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Differentiation as Measured by the Classroom Practices Survey: A Validity Study Updating the Original Instrument

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**Differentiation as Measured by the Classroom Practices Survey:
A Validity Study Updating the Original Instrument**

Abstract

The Classroom Practices Survey is an instrument developed to collect information on educators' use of differentiated instruction with students achieving at average and high levels. The purposes of this study were to investigate if the Classroom Practices Survey (1) yields reliable and valid data from the groups it was originally designed for, and (2) can be used to evaluate teachers' differentiation practices for students who achieve at low levels. Participants included 648 elementary teachers who completed the Classroom Practices Survey on students achieving at high, average, and low levels. Results of confirmatory factor analyses revealed that the original six-factor model was not supported by the current data. Model fit was improved with a four-factor model, but did not reach the recommended values for good model fit. Further research and possibly modifications are needed before this tool is used by researchers and schools. This study highlights the importance of periodically evaluating instruments and revising them if necessary.

Differentiation as Measured by the Classroom Practices Survey:

A Validity Study Updating the Original Instrument

In recent years, schools and teacher preparation programs have increasingly emphasised differentiation as a must in classrooms to address varying achievement levels of their students (Dixon et al. 2014; Tomlinson 2014). This means that new teachers tend to start their first jobs with at least some knowledge of and, ideally, experience with differentiated instruction. However, researchers have found that teachers do not frequently differentiate instruction in their classrooms (Al-Lawati and Hunsaker 2007; Latz et al. 2009). The Classroom Practices Survey (CPS; Archambault et al. 1993) was developed to assess teachers' use of differentiated educational practices with youth who achieve at average and high levels. Since its development, CPS has been used in research in gifted education (e.g., Gentry et al. 2002; Stamps 2004) to understand how educators meet the individual learning needs of students with average and high ability in regular classrooms. Although CPS is a frequently used instrument to evaluate teachers' use of differentiated instruction in gifted education, twenty-five years after its development, this instrument is likely dated due to changes in expectations for differentiated instructional strategies and the roles of teachers in today's classrooms. In addition, limited current psychometric evidence exists to support the intended use of the instrument.

Furthermore, students' learning and education environments have drastically changed since the development of CPS. Accordingly, instruments, especially those focusing on current practices such as CPS, should be reviewed and revised periodically, as indicated in the Standards for Educational and Psychological Testing published by the American Educational Research Association (AERA), American Psychological Association (APA), and the National Council on Measurement in Education (NCME 2014), to check if such instruments have maintained their

score reliability and validity over time. Thus, in this study, we aimed to investigate if the constructs measured by CPS reflect appropriately the context of the current education landscape. This aligns with the push from Makel and Plucker (2015) on the importance of replication research in gifted education. As a form of constructive replication, CPS was used with a group of teachers working with students of different achievement levels within their classrooms to examine the relevance of the CPS constructs and its utility in today's classrooms.

Literature Review

Differentiating instruction has become an expectation for teachers in general and gifted education classrooms. The National Association for Gifted Children (NAGC) and Council for Exceptional Children (CEC) developed teacher preparation standards for gifted and talented education (2013), emphasising seven areas: (1) *student characteristics and learner development*; (2) *learning environment*; (3) *curricular content knowledge*; (4) *assessment*; (5) *instructional planning and strategies*; (6) *professional learning and ethical practice*; and (7) *collaboration*. These standards are significant milestones in the field of gifted education as they marked the push for consistency in preparing teachers to work with gifted students and in connecting new developments from researchers with practice (Mammadov 2014; VanTassel-Baska and Johnsen 2007). Even though the NAGC-CEC Standards were designed for teachers in gifted education, they could serve as a reference for preparation of general classroom teachers, as teaching strategies that work for students with gifts and talents, especially differentiation, generally work for other students (Beecher and Sweeny 2008; Gentry and Owen 1999).

The Council for the Accreditation of Educator Preparation (CAEP) highlighted the need for pre-service teachers to have an understanding of the Council of Chief State School Officers' (CCSSO) *Interstate Teacher Assessment and Support Consortium (InTASC) Model Core*

Teaching Standards and Learning Progressions for Teachers (CCSO 2013). The InTASC Standards emphasise the need for teachers to create an inclusive learning environment and to recognise individual differences (Standard 2, CCSSO 2013) and to support “every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community” (CCSSO 2013, pp. 9). This is an example of changing expectations in teaching practices.

NAGC (2010a) also provided a set of programming standards to guide schools in evaluating gifted education programs. There is a common thread of using a variety of activities and strategies to meet students’ needs throughout the NAGC programming standards. Additionally, NAGC (2010a) suggested moving beyond differentiation based solely on learning needs, readiness, and interests, and also considering students’ cultural and linguistic backgrounds, their social and emotional development, and how to integrate social responsibility when developing differentiated curriculum and instruction. The emphasis on thinking skills is also evident in the NAGC *Pre-K–Grade 12 Gifted Programming Standards* (NAGC 2010a), which encourage teachers to incorporate critical and creative thinking skills as part of their teaching strategies (NAGC 2010b).

Changes in Teaching and Learning in Classrooms

With the current pace of life in a technologically driven society, classrooms are also constantly changing and that includes how students learn and how teachers teach. For example, students are likely to find it difficult to focus on learning if they see little relevance of lessons to their interests and needs (Medina 2008). Tomlinson (2014) highlighted the importance of helping students make deep meaningful connections to the information for them to learn. It is more pertinent than ever for teachers to recognise the importance of their roles in helping students

form the connections they need to be engaged in meaningful learning. When students are more engaged in lessons and relate to the topic through their personal experiences, they are more motivated to learn (Hertzog 2005). Accounting for students' interests, levels of readiness, and learning preferences are motivational strategies recommended by researchers for teachers to apply when differentiating lessons for their students (Tomlinson 2014).

New developments have taken place in terms of understanding how the human brain functions during the learning process and researchers are applying them to the classrooms. Sousa and Tomlinson (2010) made the connection between developments in neuroscience research and imaging of the brain to students' learning behaviors and motivation. The authors explained how the human brain functions during the learning process, the influence of prior experiences on learning, and how the effect of the environment on brain development could affect how students learn. Medina (2008) also discussed how factors such as a multimedia-based culture and fast pace of life shaped the way current students learnt and processed information. Thus, it is not surprising that Renzulli (2012) highlighted the importance of incorporating executive functions, such as planning, troubleshooting, and leadership skills in talent development models and the need to provide such learning opportunities to all students including those with gifts and talents. These changes can influence the development of teaching and differentiation strategies in the classroom.

In addition to the fast-paced societal changes, how giftedness is perceived and defined by all stakeholders is also changing. From the use multiple measures and multiple pathways rather than relying solely on ability or achievement scores to identify students for gifted education services (NAGC 2008), changes are taking place in policies concerning identifying and serving students in gifted education programs. In gifted education classrooms, there is now a shift from

serving only students who had displayed their abilities through achievements to including students with potential (Hertzog 2005). Similar ideas are also expressed in the *NAGC* (2010a) *Programing Standards*, in which teachers are encouraged to provide students with different opportunities and learning conditions to help maximise student potential. Thus, all teachers need to be prepared to meet the needs of the different students in their classrooms. Tomlinson (2014) also emphasised the need for teachers to know their students' needs and potential and differentiate learning and instruction.

Importance of Preparing Teachers to Differentiate Instruction

For teachers to successfully implement strategies such as differentiation, curriculum compacting (Renzulli and Reis 2004), and grouping, they need to have a strong understanding of the curricula, lesson objectives, and the level of readiness of their students (Dixon et al. 2014; Hertberg-Davis 2009). However, few teachers have the opportunity to engage with these strategies during their pre-service years. The State of States survey by the Council of State Directors of Programs for the Gifted (CSDPG) and NAGC (NAGC and CSDPG 2015) reported that 39 out of the 40 states from which survey responses were received do not require gifted education coursework of pre-service teachers. Yet, 32 states recognised the need for pre-service teachers to have experience in gifted education (NAGC and CSDPG 2015). Still, with the standards and gifted training provided, some pre-service teachers continue to struggle with putting into practice what they learnt (Edwards et al. 2006). For beginning teachers who may have received little to no training on differentiation strategies, the difficulties are compounded. Tomlinson et al. (1995) also warned against the assumption that new teachers will eventually engage in differentiation strategies once they have gained experiences in the classroom. This is often not the case. Experienced teachers are also just as likely to be unwilling differentiate

curricula and instructions in their classroom, as they consider such strategies to be more time-consuming than their usual way of teaching to the whole class (Hertberg-Davis 2009). Thus, there is a need to better understand the various teaching strategies teachers use to meet the diverse needs of the students in their classrooms.

Development and Use of the Classroom Practices Survey in Research and Practice

The Classroom Practices Survey (CPS: Archambault et al. 1993) was originally developed as a research tool to investigate how and how often differentiated instruction was provided to students achieving at average and high levels in general classrooms. The original survey consisted of four parts: (1) Teacher Background, (2) School and District Policies and Procedures, (3) Classroom Issues, and (4) Classroom Practices (Archambault et al. 1993, pp. 21). The fourth section, which is the focus of this study, contained 39 items responded to using a six-point rating scale, measuring instructional practices being used with students achieving at average and high levels in general classrooms (see Appendix for CPS items).

Archmbault et al. (1993) analysed the data obtained from 3,993 third and fourth grade classroom teachers across the United States using principal axis factoring and identified six factors and 37 items (items 14 and 39 were eliminated due to low factor loadings), which explained 38% of variation in responses. These six factors were: (1) Questioning and Thinking, (2) Providing Challenges and Choices, (3) Reading and Written Assignments, (4) Curriculum Modifications, (5) Enrichment Centers, (6) Seatwork. Archambault et al. also calculated internal consistency estimates with Cronbach's alpha for each of the factors in relation to the categorisation of the students: Gifted, Perceived, Both, and Average. Note that students categorised as Gifted, were formally identified as having gifts and talents, and students who were categorised as Perceived were not formally identified but teachers perceived them to have gifts

and talents. The category Both included students from the Gifted and Perceived groups. The Seatwork subscale had lower levels of internal consistency, with alpha reliability estimates ranging from .475 to .525 for the four categories of students. Alpha reliability estimates for the other five subscales ranged from 0.687 to 0.831 with similar levels of reliability across the four categories (Archambault et al. 1993).

Although no further psychometric evidence of CPS is available from previous research using the instrument, CPS has primarily been used by researchers examining classroom teaching strategies and/or to make recommendations on improving practices since its development. For example, Al-Lawati and Hunsaker (2007) used CPS to examine teaching practices of 157 elementary school teachers from 47 Islamic schools in the United States. They found that these teachers did not report differentiating instructional strategies between gifted and average students, although 74% of the teachers in their sample believed there were gifted students within their classrooms. Gentry et al. (2002) used both *My Class Activities* (MCA: Gentry and Gable 2001), which measures students' perceptions of Challenge and Choice in classrooms, and teachers' responses on the Providing Challenges and Choices subscale of CPS, and found that elementary and middle school students and their teachers perceived challenge in their classrooms differently. Interestingly, they also found no relationship ($r= 0.06, p= 0.56$) between elementary school students' and their teachers' perceptions of choice. Thus, the authors suggested teachers need to be more deliberate when offering choices and integrating challenges in their classrooms. Finally, Stamps (2004) used CPS in her quasi-experimental study to assess the effect of training on teachers' use of classroom practices related to curriculum compacting. Stamps reported significant differences between the use of curriculum compacting strategies of teachers in the

control and treatment groups, although the small number of participants (i.e., two teachers in the treatment group and two in the control group) limits the generalisability of her findings.

Purpose of the Study

Although CPS has been used widely, particularly in research in gifted education, limited psychometric evidence of its validity may affect the implications of findings of previous studies using CPS. Additionally, after examining the current literature on differentiation strategies, teacher preparation standards (CCSSO 2013; NAGC 2013), and the gifted programming standards (NAGC 2010a), some of the CPS subscales and items may no longer be relevant for today's classrooms. This is partially because Archambault et al. (1993) developed CPS using the literature and knowledge based on differentiation practices in the early 1990s and recommended instructional practices have changed significantly since then.

Therefore, it is important to evaluate and revalidate CPS with a current sample of teachers using more rigorous and thorough psychometric approaches. Accordingly, the purposes of this study were to (1) investigate if CPS yields reliable and valid data from the achievement groups it was originally designed for (i.e., average and high achieving students), and (2) investigate if CPS can be used to evaluate teachers' differentiation practices for *all* students, including students with low levels of achievement as the low achievement group was not included in the original CPS validation sample in 1993. The following research questions guided this inquiry:

1. To what extent does CPS maintain reliability and structural validity to measure teachers' differentiation practices in classrooms 25 years after its development?
2. To what extent can CPS yield reliable scores to make valid inferences concerning teacher practices with students who achieve at low levels?

Method

Data Sources

We used secondary data originally collected from 2010 to 2012 as a part of a large research project investigating students' performance growth with the implementation of the Total School Cluster Grouping model (TSCG: Gentry et al. 2014). The dataset used for the current study contains responses to the Classroom Practices Survey (Archambault et al. 1993) from 701 teachers from six different states (i.e., AZ, CA, IN, IA, MI, and WA) where the schools participating in the TSCG research project were located. Teachers in schools implementing TSCG participate in the process of assigning students to five different achievement levels: low, low-average, average, above average, and high achieving (Gentry et al. 2014). Teachers completed CPS on three groups of students: High-achieving, Average-achieving, and Low-achieving. We used listwise deletion to handle missing responses and thus, 53 teachers who did not respond to all of the survey items were excluded from the analyses. Table 1 summarises the demographic characteristics of the respondents.

Table 1

Data analysis

First, we computed descriptive statistics for each item response for the three achievement groups. To address the first research question, Cronbach's internal consistency reliability (α) and the model-based omega (ω) coefficient (McDonald 1999) using factor loadings and estimated error variances with CFA were first computed for the six factors. Two types of reliability coefficients are reported because Cronbach's alpha is often reported in the literature to support the use of the

scale for a given sample and the information will be helpful for practitioners and researchers to consult the use of CPS with their sample. McDonald's omega produces a more accurate estimation of reliability than the alpha coefficient as this coefficient does not assume equal correlation between an indicator and the latent common factor for all items (Gelfhof et al. 2014).

Next, we performed confirmatory factor analysis (CFA: Brown 2015) with Mplus 7.4 (Muthén and Muthén 2012-2015) on teachers' responses for all three achievement groups. CFA was performed separately for each achievement group because the data were provided by the same teacher on all three achievement groups, so responses for the three groups are dependent. We decided not to use the method of analysing multiple dependent groups as teachers do not necessarily teach all three achievement levels of students. Additionally, we were not interested in differences in their responses by ability group for this study.

We tested the original six-factor model that allowed all factors to correlate with one another, while residuals are all independent. No item was cross-loaded on multiple factors. For model identification, the factor loading of the first item in each factor was fixed to 1.0 (Brown 2015) and factor correlations and residual variances associated with each item were freely estimated. Due to the ordinal nature of the item responses, we used the mean- and variance-adjusted weighted least squares (WLSMV) estimator. As recommended in the literature, to reduce the probability of committing Type I or II errors (e.g., Bentler 1990), we used multiple fit indices, including root-mean-square error of approximation (RMSEA) with 95% confidence interval, weighted root-mean-square residual (WRMR), Tucker-Lewis index (TLI), and comparative fit index (CFI), to evaluate the fit of the tested model to the data in conjunction with a chi-square test,. Although a variety of recommendations have been made for interpreting these fit indices (e.g., Bentler 1990; Browne and Cudeck 1992; Hu and Bentler 1999; MacCallum et al.

1996), we considered that a model showed good fit when $RMSEA \leq 0.05$ (Browne and Cudeck 1992); $WRMR \leq 1.0$ (Yu 2002), TLI and $CFI > 0.95$ (Byrne 2013; Hu and Bentler 1999). The model fit was deemed acceptable when $RMSEA \leq 0.08$ (Browne and Cudeck 1992) and TLI and $CFI > 0.90$ (Bentler 1992; Byrne 2013).

Results

Item Descriptive Analysis

Table 2 reports the descriptive statistics for each CPS item and reliability estimates for the 6 factors. Two observations that worth mentioning are: (a) the patterns of teacher responses on classroom practices are relatively similar across different achievement level of students, and (b) the average ratings are consistently high for Questioning and Thinking items (these means range from 3.4 to 4.4) for all achievement levels, while the average ratings are consistently low for Providing Challenges and Choices items (these means range from 0.6 to 2.5). These patterns indicate that teachers tend to use instructional techniques that evoke student questioning and thinking more often in their classrooms while they tend not to provide much opportunity for challenging material and activities and choice in their classroom for all students.

Table 2

Score Reliability

Cronbach's alpha reliability coefficient ranged from 0.66 (Seatwork) to 0.91 (Questioning and Thinking), and from 0.68 (Seatwork) to 0.93 (Questioning and Thinking) for average- and high-achieving groups, respectively. The omega coefficient, in general slightly higher than the corresponding alpha coefficient, ranged from 0.73 (Seatwork) to 0.94 (Questioning and

Thinking) and from 0.75 (Seatwork) to 0.95 (QT) for average- and high-achieving students, respectively. Although the number of items (i) representing each factor was different and ranged from 4 to 13, the reliability for Seatwork ($i = 4$) was the lowest for the average- and high-achieving groups. For students with low achievement, we found a similar patterns as we found for the other two achievement levels – i.e., alpha reliability coefficients ranged from 0.61 (Seatwork) to 0.87 (Questioning and Thinking). However, the reliability estimates for the low-achieving group were lower than those for the average and high-achieving groups, indicating that the CPS scores are less reliable for assessing teachers' use of differentiation strategies with low-achieving students.

Structural Validity of Constructs

Also reported in Table 2 are the standardised factor loadings of CPS items for all three achievement levels. First, prior to exploring the factor loadings, we evaluated the model fit to the data for teachers' responses for the high- and average-achieving groups and found that the original six-factor model showed only marginal fit to the current data for these groups. Fit indices marginally reached the recommended values for RMSEA, TLI and CFA for the high-achieving group (RMSEA=0.075, TLI=0.91, CFI=0.91) and WRMR was 1.78, which deviated from Yu's (2002) suggested cut-off value of 1 for a good fitting model. The model fit indices for the average-achieving group showed similar, but slightly worse fitting patterns (RMSEA=0.075, TLI=0.88, CFI=0.89, WRMR =1.83). We found the model fit for the low-achieving group (RMSEA=0.073, TLI=0.84, CFI=0.85, WRMR=1.82) was similar to or slightly worse than the fit for average-achieving group. Second, these six factors are highly interdependent as reported in Table 3. The highest interfactor correlation was observed between the Providing Challenges and Choices and the Curriculum Modifications subscales ($r = 0.80, 0.79$ and 0.69 , for high-,

average- and low-achievement group, respectively) and the next highest interfactor correlation was found between the Reading and Written Assignments and Seatwork subscales ($r = 0.79, 0.77$ and 0.72 , for high-, average- and low-achievement groups, respectively) for all achievement groups. These findings provided weak support to the originally hypothesised six-factor representation of CPS and suggest that there is room for improving the instrument for better representation of the constructs.

Table 3

Third, the pattern of factor loadings, however, is similar among the three achievement levels, and, as expected from the model fit indices, factor loadings for the same item tend to be lowest for the low-achieving group compared to the other two achievement levels. The results also indicate that none of the CPS items showed extremely low loadings onto the corresponding factor. The standard factor loadings for the Questioning and Thinking items are relatively high and range from 0.83 to 0.93 for the high-achieving group, from 0.81 to 0.91 for average-achieving group, and 0.75 to 0.88 for the low-achieving group. Although factor loadings are moderately strong for Providing Challenges and Choices items, the strength of factor loadings varies across items in this subscale. Of particular note is that item 29 of the Providing Challenges and Choices subscale (“Group students by ability across classrooms at the same grade level”) showed the lowest, but still acceptable level of factor loadings (i.e., 0.52 for high-achieving group, 0.45 for average –achieving group, and 0.37 for low-achieving group). Factor loadings for the Reading and Written Assignments items were moderately strong and consistent across items. For teachers’ ratings for the high-achieving group, loadings ranged from 0.71 to

0.81. Similarly the loadings ranged from 0.69 to 0.75 for average-achieving students and from 0.61 to 0.74 for those in the low-achieving group. Similar strength of factor loadings was observed for all Curriculum Modifications items. For Enrichment Centers items, factor loadings were also moderately strong and consistent (0.73 to 0.83) for the high-achieving group, while the loadings of items 11 and 17 were about 0.10 lower for the low-achieving group. Finally, factor loadings of Seatwork items varied and the lowest factor loading on this factor was observed for item 1 (0.49, 0.49 and 0.40 for high-, average- and low-achieving groups, respectively).

Follow-up Investigation

We conducted follow-up analyses to understand the cause of the weak structural evidence for representing the target constructs. We scrutinised each item of the original CPS for its content and wording to identify any items that might not reflect current classroom practices. We also used modification indices produced from the CFA analyses as a guide to identify items that possibly caused model misfit. We determined that items from two factors – Enrichment Centers and Seatwork – no longer reflect current classroom practices (NAGC 2010a) and decided to eliminate eight items representing these two factors from follow-up analyses. For example, items in the Seatwork subscale, such as “Use basic skills worksheets” and “Use enrichment worksheets” may no longer be considered good teaching due to the shift from mastery to helping students form connections among what they are learning, their interests, and their needs (Medina 2008; Tomlinson 2014). Furthermore, reliability estimates for the Enrichment Centers and Seatwork subscales were lower than the other four subscales, which provided additional evidence that the two could be contributing the model misfit. Additionally, items 24 and 34 from the Providing Challenges and Choices subscale were eliminated as they represent strategies that

are rarely used in elementary schools, especially with early elementary students, and they do not reflect the NAGC and CEC teacher preparation standards (2013).

The resultant dataset contained responses for 28 items designed to measure four dimensions of classroom practices. We performed CFA on the dataset with the revised four-factor model with teachers responses for all achievement groups to evaluate how the fit was improved to support the four-factor representation with the reduced items compared to the original six-factor representation with all CPS items. Similar to the first set of CFA analyses with the six-factor model, all four factors were allowed to correlate with each other, but all residuals were uncorrelated. Both factor correlations and error variance parameters were freely estimated.

Note that, because the original six-factor and the four-factor models are not nested, a likelihood ratio test, which is typically used for model comparison, is not appropriate for our investigation (Bollen 1989). Alternatively, we evaluated fit indices for the revised model descriptively by comparing them with those from the original model to see how each value changed. Results of the CFA with the four-factor model indicated that model fit was improved, but model indices still did not reach the recommended thresholds for good fit. For the high-achieving group, TLI and CFI were 0.93 and 0.94, respectively, closer to the recommended cut-off values for good fit, and WRMR was 1.64. Similarly, the model fit improved marginally for the average-achieving group (RMSEA=.075, TLI=.92, CFI=.93, WRMR =1.61). Model fit was worse for the low-achieving group among the three achievement levels (RMSEA=0.078, TLI=0.89, CFI=0.88, WRMR =1.73).

In summary, CPS has maintained relatively high internal consistency estimates for all achievement levels except for the Seatwork subscale. However, the current data do not provide strong evidence to support original six factor representation of constructs measured by CPS. In

fact, a more parsimonious model reflecting four dimensions of classroom practices, rather than the original six factors better fit the data used for this study. Our follow-up analysis with the four-factor model supported eliminating two factors from the survey - Seatwork and Enrichment Centers - and eliminating two items from the Questioning and Thinking subscale to improve overall fit of the data to the model. Yet, our results suggest room for further improvement of the instrument exists by focusing on item-level revisions.

Discussion

The purpose of this study was to investigate if the Classroom Practices Survey yields reliable and valid data for measuring today's classroom practices for differentiated instruction, and if the survey, which was originally developed for use with average- and high-achieving students, can be used with low-achieving students. Since the 1990s, education and educational policy has undergone significant changes (Hunsaker and Shepherd, 2010), and differentiated instruction has become a commonly recommended teaching strategy (Gregory and Kuzmich 2014). Thus, instruments focusing on classroom practices, such as CPS, created more than 20 years ago may no longer yield valid and reliable data and should be re-evaluated. Since limited psychometrical investigation was available on CPS from previous studies, including the original validation studies by Archambault et al. (1993), we conducted this empirical evaluation of the instrument including structural validation of the constructs it purports to measure. This is consistent with recommendations that instruments should be periodically examined and reviewed (AERA, APA, NCME 2014).

The six-factor structural model proposed by Archambault et al. (1993) to capture dimensions of classroom practices needs revision as the model was not fully supported by the data used in the current study. There may be at least two possible reasons for this finding. First,

for decades, the only available psychometric evidence supporting CPS construct-related validity came from exploratory factor analyses (Archambault et al.1993). This analysis was conducted when the instrument was first developed, and no additional studies have investigated other validity evidence for this instrument. Although Archambault et al. (1993) developed items with comprehensive literature review on classroom practices and information from EFA, the lack of full psychometric investigation at the stage of scale development may have resulted in misspecification of the structural model of the construct. One explanation for this could be the high inter-factor correlations, which could indicate that some of the factors are actually measuring the same (or similar) constructs.

Second, the internal structure of the constructs measured by CPS has likely changed together with differentiated practices in schools and as time has passed resulting in new differentiation methods and tools. Several of the differentiation practices included in CPS are now more widely used than they were when CPS was first developed, others might have been replaced or may simply no longer be as common in current classrooms. Some of these differentiation practices are addressed in teacher preparation standards (e.g., NAGC and CEC-TAG 2013) and thus many teachers start their first job with at least some knowledge of how to differentiate instruction.

Evidence from our data supports the use potential use of CPS as a tool to evaluate teachers' practices with students who achieve at low levels. However, the construct-related validity evidence is weaker for use with these students than for those who achieve at average or high levels. One reason for the worse model fit may be the fact that most of the CPS items reflect educational practices that have been emphasised for use with students who have gifts and talents, reflecting educational practices described in gifted and talented education programming (NAGC

2010a) and teacher preparation (NAGC and CEC-TAG 2013) standards. However, it is important to note that these strategies should not be limited to students with gifts and talents. Students in general education could also benefit from such educational practices. In addition, some strategies described in CPS, such as using basic skills worksheets and using learning centers to reinforce basic skills, reflect practices not recommended by the NAGC programming standards (2010). Thus, revising the wording of some of the CPS items may increase the validity for the use with teachers' of low-achieving students. New items may be needed for better alignment with the NAGC (2010a) programming standards.

Limitations and Future Research

One limitation of this study is the use of self-reported responses on a survey regarding teachers' use of differentiation strategies and enacted practices in their classroom, which may increase the risk for measurement errors due to social desirability or individual variation in interpretation of items. For example, even though CPS contains questions on curriculum modification and provision of challenges and choices, it does not address the need for culturally diverse materials and application of real-world situations (Medina 2008), which have become important and common practices in general and gifted education. Thus, as future research, a follow-up study involving classroom observations would provide additional insights into actual classroom practices. Future studies should also include revising CPS items and adding items reflecting new classroom practices and strategies introduced in classrooms after 1993 when CPS was originally developed.

Conclusion

CPS has been used in the field of gifted education to investigate how often classroom teachers modify instruction to meet the needs of students who achieve at average to high levels. However

the data used in this study do not support the use of the original, six-factor model, as a revised, four-factor model provided better model fit. Construct-related validity evidence was weaker for students who achieve at low levels than for students who achieve at average and high levels. Our results suggest the need for further revisions to align CPS items with the current classroom practices related to differentiation and highlight the importance of periodically evaluating instruments and revising them if necessary.

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Table 1
Demographic Characteristics of Respondents (n= 648)

		<i>n</i>	<i>%</i>
Gender	Male	71	10.96
	Female	577	89.04
Ethnicity	American Indian or Alaskan		
	Native	18	2.78
	Asian or Pacific Islander	14	2.16
	Black	14	2.16
	Latinx	11	1.70
	Mixed Race	13	2.01
	White	573	88.43
	Other	5	0.77
Teaching Experience (Years)	1-5	119	18.36
	6-10	143	22.07
	11-20	228	35.19
	21+	158	24.38

Table 2

Means, Standard Deviations, Factor loadings, alpha internal consistency estimates, and McDonald's Omega for high-, average-, and low achieving groups

Factor	Item	High Achieving					Average Achieving					Low Achieving				
		M	SD	Factor Loading	α	ω	M	SD	Factor Loading	α	ω	M	SD	Factor Loading	α	Ω
QT	22	3.4	1.5	0.83			3.5	1.4	0.81			3.5	1.3	0.77		
	35	3.5	1.5	0.88			3.4	1.5	0.86			3.4	1.4	0.83		
	36	3.8	1.4	0.93			3.8	1.4	0.91			3.9	1.2	0.88		
	37	3.6	1.5	0.91			3.6	1.5	0.88			3.6	1.4	0.86		
	38	4.2	1.4	0.88	0.94	0.95	4.3	1.2	0.85	0.91	0.94	4.4	1.0	0.75	0.87	0.91
CC	18	1.9	1.7	0.66			1.7	1.7	0.64			1.7	1.6	0.56		
	23	1.8	1.4	0.69			1.8	1.5	0.69			1.8	1.4	0.66		
	24*	0.6	1.2	0.60			0.5	1.1	0.57			0.5	1.0	0.60		
	25	1.3	1.5	0.75			1.2	1.4	0.72			1.2	1.5	0.72		
	26	1.7	1.6	0.75			1.5	1.5	0.74			1.5	1.5	0.73		
	27	1.7	1.8	0.70			1.2	1.6	0.68			0.9	1.4	0.68		
	28	1.8	1.6	0.77			1.4	1.4	0.73			1.1	1.4	0.72		
	29	2.4	2.0	0.52			2.4	2.0	0.45			2.5	2.0	0.37		
	30	0.8	1.6	0.52			0.6	1.3	0.54			0.5	1.3	0.56		
	31	1.4	1.4	0.72			1.3	1.3	0.71			1.2	1.3	0.72		
	32	2.0	1.5	0.68			2.0	1.5	0.67			2.0	1.5	0.64		
	33	1.8	1.6	0.68			1.7	1.5	0.66			1.7	1.5	0.60		
	34*	1.4	1.5	0.69	0.88	0.92	1.3	1.4	0.68	0.87	0.91	1.2	1.4	0.66	0.85	0.90
RW	3	2.9	1.6	0.81			2.2	1.4	0.72			1.6	1.4	0.61		
	5	1.2	1.2	0.79			1.1	1.0	0.75			0.9	1.0	0.74		
	6	1.8	1.4	0.74			1.6	1.3	0.69			1.4	1.3	0.66		
	7	1.0	1.2	0.71			0.9	1.1	0.70			0.8	1.0	0.69		

Factor	Item	High Achieving					Average Achieving					Low Achieving				
		M	SD	Factor Loading	α	ω	M	SD	Factor Loading	α	ω	M	SD	Factor Loading	α	Ω
CM	9	2.0	1.4	0.71			1.9	1.3	0.70			1.9	1.3	0.70		
	10	2.0	1.4	0.79	0.85	0.89	2.0	1.4	0.75	0.81	0.86	1.9	1.3	0.71	0.78	0.84
	12	1.9	1.3	0.72			1.9	1.2	0.68			1.9	1.2	0.68		
	13	2.3	1.6	0.71			2.1	1.5	0.65			2.0	1.5	0.65		
	14	2.8	1.5	0.61			3.2	1.3	0.57			3.7	1.2	0.58		
	15	2.9	1.5	0.86			2.5	1.5	0.80			2.1	1.6	0.74		
	16	3.0	1.5	0.79			3.1	1.4	0.73			3.3	1.3	0.69		
	19	2.3	1.7	0.72	0.84	0.88	2.2	1.6	0.69	0.81	0.84	2.3	1.7	0.65	0.76	0.83
EC*	11	2.6	1.5	0.80			2.4	1.4	0.76			2.4	1.4	0.69		
	17	3.6	1.5	0.81			3.7	1.5	0.77			3.8	1.4	0.68		
	20	2.5	1.8	0.73			2.6	1.7	0.72			2.8	1.7	0.67		
	21	2.3	1.6	0.83	0.81	0.87	2.2	1.6	0.84	0.79	0.86	2.1	1.6	0.81	0.73	0.80
SW*	1	2.2	1.4	0.49			2.6	1.3	0.49			2.8	1.3	0.40		
	2	2.5	1.4	0.85			2.2	1.2	0.82			1.9	1.3	0.74		
	4	0.9	1.4	0.63			0.8	1.3	0.62			0.8	1.3	0.61		
	8	1.8	1.4	0.63	0.68	0.75	1.8	1.3	0.61	0.66	0.73	1.8	1.3	0.56	0.61	0.67

Note. QT= Questioning and Thinking, CC= Providing Challenges and Choices, RW= Reading and Written Assignments, CM= Curriculum Modifications, EC= Enrichment Centers, SW= Seatwork. *Factors and items deleted for 4 factor model.

Table 3

Factor correlations for all student achievement group groups

		CC	RW	CM	EC	SW
High-achieving	QT	.674	.615	.759	.683	.602
	CC		.763	.800	.658	.636
	RW			.795	.619	.789
	CM				.791	.718
	EC					.669
Average-achieving	QT	.589	.539	.679	.626	.527
	CC		.746	.792	.599	.624
	RW			.748	.525	.768
	CM				.762	.698
	EC					.609
Low-achieving	QT	.480	.395	.561	.528	.357
	CC		.714	.688	.541	.621
	RW			.608	.451	.720
	CM				.670	.583
	EC					.547

Note. QT= Questioning and Thinking, CC= Providing Challenges and Choices, RW= Reading and Written Assignments, CM= Curriculum Modifications, EC= Enrichment Centers, SW= Seatwork. *Factors and items deleted for 4 factor model .

Appendix

Classroom Practices Survey Items Used in this Study

Classroom Practices: Please respond to each statement three times, indicating how often you use these strategies with students of different achievement levels by clicking the appropriate response for each achievement level.

Use the following scale to describe the frequency with which you use each strategy below:												
			0	1	2	3	4	5				
			Never	Once a month, or less frequently	A few times a month	A few times a week	Daily	More than once a day				
Strategies			Low to Below Average Achieving			Average Achieving			Above Average to High Achieving			
1. Use basic skills worksheets			0 1 2 3 4 5			0 1 2 3 4 5			0 1 2 3 4 5			
2. Use enrichment worksheets			0 1 2 3 4 5			0 1 2 3 4 5			0 1 2 3 4 5			
3. Assign reading of more advanced level work			0 1 2 3 4 5			0 1 2 3 4 5			0 1 2 3 4 5			
4. Use selfdirected instructional kits such as S.R.A			0 1 2 3 4 5			0 1 2 3 4 5			0 1 2 3 4 5			
5. Assign reports			0 1 2 3 4 5			0 1 2 3 4 5			0 1 2 3 4 5			
6. Assign projects or other work requiring extended time for students to complete			0 1 2 3 4 5			0 1 2 3 4 5			0 1 2 3 4 5			
7. Assign book reports			0 1 2 3 4 5			0 1 2 3 4 5			0 1 2 3 4 5			
8. Use activities such as puzzles or word searches			0 1 2 3 4 5			0 1 2 3 4 5			0 1 2 3 4 5			
9. Give creative or expository writing assignments on topics selected by the teacher			0 1 2 3 4 5			0 1 2 3 4 5			0 1 2 3 4 5			
10. Give creative or expository writing assignments on topics selected by the students			0 1 2 3 4 5			0 1 2 3 4 5			0 1 2 3 4 5			

Strategies	Low to Below Average Achieving	Average Achieving	Above Average to High Achieving
11. Make time available for students to pursue self-selected interests	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
12. Use pretests to determine if students have mastered the material covered in a particular unit or content area	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
13. Eliminate curricular material that students have mastered	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
14. Repeat instruction on the coverage of more difficult concepts for some students	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
15. Substitute different assignments for students who have mastered regular classroom work	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
16. Modify the instructional format for students who learn better using alternative approach	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
17. Encourage students to move around the classroom to work in various locations	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
18. Allow students to leave the classroom to work in another location, such as the school library or media center	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
19. Assign different homework based on student ability	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
20. Use learning centers to reinforce basic skills	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5

Strategies	Low to Below Average Achieving	Average Achieving	Above Average to High Achieving
21. Use enrichment centers	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
22. Teach thinking skills in the regular curriculum	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
23. Teach a unit on a thinking skills, such as critical thinking or creative problem solving	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
24. Participate in a competitive program focusing on thinking skills/problem solving, such as Future Problem Solving, Odyssey of Mind, etc.	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
25. Use contracts or management plans to help students to organise their independent study projects	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
26. Provide time within the school day for students to work on their independent study projects	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
27. Allow students within your classroom to work from a higher grade level textbook	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
28. Provide a different curricular experience by using a more advanced curriculum unit on a teacher-selected topic	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
29. Group students by ability across classrooms at the same grade level.	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
30. Send students to a higher grade level for specific subject area instruction	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5

Strategies	Low to Below Average Achieving	Average Achieving	Above Average to High Achieving
31. Establish interest groups which enable students to pursue individual or small group interests	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
32. Consider students' opinion in allocating time for various subjects within your classroom	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
33. Provide opportunities for students to use programmed or selfinstructional materials at their own pace	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
34. Give assignments that encourage students to organise their own work schedule to complete a long range project	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
35. Provide questions that encourage reasoning and logical thinking	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
36. Ask open-ended questions	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
37. Encourage students to ask higher-level questions	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
38. Encourage student participation in discussions	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5