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Abstract

Methods for measuring homework performance have been limited primarily to parent reports of homework deficits. The Homework Performance Questionnaire (HPQ) was developed to assess the homework functioning of students in Grades 1 to 8 from the perspective of both teachers and parents. The purpose of this study was to examine the factorial validity of teacher and parent versions of this scale, and to evaluate gender and grade-level differences in factor scores. The HPQ was administered in 4 states from varying regions of the United States. The validation sample consisted of students (n=511) for whom both parent and teacher ratings were obtained (52% female, mean of 9.5 years of age, 79% non-Hispanic, and 78% White). The cross validation sample included 1,450 parent ratings and 166 teacher ratings with similar demographic characteristics. The results of confirmatory factor analyses demonstrated that the best fitting model for teachers was a bifactor solution including a general factor and 2 orthogonal factors, referring to student self-regulation and competence. The best-fitting model for parents was also a bifactor solution, including a general factor and 3 orthogonal factors, referring to student self-regulation, student competence, and teacher support of homework. Gender differences were identified for the general and self-regulation factors of both versions. Overall, the findings provide strong support for the HPQ as a multi-informant, multidimensional measure of homework performance that has utility for the assessment of elementary and middle school students.

Keywords: homework, assessment, teacher ratings, parent ratings

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Parents serve a critical role in the educational performance of their children and can influence the academic functioning of their children in many ways (e.g., involvement in educational activities at home and school). It is clear that family involvement in education within the home setting is critically important for student success in school (Fantuzzo, McWayne, Perry, & Childs, 2004; Gonzalez-DeHass, Willems, & Holbein, 2005; Manz, Fantuzzo, & Power, 2004). Homework is one way in which parents can support their children's education in the home setting. Indeed, both family influences and learning strategies (including homework management) are highlighted as key elements in an integrated framework for promoting student academic achievement (Lee & Shute, 2010). Homework has been defined as educational activities assigned by teachers to students to be completed outside of school (Cooper, 1989), typically in the home setting. Although the value of homework has been debated for decades, there is a consensus in the United States that homework serves a useful purpose (Gill & Schlossman, 2003).

Potential Benefits of Homework

The proposed merits of homework are many. Homework provides students with opportunities to practice academic skills, become fluent in the use of skills, and develop strong work habits. Amount of time spent on homework and rates of homework completion are positively associated with academic performance, as assessed by classroom grades and academic achievement tests (Cooper, Lindsay, Nye, & Greathouse, 1998; Keith, Diamond-Hallam, & Goldenring Fine, 2004). The relationship between homework and academic performance is moderated by grade level, with higher correlations in the upper grades (Cooper, Robinson, & Patall, 2006).

Homework also facilitates communication between school and home (Olympia, Sheridan, & Jenson, 1994). It informs parents about the academic work their child is performing and provides insights about their child's competence on academic tasks, organizational skills, and motivation to complete work. This information can be useful to parents in understanding the skills and potential learning challenges of their child. When children struggle with homework, it is often a sign that instructional, motivational, organizational, or time management strategies are needed to guide their child's performance. Success in resolving homework problems typically requires teacher invitations for parents to communicate, collaborate, and problem solve; unfortunately, this often fails to occur, and homework may become a source of conflict between family and school as well as parent and child (Rogers, Wiener, Marton, & Tannock, 2009).

Measurement of Homework Performance

Research related to homework performance has focused on the measurement of this construct. Homework has been measured by time spent on work (Cooper et al., 2006), rates of work completion (Mautone, Marshall, Costigan, Clarke, & Power, 2012), records of work efficiency in an after-school setting (Kahle & Kelley, 1994), and student self-ratings of homework management strategies (e.g., time management, motivation monitoring, emotion regulation) at the high school level (Xu, 2007). Perhaps the most commonly used measure of homework performance is the Homework Problem Checklist (HPC; Anesko, Schoiock, Ramirez, & Levine, 1987), a 20-item parent report scale. The HPC assesses a wide range of homework problems (e.g., fails to bring home assignments and materials; whines and complains about homework; puts off doing homework, waits until the last minute; fails to complete homework; and forgets to bring assignments back to class). Although the measure was originally developed for students in early elementary school, its validity and applicability for upper elementary and middle school students has been demonstrated (Power, Werba, Watkins, Angelucci, & Eiraldi, 2006). Factor analyses of the HPC using normative and clinical samples have replicated a two factor solution: The first factor assesses inattention and task avoidance, and the second assesses poor productivity and nonadherence with homework rules (Langberg et al., 2010a; Power et al., 2006). The utility of the HPC has been demonstrated by its sensitivity to family school behavioral interventions for children with attention deficit hyperactivity disorder (ADHD; Langberg et al., 2010b; Power et al., 2012). Further, poor productivity and nonadherence with homework rules, as measured by the second

factor of the HPC, has been shown to serve a mediating role in the relationship between the level of inattention in early elementary school and academic grades in high school among students with ADHD (Langberg, Molina, Arnold, Epstein, & Altaye, 2011).

Although the HPC has been shown to be useful in assessing important dimensions of homework functioning, a major limitation of this scale is its lack of a teacher report of homework performance. In fact, research on teacher perceptions of homework performance has been very limited. Clearly, teachers serve a critical role in students' homework performance; they assign work to students, prepare students to complete homework, and evaluate the products generated by student homework. Understanding teacher perspectives of homework can provide valuable information that is complementary to the perspectives of parents. Another limitation of the HPC is that it fails to assess student competence in completing homework assignments. Difficulties with homework performance are related to multiple factors, but one potential and important source is lack of student competence or the mismatch between task difficulty and the skill level of the child (Gravois & Gickling, 2002; Hosp & Ardoin, 2008). The HPC is highly useful in assessing motivational and organizational problems in completing work, but its failure to assess student competence precludes its ability to differentiate skill deficits from performance deficits related to homework completion. In addition, the HPC, like most measures of child behavior and performance, focuses solely on the assessment of student deficits. This approach has served psychology and education well over the years, but a clear limitation is that it fails to detect student strengths, which can be useful in communicating feedback to children and families, setting goals, and planning intervention strategies.

Contribution of the Homework Performance Questionnaire (HPQ)

The Homework Performance Questionnaire (HPQ) addresses these gaps in homework assessment (Power, Dombrowski, Watkins, Mautone, & Eagle, 2007). The HPQ was developed in response to a series of focus groups with teachers and parents of students in Grades 1 to 8, as well as a review of the literature. The measure includes both a teacher (HPQ-T) and parent (HPQ-P) version and thereby facilitates multi-informant assessment. Items on the HPQ assess primarily student strengths, although items evaluating deficits are also included. In addition, the HPQ provides an assessment of student homework performance as well as their competence and skills to complete assignments. Moreover, the role of teachers in supporting homework is also assessed. Evidence of the multidimensional structure of both the teacher and parent versions of this scale is available (Pendergast, Watkins, & Canivez, 2014; Power et al., 2007). The HPQ-T was shown to assess two factors: Student Responsibility and Student Competence. The HPQ-P was demonstrated to assess four factors: Student Task Orientation and Efficiency, Student Competence, Teacher Support, and Parent Involvement, although the Parent Involvement factor demonstrated severely skewed responses. Further, there is preliminary support for the construct validity of the subscales in a general, school-based sample (Pendergast et al., 2014), and in a clinical sample of children with ADHD (Mautone et al., 2012).

Although the HPQ-T and HPQ-P address gaps in the measurement of homework performance, to date, research on these scales has been limited. An exploratory factor analysis (EFA) was initially used to examine the factor structure of both scales, based on data derived in two school districts located in one region of the country using a relatively small sample (Power et al., 2007). Subsequently, an EFA of the HPQ-T was conducted in a different region of the country, but the sample size was relatively small and homogenous (Pendergast et al., 2014). These studies indicated that modifications to the HPQ are needed to improve the precision, efficiency, and acceptability of the scales. In addition, research confirming the factor structure using a large, demographically diverse sample is needed.

Purpose of Study

This study was designed to confirm the factor structure of adapted versions of the HPQ-T and HPQ-P with a relatively large sample of students from schools across four regions of the United States. Factor solutions were further examined using an independent, cross-validation sample.

Method

Participant Selection

The study was conducted in four states in the United States: Nebraska, North Carolina, New Jersey, and Arizona. Across these states, our team received initial approval to recruit in 57 schools with students in Grades 1 to 8, and 19 schools (33%) actually participated in the study. The major reason for nonparticipation concerned school administrators' beliefs that teachers were overly burdened by existing commitments to other research studies or school activities. Parents whose primary language was English or Spanish were included. This study included a validation sample as well as a cross validation sample.

Validation sample. Given well-documented concerns about obtaining teacher buy-in and reasonably high parent consent rates in school-based research (see Blom-Hoffman et al., 2009), we developed a strategy to ensure acceptable participation rates. The following rules were applied in determining whether to include data collected from participating schools: (a) at least 25% of general education teachers in the school had to provide consent to participate; and (b) at least 50% of students in a classroom had to return the parent consent form to the teacher, with or without consent. Based on prior research (Blom-Hoffman et al., 2009), a return rate of 50% from parents appeared to be a reasonable goal, and it was expected that at least 75% of returned forms would include parent consent.

A high percentage of students returning the consent form had parental approval and completed measures (approximately 80%). Of the 19 participating schools, 14 met criteria to be included in the validation study. These 14 schools, which were composed of 12 public schools and two private schools, contained a total of 228 classrooms. Across states, 133 of the 228 classrooms (58%) met criteria for inclusion in the validation sample (i.e., >50% of students in the classrooms returned parent consent forms). An estimated 95% of teachers in the 133 participating classrooms completed measures for four students (two boys and two girls) selected using class lists from the pool of students for whom parent consent was provided. Using these methods, it is estimated that 55% of all general education teachers in the 14 schools meeting eligibility criteria for the validation sample completed study measures, and approximately 50% of parents in these teachers' classrooms completed measures.

The final validation sample consisted of 511 students for whom both parent and teacher ratings were provided in the 14 schools eligible for the validation study. Table 1 indicates the number of cases with parent and teacher data at each grade level across the four states. Demographic information about the validation sample is presented in Table 2. The sample of students was primarily in general education (84.3%), non- Hispanic (78.5%), and White (77.3%). Parents reported that 20.3% of the children were Hispanic and 9.4% were Black/African American. In general, English was spoken at home

Table 1. *Number of Students in Each Grade Level Across Each of the 4 States*

Grade level	NE	NC	NJ	AZ	Total
1st	4	11	16	36	67
2nd	0	12	13	32	57
3rd	24	15	18	39	96
4th	16	16	20	30	82
5th	20	4	12	37	73
6th	4	31	14	18	67
7th	0	9	10	8	27
8th	0	11	11	20	42
Total	68	109	114	220	511

NE = Nebraska; NC = North Carolina; NJ = New Jersey; and AZ = Arizona.

Table 2. *Demographic Characteristics of the Validation and Cross-Validation Samples*

Characteristic	Validation	Cross-validation
Age of child (mean [*SD*])	9.53 (2.14)	9.52 (2.05)
Gender of child (% female)	51.5	52.5
Child education status		
General education	84.3	86.8
Special education	2.5	1.1
Not reported	13.1	12.1
Child ethnicity		
Hispanic	20.6	20.1
Non-Hispanic	79.4	79.9
Child race		
Black/African American	9.5	10.0
Asian/Pacific	2.4	3.1
Native American	2.0	1.7
White	78.2	76.3
More than one race	7.7	8.5
Other/Not reported	0.2	0.4
Language for HPQ-P		
English	94.1	94.9
Spanish	5.9	4.6
Home language		
English	87.5	87.3
Spanish	9.4	9.0
Multiple	2.3	0.9
Family status		
Single parent	20.0	19.9
Two parent	78.2	79.3
Other or not reported	1.8	0.8
Highest parent education level		
Less than high school	5.0	5.9
High school graduate	11.2	8.6
Partial college	22.3	21.3
College degree	32.7	32.7
Graduate/professional	28.8	31.5
Teacher gender (% female)	90.0	90.2
Teacher ethnicity (% Hispanic)	6.1	4.6
Teacher race (% White)	83.4	93.1
Teacher highest degree		
Bachelor's degree	55.6	27.7
Master's degree	41.7	72.3
Doctoral degree	0.8	0.0
Years teaching (mean [*SD*])	12.48 (8.84)	13.14 (10.49)
# students in class (mean [*SD*])	24.10 (8.63)	28.11 (19.28)

SD = standard deviation; HPQ-P = Homework Performance Questionnaire-Parent Form.

(87.5%), families had two parents (78.2%), and the highest level of education among parents was college or above (61.5%). Teachers were mostly female (90%), non-Hispanic (88.0%), and White (83.4%).

Cross-validation sample. The cross-validation sample included data derived from parents and teachers who were not included in the validation sample for the total group of 19 participating schools. The high level of similarity between the students being rated and informants (particularly the parents) on demographic factors across the validation and cross-validation samples (see Table 2) provided justification for the use of this strategy. For parents, the cross validation sample included parent ratings obtained from the five schools that did not meet eligibility criteria for the validation

sample, and parent ratings for students in the 14 schools included in the validation sample who were not selected for teacher ratings. For teachers, this included teacher ratings from the five schools that did not meet criteria for the validation sample, and teacher ratings for classrooms in which <50% of parent consent forms were obtained. Across the four states, a total of 1,450 parents and 166 teachers were included in the cross-validation sample.

Measures

Background information form. The parent version of this form requested parents or caregivers to provide information about their child's grade level, race and ethnicity, primary language spoken at home, highest level of education of each parent, and single parent status. The teacher version of this form requested teachers to provide information about teacher gender, teacher race and ethnicity, teacher level of education, grade level taught, and the student's special education status.

Homework Performance Questionnaire – Teacher Form (HPQ-T). The HPQ-T represents a significant modification of the initial version of the HPQ-T (Power et al., 2007), inclusive of two factors: Student Responsibility and Student Competence. These factors are potentially useful in differentiating whether a homework problem is related to a skills deficit (lack of student competence), a performance deficit (problem with implementation), or both (Pendergast et al., 2014). The HPQ-T was adapted to minimize the likelihood of cross loadings, maximize the magnitude of pattern coefficients on hypothesized factors, and clarify the meaning of items to teachers. The 5-point scale from the original version was modified to a 7-point version to reflect the amount or percentage of time that each behavior occurred during the previous four weeks (0 to 10% = *never/rarely*; 11% to 20% = *seldom*; 21% to 40% = *not often*; 41% to 60% = *some of the time*; 61% to 80% = *often*; 81% to 90% = *usually*; 91% to 100% *almost always/always*) to optimally balance item variability and respondents' discriminative capacity (Lozano, Garcia- Cueto, & Muniz, 2008). Prior experience with the HPQ-T indicated that teachers were capable of making finer distinctions in frequency, justifying the inclusion of a greater number of anchor points. Nine items from the original HPQ-T were retained, although some items were edited for clarity (e.g., the item "As far as I know, this student manages time effectively during homework" was edited to read, "This student seems to manage time effectively during homework"). Five items from the original version were deleted, and eight new items were added. With these changes, the second version of the HPQ-T included 17 items rated on a 7-point scale. The HPQ-T also included an additional eight items, not analyzed in this study, to obtain information about the context within which student homework was being performed. In total, the HPQ-T contained 25 items.

Homework Performance Questionnaire – Parent Form (HPQ-P). The HPQ-P represents a significant adaptation of the original version of the HPQ-P (Power et al., 2007), which assessed four factors: Student Task Orientation and Efficiency, Student Competence, Teacher Support, and Parent Involvement. The current version was developed to minimize the likelihood of cross-loadings, maximize the magnitude of pattern coefficients on hypothesized factors, and clarify the meaning of items to respondents. In addition, items pertaining to Factor IV from the original version, which assessed parent perceptions of their involvement in homework, were deleted from the adapted version because responses to these items were severely skewed and there was little variability in the distribution of responses to this factor. The 4-point scale from the original version was retained to optimally balance item variability and respondents' discriminative capacity (Lozano et al., 2008), assessing how often each behavior has happened in the past 4 weeks (0 = *rarely/never*, 1 = *some of the time*, 2 = *most of the time*, 3 = *always/almost always*). Nineteen items from the original HPQ-P were retained, although some items were edited for clarity (e.g., the item "My child is ready to begin homework at the time that has been set" was edited to read, "My child is ready to start homework when it's time to begin"). Twelve items from the original version were deleted; many of these loaded on the parent involvement factor that was omitted from this version. In addition, four new items were included in the current version (e.g., "Homework assignments are too difficult for my child" and "The teachers seem interested in helping my child complete homework assignments"). With these changes,

the second version of the HPQ-P contained 23 items rated on a 4-point scale. The HPQ-P also included four items (e.g., child time spent on homework; parent strategy when child does not remember what to do for homework)—not analyzed, given the purpose of this study—designed to understand the context of homework performance. In total, the HPQ-P contained 27 items.

A translation of the HPQ-P was conducted for parents whose primary and preferred language was Spanish by an independent project team comprised of native speakers of the target language, editors, and subject matter experts. The process was conducted in four steps: (a) a forward translation of the HPQ-P was conducted separately by Mexican Spanish and Puerto Rican Spanish reviewers; (b) these reviewers and the project manager conferred with each other to reconcile differences in translation; (c) the reconciled translation was back translated into U.S. English by an independent translator; and (d) the project team conferred to address any discrepancies between the original and back-translated versions.

Assessment Procedures

Consenting teachers were asked to distribute to students a packet of forms, consisting of a parent consent form, a background information form, and the HPQ-P, to be completed by their parents. The teachers were asked to remind the students on a frequent basis to return the forms to school. Across the four states, if 60% of the students in a classroom returned the forms (with or without parent consent), the teacher was given a gift valued at $20 to be used as a reward for the class. In Arizona, all teachers agreeing to participate were given a gift of $20, but it was not contingent on response rate at the recommendation of the university institutional review board. Teachers were informed that students with Spanish-speaking parents should be sent forms in both English and Spanish.

Next, participating teachers were asked to complete measures for an equal probability systematic sample (Garson, 2012) of boys and girls (e.g., first and third boys, second and fourth girls) listed alphabetically on class lists who had parent permission to participate in the study. For students in Grades 5 through 8 who had multiple teachers, only one teacher completed ratings; a relatively equal number of math and language arts classes were targeted for participation so that homework performance assessed at these grade levels would reflect performance across subject areas. Teachers in Nebraska, North Carolina, and New Jersey were also given a gift valued at $15 for completing measures for the four students, but this was not extended to teachers in Arizona.

Data Analyses

Given the strong theoretical expectations for the HPQ scales and existing pilot studies, confirmatory factor analysis (CFA) was applied to scores from both the HPQ-T and HPQ-P using Mplus 7 for Macintosh (Muthén & Muthén, 2012). Missing data were minimal (less than 1% of the data points) and were directly imputed within Mplus (Brown, 2006). Items were coded so that higher scores reflected more adaptive functioning. Although there are no universally recognized standards for model fit, a variety of fit criteria were applied (Marsh, Hau, & Grayson, 2005), including chi square, the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). Given that chi square was significant in each model, CFI and RMSEA were used to examine fit. For adequate fit, CFI ≥ .90 and RMSEA ≤ .08 were required. For good fit, CFI ≥ .95 and RMSEA ≤ .06 were needed (Browne & Cudeck, 1993). Meaningful differences between well-fitting models were evaluated using ΔCFI > ±.01 (Cheung & Rensvold, 2002). The analyses were conducted with both the validation and cross-validation samples. For the validation sample, given that the ratio of items to factors was approximately 6 to 1, the sample size exceeded the minimum guidelines delineated by Mundfrom, Shaw, and Ke (2005), with power ranging from .88 to .99 (Preacher & Coffman, 2006).

HPQ-T. Responses were not multivariately normal, so model estimation employed the Satorra-Bentler scaled chi square (Lei & Wu, 2012). Three models were tested: (a) a two factor oblique model aligned with theoretical expectations, (b) modifications of the theoretical model suggested by specification searches, and (c) a bifactor version of the theoretical model with orthogonal factors. In the bifactor model, each item is directly and

independently influenced by two factors: one general factor and one domain specific first-order factor. Bifactor models have often been applied with intelligence tests (Gignac & Watkins, 2013), and have been found to be appropriate for constructs such as psychopathology and behavioral disorders (Wiesner & Schanding, 2013). A higher order model could not be tested because it would be unidentified with only two first-order factors (Brunner, Nagy, & Wilhelm, 2012).

HPQ-P. Response options consisted of four ordered categories, so extraction was accomplished with robust diagonal weighted least squares (Rhemtulla, Brosseau-Liard, & Savalei, 2012). As with the HPQ-T, three models were tested: (a) a three-factor oblique model aligned with theoretical expectations (items from the fourth [parent involvement] factor of the original version were deleted, as indicated), (b) modifications of the theoretical model suggested by specification searches, and (c) a bifactor version of the theoretical model with orthogonal factors. A higher order model could not be tested because it would be just identified with three first order factors, and therefore its fit would not differ from the oblique first-order model (Brunner et al., 2012).

Results

The following sections describe the results of CFA analyses for the HPQ-T and HPQ-P using both the validation and cross-validation samples.

HPQ-T

CFA fit statistics for the validation and cross validation samples are presented in Table 3. Both samples exhibited the same pattern: Fit for the two-factor theoretical model was close to adequate, fit for the modified theoretical model (three items cross-loaded and two items with correlated errors) was adequate, and fit for the bifactor model was good. Although fit statistics for the validation sample generally were superior to those in the cross-validation sample, the pattern was similar across samples, and fit for the bifactor model in the cross-validation sample was good. Thus, the bifactor model was determined to provide the best fit, and the bifactor model provided the most conceptually parsimonious explanation of the data (Gustafsson, 2001).

Standardized loadings for the bifactor model in both validation and cross-validation samples are presented in Table 4. Coefficients of congruence for the three factors were excellent (MacCallum, Widaman, Zhang, & Hong, 1999), indicating that the factor loadings were invariant across the two samples. Reliability, as quantified by coefficient alpha, was strong for both validation and cross-validation samples, ranging from .91 to .94. These results support the validity of a single total (general) score that reflects overall student homework performance, which may be useful in identifying students with more homework difficulties (or problems performing homework competently). In

Table 3. *CFA Results for Validation (n _ 511) and Cross-Validation (n _ 166) Samples on the Homework Problem Questionnaire-Teacher Version (HPQ-T)*

Model	x^2	*df*	CFI	RMSEA	RMSEA 90% CI
Validation sample					
Theoretical	242.06	118	.89	.05	[.04, .06]
Theoretical modified	193.20	115	.93	.04	[.03, .05]
Bifactor	144.63	102	.96	.03	[.02, .04]
Cross-validation sample					
Theoretical	216.65	118	.89	.07	[.06, .09]
Theoretical modified	180.43	114	.92	.06	[.04, .08]
Bifactor	140.76	102	.96	.05	[.03, .07]

CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation.

Table 4. *Standardized Loadings of the Bifactor Model for Validation/Cross-Validation Samples on the Homework Problem Questionnaire-Teacher Version (HPQ-T)*

HPQ-T item	General	Student self-regulation	Student competence
9. Finishes homework assignments		.65/.63	.67/.75
10. Has ability to complete work independently	.87/.75		.07/.36
11. Turns in homework on time	.70/.64	.67/.73	
12. Manages time effectively	.84/.85	.33/.36	
13. Gets forms and tests signed and returned	.63/.74	.46/.47	
14. Assignments are easy for child	.80/.53		.25/.56
15. Turns in homework that is messy	.50/.46	.11/.11	
16. Understands how to do homework	.56/.28		.70/.87
17. Organizes materials needed for homework	.53/.76	.31/.27	
18. Needs help to complete assignments	.52/.46		.23/.31
19. Knows how to do assigned work	.60/.37		.63/.83
20. Turns in work that is completed accurately	.71/.62	.28/.35	
21. Makes an effort to complete homework	.64/.75	.67/.60	
22. Assignments seem too difficult for child	.66/.40		.33/.50
23. Student can do homework assigned	.67/.44		.53/.74
24. Percentage of work completed	.58/.63	.70/.71	
25. Percentage of work completed correctly	.73/.63		.26/.31
Coefficients of congruence	.97	1.00	.98
Alpha coefficients	.94	.92/.94	.91/91

Items are shortened for brevity. Standardized loadings for the validation sample are presented first, followed by loadings for the cross-validation sample.

Table 5. *CFA Results for Validation (n _ 511) and Cross-Validation (n _ 1,450) Samples on the Homework Problem Questionnaire-Parent Version (HPQ-P)*

Model	x^2	*df*	CFI	RMSEA	RMSEA 90% CI
Validation sample					
Theoretical	896.46	227	.94	.08	[.07, .08]
Theoretical modified	770.21	226	.95	.07	[.06, .07]
Bifactor	673.86	207	.96	.07	[.06, .07]
Cross-validation sample					
Theoretical	2187.98	227	.94	.08	[.07, .08]
Theoretical modified	1992.42	226 .	95	.07	[.07, .08]
Bifactor	1466.68	207	.96	.07	[.06, .07]

CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation.

addition, the two orthogonal group factors indicate that the HPQ-T identifies specific student factors that are distinct from the general factor. The first factor appears to refer to student homework self-regulation. This factor consists of many of the items loading on the student responsibility factor identified in previous factor analytic studies (Pendergast et al., 2014; Power et al., 2007). Self-regulation was determined to be a more accurate term to describe this factor because this dimension includes items referring to motivation (effort to complete work) and organization (manages time, organizes materials), in addition to student responsibility (work completion). The second factor, referring to student competence, includes items that reflect student understanding of assignments and ability to complete the work (knows how to do homework assignments, understands how to do homework, can do homework assignments).

HPQ-P

CFA fit statistics for the validation and cross validation samples are presented in Table 5. Both samples exhibited the same pattern: Fit for the three-factor theoretical model was adequate, fit for the modified

theoretical model (two items cross-loaded) was adequate, and fit for the bifactor model was also adequate. The bifactor model was slightly superior in the validation and cross-validation samples (ΔCFI = .01) and was the most conceptually parsimonious explanation of the data (Gustafsson, 2001).

Standardized loadings for the bifactor model in both validation and cross-validation samples are presented in Table 6. Coefficients of congruence for the four factors were excellent (MacCallum et al., 1999), indicating that the factor loadings were invariant across the two samples. Alpha coefficients for each factor were strong for both the validation and cross validation samples, ranging from .82 to .90. These results support the validity of a single total (general) score, reflecting overall homework performance, to identify students with homework difficulties. In addition, the three orthogonal group factors indicate that the HPQ-P identifies specific dimensions that are distinct from the general factor. The first two factors, referring to student homework self regulation and student competence, include items that are similar to corresponding factors on the HPQ-T. The third factor, teacher support, reflects parent perceptions of teacher involvement and support with homework.

Factor Relationships

Scores were created for each factor on each scale using unit weights (Wainer, 1976). Descriptive statistics for those scores within the validation sample are provided in Table 7. In general, correlations between informants on similar factors were higher than correlations across informants on different factors. The correlations between HPQ-T and HPQ-P on similar factors (general, self-regulation, and competence factors) were .44, .45, and .44,

Table 6. *Standardized Loadings of the Bifactor Model for Validation/Cross-Validation Samples on the Homework Problem Questionnaire-Parent Version (HPQ-P)*

HPQ-P item	General	Student self-regulation	Student competence	Teacher support
5. Must remind child to begin work	.43/.43	.76/.71		
6. Child able to complete math homework	.54/.57		.64/.64	
7. Teachers understand effect on families	.29/.34			.71/.62
8. Child needs close supervision	.62/.64	.59/.50		
9. Child understands how to do work	.79/.79		.33/.24	
10. Teachers communicate with families	.34/.37			.65/.67
11. Child wastes time on homework	.54/.50	.67/.69		
12. Assignments are easy for child	.73/.76		.36/.27	
13. Child is ready for work when it's time	.65/.58	.58/.65		
14. Teacher is willing to help	.33/.44			.74/.75
15. Child able to complete reading work	.75/.71		.08/.11	
16. Child works steadily on homework	.66/.65	.51/.50		
17. Teachers assign too much work	.36/.31			.48/.42
18. Assignments are too difficult for child	.72/.73		.27/.15	
19. Teachers/parents have similar ideas	.38/.39			.65/.60
20. Child tries to avoid doing homework	.54/.55	.73/.69		
21. Teacher assignments are confusing	.56/.51			.27/.34
22. Child needs help to complete work	.78/.80		.21/.13	
23. Child brings home materials needed	.50/.54	.23/.11		
24. Teachers seem interested in helping	.29/.35			.78/.71
25. Child gets confused during homework	.79/.85		.20/.14	
26. Child returns completed work to class	.54/.59	.23/.22		
27. Child follows directions	.50/.56	.28/.31		
Coefficients of congruence	1.00	.99	.98	1.00
Alpha coefficients	.90	.89/.88	.86/.86	.83/.82

Items are shortened for brevity. Standardized loadings for the validation sample are presented first, followed by loadings for the cross-validation sample.

Table 7. *Means (Standard Deviations) for Boys and Girls on HPQ-T and HPQ-P Using Unit Weighted Factor Scores for the Validation Sample of 511 Students*

	Grades 1–2		Grades 3–5		Grades 6–8		Total	
Scale	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
HPQ-T								
General	5.18 (1.00)	5.21 (0.93)	5.05 (0.93)	5.38 (0.67)	4.86 (0.99)	5.41 (0.83)	5.04 (0.96)	5.35 (0.78)
Self-regulation	5.18 (1.03)	5.27 (0.99)	4.95 (1.19)	5.50 (0.66)	4.70 (1.20)	5.46 (0.87)	4.94 (1.16)	5.43 (0.87)
Competence	5.12 (1.09)	5.10 (0.97)	5.13 (0.90)	5.21 (0.89)	5.01 (0.99)	5.33 (0.86)	5.10 (0.97)	5.22 (0.90)
HPQ-P								
General	2.31 (0.41)	2.34 (0.46)	2.15 (0.50)	2.39 (0.45)	2.25 (0.40)	2.39 (0.36)	2.22 (0.46)	2.37 (0.43)
Self-regulation	2.15 (0.61)	2.23 (0.64)	2.02 (0.69)	2.42 (0.59)	2.29 (0.61)	2.49 (0.47)	2.12 (0.66)	2.39 (0.58)
Competence	2.29 (0.54)	2.33 (0.61)	2.26 (0.54)	2.31 (0.54)	2.26 (0.57)	2.46 (0.47)	2.27 (0.54)	2.36 (0.54)
Teacher Support	2.49 (0.54)	2.51 (0.43)	2.26 (0.63)	2.33 (0.57)	2.09 (0.59)	2.18 (0.52)	2.27 (0.61)	2.33 (0.54)

Mean scores for the HPQ-T reflect mean item scores, which range from 0 to 6. Mean scores for the HPQ-P reflect mean item scores, which can range from 0 to 3. HPQ-T = Homework Performance Questionnaire-Teacher Form; HPQ-P = Homework Performance Questionnaire-Parent Form.

respectively. We found correlations of .33 and .16 between the HPQ-T self-regulation factor and the HPQ-P competence and teacher support factors, respectively, and correlations of .31 and .21 between the HPQ-T competence factor and the HPQ-P self-regulation and teacher support factors, respectively.

Exploration of Gender and Grade-Level Differences

A series of univariate tests (ANOVAs) were conducted to examine gender and grade-level effects for the purpose of interpreting scores derived from each factor. Given that multiple ANOVAs were conducted, significance was tested at an alpha level of .01. Because of the limitations imposed by the sample size, grade levels were combined into lower elementary (Grades 1 to 2), upper elementary (Grades 3 to 5), and middle school (Grades 6 to 8).

On the HPQ-T, there was a significant gender effect on the general factor (F = 12.56, df = 1, p < .001, η_p^2 = .026 [small effect]) and self regulation factor (F = 24.065, df = 1, p < .001, η_p^2= .047 [small to medium effect]), reflecting higher scores for girls, but there was a nonsignificant gender effect on the competence factor. None of the HPQ-T factors demonstrated grade level effects, and the interaction of gender and grade level was nonsignificant on each factor. On the HPQ-P, an analysis of gender effects found that the general factor (F = 9.22, df = 1, p < .003, partial η_p^2= .021 [small effect]) and self-regulation factor (F = 14.65, df = 1, p < .001, η_p^2 = .03 [small effect]) were statistically significant, with girls receiving higher ratings than boys. However, the competence and teacher support factors did not demonstrate a significant gender effect. A grade-level effect was detected only on the teacher support factor (F = 12.31, df = 2, p < .001, η_p^2= .051 [small to medium effect]), with lower scores at higher grade levels. The interaction of gender and grade level was nonsignificant on each factor.

Discussion

This study addresses a major gap in the scientific literature related to the measurement of homework performance, specifically the need to assess homework from the perspective of both parents and teachers (Power et al., 2006). This study was designed to evaluate the validity of adapted multi-informant, strength-based rating scales for the assessment of student homework performance in a relatively large, geographically, ethnically, and racially diverse sample of students in elementary and middle school. The study provided strong evidence to support the structural validity of the HPQ-T and HPQ-P for assessing student homework performance. The expected factor structure for each scale, based on studies of previous versions of the HPQ scales (Pendergast et al., 2014; Power et al., 2007), was confirmed through CFAs. Among several models tested, the bifactor model was the best fitting and most parsimonious for each scale. The

bifactor model identified a general factor as well as orthogonal (uncorrelated) factors that were distinct from the general factor. This pattern of findings was strongly confirmed by replication in an independent, cross validation sample of teachers and parents.

The analyses of the HPQ-T supported a bifactor model, consisting of a general factor and two orthogonal factors pertaining to student homework self-regulation and student competence. Student homework self-regulation refers to a heterogeneous set of homework behaviors concerning homework productivity, motivation, time management, and materials management. In contrast, student competence refers to student understanding of assigned homework, knowledge of the material, and ability to complete the work independently.

The analyses of the HPQ-P also supported a bifactor model, consisting of a general factor and three orthogonal factors pertaining to student homework self-regulation, student competence, and teacher support. The self-regulation factor refers to a diverse set of items pertaining to task orientation, persistence, organization, and time management. The student competence factor refers to student understanding of the material assigned for homework and ability to complete work independently. Teacher support concerns parents' perceptions of teacher interest and willingness to support families with homework and ability to communicate with parents about homework.

The construct validity of the scales was further demonstrated by the pattern of correlations among subscales. In every case, correlations across informants were higher when similar constructs were examined (e.g., correlation across informants for the student homework self-regulation factor) than when dissimilar constructs were examined (e.g., correlation across informants between the self-regulation and competence factors).

Similar to previous studies of informant ratings of homework performance (Anesko et al., 1987; Power et al., 2006), there were gender differences in informant perceptions of homework factors. Significant gender differences were identified only on the general and self regulation factors, rated by both teachers and parents, with girls being rated higher than boys. No gender differences were identified on the student competence factor (both scales), nor on the teacher support factor of the HPQ-P. This pattern of findings is similar to that found on the Academic Competence Evaluation Scales (ACES) and the Academic Performance Rating Scale (APRS). Gender differences on the ACES generally were more prominent in the academic enablers domain, which assesses attitudes and behaviors that enable a student to actively participate in academic instruction, than in the academic skills domain (DiPerna & Elliott, 2000). On the APRS, gender differences were detected on factors pertaining to productivity and impulse control, but not academic success or competence (DuPaul, Rapport, & Perriello, 1991). As demonstrated on the previous version of the HPQ-P (Power et al., 2007), grade-level differences were noted only on the HPQ-P teacher support factor. Although expectations for student homework productivity clearly increase with advancing grade level (Keith & Keith, 2006), teacher and parent ratings of student self-regulation and competence remained essentially unchanged from Grades 1 to 8. However, the findings indicated that teachers become less supportive of families regarding homework issues as children advance through the grades. The transition from elementary to middle school, typically resulting in students being educated by more teachers and spending less time in class with each teacher, is likely to be a factor that contributions to this trend. Additional research is needed to understand whether decreasing teacher engagement in homework has an impact on student performance and family involvement in education.

Implications for Practice and Research

The HPQ represents a unique contribution to the measurement of student homework performance and may have several uses in practice and research. First, both the teacher and parent versions of the HPQ yield scores on a general factor as well as student self-regulation and competence factors, thereby offering multi-informant assessment of similar constructs, which may be useful in making comparisons between teachers and parents. Second, the HPQ assesses positive dimensions of homework functioning and, as such, may prove to be more acceptable to parents than the deficit-oriented scales commonly used to assess children's homework, such as the HPC (Anesko et al., 1987).

Third, the HPQ differentiates the assessment of student self-regulation abilities from student competence to complete homework assignments, which is akin to distinguishing enablers from skills when conducting an assessment of academic functioning (DiPerna & Elliott, 2000). Such differentiation in the assessment process may be useful at the Tier 2 and Tier 3 levels of intervention when planning homework strategies, as it provides information about the source of individual differences, specifically related to difficulties in self-regulation versus gaps in knowledge or skill. Additional research is needed to examine the feasibility and utility of using this measure for intervention design and outcome evaluation. Fourth, the parent version of the scale includes a factor related to parent perceptions of teacher support of homework. This scale might be useful in identifying situations in which family school consultation is indicated to build a more collaborative family-school relationship to support student academic progress.

Evidence-based interventions to improve the organizational skills of students with attention and behavior problems have recently emerged (Evans, Owens, & Bunford, 2013). These programs emphasize the importance of strengthening skills in organizing academic work (e.g., materials management, time management, planning) and improving the implementation of these skills in real-world settings (Abikoff et al., 2013). As such, the need for homework measures to differentiate organizational skills deficits from performance deficits (or competence in organizational skills vs. the ability to execute these skills consistently) has been recognized (Langberg et al., 2010a). The HPQ homework self-regulation factor includes items pertaining to both organizational skills and performance, but it does not differentiate these constructs into separate factors. A potentially fruitful direction for research in the future would be to examine whether the HPQ could be adapted to assess distinct dimensions pertaining to organizational skills and effective performance, while retaining a separate dimension pertaining to competence with regard to the comprehension of homework material and ability to complete work independently. Another worthwhile direction for future research is to examine contextual factors that have an effect on student self regulation and competence during homework. In addition, building upon the research of Cooper and colleagues (2006), research is needed to examine the relationship of HPQ factors to academic achievement and the potentially moderating effects of gender and grade level.

Study Limitations

A limitation of the study is the representativeness of the sample. Although the study included students from each of the four major geographic regions of the United States, the distribution of the sample across the regions demonstrated substantial variations from 2010 Census data. The Northeast (study = 22.3% vs. census = 17.9%) and West (43.1% vs. 23.3%) samples were overrepresented, and the South (21.3% vs. 37.1%) and Midwest (13.3% vs. 21.7%) samples were underrepresented. In addition, children enrolled in some grade levels were substantially underrepresented in some geographic regions (e.g., no seventh- and eighth-grade students were included from the Midwest region).

The ethnic and racial composition of the sample was generally similar to U.S. census data, although there were some deviations. The Hispanic population was slightly overrepresented in this study (study = 20.3% vs. census = 16.3%). With regard to race, the White (77.3% vs. 72.4%), Native American (2.0% vs. 0.9%), and multiracial (7.6% vs. 2.9%) groups were somewhat overrepresented, but Black/African American (9.4% vs. 12.6%) and Asian (2.3% vs. 4.8%) groups were underrepresented. Although the overall study sample is generally representative of the entire United States with regard to race and ethnicity, a limitation is that the regional subsamples did not capture the range and proportion of minority groups within each region. In addition, two-parent families were somewhat overrepresented in this study compared with census data (78% vs. 69%). In addition, the percentage of parents in this study with greater than a high school education was higher than that reflected in the U.S. census data (84% vs. 63%). As such, the scales should be used with caution when assessing students from low-income families.

Although the sample size was relatively large, it was not sufficient to examine factor invariance (i.e., applicability of the factor structure) across subgroups, defined by gender, grade level, and

ethnic/racial groups. In addition, our inability to examine factor invariance across the English and Spanish versions of the HPQ-P was a notable limitation. Additional research using a larger, nationally representative sample is needed to establish invariance.

The recruitment strategy used to obtain parent consent and collect data ensured a relatively high response rate from parents and teachers (approximately 50%). The response rate for parents in this study is higher than many studies that recruit families through schools using active consent procedures (e.g., Courser, Shamble, Lavaca's, Collins, & Dateline, 2009; Du- Paul et al., 1998). Nonetheless, limitations of the study are that approximately 45% of teachers from participating schools chose not to participate or did not achieve a sufficient return rate from parents to be included, and about 50% of parents did not participate in the study. In addition, many schools invited to participate did not do so, although reasons for nonparticipation were essentially unrelated to the focus of the study on homework assessment. It was not feasible to collect information about nonparticipants, and it is possible that participating parents and teachers were more engaged in the educational process than others. The high level of congruence in findings across the validation and cross-validation samples, however, mitigates, to some extent, concerns about the representativeness of the findings derived from the validation sample.

Conclusions

This study provides strong support for the structural validity of the HPQ teacher and parent versions. For each scale, the best fitting and most parsimonious solution was a bifactor model, indicating that the scales yield a general homework performance factor and independent scales pertaining to student self-regulation and competence. In addition, the parent version yields a factor reflecting parents' perceptions of teacher support of homework. Gender differences were identified on the general and self regulation factors. Correlations between factors across the teacher and parent scales provided preliminary evidence of convergent and discriminant validity. Additional research is needed to establish the validity of the factors in a diverse sample that closely corresponds with demographic characteristics of the U.S. population. Nonetheless, this study indicates that the HPQ scales have a strong empirical foundation and appear to be highly promising for use in the multi-informant assessment of student homework problems across the elementary and middle school years.

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