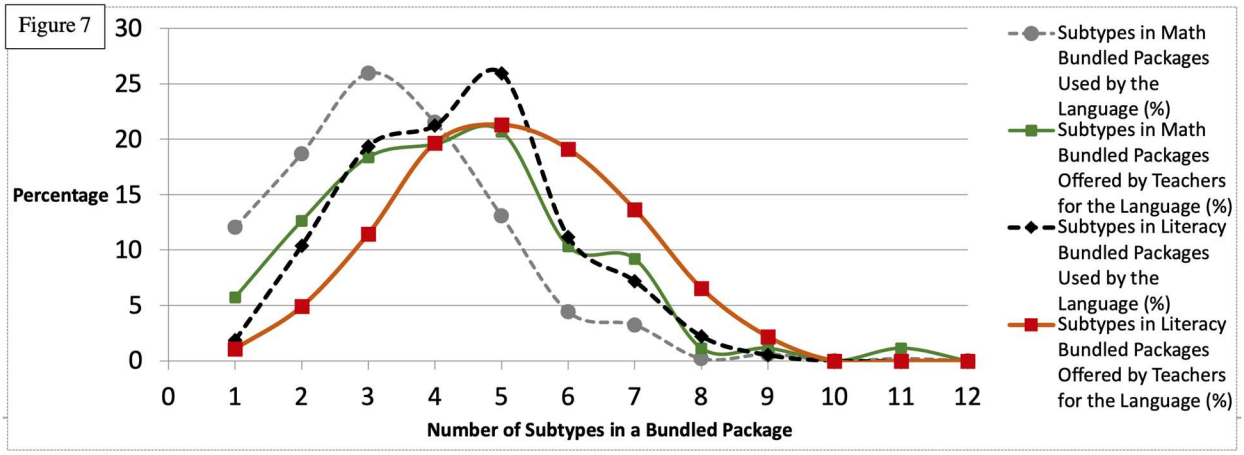


Figure 8

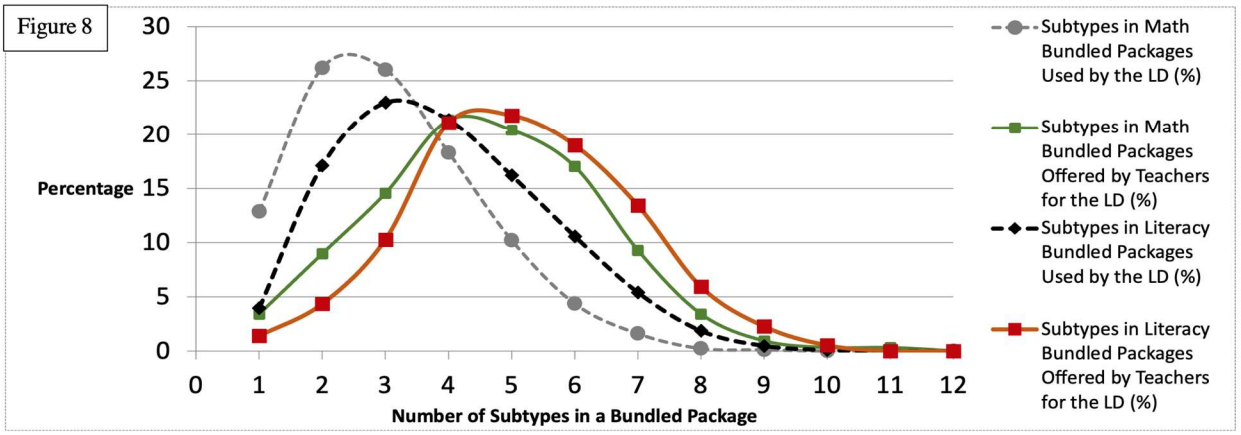


Figure 9

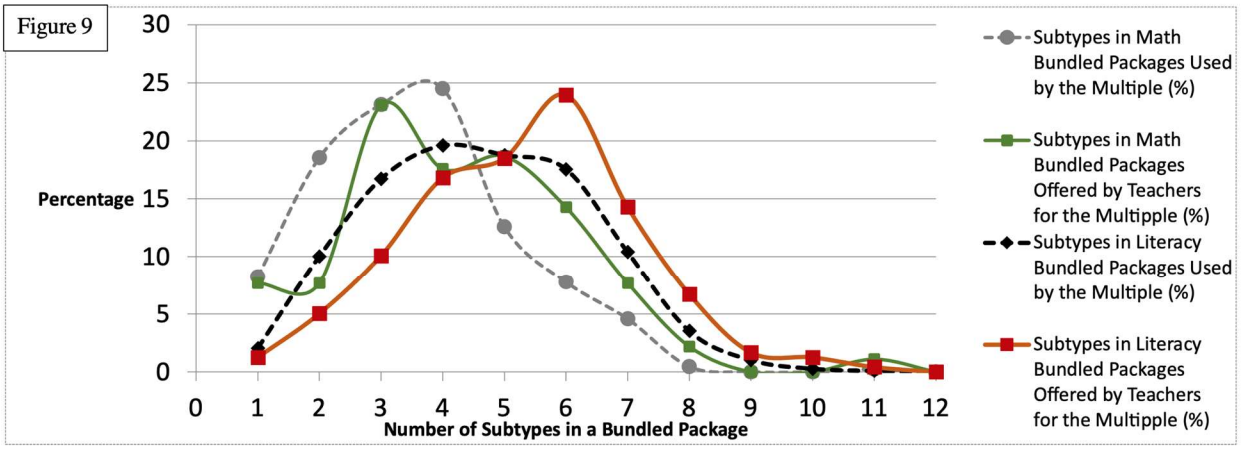
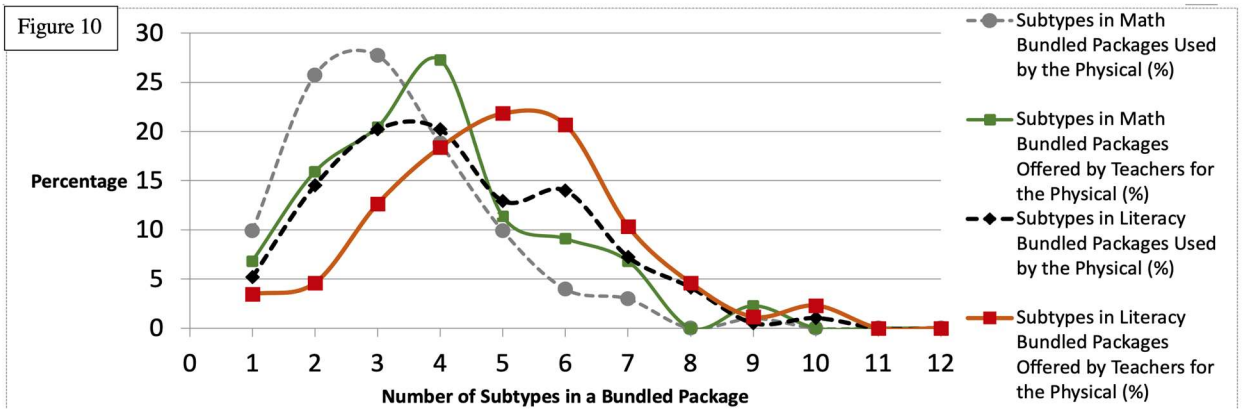
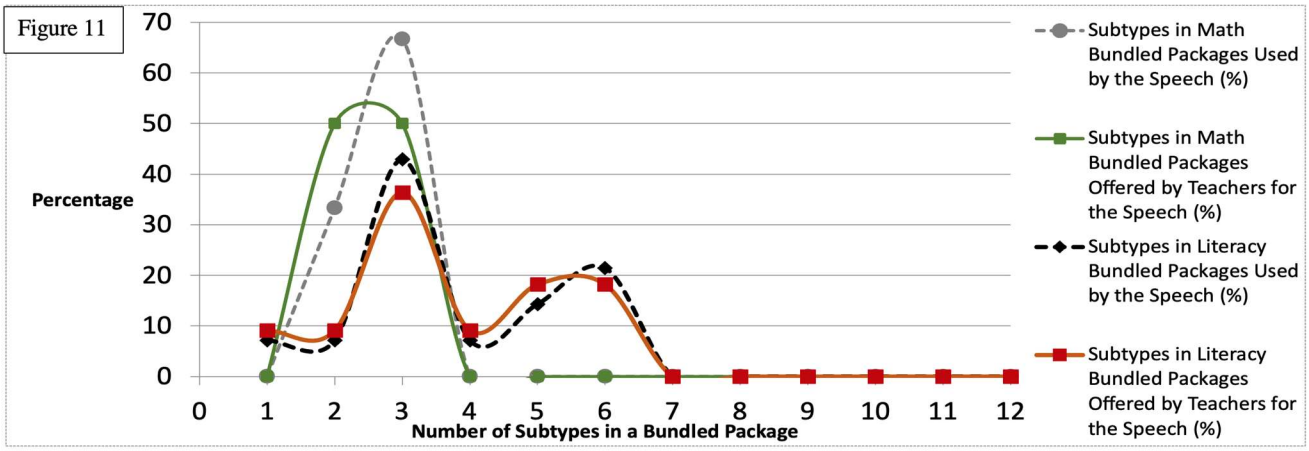


Figure 10





observed among students' use of accommodations, teachers were inclined to provide a greater number of accommodations to their students with special needs, especially for the high-stakes literacy test. There are two possible explanations for these findings: On the one hand, teachers tended to have positive beliefs and attitudes toward accommodations. Tindal et al. (2008) reported that special education and general classroom teachers were very positive about the potential benefits of accommodations for math. Lin et al. (2015) also found that special education and general classroom teachers were more positive about the use of accommodations than they were for other assessment concepts. On the other hand, it is likely that some teachers may assume that more accommodations mean better student academic performances. In an earlier study, Fuchs et al. (2000a) found that teachers' decisions were affected by certain 'performance variables' (e.g., lower reading performances, IQ scores, and had been retained more years in schools)(p. 78). In addition, those teachers over-accommodated students with LD for a reading comprehension and a math test (Fuchs et al., 2000a, 2000b). Our results from polyserial correction analyses reveal that the association between the number of accommodations and math assessment is very weak, or even yields negative correlations (Table 5). For instance, students with autism spectrum disorders who received more accommodations had poorer math performances in the present study (Table 5). This phenomenon was also observed in the literacy test. Our findings accord with earlier observations, which showed that unnecessary accommodations may distract or confuse the students and subsequently compromise student achievements (Helwig & Tindal, 2003; Ketterlin-Geller, Alonzo, Braun-Monegan, & Tindal, 2007). Previous research also raised some serious concerns over the decisions made by teachers. It has been reported that teachers' judgments were consistent approximately 50 percent of the time and had difficulty in accurately predicting how students would benefit from the assigned accommodations (Helwig et al., 2003; Tindal et al., 2008). We recommend that teacher education and professional development programs provide teachers with opportunities for re-visiting their assessment beliefs and clarifying the misconceptions about accommodations. More specifically, Destefano, Shriner, and Lloyd (2001) suggest teachers document those instructional accommodations; that could be useful for assessment purposes as a way to avoid over-accommodation. Further, keeping track of the use of accommodation can also avoid such misuse (Shriner & Ganguly, 2007).

The findings of the present study show that teachers' decisions on accommodations may depend on whether or not a test is high-stakes. A heated debate has been taking place about the relationship between school accountability and high-stakes assessments over the years. Many researchers have argued that it is necessary to shift the current paradigm from testing to student-centered learning; such conversations have caused tensions between advocates of formative assessments for continuous improvement of teaching and learning and the supporters of summative assessments for reporting and accountability purposes (e.g., Birenbaum et al., 2006; Black & Wiliam, 1998a, 1998b; Brindley 2001; Harlen, 2005; Harlen & James, 1997; Remesal 2011; Tan, 2011; Teasdale & Leung, 2000). The results of this study do not support teachers' assessment practices in terms of believing that it is better to offer more accommodations to students or accommodate more students for high-stakes assessments. What is the most important is however that the assigned accommodations improve student access to learning and measurement of learning outcomes (e.g., Bolt & Thurlow, 2004; Fuchs, Fuchs, & Capizzi, 2005; Pitoniak & Royer, 2001; Sireci, Scarpati, & Li, 2005). We recommend that all stakeholders rethink the standard 12.10 in the *Standards for Educational and Psychological Testing*: 'In educational settings, a decision or characterization that will have a major impact on a student should take into consideration not just scores from a single test but other relevant information.' (American Educational Research Association et al., 2014, p. 198).

Further analyses of this study revealed that a large number of bundled accommodations were offered to different student groups. In particular, many combinations of the accommodations were used by only one student. On the one hand, this practice follows the major principle for the use of accommodations- that priority should be given to meet individuals' special needs. On the other hand, it is often challenging to evaluate the effectiveness of completely individualized practices of single or bundled

accommodations due to small sample sizes. Consequently, systematic reviews and evaluations of bundled accommodations are still lacking. In other words, we do not know much about the effects of all the bundled packages that have been used over the years. As we found that a large number of bundled accommodations had been offered to examinees in different groups, developing a research methodology that can conduct a comprehensive review of all bundled packages as well as can handle very small samples is critically important for future research.

CONCLUSIONS

According to our results of data analyses, we concluded that receiving complex bundled accommodations did not necessarily mean better math or literacy achievements. However, we found that teachers may offer more accommodations to Grade 10 students with special needs for a high-stakes literacy test than they did for the math assessment for Grade 9 students. In addition, the percentages of accommodated examinees also increased in the literacy test. From our further investigation, the results show that high percentages of bundled accommodations were provided with only one examinee in a given group with special needs.

As a majority of students with special needs received varied accommodations for assessments, teachers and school administrators often face the challenges of making decisions on accommodations that need to be documented in students' IEPs. Thus, it is imperative to conduct the present study. The implications of our findings are at least threefold. First, as there is no extant comprehensive review of teachers' accommodation practices for math and literacy assessments, this study provides updated data on bundled accommodations, data that can be used to inform stakeholders such as general classroom and special education teachers, school principals, policy makers and teacher educators about current assessment practices for students with special needs in the general classroom. The findings of this study suggest that there is clearly a continuing need to clarify possible misconceptions about the bundle accommodations as well as revisiting and reevaluating the practices of bundled accommodations, especially for those complex bundled packages that consist of a long list of accommodations. Second, this study adds to the limited body of literature about bundled accommodations for broader and larger student populations with special needs that is over and beyond the previous studies on relatively small or convenience samples of one or few student groups such as those with LD. Finally, the results of the present study did raise some concerns about the large number of bundled packages offered to only one or a few students. From a research perspective, the current study might possibly lead to future studies on how to evaluate the effectiveness of a wide variety of bundled accommodations but with very small sample sizes. Developing an innovative method is critically important to meeting the methodological challenge of analyzing the small accommodation data. The findings of the present study have valuable implications both for practice and research, as well as highlighting the need for more future in-depth research on bundled accommodations.

ACKNOWLEDGMENTS

This research was supported by the Social Sciences and Humanities Research Council of Canada.

REFERENCES

American Educational Research Association, American Psychological Association, National Council on Measurement in Education [AERA, APA, NCME]. (2014). Standards for educational and psychological testing. Washington, DC: American Educational Research Association.

Birenbaum, M., Breuer, K., Cascallar, E., Dochy, F., Dori, Y., Ridgway, J., et al. (2006). A learning integrated assessment system. *Educational Research Review, 1*, 61–67.

Black, P., & Wiliam, D. (1998a). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan, 80*, 139–148.

Black, P., & Wiliam, D. (1998b). Assessment and classroom learning. *Assessment in Education: Principles, Policy, and Practice, 5*, 7–73.

Bolt, S. E., & Thurlow, M. L. (2004). Five of the most frequently allowed testing accommodations in state policy: Synthesis of research. Remedial and Special Education,

Brindley, G. (2001). Outcomes-based assessment in practice: Some examples and emerging insights. *Language testing, 18*, 393-407.

Cawthon, S. W., Kaye, A. D., Lockhart, L. L., & Beretvas, S. N. (2012). Effects of linguistic complexity and accommodations on estimates of ability for students with learning disabilities. *Journal of School Psychology, 50*(3), 293-316.

Christensen, L. L., Braam, M., Scullin, S., & Thurlow, M. L. (2011). *2009 state policies on assessment participation and accommodations for students with disabilities* (Synthesis Report 83). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Christensen, L. L., Lazarus, S. S., Crone, M., & Thurlow, M. L. (2008). *2007 state policies on assessment participation and accommodations for students with disabilities* (Synthesis Report 69). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Christensen, L. L., Thurlow, M. L., & Wang, T. (2009). *Improving accommodations outcomes: Monitoring instructional and assessment accommodations for students with disabilities*. Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Clapper, A. T., Morse, A. B., Lazarus, S. S., Thompson, S. J., & Thurlow, M. L. (2005). *2003 state policies on assessment participation and accommodations for students with disabilities* (Synthesis Report 56). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Cox, M. L., Herner, J. G., Demczyk, M. J., & Nieberding, J. J. (2006). Provision of testing accommodations for students with disabilities on statewide assessments: Statistical links with participation and discipline rates. *Remedial and Special Education, 27*, 346-354.

Destefano, L., Shriner, J. G., & Lloyd, C. A. (2001). Teacher decision making in participation of students with disabilities in large-scale assessment. *Exceptional Children*, *68*(1), 7-22.

Education Quality and Accountability Office (EQAO)(2012). *Grade 9 Assessment of Mathematics: Guide for accommodations and special provisions, 2012.* Ontario: Education Quality and Accountability Office.

Education Quality and Accountability Office (EQAO)(2013). *Ontario Secondary School Literacy Test (OSSLT): Guide for accommodations, special provisions and exemptions, 2013.* Ontario: Education Quality and Accountability Office.

Fernandez, S., & Moldogaziev, T. (2013). Employee empowerment, employee attitudes, and performance: Testing a causal model. *Public Administration Review*, *73*(3), 490-506.

Fletcher, J. M., Francis, D. J., O'Malley, K., Copeland, K., Mehta, P., Kalinowski, S., Calwell, C. J., Young, V., & Vaughn, S. (2009). Effects of a bundled accommodations package on high-stakes testing for middle school students with reading disabilities. *Exceptional Children, 75*(4), 447-463.

Fuchs, L. S., Fuchs, D., & Capizzi, A. M. (2005). Identifying appropriate test accommodations for students with learning disabilities. *Focus on Exceptional Children, 37* (6), 1-8.

Fuchs, L. S., Fuchs, D., Eaton, S. B., Hamlett, C., Binkley, E., & Crouch, R. (2000a). Using objective data sources to enhance teacher judgments about test accommodations. *Exceptional Children, 67*(1), 67-81.

Fuchs, L. S., Fuchs, D., Eaton, S. B., Hamlett, C. L., & Karns, K. M. (2000b). Supplemental teacher judgments of mathematics test accommodations with objective data sources. *School Psychology Review, 29*, 65-85.

Fuchs, L. S., & Fuchs, D. (2001). Helping teachers formulate sound test accommodation decisions for students with learning disabilities. *Learning Disabilities Research & Practice, 16*(3), 174-181.

Gregg, N. (2012). Increasing access to learning for the adult basic education learner with learning disabilities: Evidence-based accommodation research. *Journal of Learning Disabilities, 45*(1), 47-63.

Helwig, R., & Tindal, G. (2003). An experimental analysis of accommodation decisions on large-scale mathematics tests. *Exceptional Children, 69*(2), 211-225.

Harlen, W. (2005). Teachers' summative practices and assessment for learning – tensions and synergies. *The Curriculum Journal, 16*(2), 207-223.

Harlen, W., & James, M. (1997). Assessment and learning: Differences and relationships between formative and summative assessment. *Assessment in Education: Principles, Policy & Practice, 4*(3), 365-379.

Ketterlin-Geller, L. R., Alonzo, J., Braun-Monegan, J., & Tindal, G. (2007). *Recommendations for accommodations: Implications of (In)consistency. Remedial and Special Education, 28*, 194-206.

Kettler, R. J. (2012). Testing accommodations: Theory and research to inform practice. *International Journal of Disability, Development and Education, 59*(1), 53-66.

Lazarus, S. S., Thurlow, M. L., Lail, K. E., Eisenbraun, K. D., & Kato, K. (2006). *2005 state policies on assessment participation and accommodations for students with disabilities* (Synthesis Report 64). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Lin, P. Y., & Lin, Y. C. (2015). What teachers believe about inclusive assessment in Canada: An empirical investigation. In L. Thomas & M. Hirschkorn, (Eds.), *Change and progress in Canadian teacher education: Research on recent innovations in teacher preparation in Canada* (pp. 492-525). E-book published by the Canadian Association for Teacher Education.

National Research Council. (2004). *Keeping score for all: The effects of inclusion and accommodation policies on large-scale educational assessments*. Committee on Participation of English Language Learners and Students with Disabilities in NAEP and Other Large-Scale Assessments. Judith A. Koenig and Lyle F. Bachman, Editors. Board on Testing and Assessment, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

Olsson, U., Drasgow, F., & Dorans, N. J. (1982). The polyserial correlation coefficient. *Psychometrika, 47*, 337-347.

Pitoniak, M. J., & Royer, J. M. (2001). Testing accommodations for examinees with disabilities: A review of psychometric, legal, and social policy issues. *Review of Educational Research, 71*, 53-104.

Principles for fair student assessment practices for education in Canada. (1993). Edmonton, AB: Joint Advisory Committee.

Remesal, A. (2011). Primary and secondary teachers' conceptions of assessment: A qualitative study. *Teaching and Teacher Education, 27*, 472-482.

Shriner, J. G., & Ganguly, R. (2007). Assessment and accommodation issues under the no child left behind act and the individuals with disabilities education improvement act information for IEP teams. *Assessment for Effective Intervention*, *32*(4), 231-243.

Sireci, S. G., Scarpati, S. E., & Li, S. (2005). Test accommodations for students with disabilities: An analysis of the interaction hypothesis. *Review of Educational Research, 75*, 457-490.

Tan, K. (2011). Assessment for learning reform in Singapore- Quality, sustainable, or threshold?. In R. Berry, & B. Adamson (eds.), *Assessment Reform in Education, Education in the Asia-Pacific Region: Issues, Concerns and Prospects 14* (pp. 75-87). Springer Netherlands.

Teasdale, A., & Leung, C. (2000). Teacher assessment and psychometric theory: A case of paradigm crossing? *Language Testing, 17*(2), 163-184.

Thompson, S. J., Morse, A. B., Sharpe, M., & Hall, S. (2005). *Accommodation manual: How to select, administer, and evaluate use of accommodations for instruction and assessment of students with disabilities and professional development guide*. Washington, DC: The Council of Chief State School Officers (CCSSO).

Thurlow, M., L., Christensen, L. L., & Lail, K. E. (2008). *An analysis of accommodations issues from the standards and assessments peer review* (Technical Report 51). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Thurlow, M., House, A., Boys, C., Scott, D., & Ysseldyke, J. (2000). *State participation and accommodation policies for students with disabilities: 1999 update* (Synthesis Report 33). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Thurlow, M. L., Lazarus, S. S., Thompson, S. J., & Morse, A. B. (2005). State policies on assessment participation and accommodations for students with disabilities. The *Journal of Special Education, 38*, 232-240.

Thurlow, M., Lazarus, S., Thompson, S., & Robey, J. (2002). *2001 state policies on assessment participation and accommodations* (Synthesis Report 46.) Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Thurlow, M., Rogers, C., & Christensen, L. (2010). *Science assessments for students with disabilities in school year 2006-2007: What we know about participation, performance, and accommodations* (Synthesis Report 77). Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.

Tindal, G., Lee, D., & Ketterlin-Geller, L. (2008). *The reliability of teacher decision-making in recommending accommodation for large-scale tests* (Technical report 08-01). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

Ysseldyke, J. E., Thurlow, M. L., McGrew, K. S., & Shriner, J. G. (1994). Recommendations for making decisions about the participating of students with disabilities in statewide assessment programs. (Synthesis Report 15.) Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.