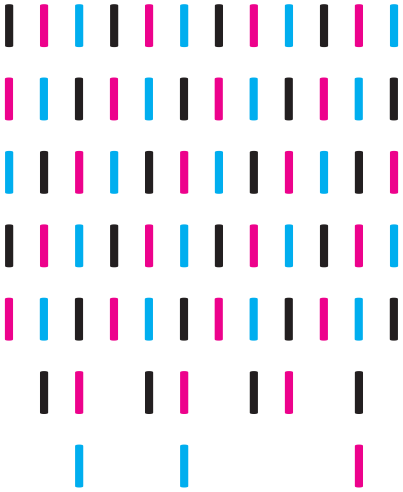

NEPS SURVEY PAPERS

Frank Goßmann and Gabrina Mätzke

MEASURING CULTURAL KNOWLEDGE IN THE NEPS

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Measuring cultural knowledge in the NEPS

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Measuring cultural knowledge in the NEPS

Abstract

Contributing to the debate on adequate measures of cultural capital, our research project intended to extend the existing quantitative cultural capital measurements in the NEPS by the qualitative instrument of cultural knowledge. Studies investigating the impact of cultural knowledge on educational outcomes suggest that cultural knowledge explains social inequalities in educational success to some extent. We define cultural knowledge as knowledge of those cultural products from literature, classical music, theatre, and visual arts that are commonly conceived as valuable in a society. On this conceptual basis, we developed a theory-driven multistage procedure to identify cultural products that cultural knowledge refers to. Out of these, 40 items were created and tested afterwards in a quantitative pretest. Based on empirical findings regarding item difficulty, discriminatory power, and factor loadings, 15 of the 40 items were chosen to form the cultural knowledge measurement in the NEPS. First analyses with the newly developed instrument show that the instrument is reliable and valid. Correlation and regression analyses indicate that cultural knowledge is related to other cultural capital indicators but nevertheless measures a distinct dimension of cultural capital. Furthermore, it is unequally distributed across social classes and negatively affected by migration background.

Keywords

educational inequality, cultural capital, cultural knowledge, Bourdieu

1 Introduction

In the field of sociology of education, one of the most prominent theories is cultural capital theory. A number of studies show that cultural capital affects various educational outcomes (Aschaffenburg & Maas, 1997; de Graaf, de Graaf & Kraaykamp, 2000; DiMaggio, 1982; Rössel & Beckert-Zieglschmid, 2002; Sullivan, 2001). With only some exceptions, the vast majority of studies are restricted to items quantifying cultural possessions and cultural activities such as the number of books in the household, reading quantity or participation in high-brow culture (Goßmann, 2018). Revisiting Bourdieu's writings, there is an ongoing debate on adequate ways to measure cultural capital (Gaddis, 2013; Goldthorpe, 2007; Kingston, 2001; Lareau & Weininger, 2003, 2007). A central critique of such measures is that they are only of quantitative nature and are not able to capture qualitative differences in cultural capital. In contrast, cultural knowledge is a qualitative dimension of embodied cultural capital (Bourdieu 1977, 1983) and therefore assumed to be decisive for educational attainment and in turn for social inequalities in educational success. Studies that have accounted for cultural knowledge are rare (Bennet et al. 2005; Zimdars et al., 2009), and even less have considered cultural knowledge as a separate dimension of cultural capital (Becker, 2010; Sullivan, 2001; Zimdars et al., 2009). Sullivan (2001: 908) shows that the effects of cultural activities on school grades are entirely mediated by cultural knowledge and linguistic ability which, "suggests that the mechanism through which cultural participation improves educational attainment is in fact the possession of knowledge or a set of competencies […]". This finding supports the importance of measuring qualitative dimensions of cultural capital in the NEPS in order to identify causal mechanisms of generating differences in outcomes.

Previous studies which considered cultural knowledge lack a clear definition of the term cultural knowledge, documentation of the item developmental process and detailed reliability and validity checks. Against this background, our research project intended to extend existing quantitative measurements of cultural capital in the NEPS by the qualitative instrument of cultural knowledge and to avoid the shortcomings of previous studies, that is (1) to give a clear theory-driven definition of the content of cultural knowledge and (2) to present encompassing empirical analyses concerning reliability and validity.

Measuring cultural knowledge allows for analyzing:
(1) some mechanisms underlying the empirical correlations of quantitative measures of cultural capital and various educational outcomes,
(2) the unequal endowment of individuals with cultural knowledge as a crucial educational resource with regard to social status and ethnicity,
(3) the impact of cultural knowledge on educational outcomes at various stages of life, and
(4) further returns to cultural knowledge across the life course (e.g. on the labor market or the marriage market).

This paper presents the measurement of cultural knowledge in the NEPS. First, we outline the theoretical background (section 2). Next, we give an overview of the instruments to measure cultural knowledge that already exist (section 3). Thereafter, the process of the item development is detailed (section 4). In the following section, we describe the sample and the variables of the quantitative pretest (section 5.1 and 5.2) that contained 40 items. Out of these 40 items, 15 were selected for the NEPS measurement based on empirical results (section 5.3). In section 5.4, we present key figures about the NEPS measurement

including item difficulty, reliability, and dimensionality. Subsequently, we show some empirical findings including distributions, correlation analyses, and tests of criterion validity (section 5.5). The paper closes with a summary, implications for measuring cultural capital, and limitations of the measurement.

2 Theoretical background

Bourdieu has neither provided an approach how to operationalize cultural knowledge nor a clear definition of the term. Nevertheless, there is broad agreement in the scientific literature on the term (Lamont & Lareau, 1988; Lareau & Weininger, 2003; Sullivan, 2001). Alongside participation in high-brow culture and "cultural involvement" cultural knowledge is understood as part of cultural capital in the embodied state. It is mostly defined as the familiarity with the products of the dominant culture of a certain society (DiMaggio, 1982; Lamont & Lareau, 1988; Purhonen et al., 2011; Sullivan, 2001). The main art genres of the dominant culture are literature, classical music, theatre and visual arts (Bourdieu & Passeron, 1971; Bourdieu, 1977; Purhonen et al., 2011; Sullivan, 2001) as they "[…] have been deeply institutionalized by states and institutions of higher learning [and] they constitute the most broadly recognized forms of prestigious culture throughout European and western countries." (DiMaggio & Mukhtar, 2004: 170).[1] The single elements within these different art genres forming cultural knowledge as a whole depend on a particular society or country and the specification of its cultural institutions (Bennett, 2009; DiMaggio & Mukhtar, 2004; Schulze, 2005). Hence, we define cultural knowledge as knowledge of those cultural products from literature, classical music, theatre, and visual arts that are commonly conceived as valuable in a society. This definition is the basis for our cultural knowledge measurement. This implies that we do not refer to another dimension that is sometimes labelled as cultural knowledge, namely knowledge about the educational system and the characteristics of the school system (see Lareau & Weininger, 2003; Lareau, 2015). We do not summarize this concept under our notion of cultural knowledge, but regard it as distinct aspect regarding educational inequalities that we name "information about the German education system".

We refer to cultural knowledge as a dimension of cultural capital. Thus, the former underlies the same theoretical assumptions as the latter.[2] Cultural capital is conceived of as crucial factor for a successful educational career. This is especially true for embodied cultural capital that comprises cultural knowledge (Bourdieu, 1977; DiMaggio, 1982; Lamont & Lareau, 1988). The acquisition of cultural knowledge begins at an early age through intergenerational transmission from parents to children during the process of socialization (Becker, 2010; Bourdieu, 1977, 1983; Dumais, 2002; Sullivan, 2001). Since cultural knowledge is unequally distributed across social classes, children of higher-class parents acquire more cultural knowledge in their early years than their lower-class counterparts (Dumais, 2002; Sullivan, 2001) and social class differences persist across the life course. Studies show that cultural knowledge is mainly dependent of the social status measured by social class and education (Purhonen et al., 2011; Sullivan, 2001; Zimdars et al., 2009). The higher the individual social status, the higher the endowment with cultural knowledge. Besides, migration background seems to have a negative impact on cultural knowledge

[1] From this argumentation follows that in other than European and western countries possibly other genres constitute the legitimate and most valued culture.

[2] For more information see the survey paper "Measuring Cultural Capital in the NEPS".

(Becker, 2010). Findings regarding the impact of cultural activities on cultural knowledge are mixed. Becker (2010: 29) shows that cultural knowledge of 3-4 year old children in Germany was affected by reading books to them, visiting a zoo respectively a circus and visiting a museum or theater. In contrast, telling stories to the children and visiting the library was not related to cultural knowledge. Sullivan (2001) finds that cultural knowledge of 16 year old students in England is affected by reading and watching sophisticated television programs, whereas high-brow cultural activities (visiting art galleries or museums, plays, classical concerts) and activities associated with music (playing an instrument and listening to classical music) are not (Sullivan, 2000: 69; Sullivan, 2001: 904-905). In sum, being read to and reading seem to have a positive influence on cultural knowledge in early childhood as well as in adolescence. In contrast, findings with regard to the effects of high-brow cultural activities on cultural knowledge are inconsistent across these stages of life.

Since the educational system presupposes and rewards cultural knowledge, its unequal endowment leads to educational inequalities (Becker, 2010; Sullivan, 2001; Tzanakis, 2011). More specifically, cultural knowledge seems to have a positive influence on several educational outcomes. Tuppat & Becker (2014) revealed that the probability of beginning school with seven instead of six years was smaller for children with higher cultural knowledge. Sullivan (2001) found that English students with a high amount of cultural knowledge performed better in their final exams than their classmates with less cultural knowledge did. Zimdars et al. (2009) showed that the chance to get elite university admission in Britain was higher for applicants with a high cultural knowledge net of certificates and grades. Additionally, several studies showed that the impact of cultural activities on educational outcomes was mediated by cultural knowledge (Purhonen et al., 2011; Sullivan, 2001; Zimdars et al., 2009).

The literature distinguishes three theoretical mechanisms why students with higher cultural knowledge are more successful in the educational system. On the one hand, there is the act of (1) self-selection. Since children from higher social background possess a higher endowment of initial cultural knowledge, they feel more familiar and “at home” in educational institutions. Lower-class children in contrast struggle to fit into this climate shaped by the dominant culture, discouraging them to stay in school. Consequently, children from the lower classes tend to leave the educational system earlier as students with a higher social background (de Graaf & de Graaf, 2006; Dumais, 2002; Kalmijn & Kraaykamp, 1996). On the other hand, (2) selection and discrimination by various educators play an important role. It is expected that teachers are endowed with a high cultural knowledge enabling them to assess their students’ cultural knowledge (DiMaggio & Useem, 1978). Since it is assumed that educators also value cultural knowledge, they are expected to favor children with a high endowment of cultural knowledge over children with a low endowment (Aschaffenburg & Maas, 1997; DiMaggio, 1982; Dumais, 2002; Sullivan, 2001). As a result, the former get more attention and assistance from their educators, are regarded as more intelligent and able and hence are evaluated better by their teachers (Aschaffenburg & Maas, 1997; DiMaggio, 1982; Kalmijn & Kraaykamp, 1996). The third mechanism relates to (3) the content of the curricula, the classes and the exams, which presuppose cultural knowledge in order to be successful. On average, students with a low endowment perform worse in every kind of assessment than students with more cultural knowledge (de Graaf & de Graaf, 2006; Kalmijn & Kraaykamp, 1996). Lower-class students with less initial endowment cannot compensate

their unfortunate start (Bourdieu & Passeron, 1977; Bourdieu, 1977; Lamont & Lareau, 1988).[3]

Taken all the theoretical assumptions together, higher-class children are expected to outdo less advantaged ones during the entire educational career. They decide in favor of schooling at every critical point, get more attention from educators, and earn better grades, better final credentials and higher certificates. Hence, they are able to maintain their high social status, whereas lower-class children fail to improve their social class position. By presupposing that students are endowed with cultural knowledge that is typically possessed only by higher social classes, the educational system reproduces the social class structure across generations and, hence, social inequality. Furthermore, it legitimates social inequality under the cover of meritocracy claiming that the school system just reflects ability (Bourdieu, 1977; Lamont & Lareau, 1988; Sullivan, 2002).

With these theoretical assumptions in mind, we expect cultural knowledge to play an important role for all Starting Cohorts in the NEPS, since it has an impact at every point of the educational career. For instance, we expect children with a high endowment of cultural knowledge to be less likely to be enrolled in primary school at age 7 instead of age 6, to have higher chances of attending upper secondary school *(Gymnasium)* at age 10-12 and of leaving the school system with a tertiary education entrance qualification *(Abitur)* at age 18-19. Furthermore, we assume that after leaving school graduates with a high endowment of cultural knowledge are more likely to enter university and to decide for a master's program instead of leaving with a bachelor's. Moreover, there might be positive effects on the likelihood of getting a job, at least in non-manual occupations. Similar to the educational context, on the labor market cultural knowledge might function as a signal of being intelligent and highly educated. Hence, chances of getting jobs which require mainly cognitive skills might increase with the endowment of cultural knowledge.

Additionally, it is also crucial to measure the cultural knowledge of parents to test the influence of parental cultural knowledge on the educational outcomes of their children. In particular in the early stages of the educational career up to primary schooling, educators might to some extend judge the potential of cognitive development and the educational chances of children depending on their parents' cultural knowledge.

Besides its direct effect on educational outcomes, cultural knowledge is assumed to mediate the effects of other dimensions of cultural capital on educational outcomes. For instance, cultural knowledge might contribute to explain the impact of cultural participation and possession of cultural goods on educational success (Purhonen et al., 2011; Sullivan, 2001). Theoretically it might be likely that both participation and possession have no (direct) causal effect on educational outcomes, but are correlated with cultural knowledge as well as educational outcomes. Given that cultural knowledge has a positive effect on educational outcomes, there are two plausible explanations that support that reasoning. First, participation in high-brow culture like visiting a museum might increase cultural knowledge. Moreover, if someone owns classic literature, he is likely to read it and acquire the respective cultural knowledge. Hence, the effects of participation in high culture and cultural possessions are mediated by cultural knowledge. However, theoretical assumptions

[3] However, it was argued that the importance of high-brow culture in the curricula varies strongly across countries (de Graaf et al., 2000).

(Bourdieu, 1977, 1983) and empirical findings (Becker, 2010) suggest that cultural knowledge is also acquired by familial socialization beginning at an early age. Hence, measuring cultural knowledge by participation in highbrow culture and cultural possessions does not seem to be feasible. Second, the endowment with cultural knowledge might be associated with a positive attitude towards high-brow culture and an intrinsic motivation to participate in high-brow culture and to purchase cultural goods. Hence, cultural knowledge is a necessary condition to enjoy the consumption of high-brow culture (Bourdieu, 1977: 488). Thus, participation in high-brow culture and cultural possessions as well as educational outcomes are affected by cultural knowledge. Adding the qualitative measurement of cultural knowledge to the existing quantitative cultural capital items in the NEPS allows to test these hypotheses in the German context and to identify the mechanisms that underly the effects of cultural capital on educational outcomes.

3 Existing measurement instruments

As mentioned before, there are only a few studies that have measured cultural knowledge. Regarding adults, the applied items can be classified into three categories:

(1) There are questions that ask about the knowledge of certain books, compositions or artists (Bennett et al., 2005; Purhonen et al., 2011; Veenstra, 2005), for example: Do you know Antonio Vivaldi? (Purhonen et al., 2011: 398).

(2) In some instruments people have to be assigned to art genres like literature, music, art (see Sullivan, 2001, 2000; Zimdars et al., 2009), for example: For each person, please say which category (politics, music, literature, art or science) you associate him or her with – Graham Greene (Zimdars et al., 2009: 662).

(3) Other measurements contain detailed questions about artists, works or contents of certain books or paintings (see DiMaggio, 1982; Kalter et al., 2013; Wise, McLaughlin, & Steel, 1979), for example: Which opera takes place in ancient Egypt? (DiMaggio, 1982).

As cultural knowledge is a latent construct, all the existing studies measured it by several items, which were combined in a score representing the individual endowment with cultural knowledge.

In sum, the empirical results described in the previous section suggest that these measurements seem to be plausible. However, all studies lack an explanation how and why the researchers have chosen the respective indicators and why they assume that the items are appropriate to measure cultural knowledge. Therefore, the existing measurements might be arbitrary. Thus, their suitability to capture cultural knowledge and their content validity are questionable. Hence, in the NEPS we decided to develop and pretest a new instrument to ensure content validity. This process is described in the following section.

4 Item Development

To develop an instrument that meets the criterion of content validity we had to identify cultural products, which represent high-brow culture and are objects of cultural knowledge in the sense of cultural capital theory. Hence, we developed a theory-driven multistage procedure. Firstly, we defined the art genres to be constitutive for knowledge in the field of

high-brow culture. In accordance with previous studies (cf. Section 2), we specified literature (including theatre), classical music and visual arts as integral components. Secondly, we identified agents and institutions possessing the power to define valuable cultural products (and thereby artists; see DiMaggio & Mukhtar, 2004; Schulze, 2005). Thirdly, we gathered lists of cultural products and their originators provided by these agents and institutions. Fourthly, we derived a catalogue comprising the totality of high-brow cultural entities from those lists by extracting cultural products and their originators from the lists according to certain criteria and combining them. In the following, the implementation of this multistage procedure is described.

We assumed that valuable *literature* is defined by theatres and German literature studies at universities. Of course, there might be other agents or institutions with definitory power, but we claim that information about valuable literature provided by these institutions captures high-brow literature adequately. Therefore, we analyzed set books for German literature students from six German universities as well as two textbooks with recommended readings (see appendix). From these sources, we extracted authors and books including dramas (theatre), resulting in eight lists. We restricted the works to the 18th, 19th and 20th century, as we suppose that the respective publications are on average more influential and better known than older works. Hence, the expected variance of earlier works would be too low and response burden would be rather high. Afterwards, our final list of valuable literature and associated authors was created by adding all the works that are contained in at least six out of the eight initial lists.

Regarding *classical music* the subgenre opera was selected because, according to Bourdieu, opera is one of the worthiest forms of culture. Accordingly, displaying knowledge in this field has a highly distinctive effect. The creation of a catalogue with suitable musical pieces, including more than opera, was found to be extremely difficult and time-consuming. We assumed that institutions performing operas play a crucial role in defining the most important pieces. Thus, we considered the indications of the *Deutscher Bühnenverein*, which registers the number of visitors as well as the number of performances for every play performed at German operas, theatres, and concert halls. From this source, we decided to choose the most widespread operas, since knowledge about this field is rather exclusive. Thus, we derived a catalogue of operas, which included the 12 most visited or performed pieces and their composers in the years 2009 to 2012.

In the field of *visual arts*, art museums were assumed to define valuable works. Therefore, we analyzed public information from the leading museums in the capitals of the 16 German federal states (see appendix). Our list of eminent artists in the field of visual arts comprises all artists who were on display in at least six of the 16 permanent exhibitions (2012/2013). The artists originate from the 14th to the 20th century.

To measure cultural knowledge we use three types of items: (a) assignment of artists to art genres (cf. Table 1; Sullivan, 2001, 2000; Zimdars et al., 2009), (b) assignment of works to artists (cf. Table 2) (DiMaggio, 1982; Wise et al., 1979), and knowledge of books (cf. Table 3) (Purhonen, Gronow, & Rahkonen, 2011; Veenstra, 2005).

Table 1: Example items for the assignment of artists to art genres

Variable	German text	English translation
	Nun werde ich Ihnen eine Reihe von Personen nennen. Sagen Sie mir bitte, ob die jeweilige Person ein Maler, Schriftsteller oder Komponist war. Falls Sie die Antwort nicht wissen, dann geben Sie einfach „weiß nicht“ an.	Now I will name several people. Please tell me if the respective person was a painter, writer or composer. If you do not know the answer, simply say “don’t know”.
	1 - Maler	1 - painter
	2 - Schriftsteller	2 - writer
	3 - Komponist	3 - composer
t34130d	… Clemens Brentano	… Clemens Brentano
t34130m	… Caspar David Friedrich	… Caspar David Friedrich
t34130n	… Giacomo Puccini << ausgesprochen wie Dschakomo Putschini >>	… Giacomo Puccini << pronounced as Dschakomo Putschini >>

Table 2: Example item for the assignment of works to artists

Variable	German text	English translation
	Im Folgenden werde ich Ihnen einige Werke aus den Bereichen Literatur, Kunst und Oper nennen. Sagen Sie mir bitte, von wem das jeweilige Werk ist. Falls Sie die Antwort nicht wissen, dann geben Sie einfach „weiß nicht“ an.	In the following, I will name several works from literature, art and opera. For each work, please tell me by whom it was created. If you do not know the answer, simply say “don’t know”.
t34120f	… von wem ist das Gemälde „Der Schrei“?	… who created the painting “The Scream”?
	1 - Max Liebermann	1 - Max Liebermann
	2 - Christian Gottlieb Schick	2 - Christian Gottlieb Schick
	3 - Max Beckmann	3 - Max Beckmann
	4 - Edvard Munch	4 - Edvard Munch

Table 3: Example items for the knowledge of books

Variable	German text	English translation
	Im Folgenden werde ich Ihnen einige Buchtitel nennen. Sagen Sie mir bitte, ob Sie das jeweilige Buch kennen. Mit „kennen“ meine ich, dass Sie das Buch gelesen haben oder es als Hörbuch gehört haben oder eine Theateraufführung oder Verfilmung gesehen haben.	In the following, I will name some book titles. For each book, please tell me if you know it. By “knowing” I mean that you have read the book or listened to the audiobook or seen a corresponding play or film version.
	1 - ja	1 - yes
	2 - nein	2 - no
t34110a	Kennen Sie “Die Blechtrommel” von Günter Grass?	Do you know “The Tin Drum” by Günter Grass?
t34110n	Kennen Sie “Berlin Alexanderplatz” von Alfred Döblin?	Do you know “Berlin Alexanderplatz” by Alfred Döblin?
t34110o	Kennen Sie “Der Prozess” von Franz Kafka?	Do you know “The Trial” by Franz Kafka?

Artists were drawn randomly from the lists and assigned to one of the question types resulting in three item sets. More specifically, artists were drawn randomly without replacement from the lists for the three sets separately. In case of multiple works of the respective artist, the work most often mentioned in the initial lists was selected. As knowledge about operas is quite uncommon, we chose the most visited operas. To capture cultural knowledge as diversified as possible artists in the field of literature and visual arts were drawn from different centuries (18th, 19th and 20th century) and artistic styles. Finally, 40 items entered the quantitative pretest, which is described in the next section.

5 Quantitative Pretest

5.1 Sample

The instrument was developed to measure cultural knowledge of adults living in Germany. The target group of the pretest were persons aged between 25 and 65 living in Germany. Thus, a sample of 1,000 persons was drawn from registry offices in Germany born between 1953 and 1993. In 2018, computer-assisted telephone interviews (CATI) were conducted.

The net sample consists of 502 persons aged between 25 and 72 years (mean = 45.97; standard deviation = 11.03) and living in Germany. 63 percent of the respondents were female, 28 percent were born abroad, and 26 percent were non-German native speakers. About 30 percent of the respondents belong to the upper or lower service class. Moreover, 5.57 percent have a degree equivalent to ISCED[4] 0 to 2 (lower secondary education: Hauptschulabschluss, Mittlere Reife), 38.84 percent have an educational qualification in accordance with ISCED 3 to 4 (upper secondary and post-secondary, non-tertiary education: for example Abitur, Fachabitur, Dual vocational training), and 54.38 percent hold a tertiary degree (ISCED 5 to 8, bachelor’s, master’s, and doctor’s degree).

[4] ISCED 2011

To assess the representativity of the sample, we compared these numbers with the official figures on the target population provided by the Bundesamt für Statistik. The numbers we report in the following refer to 2017 as this is latest data available. Even though the available data does not include all of the information mentioned above, the Bundesamt für Statistik offers data on the age, sex, migration background, and the educational level of the target population.[5] In 2017, the mean age of the target population was 45.63 and the relative share of women amounted to 49,57% (Bundesamt für Statistik 2019a). Furthermore, 14,1 percent of the target population was born abroad (Bundesamt für Statistik 2019a, 2019b). 13 percent of the German population aged 15 to 64 had a lower secondary degree or less (ISCED 0 to 2), 58 percent an upper secondary or post-secondary non-tertiary qualification (ISCED 3 to 4), and 29% had a tertiary degree (ISCED 5 to 8) (Bundesamt für Statistik 2018).

Table 4: Sample description

Variables		**Frequency**	**Percent**
Sex	Male	186	37.05
	Female	316	62.95
Born abroad	No	360	71.71
	Yes	142	28.29
Native language: German	No	129	25.70
	Yes	373	74.30
EGP	Working class [VI, VII]	56	11.16
	Petty bourgeoisie [IV]	4	0.80
	Middle classes [III, V]	106	21.12
	Lower service class [II]	138	27.49
	Upper service class [I]	147	29.28
	Never been employed	5	1
	Not determinable	46	9.16
Education	ISCED 2011 0 to 2	28	5.57
	ISCED 2011 3 to 4	195	38.84
	ISCED 2011 5 to 8	273	54.38
	Not determinable	6	1.20

[5] There are no figures available regarding the native language and the EGP class position.

Consequently, the net sample is biased to some degree regarding sex, migration background, and educational level: women, migrants, and highly educated are overrepresented. This might bias the results regarding the item difficulties as studies showed that migration background and education affect cultural knowledge (compare chapter 2). However, these are opposite effects: migration background has a negative effect on cultural knowledge whereas education has a positive impact.

5.2 Variables

We pretested 40 items to measure cultural knowledge. The single items were converted into dichotomous variables indicating whether an item was known respectively answered correctly or not. Furthermore, we collected data on respondents' socio-demographic characteristics. Social status was measured by the EGP class scheme and formal education. To get robust empirical results from bi- and multivariate analyses, EGP and formal education were conflated into three-level variables. Native language was used as indicator for migration background. As we aim to assess whether the cultural knowledge instrument measures a construct that is distinct from other dimensions of cultural capital and common knowledge, we included measures for the latter two in the questionnaire. Further dimensions of cultural capital were surveyed by using established NEPS measures on reading quantity, number of books at home, cultural possessions and participation in high-brow culture (see Goßmann, 2018). To measure common knowledge, we used the BEFKI GC-K short scale for measuring crystallized intelligence (Schipolowski et al., 2013). Minor adaptions of the BEFKI GC-K scale were necessary due to the survey mode. Sum scores were generated to measure the latent variables BEFKI GC-K, cultural possessions, and participation in high-brow culture, whereas number of books at home and reading quantity were single indicators.

5.3 Data-based Item Selection

The items of the final NEPS instrument were selected based on the pretest results, according to the following criteria: (1) An equal number of items regarding literature, visual arts, and opera has to be used to measure cultural knowledge, since they are of equal importance for the construct. (2) Within the art genres items should refer to different centuries and artistic styles. (3) Considering the item set 'knowledge of books' those books should be selected that are not predominantly read in school, since we aim to measure cultural knowledge independent from school education. (4) Taking the selection criteria 1 to 3 into account that refer to content validity, items are selected according to empirical results of the quantitative pretest. The item difficulty[6] shall be between 20 and 80 and item difficulties should vary across this range. Given the aforementioned criteria, the item with the highest discriminatory power[7] is selected. However, discriminatory power shall be at least 0.3. Factor loadings on factor one have to be substantial (≥0.4), and factor loadings on further factors must not be substantial (<0.4).

Table 5-7 show the information relevant for item selection for the three item sets: art genre, century, artistic style, share of respondents who read the respective book in school (Table 7 only), item difficulty, and the factor loadings (≥ 0.3).

[6] The item difficulty is defined as the percentage of respondents that answered an item correctly or positively stated to know a book.

[7] The discriminatory power is measured by the item-rest correlation.

Table 5: Items of the quantitative pretest and statistical characteristics: allocation of artist to genre

Cultural product	Art genre	Century	Artistic style	Item difficulty	Discrimi-natory power	Factor loading factor 1	Factor loading factor 2	Factor loading factor 3
Wolfgang Amadeus Mozart	Opera	18		98.80	0.14			
Paul Klee	Visual arts	20	Expressionism	64.34	0.56	0.58		
Carl Maria von Weber	Opera	19		21.12	0.46	0.48		
Clemens Brentano	Literature	18	Romanticism	32.67	0.58	0.61		
Georg Büchner	Literature	19	Vormärz	56.57	0.53	0.55		
Gioachino Rossini	Opera	19		57.57	0.51	0.54		
Hermann Hesse	Literature	20	Neo-Romanticism	85.26	0.43	0.46		
Sigmar Polke	Visual arts	20	Postmodern Realism	11.16	0.35	0.37		
Adalbert von Chamisso	Literature	18	Romanticism	10.36	0.45	0.48		
Heiner Müller	Literature	20	Post-war Literature, GDR	19.92	0.34	0.36		
Lovis Corinth	Visual arts	19/20	Impressionism	15.14	0.46	0.49		-0.32
Umberto Giordano	Opera	19/20		9.96	0.02			
Caspar David Friedrich	Visual arts	19	Romanticism	44.82	0.59	0.63		
Giacomo Puccini	Opera	19/20		68.33	0.58	0.61		
Peter Paul Rubens	Visual arts	16/17	Baroque	69.72	0.55	0.58	-0.32	

Table 6: Items of the quantitative pretest and statistical characteristics: allocation of work to artist

Cultural product	Art genre	Century	Artistic style	Item difficulty	Discrimi-natory power	Factor loading factor 1	Factor loading factor 2	Factor loading factor 3
Johann Wolfgang Goethe: Faust	Literature	18	Weimar classicism	84.86	0.44	0.46		
Thomas Mann: Buddenbrooks	Literature	20	Neuromant. Gegenströmung	61.55	0.63	0.67		
Gerhart Hauptmann: The Weavers	Literature	19	Naturalism	22.51	0.58	0.61		
Peter Handke: Offending the Audience	Literature	20	Weimar Classicism	8.76	0.47	0.50		-0.32
Pablo Picasso: Guernica	Visual arts	17	Cubism, Surrealism	29.08	0.48	0.51		
Edvard Munch: The Scream	Visual arts	19	Expressionism	57.77	0.56	0.60		
Otto Dix: Metropolis	Visual arts	20	Neue Sachlichkeit	6.57	0.37	0.39		
Johann Strauss: Die Fledermaus	Opera	19		43.43	0.50	0.52		
Georges Bizet: Carmen	Opera	19		31.27	0.53	0.56		
Giuseppe Verdi: La Traviata	Opera	19		57.16	0.53	0.55		

Table 7: Items of the quantitative pretest and statistical characteristics: knowledge of books

Cultural product	Art genre	Century	Artistic style	Known from school	Item difficulty	Discrimi-natory power	Factor loading factor 1	Factor loading factor 2	Factor loading factor 3
Günter Grass: The Tin Drum	Literature	20	Post-war literature, FRG	24.03	56.37	0.49	0.52		
Theodor Storm: The Rider on the White Horse	Literature	19	Poetic Realism	68.91	38.45	0.43	0.45		
Franz Grillparzer: The Poor Musician	Literature	19	Biedermeier	33.33	2.39	0.16		0.42	
Friedrich Schiller: The Robbers	Literature	18	Sturm und Drang	59.45	50.60	0.49	0.50		
Karl Philipp Moritz: Anton Reiser	Literature	18	Sturm und Drang	11.11	1.79	0.17		0.41	
Bertold Brecht: Mother Courage and her Children	Literature	20	Neue Sachlichkeit	50.92	43.43	0.59	0.61		
Friedrich Hölderlin: Hyperion	Literature	18	Weimar Classicism	36.36	4.38	0.34	0.36	0.45	
Gotthold Ephraim Lessing: Emilia Galotti	Literature	18	Age of Enlightenment	68.29	24.50	0.40	0.40		
Eduard Mörike: Painter Nolten	Literature	19	Biedermeier	33.33	2.99	0.18			0.35
Botho Strauß: Trilogy of Reunion	Literature	20	Contemporary literature	0.00	2.59	0.07		0.45	
Annette v. Droste-Hülshoff: The Jew's beech	Literature	19	Biedermeier	68.10	23.11	0.48	0.50		
Heinrich Heine: Germany. A Winter's Tale	Literature	19	Vormärz	34.16	32.07	0.37	0.38		
Christa Wolf: Kassandra	Literature	20	Contemporary literature	13.46	10.36	0.31	0.33	0.34	
Alfred Döblin: Berlin Alexanderplatz	Literature	20	Modernity	19.23	31.08	0.49	0.51		
Franz Kafka: The Trial	Literature	20	Expressionism	43.51	47.61	0.47	0.49		

Overall, no problems regarding missing values occurred. Despite the fact that the option "don't know" was explicitly offered to prevent respondents from guessing, item nonresponse was negligible.

As NEPS is a large-scale study covering a broad spectrum of research topics, available interview time to measure cultural knowledge is limited. Hence, we developed a scale that is sufficiently short and still fulfills reliability and validity criteria. Considering estimates of interview duration of the instrument and applying the mentioned criteria to the 40 items of the pretest resulted in 15 items that constitute the NEPS measurement of cultural knowledge (cp. Table 8).

5.4 Description of the final cultural knowledge measurement

To keep the potential frustration to a minimum, the final item sets were ordered according to their average item difficulty: In the first place is the assignment of artists to art genres as its average item difficulty is the highest; i.e. items of this set are solved correctly most commonly compared to the other item sets. In the second place is the assignment of works to artist as it has the lowest average item difficulty. At the end of the measure, we placed the items on knowledge of books. Each item set starts and ends with simpler items, while the most difficult ones are placed in the middle. We also offered explicitly the "don't know" category to the respondents to avoid a falsification of the answers by guessing. If nevertheless some respondents become deterred during the interview and they refuse to answer the questions, technical features of the computer assisted interviews are used. If the interviewee refuses to answer the questions two times in a row the whole cultural knowledge questionnaire will be skipped. These arrangements are supposed to keep the potential frustration to a minimum.

Item Difficulty

We define the degree of item difficulty by the relative share of respondents who answered an item correctly, or respectively gave a positive answer. Hence, the higher the difficulty of an item, the more respondents solved the item correctly or answered it positively. We aimed at varying the levels of items difficulty in order to capture persons with a different endowment of cultural knowledge. Since this requirement is not met by items solved by (almost) everyone or (almost) nobody, we excluded those items which displayed an item difficulty of less than 20% respectively more than 80% from the scale. As Table 8 shows, the item difficulties varied considerably between 21% and 70%.

Reliability

Overall, internal consistency of the cultural knowledge scale is satisfactory, following Acock (2014), denoted by a Cronbach's alpha of 0.87 (cp. Table 8). The alpha coefficient in the fourth column shows the Cronbach's alpha of the scale without the respective item. None of the values were higher than or equal to the alpha of the whole scale indicating that every item increased the reliability of the scale. Furthermore, the discriminatory power of the items measured by their item-rest correlation seems to be suitable. The item-rest correlations ranged from 0.40 to 0.63. In sum, the results imply that the developed items are highly interrelated, i.e. the measurement meets the reliability criterion.

Table 8: The NEPS measurement of cultural knowledge

	Art genre	Century	Artistic style	Cultural product / artist	Item difficulty	Item-rest cor-relation	Alpha without resp. item
				Assignment of artist to art genre			
1	Visual arts	16/17	Baroque	Peter Paul Rubens	69.72	0.5830	0.8632
2	Opera	19/20		Giacomo Puccini	68.33	0.6313	0.8609
3	Opera	19		Gioachino Rossini	57.57	0.5438	0.8649
4	Visual arts	19	Romanticism	Caspar David Friedrich	44.82	0.6041	0.8619
5	Literature	19	Vormärz	Georg Büchner	56.57	0.5195	0.8661
6	Opera	19		Carl Maria von Weber	21.12	0.4251	0.8701
7	Literature	18	Romanticism	Clemens Brentano	32.67	0.5767	0.8634
8	Visual arts	20	Expressionism	Paul Klee	64.34	0.5899	0.8627
				Assignment of work to artist			
9	Opera	19		Giuseppe Verdi: La Traviata	59.16	0.5458	0.8648
10	Opera	19		Georges Bizet: Carmen	31.27	0.5325	0.8655
11	Visual arts	20	Cubism, Surrealism	Pablo Picasso: Guernica	29.08	0.4637	0.8686
12	Visual arts	19	Expressionism	Edvard Munch: The Scream	57.77	0.5775	0.8633
				Knowledge of books			
13	Literature	20	Modernity	Alfred Döblin: Berlin Alexanderplatz	31.08	0.4033	0.8713
14	Literature	20	Expressionism	Franz Kafka: The Trial	47.61	0.3962	0.8721
15	Literature	20	Post-war literature, FRG	Günter Grass: The Tin Drum	56.37	0.4590	0.8691
				Cronbach's Alpha			**0.8737**

Dimensionality

In order to test uni-dimensionality of the scale, we performed a factor analysis with the selected items. As we expect one underlying construct, loadings on the common factor should be substantial (≥0.4) and loadings on other factors should be minor (<0.4). Table 9 shows all the factor loadings higher than 0.3. The factor loadings on the common factor are between 0.4223 and 0.6810. Thus, all the items measure a common latent construct. However, two items show loadings above 0.3 on another factor. Nevertheless, we argue that

uni-dimensionality is given, as according to the Kaiser-Guttmann criterion only one factor can be retained. The eigenvalue of the first factor amounts to 4.85, whereas all the further 14 factors display eigenvalues far below 1.0 (the second highest is .47). This suggests that there is one substantive latent factor and, hence, the items measure one construct only.

Table 9: Factor analysis - Factor loadings

	Item	Factor 1	Factor 2	Factor 3
1	Assignment artist to art genre: Rubens	0.6327		
2	Assignment artist to art genre: Puccini	0.6810		
3	Assignment artist to art genre: Rossini	0.5915		
4	Assignment artist to art genre: Friedrich	0.6466		
5	Assignment artist to art genre: Büchner	0.5529		
6	Assignment artist to art genre: von Weber	0.4643		
7	Assignment artist to art genre: Brentano	0.6161		
8	Assignment artist to art genre: Klee	0.6340		
9	Assignment work to artist: La Traviata	0.5900		
10	Assignment work to artist: Carmen	0.5765		
11	Assignment work to artist: Guernica	0.4932		
12	Assignment work to artist: The Scream	0.6247		
13	Knowing of books: Berlin Alexanderplatz	0.4296		0.3691
14	Knowing of books: The Trial	0.4223		
15	Knowing of books: The Tin Drum	0.4917		0.3872

5.5 Empirical Results of the NEPS Measurement of Cultural Knowledge

As detailed above, 15 out of the 40 pretested items were selected to form the NEPS measurement of cultural knowledge. To compute the cultural knowledge score, the single items were first coded as dummy variables indicating whether an item was known or answered correctly and secondly summed up. Hence, values of the index range from 0 to 15.

Distributions

Table 10 gives a short overview of the cultural capital and knowledge indicators, showing means, medians, standard deviations, minima, and maxima. The mean of the cultural knowledge sum score is 7, meaning that respondents answered on average half of the items correctly. Nevertheless, at least one person could not answer any of the cultural knowledge items and at least one other person had all answers right. The same applies to the common knowledge measurement with a mean of 8. The average reading quantity of the sample, measured as hours per day, is 1,1 hours, whereas the median of the categorical variable "number of books" amounts to three, indicating that 50% of the surveyed people own at least 26-100 books. Furthermore, half of the respondents also have at least two of the three relevant "cultural possessions" at home.

Table 10: Description of cultural capital and knowledge indicators

	Mean	Median	SD	Min	Max
Cultural knowledge	7.27	7	4.30	0	15
Common knowledge (BEFKI GC-K)	7.54	8	2.74	0	12
Reading quantity	1.13	1	1.05	0	12
Number of books	2.98	3	1.25	1	5
Cultural possessions	1.78	2	1.10	0	3
Participation in high-brow culture	6.88	7	2.92	3	15

Figure 1 allows a more detailed view on the distribution of the cultural knowledge sum score. The distribution has two peaks: About 8,5% answered six respectively ten items correctly. Besides, the relative share of the ascending cultural knowledge scores increases from the minimum to the first peak and decreases from the second peak to the maximum. Moreover, the figures indicate that the proportion of respondents with a high amount of cultural knowledge is comparable to the proportion of respondents with a rather low amount.

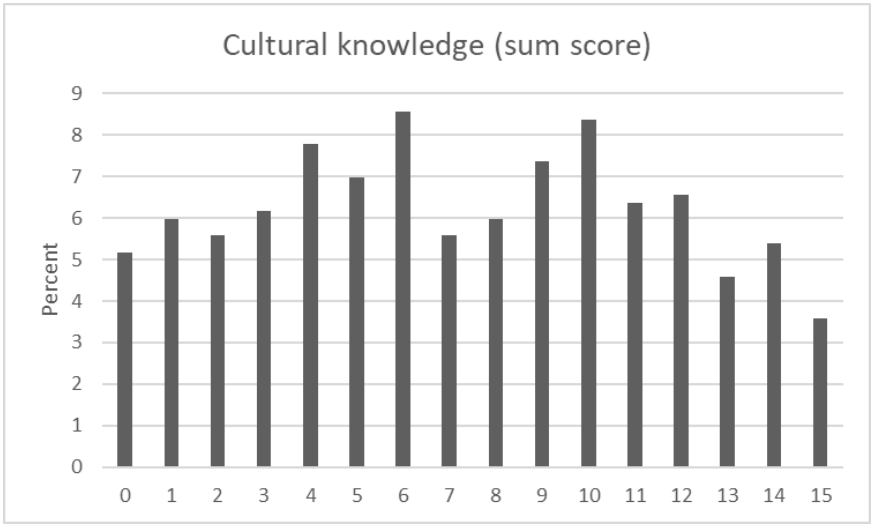

Figure 1: Distribution of cultural knowledge sum score

Correlation analysis

Furthermore, we analyze if the cultural knowledge scale measures a construct of cultural capital distinct from the established instruments in the NEPS and common knowledge. Table 11 shows the pairwise correlations of the cultural knowledge scale, the NEPS cultural capital indicators, and the BEFKI GC-K test score. Cultural knowledge correlates with books at home (r = 0.51), cultural possessions (r = 0.48), and participation in high culture (r = 0.48). The level of the correlations with these cultural capital indicators suggest that the cultural knowledge items capture a distinct dimension of cultural capital. In contrast, cultural knowledge does not correlate with the time respondents usually spend on reading in their leisure time (reading quantity). Moreover, the results show that cultural knowledge is not equivalent to common knowledge measured by the BEFKI GC-K (r = 0.62).

Table 11: Pairwise correlations

	Cultural knowledge	Books at home	Reading quantity	Cultural possessions	Participation	Common knowledge
Cultural knowledge	1.0000					
Books at home	0.5146*	1.0000				
Reading quantity	0.0153	0.0866	1.0000			
Cultural possessions	0.4798*	0.4998*	0.0860	1.0000		
Participation	0.4762*	0.3696*	0.0243	0.3881*	1.0000	
BEFKI GC-K	0.6218*	0.3904*	0.0181	0.3243*	0.2620*	1.0000

Note. *p < 0.05

Criterion validity

According to criterion validity, quantitative analyses should confirm hypotheses of prior research. Cultural capital theory claims that cultural knowledge is unequally distributed across social classes: the higher the social class position, the higher is the endowment with cultural knowledge (Purhonen et al., 2011; Sullivan, 2001; Zimdars et al., 2009). Furthermore, migration background is supposed to have a negative impact on cultural knowledge (Becker, 2010).

Table 12 shows the distribution of the cultural knowledge scale by social and migration background. The significance of these differences was tested using one-way analyses of variance (ANOVA) for the social class indicators (EGP-class membership and educational attainment) and a t-test for the migration indicator. All subgroup differences were significant at the 5-percent-level. Hence, the described hypotheses are confirmed: the higher the social class position is, the more cultural knowledge persons in our data possess. Moreover, migrants have considerably less cultural knowledge than locals. Unexpectedly though,

members of the upper service class display slightly lower values of cultural knowledge than respondents from the lower service class.

Table 12: Distribution of cultural knowledge by sociodemographic characteristics

	Mean	SD	N	Sig.
Social class (EGP)				0.000
Working and middle class, petty bourgeoisie [III, IV, V, VI, VII]	6.05	4.15	166	
Lower service class [II]	8.36	4.10	138	
Upper service class [I]	7.98	4.16	147	
Total	7.38	4.26	451	
Educational attainment				0.000
Lower/intermediate sec. school	4.98	3.61	151	
University entrance degree	7.54	4.12	130	
Tertiary education	8.81	4.15	215	
Total	7.31	4.30	496	
Native language				0.000
German	8.18	4.12	373	
Other	4.66	3.67	129	
Total	7.27	4.30	502	

6 Summary and Conclusions

This paper described a new cultural knowledge instrument developed for adults living in Germany including theoretical background, existing measurements, an extensive description of item development, and results of a quantitative pretest.

Building on theoretical consensus, we defined cultural knowledge as knowledge of those cultural products from literature, classical music, theatre, and visual arts that are commonly conceived as valuable in a society. On this conceptual basis, we used a theory-driven multistage procedure to identify cultural products that cultural knowledge refers to. The instrument contains three different types of items, which we adapted from other studies. We argue that the applied theory-driven multistage procedure is suitable for developing items measuring cultural knowledge in terms of content validity. This regards especially the methods to define the set of elements representing the totality of high-brow cultural knowledge within the considered art genres and the methods to select certain items.

The 15 items, which jointly form the cultural knowledge scale in the NEPS were selected from a set of 40 items based on the results of a quantitative pretest. 502 randomly sampled adults living in Germany were surveyed. In sum, the pretest results indicate that the NEPS measurement of cultural knowledge is reliable, valid and uni-dimensional. Correlation analyses showed that cultural knowledge measures a distinct dimension of cultural capital and knowledge, despite being related to other dimensions of cultural capital and common knowledge. Moreover, analyses confirmed cultural knowledge is unequally distributed across social classes and negatively affected by migration background, implying criterion validity.

However, the finding that reading activities are not related to cultural knowledge seems to contradict the hypothesis that embodied cultural capital is accumulated by work of acquisition, i.e. time spent on learning (Bourdieu, 1986: 244). It has to be considered, though, that reading quantity in the pretest referred to the time currently spent on reading and any adults have only a limited amount of time to read due to family responsibilities and work obligations. Hence, measuring the amount of time currently spent on reading bears the risk of misleading conclusions regarding the time individuals spent on learning sometime and the endowment with embodied cultural capital.

Further support for the hypotheses that embodied cultural capital is accumulated by work of acquisition might be implied by the high correlation of cultural knowledge and the number of books at home. If we assume that the number of books at home approximates the number of books respondents actually have read sometime, this measure is a suitable proxy for the work of acquisition in terms of reading in the past. Therefore, we argue that the hypothesis of cultural knowledge accumulation by work of acquisition in terms of time spent on reading should not be discarded. Rather we should reconsider the measurement of work of acquisition with regard to the respondents' stage of life.

Developing a measurement of cultural knowledge requires by necessity to make choices regarding the definition of the totality of high-brow cultural entities. Undoubtedly, these choices can be disputed. Possibly further art genres constitute cultural knowledge. Nevertheless, an extension of art genres should be well-grounded. Moreover, the mode of selection within the art genres could be criticized. In the end, the definition of such selection criteria is necessarily more or less arbitrary, but can be refined easily. However, the utilized procedure aims to reduce subjective choices regarding the content of cultural knowledge and, hence, to realize content validity as far as possible. Moreover, the procedure can be applied to alternative or additional art genres. Furthermore, high-brow cultural entities constituting cultural knowledge differ by cultural context. The cultural context varies across countries and within countries across time. Hence, content validity of the developed measurement is given as long as there are no substantial changes of the high-brow cultural canon regarding the art genres the measurement refers to, that is literature, classical music, theatre, and visual arts. However, the multi-stage procedure is applicable to other or changing cultural contexts.

The instrument presented in this paper was developed to measure cultural knowledge of adults. Accordingly, the sample of the pretest contained persons aged between 25 and 72. Hence, evidence regarding reliability and validity is available only for this population. However, we suppose that the instrument might be suitable to measure cultural knowledge of persons that are younger than 25 years. Other studies measuring high-brow cultural knowledge surveyed about 16 years old students (DiMaggio, 1982; Sullivan, 2001) and adults aged between 18 and 74 respectively 65 (Purhonen et al., 2011; Veenstra, 2005). But as we lack empirical evidence with respect to younger target populations, we cannot specify the lower age limit of the NEPS measurement of cultural knowledge. Thus, defining the lower age limit should be a focus of future research.

The first release of NEPS data on cultural knowledge is scheduled in 2021 in the NEPS scientific use file of Starting Cohort 1, wave 8. It will contain information on parents' cultural knowledge.

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Appendix

Agents and institutions defining high culture

Literature

Universität Greifswald; Universität Bielefeld; Universität Augsburg; Universität Würzburg; Universität Köln; Universität Leipzig.

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Art

Staatsgalerie Stuttgart; Angermuseum Erfurt; Hamburger Kunsthalle Hamburg; Kunsthalle Kiel; Landesmuseum Mainz; Kunstpalast Düsseldorf; Kunstsammlung Nordrhein-Westfalen; Museum Wiesbaden; Alte Nationalgalerie, Neue Nationalgalerie, Berlinische Galerie für Moderne Kunst Berlin; Alte Pinakothek, Neue Pinakothek, Pinakothek der Moderne München; Saarlandmuseum Saarbrücken; Sprengel Museum Hannover; Staatliche Kunstsammlung Dresden; Staatliches Museum Schwerin; Stiftung Moritzburg, Kunstmuseum Magdeburg; Fluxus+ Potsdam; Kunsthalle Bremen.

Music

Deutscher Bühnenverein