Measurement Instruments for the Social Sciences

VALIDATION OF MEASUREMENT INSTRUMENTS Open Access

Measuring cultural capital through the number of books in the household

Swen Sieben[1*] and Clemens M. Lechner[2]

Abstract

Cultural capital is frequently measured via the number of books in a respondent's household. Despite this measure's widespread use, its quality remains largely unclear. To remedy this, we conducted a comprehensive assessment of the measurement properties of two items measuring past and present objectified cultural capital via the number of books in the household of the respondent's family of origin and the respondent's current household, respectively. For this purpose, we used data ($N = 3260$) from the Programme for the International Assessment of Adult Competencies (PIAAC) 2012 survey in Germany and the 2015 wave of a follow-up study (PIAAC-L). We analyzed the two items' distributions (total sample and separately by age-group), test-retest reliability over 3 years (for past cultural capital only), and their convergent and divergent validity (i.e., correlations with socioeconomic status, literacy and numeracy skills, and cultural and literary activities).

Our analyses (1) reveal that past and present objectified cultural capital are substantially but not perfectly related ($\rho = .52$), which may reflect intergenerational transmission; (2) demonstrate that the item measuring past objectified cultural capital shows high test-retest reliability over three years ($\rho = .74$); and (3) attest to both the convergent and divergent reliability of both items, as indicated by systematic yet only small to medium-sized correlations with socioeconomic status, literacy and numeracy skills, and cultural and literary activities. At the same time, our analyses (4) underscore that cultural capital is not a uniform construct, highlighting that the number of books captures a specific aspect of the concept (i.e., *objectified* cultural capital). Our findings can serve as a benchmark for future research on cultural capital.

Keywords: Cultural capital, Objectified cultural capital, Number of books, Number of books at age 16, Bourdieu, Cultural reproduction, Cultural mobility

Introduction

In his seminal work, Pierre Bourdieu (1973, 1986) distinguished three fundamental forms of capital that, in his view, allow for a more complete and nuanced understanding of social reproduction and the societal distribution of power. According to his conceptualization, economic capital refers to economic resources (e.g., income, property). Social capital refers to resources available through social ties and membership in social networks. Cultural capital comprises "instruments for the appropriation of symbolic wealth worthy of being sought and possessed" (Bourdieu, 1973, p. 175). Regarding the conversion of the three forms of capital, Bourdieu (1986) posited that social and cultural capital can be construed from economic capital to a certain degree but only with much effort. This implies on the one hand that economic capital is fundamental to the other capital forms and on the other hand that social and cultural capital cannot be reduced to economic resources (Bourdieu, 1986).

In his later work, Bourdieu distinguished between three more specific forms of cultural capital: incorporated, institutionalized, and objectified cultural capital (Bourdieu, 1979). *Incorporated* cultural capital is understood as an individual's inherent and lasting disposition influenced by processes of formal education and individual socialization. *Institutionalized* cultural capital grants institutional or public recognition mostly represented by academic titles. It is, under the right circumstances, convertible into economic capital (Koller, 2009). Finally, *objectified* cultural capital comprises tangible cultural goods such as books or works of art that can, in

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contrast to incorporated cultural capital, be physically transferred. It is the latter form of cultural capital that the widespread "number of books in the household" items capture.

Initially, Bourdieu introduced the concept of cultural capital in an attempt to explain how social status is reproduced through a society's educational system (Bourdieu, 1973, 1984, 1986; Bourdieu & Passeron, 1990; Lareau & Weininger, 2005). He accorded a pivotal role to the intergenerational transmission of cultural capital, by which children are endowed with parental cultural capital during the process of socialization. Bourdieu and Passeron (1990) argued that children profit the most from parental cultural capital when their parents are of a high social status, that is, if parents have accumulated greater amounts of cultural capital. Those children are better prepared for higher levels of education and receive greater rewards during their educational career (e.g., in form of better school grades). This recreation of social privilege is known as the Cultural Reproduction Theory. In contrast to Bourdieu's ideas, DiMaggio (1982) found that male students benefit the most from their parental cultural capital if their fathers had a low to medium socioeconomic status. He concluded that children whose parents are of a lower socioeconomic standing are better able to use their parental cultural resources as an additional asset to their measured ability on their way to higher education. He names this the Cultural Mobility Theory (DiMaggio, 1982).

Today's predominant interpretation and operationalization of cultural capital can be traced back to the work of DiMaggio (for reviews, see Kingston, 2001; Lareau & Weininger, 2005). He filled in Bourdieu's sometimes unclear and inconsistent explanations of how incorporated cultural capital is associated with individual educational outcomes (Lamont & Lareau, 1988; Kingston, 2001; Sullivan, 2001; Lareau & Weininger, 2005) by arguing that "schools reward students on the basis of their cultural capital […]. Teachers […] communicate more easily with students who participate in elite status cultures, give them more attention and special assistance, and perceive them as more intelligent or gifted than students who lack cultural capital" (DiMaggio, 1982, p. 190). Thus, DiMaggio specified a mechanism through which cultural capital can contribute to individual educational outcomes. Consequently, DiMaggio's cultural capital follows a Weberian notion of "elite status groups", according to which specific traits, tastes, and styles within a social group generate "a common sense of honor based upon and reinforced by shared conventions" (DiMaggio, 1982, p. 189). He operationalized cultural capital as participation in cultural activities that represent a high social status such as visiting the museum and theater or enjoying classical music (cf. Kingston, 2001; Lamont & Lareau, 1988; Lareau & Weininger, 2005).

Despite the elaborate theoretical underpinnings of the cultural capital concept, little effort has been devoted to the question as to how cultural capital should best be measured (Kingston, 2001; Dumais, 2006). Although Bourdieu suggested a range of indicators of cultural capital that he used in his empirical work (Bourdieu, 1973), there are no established "gold standard" indicators of cultural capital (Kingston, 2001; Dumais, 2006). Research has used widely varying measures, often chosen ad hoc, and the validity of even the most widely used indicators is largely unclear.

Teachman (1987) was one of the first to use measures of objective parental cultural resources that foster academic success and which are not bound to family demographics (see also Leibowitz, 1977). In his study, he focused on educational resources measured through four items asking if, in the respondents' home, there were a place to study, a daily newspaper, a dictionary, or an encyclopedia and if there were reference books (Teachman, 1987, p. 550).

Subsequently, an item asking respondents how many books there were in their family's home when they were 16 years old has emerged as one of the most widely used operationalizations of objectified family cultural capital. This single-item measure has been used, for example, in large-scale international comparisons conducted by the Organization for Economic Co-operation and Development (OECD; e.g., OECD, 2011). Apart from its face validity, however, the quality of this measurement approach has rarely been systematically scrutinized.

The aim of our present analyses is to fill this gap. Specifically, we analyze the measurement properties (e.g., objectivity, reliability, and especially validity) of the aforementioned item measuring past cultural capital through the number of books in the respondent family's home at age 16. Moreover, we analyze a slightly rephrased variant of this item that measures present cultural capital through the number of books in the respondent's current household. For his purpose, we draw on a large sample of German adults.

Methods

The items are part of the Programme for the International Assessment of Adult Competencies (PIAAC) and the Programme for the International Assessment of Adult Competencies - Longitudinal's (PIAAC-L) Background Questionnaire. They are presented in the context of other sociodemographic questions such as educational attainment or country of birth. No specific instructions were given for the items. The respondent is provided with a show card that depicts the response categories before the interviewer reads the survey question face-to-face (OECD, 2010).

PIAAC 2012 Germany only collects respondents' information on the *number of books in the home at age 16* (Table 1, Item 1). Respondents who are 16 years of age at the time of the interview are asked about the present number of books in their home. Within PIAAC, this item was translated and administered in more than 33 countries (see PIAAC-Home for a survey overview).

Table 1 Items

No.	English item	German item
1	About how many books were there in your home when you were 16 years old? Do not include magazines, newspapers or schoolbooks. To give an estimation, one meter of shelving is about 40 books.	Wie viele Bücher gab es ungefähr bei Ihnen zu Hause, als Sie 16 Jahre alt waren? Zählen Sie bitte keine Zeitschriften, Zeitungen oder Schulbücher mit. Als Hinweis: auf einen Meter Regalbrett passen ungefähr 40 Bücher.
2	About how many books are there in your home today? Do not include magazines, newspapers or schoolbooks. To give an estimation, one meter of shelving is about 40 books.	Wie viele Bücher gibt es heute ungefähr bei Ihnen zu Hause? Zählen Sie bitte keine Zeitschriften, Zeitungen oder Schulbücher mit. Als Hinweis: auf einen Meter Regalbrett passen ungefähr 40 Bücher.

PIAAC-L Germany (Wave 2, 2015) collected information on both, respondents' *present number of books at home* and the *number of books at home when the respondent was 16 years old* (Table 1, Items 1 and 2).

Response specifications

Response specifications are identical for both items in Table 1. Respondents provide their answers along six response categories on a show card: "10 books or less," "11 to 25 books," "26 to 100 books," "101 to 200 books," "201 to 500 books," and "More than 500 books."

Scoring

Scoring is identical for both items. Ascending numerical values are assigned to respondents' answers, resulting in a 6-point ordinal scale:

1 = "10 books or less"
2 = "11 to 25 books"
3 = "26 to 100 books"
4 = "101 to 200 books"
5 = "201 to 500 books"
6 = "More than 500 books"

In PIAAC-L, missing values are coded as follows: − 1 = "Do not know" and − 2 = "Refused".[1]

Application field

The items can be used to measure respondents' past (i.e., in the family of origin) and present (i.e., in the current household) educational resources. In terms of Bourdieu's (1986) concept of cultural capital, books in the household fall under the "objectified cultural capital" subcategory.

The items are generic enough to be used in any target population. They can be administered in any survey mode. The items have been successfully administered by several surveys in paper and pencil interviews (PAPI), computer-assisted self-interviews (CASI), and computer-assisted personal interviews (CAPI).

Secondary data offering information on one or both items abound, including several cross-nationally comparative survey programs. For example, the Programme for International Student Assessment (PISA) uses a paper-pencil as well as an online version of the item *present number of books at home* (OECD, 2017). Additionally, PISA also includes a recoded version of this item as part of an overall index of household possessions (HOMEPOS) and as part of an index of economic, social, and cultural status (ESCS). The ESCS aims at capturing the construct of family wealth as a better alternative to household income (OECD, 2012, pp. 287–288, 312). Furthermore, the Progress in International Reading Literacy Study (PIRLS) uses the item *present number of books at home* as part of an Home Educational Resources Index (HER) (Mullis et al. 2017).

Sample

The main data source for the present analyses is the second (2015) wave of the Survey of Adult Skills' (PIAAC) follow-up study PIAAC-L Germany (version 2.0.0), because only in PIAAC-L participants responded to both items of interest; past and present number of books at home. Additionally, PIAAC-L enhances and elevates the cross-sectional approach of PIAAC 2012 Germany into a longitudinal design by re-contacting and re-interviewing PIAAC 2012 participants. Therefore, PIAAC-L does not draw a new probability-based sample but is a subsample of all PIAAC 2012 respondents[2] and their household members who were willing to participate in the follow-up (further information on the sample design and sample selection is available at PIAAC-Home, PIAAC-Longitudinal, and PIAAC-Documentation).

Combining PIAAC 2012 and PIAAC-L 2015 allows us to estimate the test-retest reliability for the item *number of books at age 16*, which was measured in both surveys. The subsample for these analyses consists of participants who participated in both surveys. Test-retest reliability cannot be tested for the *present number of books at home* because this item was only assessed once, in PIAAC-L 2015.

Item parameters

Tables 2 and 3 present descriptive statistics for the two "number of books" items for the total German PIAAC-L 2015 sample and separately by age group. Although the distributions of the two items for the total sample are similar, the separation by age groups highlights that older cohorts of respondents report having had fewer books at home at age 16 compared to younger cohorts. Additionally, older cohorts tend to possess more books at home in their present households than younger cohorts do. This may reflect the changing value of books as a form of objectified cultural capital.

Table 2 The number of books in the home when respondent was 16 years old

Response category	16 to 35 years old		36 to 50 years old		51 to 70 years old		Total sample	
"10 books or less"	104	(10.16)	120	(11.65)	172	(14.51)	396	(12.23)
"11 to 25 books"	135	(13.18)	160	(15.53)	259	(21.86)	554	(17.10)
"26 to 100 books"	329	(32.13)	375	(36.41)	408	(34.43)	1112	(34.33)
"101 to 200 books"	170	(16.60)	147	(14.27)	167	(14.09)	484	(14.94)
"201 to 500 books"	177	(17.29)	136	(13.20)	112	(9.45)	425	(13.12)
"More than 500 books"	109	(10.64)	92	(8.93)	67	(5.65)	268	(8.27)
Total	1024	(100.00)	1030	(100.00)	1185	(100.00)	3239	(100.00)

Note. Valid frequencies by age groups for PIAAC-L Germany 2015 (column percentages in parentheses). Absolute total missing values: 24

Results

Objectivity

In PIAAC, three steps were taken to ensure measurement objectivity. First, only interviewers with excellent track records and previous experience with PIAAC field tests are considered as PIAAC interviewers and received extensive training. Second, as described above, respondents are provided with a show card of response categories before the interviewer reads out the question. Third, the wording of the survey items gives respondents an estimate on how many books fit on 1 meter of shelving. These applications guide objective responding and reduce interviewer effects (Zabal et al. 2013).

Reliability

The test-retest reliability (i.e., temporal consistency), measured by Spearman's rho and Kendall's tau_b of the item measuring past objectified cultural capital (*number of books at age 16*) is $\rho = .74$ and $\tau_b = .65$, respectively. Given the period of 3 years that elapsed between the measures, this indicates a satisfactory test-retest reliability of the item. This finding further applies across different age groups, as shown in Table 4. In all age groups, the 3-year test-retest reliability exceeds $\rho = .70$ and $\tau_b = .60$.

Validity

To judge the construct validity of the two items under consideration, we inspect their correlations with a range of other measures based on the sample of German PIAAC-L 2015.

Our focus in assessing validity is on three questions: First, whether the items measuring past and present number of books at home are associated with one another. Second, whether the items of past and present number of books at home are associated with other often-used indicators of incorporated cultural capital and present books-related activities (convergent validity). Third, whether the items of past and present number of books at home measure something different than socioeconomic status or acquired skills (divergent validity).

(1) Associations between past and present objectified cultural capital. Considering the correlation between past and present objectified cultural capital, we found a moderate correlation (Spearman's rho) of $\rho = .52$ between the *number of books at age 16* and the *present number of books at home* in the current household among the PIAAC-L 2015 respondents.

This correlation suggests that there is indeed a substantial intergenerational transmission of cultural capital: Respondents with a higher number of books in their family of origin's household possess a higher number of books in their own household later in life. It must be noted, however, that memory bias might inflate this correlation to an unknown extent.

(2) Convergent validity: Correlations with cultural and literary activities. To assess convergent validity, we examine the correlations of past and present number of books with two other often-used measures of cultural capital, namely cultural activities *(visiting cultural events* and *visiting cultural places*). Additionally, we look at the association of past

Table 3 The present number of books in the home

Response category	16 to 35 years old		36 to 50 years old		51 to 70 years old		Total sample	
"10 books or less"	117	(11.36)	69	(6.63)	72	(6.06)	258	(7.91)
"11 to 25 books"	174	(16.89)	115	(11.05)	95	(7.99)	384	(11.78)
"26 to 100 books"	314	(30.49)	324	(31.12)	351	(29.52)	989	(30.34)
"101 to 200 books"	226	(21.94)	219	(21.04)	263	(22.12)	708	(21.72)
"201 to 500 books"	139	(13.50)	198	(19.02)	236	(19.85)	573	(17.58)
"More than 500 books"	60	(5.83)	116	(11.14)	172	(14.47)	348	(10.67)
Total	1030	(100.00)	1041	(100.00)	1189	(100.00)	3260	(100.00)

Note. Valid frequencies by age groups for PIAAC-L 2015 Germany (column percentages in parentheses). Absolute total missing values: 3

Table 4 Temporal consistency of "The number of books in the home when respondent was 16 years old"

Age group	ρ	τ_b
16 to 35 years ($N = 1192$)	.74	.64
36 to 50 years ($N = 1169$)	.74	.65
51 to 70 years ($N = 872$)	.72	.64
Over all age groups ($N = 3233$)	.74	.65

Note. Spearman's rho and Kendall's tau_b by age groups. Item scale from 1 ("10 books or less") to 6 ("More than 500 books"). Estimates based on respondents that responded to the item in PIAAC 2012 and PIAAC-L 2015. Complete case analysis

and present books at home with present literary activities (e.g., reading, visiting the library). These items can be seen as proxies of incorported cultural capital. All four activity items are measured with a 5-point ordinal scale that asks respondents about the frequency of each activity: 1 = "Daily", 2 = "At least once a week", 3 = "At least once a month", 4 = "Less frequently", 5 = "Never". We recoded these activity items so that higher values indicate more frequent behavior.

As to be expected, both number-of-books items correlate positively ($.21 \leq \rho \leq .36$) with cultural activities, whereby the number of books in the present household – plausibly – exhibits stronger relations to these measures of cultural capital than the number of books at age 16 does. They also show moderate associations with literary activities.

Importantly, the only small to medium-sized correlations with cultural and literary activities support the idea that cultural capital is not a homogeneous construct, as one might expect from Bourdieu's distinction between objectified, incorporated, and institutionalized cultural capital. This implies that different measures of cultural capital capture partly distinct aspects of the same overarching construct (e.g., Jæger, 2011). Specifically, these correlations reflect the demarcation of incorporated cultural capital as assessed by the cultural events/places measures and objectified cultural capital assessed by the number-of-books items.

(3) Divergent validity. To test the two items' divergent validity, we examine their correlations with (1) years of formal education and occupational prestige as measures of socioeconomic status and (2) respondents' literacy and numeracy skills as indicators of acquired skills that facilitate academic success. Literacy and numeracy skills were measured with the extensive tests from the PIAAC framework. In that regard, Table 5 shows moderate correlations (Spearman's rho: $.30 \leq \rho \leq .40$) of the past and present number of books with the indicators of socioeconomic status.

The two number-of-books items also correlated as expected ($.29 \leq \rho \leq .43$) with literacy and numeracy skills.

Following DiMaggio's (1982) general understanding of cultural capital as being distinct from skills and abilities (see also Lareau & Weininger, 2005), one might expect only weak correlations of the past and present number of books at home with literacy and numeracy. Our findings show that objectified cultural capital as measured by the number of books has at least moderate correlations with both sociodemographic status and skills (Table 5). Still, these correlations are weak enough to support the divergent validity of the two number-of-books items.

Conclusions

To summarize, the pattern of correlations support both the convergent and divergent validity of the two items measuring past and present objectified cultural capital. First, both items correlate positively with cultural and literary activities. The small size of these correlations implies that owning books need not always entail a higher engagement in cultural and literary activities. It also indicates that cultural capital is not a homogenous construct per se. Researchers should be wary that the number of books in the household captures only a specific, if important, aspect of cultural capital, namely objectified cultural capital. Second, objectified cultural capital as measured through the number of books is sufficiently distinct from traditional measures of socioeconomic status and

Table 5 Convergent and divergent validity of the past and present cultural capital measures in PIAAC-L 2015

Variable		Past cultural capital: Number of books at age 16	Present cultural capital: Number of books in current household
1	Visiting cultural events	.28 (.25)	.36 (.31)
2	Visiting cultural places	.21 (.18)	.30 (.26)
3	Reading books	.32 (.26)	.45 (.37)
4	Reading the news	.03 (.03)	.19 (.16)
5	Visiting the library	.35 (.29)	.42 (.35)
6	Years in education	.40 (.31)	.33 (.26)
7	Occupational prestige (SIOPS-08)	.30 (.23)	.33 (.25)
8	Literacy skills	.43 (.32)	.37 (.27)
9	Numeracy skills	.34 (.25)	.29 (.22)

Note. $N = 3263$. Observations vary. Cell values are Spearman's rho. Kendall's tau_b in parentheses. Correlations of pairwise present observations

from acquired skills, supporting the general idea that cultural capital is a distinct dimension of capital implicated in the reproduction of social status.

Endnotes

[1]In PIAAC 2012, missing values are coded as follows: 97 = “Do not know” and 98 = "Refused".

[2]Each participating country in PIAAC 2012 administered a probability-based random sample representative of the respected working-age adult population.

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PIAAC 2012 and PIAAC-L 2015 data as used in this documentation is available via the GESIS Data Catalogue (DBK): PIAAC 2012 (Rammstedt et al. 2016) and PIAAC-L 2015 (GESIS – Leibniz Institute for the Social Sciences, German Socio-Economic Panel (SOEP) at DIW Berlin & LIfBi – Leibniz Institute for Educational Trajectories, 2017)

Authors' contributions
Both authors read and approved the final manuscript.

Competing interests
The authors declare that they have no competing interests.

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References
Bourdieu, P. (1973). *Cultural reproduction and social reproduction* (p. 178). London: Tavistock.

Bourdieu, P. (1979). Les trois états du capital culturel. *Actes de la Recherche en Sciences Sociales, 30*(1), 3–6. https://doi.org/10.3406/arss.1979.2654.

Bourdieu, P. (1984). Distinction: a social critique of the judgement of taste. Translated by Richard Nice, Harvard University Press.

Bourdieu, P. (1986). The forms of capital. In *Handbook of Theory of Research for the Sociology of Education* (Vol. 241, pp. 241–258).

Bourdieu, P., & Passeron, J.-C. (1990). *Theory, culture & society. Reproduction in education, society and culture (2nd ed.)*. Translated by Richard Nice. Thousand Oaks, CA, US: Sage Publications, Inc.

DiMaggio, P. (1982). Cultural capital and school success: The impact of status culture participation on the grades of US high school students. *American Sociological Review, 47*(2), 189–201.

Dumais, S. A. (2006). Early childhood cultural capital, parental habitus, and teachers' perceptions. *Poetics, 34*(2), 83–107. https://doi.org/10.1016/j.poetic.2005.09.003.

GESIS – Leibniz Institute for the Social Sciences, German Socio-Economic Panel (SOEP) at DIW Berlin & LIfBi – Leibniz Institute for Educational Trajectories (2017): PIAAC-Longitudinal (PIAAC-L), Germany. GESIS Data Archive, Cologne. ZA5989 Data file Version 3.0.0, https://doi.org/10.4232/1.12925.

Jæger, M. M. (2011). Does cultural capital really affect academic achievement? New evidence from combined sibling and panel data. *Sociology of Education, 84*(4), 281–298. https://doi.org/10.1177/0038040711417010.

Kingston, P. (2001). The unfulfilled promise of cultural capital theory. *Sociology of Education, 74*, 88–99. https://doi.org/10.2307/2673255.

Koller, H.-C. (2009). Bildung als Habituswandel? Zur Bedeutung der Sozialisationstheorie Bourdieus für ein Konzept transformatorischer Bildungsprozesse. In J. Budde & K. Willems (Eds.), *Bildung als sozialer Prozess. Heterogenitäten, Interaktionen, Ungleichheiten* (pp. 19–34). Weinheim: Juventa.

Lamont M., & Lareau A. (1988). Cultural capital: allusions, gaps and glissandos in recent theoretical developments. *Sociological Theory, 6*(2), 153–168. https://doi.org/10.2307/202113.

Lareau, A., & Weininger, E. (2005). Cultural capital in educational research: a critical assessment. In *Theory and Society - THEOR SOC* (Vol. 32, pp. 105–144). https://doi.org/10.1007/1-4020-2589-0_6.

Leibowitz, A. (1977). Parental inputs and children's achievement. *The Journal of Human Resources, 12*(2), 242–251.

Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2017). PIRLS 2016: International Results in Reading. Retrieved from Boston College. In *TIMSS & PIRLS international study center website* http://timssandpirls.bc.edu/pirls2016/international-results/pirls/home-environment-support/home-resources-for-learning/.

OECD. (2010). PIAAC Background Questionnaire (MS version 2.1 d.d. 15-12-2010). Retrieved from http://www.oecd.org/site/piaac/Background%20Questionnaire%2015DEC10.pdf

OECD. (2011). PIAAC Conceptual Framework of the Background Questionnaire Main Survey. Retrieved from http://www.oecd.org/skills/piaac/PIAAC(2011_11)MS_BQ_ConceptualFramework_1%20Dec%202011.pdf

OECD. (2012). *PISA 2009 Technical Report*. PISA: OECD Publishing. https://doi.org/10.1787/9789264167872-en.

OECD. (2017). *PISA 2015 assessment and analytical framework: science, reading, mathematic and financial literacy*. Paris: OECD publishing.

Rammstedt, S. Beatrice; Martin Silke; Zabal Anouk; Konradt Ingo; Maehler Débora; Perry Anja; Massing Natascha; Ackermann-Piek Daniela; Helmschrott. (2016). *Programme for the International Assessment of Adult Competencies (PIAAC), Germany - Reduced Version* (version 2.2.0). GESIS data archive, Cologne. Retrieved from https://doi.org/10.4232/1.12660

Sullivan, A. (2001). Cultural capital and educational attainment. *Sociology, 35*(4), 893–912.

Teachman, J. D. (1987). Family background, educational resources, and educational attainment. *American Sociological Review, 52*(4), 548–557.

Zabal, A., Martin, S., Massing, N., Ackermann, D., Helmschrott, S., Barkow, I., & Rammstedt, B. (2014). PIAAC Germany 2012: Technical report. Waxmann.