Approaching the Concept of Multiliteracies: Multilingual Writing Competence as an Integrated Model

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Abstract

In linguistically diverse contexts, language repertoires include various literacy skills in multiple languages across different modes of representation (multiliteracies), where multilingual writing can be conceptualized as a synthesized competence that includes all languages in a person's repertoire and is continuously evolving. We respond to the call to operationalize existing theory on multilingual writing for empirical testing by conducting first- and second-order confirmatory factor analyses that explore whether and how students' writing proficiency in different languages can be modelled as an integrated construct, to analyze multilingual writing's dimensionality. We draw on a corpus of multilingual writing in secondary students (n = 965) in three different languages: the majority language (German), the heritage languages of migrants in Germany (Russian or Turkish), and the first foreign language (English). Based on competence data of a substantial sample of multilingual adolescents, the results provide an empirical approach to modelling multilingual writing competence in complex multilingual repertoires.

Résumé

Dans des contextes linguistiquement pluriels, les répertoires linguistiques comprennent diverses compétences en littératie dans plusieurs langues et à travers différentes formes de représentation (plurilittératies). À cet égard l'écriture plurilingue peut être conceptualisée comme une compétence synthétisée qui inclut toutes les langues du répertoire d'une personne et qui est en constante évolution. Pour opérationnaliser la théorie sur l'écriture plurilingue pour des tests empiriques, nous effectuons des analyses factorielles confirmatoires de premier et de second ordre qui explore comment on peut modéliser la compétence en écriture plurilingue comme une construction intégrée et qui démontre sa dimensionnalité. Nous nous appuyons sur des données de compétence en écriture plurilingue d'élèves du secondaire (n = 965) dans trois langues différentes : la langue majoritaire (allemand), les langues d'origine des migrants (russe ou turc) et la première langue étrangère (anglais). Les résultats fournissent une approche empirique pour modéliser la compétence en écriture plurilingue dans des répertoires plurilingue complexes.

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International large-scale studies repeatedly show the educational disadvantages of migrant students (e.g., OECD, 2018). These disadvantages are rooted in the socio-economic disparities of resources induced by the disruptive effect of migration on the economic, cultural, and social capital (Nauck & Schnoor, 2015). However, migration may also bring benefits, with multilingualism being one of the prominent prosperities because it may serve as human capital (Agirdag, 2014a; 2014b; Gándara, 2018; Rumbaut, 2014).

In second-generation immigrant students, multilingual repertoires may comprise the majority language (ML), heritage languages (HLs), and foreign languages (FLs). Literacy skills in the multilingual repertoires referred to as multiliteracies (New London Group, 1996), may vary among the languages within and between individuals (Gogolin et al., 2021; Usanova & Schnoor, 2021a). While learning the ML and FL takes place at schools, only limited learning opportunities are available for the heritage languages that primarily affect the development of literacy skills in these languages (Brehmer & Mehlhorn, 2018; Kubota & Bale, 2020; Payant & Galante, 2022).

The empirical investigation of educational benefits from multilingual repertoires is a growing field. However, most large-scale studies on students' educational attainment (e.g., PISA; PIRLS) do not focus on multilingualism and conduct the measurement mostly of receptive ML skills. When considered, multilingual skills are not directly assessed by proficiency tests but approached by proxy variables (e.g., self-assessments or language practices). As Gogolin et al. (2022) state, specifically, empirical studies on multilingual writing in adolescents with substantial samples remain severely underrepresented (Gogolin et al., 2022). Consequently, the potential of multilingual writing skills remains unexplored due to the shortage of data on writing proficiency in multiple languages and the analytical, empirical approaches to modelling complex writing skills within multilingual repertoires. In response to this demand, researchers repeatedly call to embrace multilingual approaches to implement them in language testing and assessments (Schissel et al., 2019).

A valuable body of theoretical approaches is developed in the field of multilingualism. In the current study, we transfer elaborated theoretical concepts on multiliterate skills in the literature into a statistical approach to model multilingual writing competence based on large-scale test data written in multiple languages of second-generation immigrant adolescents in Germany. We begin by discussing the theoretical concepts of multiliterate skills and the empirical research we used to develop our statistical approach.

Literature Review

Theoretical Framework of Multilingual Writing

Multiliteracies Perspectives

In our study, we consider multilingual writing skills within the theoretical concept of multiliteracies (Cope & Kalantzis, 2000, 2009; New London Group, 1996), which was introduced as an educational response capturing multilingual and multimodal realities in the context of increasing linguistic diversity and multiplicity of communication channels.

According to this concept, reading and writing may occur in different languages (multilingual dimension) and modes of representation (multimodal dimension). It emphasizes the multifaceted nature of literacies encapsulated as the multiplicity of skills and practices. Thus, the "multi" within the concept denotes two "multi" dimensions – the multilingual dimension and the multimodal dimension (Cope & Kalantzis, 2009). Though primarily evolved as a pedagogical approach, the concept of multiliteracies also represents a theoretical framework for capturing the complexity of literacy within linguistically diverse contexts and serves as the basis for many subsequent studies on multilingualism and multimodality.

Along the multimodal dimension, studies revealed the multimodality of writing, for example, by showing the application of language, sound, and image in writing (Skerrett & Bomer, 2013), which may occur as literacy practices in analog and digital modes (Angay-Crowder et al., 2013; Skerrett, 2013). At the multilingual dimension, multiliteracies have been shown to be incorporated into rich multilingual repertoires (Skerrett, 2013). At this dimension, multiliteracies reflect a variety of multilingual competencies placed on the continua of literacy skills that may be developed in linguistically diverse contexts (Hornberger, 2003). Within the construct of multiliteracies, the multilingual dimension remains the least investigated (García & Kleifgen, 2020) and was argued to be largely excluded from the research (Kleifgen, 2013).

The focus on the multilingualism approach (FoM; Cenoz & Gorter, 2011) promotes the investigation of the multilingual dimension, i.e., simultaneously considering all languages in a multilingual repertoire. The FoM approach is rooted in complex dynamic systems theory in second language acquisition, which considers language development as a complex set of nested, interconnected dynamic systems (De Bot et al., 2007; Hiver & Al-Hoorie, 2020; Larsen-Freeman, 2012). Based on this theory, FoM emphasizes that research on multilinguals needs to focus on (1) whole multilingual repertoires with languages acquired in the family and learned at school, (2) the interrelations between the languages in the repertoires, and (3) the context effects from a variety of sociolinguistic factors that may affect language development. Therefore, the FoM approach encourages researchers to account for students' multilingual proficiencies in their whole complexity rather than in isolation.

Concerning a statistical approach to model multilingual writing competence, an integrated model is needed that accounts for literacy skills in complex multilingual repertoires rather than for each of the specific languages in isolation. The growing body of research on multilingual writing provides evidence for the interrelated nature of multilingual writing skills based on the data gathered in different national contexts—that of Canada (e.g., Kato-Otani, 2008; Payant, 2020), the United States (e.g., Soltero-González et al. 2012; Sparrow et al., 2014), the Netherlands (e.g., Schoonen et al., 2003; 2011, Verhoeven et al., 2012), Italy (Danzak & Arfe, 2016), and Germany (e.g., Böhmer, 2015; Riehl, 2021; Schnoor & Usanova, 2022; Usanova & Schnoor, 2021a).

In their explorative study, Cenoz & Gorter (2011) investigated writing skills in 165 secondary-school students in the Basque Country (Spain). The study showed that multilingual adolescents establish "soft boundaries" between languages, drawing on the resources provided in both languages while writing (Cenoz & Gorter, 2011, p. 366). As shown in this study, this process is reflected in the interrelation between writing skills in different languages which, in its turn, may be based on the application of similar general

strategies during writing, regardless of the language used. In a qualitative case study, Payant (2020) found that multilingual writers draw on the cumulative linguistic knowledge while writing and reflect in multiple languages while developing ideas for writing. Schnoor and Usanova (2022) analyzed the development of multilingual writing proficiencies of secondary students and their interrelation based on large-scale longitudinal data. They found cross-lagged effects between languages indicating that writing proficiencies in different languages serve as mutual resources in multilingual writing development. Based on the evidence from studies with research designs as proposed by the FoM approach, it can be hypothesized that the interrelations between writing skills in different languages are manifestations of the synthesized competence of multilingual writing (Canagarajah, 2015). Thus far, however, no study has attempted to model such a synthesized multilingual writing competence as a model that integrates the whole multilingual writing repertoire. The majority of empirical studies on multilingual writing have focused on two-language constellations (ML and HL; FL and HL; and ML and FL), whereas research that includes "multi," that is, all languages in the multilingual repertoire, as suggested by the multilingual dimension of multiliteracies and the FoM is still sparse.

In the next section, we discuss Canagarajah's (2015) theoretical approach to multilingual writing as a synthesized competence. This approach provides a theoretical foundation for our statistical model of multilingual writing competence and introduces the model's structural components.

Translingual Perspectives

In the translingual approach to writing competence, Canagarajah (2015) considers multilingual writing competence as a synthesized competence, going beyond single languages. Canagarajah's translingual view of writing competence differs from traditional language and literacy learning perspectives. The translingual approach to writing competence does not treat languages as separate entities but assumes deep connections in a person's language repertoire that make up multilingual competence. Even though languages build a synthesized competence, multilinguals may have different proficiency levels in each of the languages in their repertoires. Based on this theory, multilingual writing can be operationalized as a multidimensional construct involving both proficiency and competence.

Therefore, it is necessary to distinguish between the terms "proficiency" and "competence". Following Francis (2012), we consider proficiency, synonymous with ability, as skills in language performance. Further, we consider competence as conceptual language knowledge. As we apply these terms specifically for defining multilingual writing, we consider writing proficiencies to be language-specific and, thus, developing to a different extent in the languages of students' repertoire. By contrast, multilingual writing competence is not language-specific and is shared across all languages (c.f. Francis's 2012 view of competence as language-specific). In this sense, writing proficiencies can be considered the observable realization of multilingual writing competence within specific languages.

The interrelation between proficiency and competence can be conceptualized by Cummins's (1979) iceberg metaphor, which depicts the relationship as having observable (language-specific phenomena) and unobservable (conceptual knowledge) parts. By

applying the iceberg metaphor to the theoretical concept of multilingual writing competence, we argue that multilingual writing competence, as it represents the interrelation, has two levels: proficiency and competence.

The *proficiency level* (the observable part of the iceberg) represents students' writing proficiencies in specific languages and depicts their skills in using available language resources in writing. In multilingual writing, a substantial interrelation between the single languages exists (Schnoor & Usanova, 2022); thus, multilingual writing proficiencies actually reflect the ways multilingual people "multitask or parallel process with their languages, not keeping them disconnected when they are learning or using them" (Canagarajah, 2015, p. 423).

The research on translanguaging in writing has provided rich support for languages to be implemented in the writing process as dynamic and fluid resources and showed that "multilinguals act with a unitary semiotic repertoire" (García & Kleifgen, 2020, p. 555). The translanguaging approach proposes a unitary view of the underlying linguistic system that has no boundaries corresponding to the two socially named languages (Otheguy et al., 2015) and represents "single, undifferentiated cognitive terrain" (Otheguy et al., 2019, p. 626).

A contrasting view is delivered in the plurilingualism approach (CoE, 2001), which considers the repertoire to be built by separate linguistic systems that may overlap to some degree but whose boundaries correspond to the socially named languages (see also MacSwan, 2017). Studies that used a plurilingual lens to investigate multilingual writing have shown that students' fluid proficiencies also serve as important resources to generate ideas for writing (e.g., Payant, 2020). Despite the underlying divergence in the conceptualization of language repertoires, both theories overlap in the way they consider that multilingual learners can draw on the semiotic resources from their repertoires (for a critical overview of both approaches and their converging points, see Payant & Galante, 2022).

The *competence level* (the unobservable part of the iceberg), on the other hand, represents the same synthesized competence shared across languages. Therefore, writing proficiencies may differ among languages in a person's repertoire but are jointly rooted in shared conceptual knowledge about writing. Researchers have argued that writers might access higher-order, less language-specific knowledge such as metacognitive knowledge about writing tasks and writing strategies that may be transferred across different languages (Schoonen et al., 2011, Victori, 1999). As shown by Cenoz and Gorter (2011), multilingual writers apply similar general strategies when writing, regardless of the language used. The authors argue that writing competencies can be shared across languages and that "there is an underlying common multilingual strategy that is then produced in three languages" (Cenoz & Gorter, 2011, p. 365).

However, there is a caveat to this interpretation of the model's competence level representing a linguistic resource shared across languages with a discussion on whether other components are involved (Effatpanah & Baghaei, 2021). For example, Berthele and Vanhove (2020) critically consider the interrelation between the languages as representing the cognitive ability only (p. 551). To consider this argument, we control for cognitive ability as an exogenous factor in our statistical model of multilingual writing competence.

Research Questions

The current study provides a quantitative empirical approach to modelling multilingual writing competence by building a higher-order measurement model of multilingual writing. As suggested by the presented theory on investigating the multilingual dimension of multiliteracies and the state of research, we considered secondary students' writing proficiencies in the ML, German; HLs, Russian and Turkish; and FL, English in Germany. Our study investigated the following research questions:

- Research Question 1: Can the theory on multilingual writing competence be translated into a statistical model that integrates proficiency and competence levels?
- Research Question 2: Can the construct of multilingual writing competence be distinguished from general cognitive ability?

Methodology

Data

Our research is embedded in the junior research group "Multiliteralität als Arbeitsmarktressource (MARE)[1]", funded by the German Federal Ministry of Education and Research (2021 to 2026). We investigate multiliteracies as a multidimensional construct that involves both multilingual and multimodal literacy skills.

In the current study, we conducted a secondary analysis, drawing on data from the German panel study "Mehrsprachigkeitsentwicklung im Zeitverlauf (MEZ)[2]" (Gogolin et al., 2017). Following an interdisciplinary perspective on multilingualism, MEZ provided insights into the individual and contextual conditions that influence the development of multilingual literacy in adolescents. MEZ was a longitudinal cohort-sequence study with two starting cohorts (seventh- and ninth-grade students) and four waves of data collection over three years (2016 to 2018). The MEZ panel comprised 2,103 students from the German secondary educational system with German-Russian, German-Turkish, and monolingual German language backgrounds. Concerning the comparability of the multilingual repertoires, MEZ included only students with school careers in Germany. Thus, the MEZ sample consisted of students who had entered the German education system by the third grade at the latest (Klinger et al., 2019). The sample selection, implementation of ethics approval procedures, and data collection organization were conducted by an external survey institute (IEA Hamburg, 2017a, 2017b, 2018a, 2018b).

Participants

In the current study, we draw on the MEZ subsample of immigrant students with Russian or Turkish as their heritage languages learning English, which is the mandatory first foreign language in all German schools. We use cross-sectional writing test data in the ML (German), HL (Russian or Turkish), and the first FL (English) from the second wave of the MEZ study, conducted in the fall of 2016 (IEA Hamburg, 2017a). The sample comprised 965 students, including 364 German–Russian and 601 German–Turkish bilinguals, from both starting cohorts, grade 8 (mean age = 14.0 years) and grade 10 (mean age = 16.0 years).

Measures

Multilingual Writing Proficiencies

We applied the same pictorial stimuli to measure students' writing proficiencies in German and the HLs (Russian or Turkish) and another pictorial stimulus for English. Students were required to write down drafts of articles for a youth journal on the topics "How to make string lights" (ML, HLs) and "Picnic at the park" (FL). Both writing tasks were developed based on the same principles: they involved nine pictures and aimed at eliciting expository text types.

Writing tasks were carried out separately for each language, the students were not restricted in their language choice during the writing and had opportunities to apply all language resources from their linguistic repertoires. To avoid interactions between the language data, two test days with an intermediate waiting period were necessary. Writing in German and English was tested on the first day. Writing in the heritage language, Turkish or Russian, was tested approximately a week later.

We measure students' writing proficiencies based on a theory that considers writing as multicomponential (e.g., Puranik et al., 2008; Wagner et al., 2011). It covers different dimensions of language: textual–pragmatic, lexico–syntactic, and productivity that build together the general construct of "writing proficiency" common to all investigated languages (Gogolin et al., 2022; Table 1). To model multilingual writing as a synthesized competence, we used four empirical indicators derived from the written texts referring to these basic dimensions of language: a rating score for task accomplishment (textual–pragmatic dimension), types of verbs, conjunctions (lexico–syntactic dimension), and the text length by the number of words (productivity).

Table 1

The Assessment of Writing Proficiencies Applied to All Investigated Languages

Dimensions	Indicators	Operationalization
Textual–pragmatic	Task accomplishment	Scoring includes nine sub-categories. Each of the nine sequences is assessed according to a four-step scale: points 0, 1, 2, and 3 awarded for not mentioned, mentioned, simple, and extensive description of sequences, respectively. A maximum of 27 points can be achieved.
Lexico–syntactic	Verbs	The total number of the overall produced types of verbs.
	Conjunctions	The total number of the overall produced types of coordinating and subordinating conjunctions.
Productivity	Text length	The total number of words.

Note. Usanova & Schnoor, 2021a

Trained research assistants analyzed all written texts under the research team's supervision. Raters for the investigated languages were selected based on their qualification and skills in the respective language(s). Training and coding procedures were conducted based on language-specific manuals. Raters took refresher courses as needed. Regular quality control for each rater included continuous verification of unidimensionality and internal consistency of common scales. If coding deviated from the standard, we

conducted individual follow-up training. In our study, we achieved high inter-rater reliability measured by intraclass correlations (German: 0.935; Russian: 0.970; Turkish: 0.968; English: 0.983) for writing scores within each of the investigated languages. Previous studies on measurement invariance of the MEZ writing tasks revealed that these four indicators constitute a unidimensional latent construct of writing proficiencies in each of the languages tested (Gogolin et al., 2022; Klinger & Schnoor, 2020), indicating that the measurement of the construct meets the criterion of configural invariance (Meredith, 1993).

Cognitive ability. We used data on students' cognitive ability to ensure the external validity of the construct of multilingual writing competence. Cognitive ability was measured by the nonverbal subtest, N2, of the standardized "Kognitiver Fähigkeitstest 4-12+ R" (Heller & Perleth, 2000). The used subtest N2 consists of 25 items. Each item represents a pair of related figures, and for a third figure, one of five alternative figures must be selected that adequately replicates the analogous relationship (Klinger et al., 2022).

Data Analyses

We conducted higher-order confirmatory factor analysis (CFA; Jöreskog, 1967, 1969) to translate the theory of an integrated construct of multilingual writing competence into a statistical measurement model. Based on the common factor model (Thurstone, 1947), CFA assumes that a person's scores in a test are manifestations (indicators) of the influence of one (or more) hypothetical construct(s) at a higher level of abstraction (factor; for an introduction to CFA, see Brown, 2015; Kline, 2016; Little, 2013).

We applied a higher-order CFA model to the writing task data. Figure 1 shows the model's structure. The model aims to translate the referred theory on multilingual writing competence as a synthesized construct into a statistical model to test the theories' appropriateness. Referring to Cummins (1979), in our model of multilingual writing, we distinguish between a proficiency level (i.e., language-specific writing skills) and a competence level (i.e., shared knowledge across languages).

Concerning our statistical modelling approach, the lower part of the figure represents the proficiency level, consisting of first-order latent factors of language-specific writing proficiencies (ML, HL, and FL). Each of these three latent factors is measured by four observed indicators derived from the students' text products: task accomplishment (TA), verbs (VB), conjunctions (CO), and text length (TL). These first-order factors represent theoretical constructs (i.e., assumptions made by the theory) that are directly linked to the observed empirical data (i.e., the indicators) by the indicators' covariance patterns.

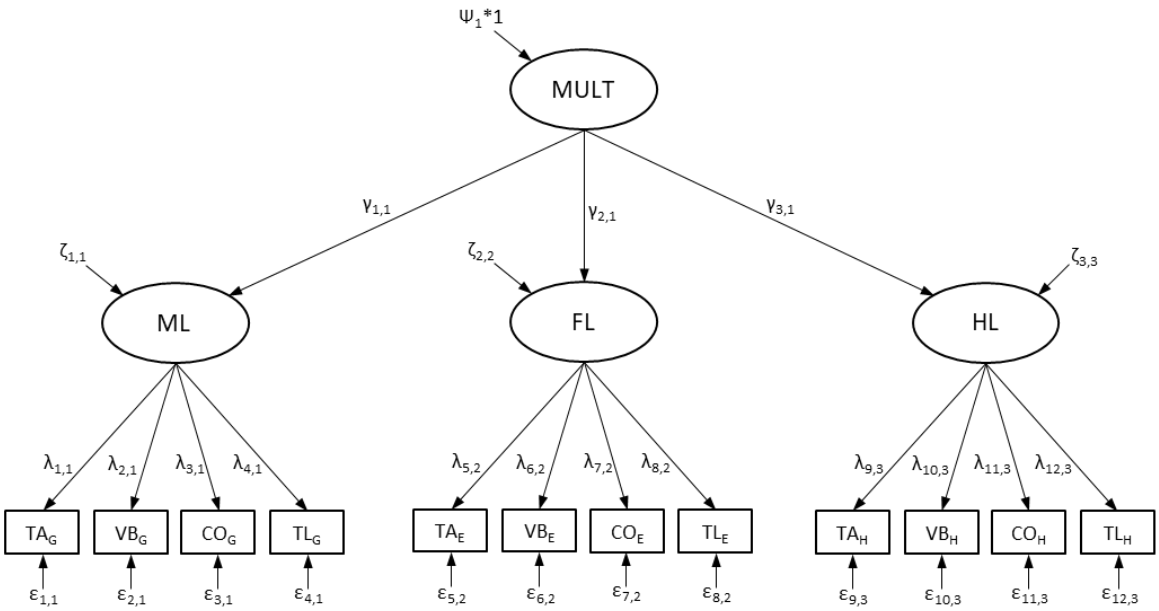
The upper part of the figure represents the competence level. This second-order factor represents multilingual writing competence based on the correlations of the first-order language-specific skill factors. However, this higher-order part of the model is only indirectly linked to the observed data and is, therefore, rather theory-based. This theory-based nature is also reflected in a rather technical issue of the model equations. It is impossible to statistically test whether introducing the second-order factor of multilingual writing competence represents the observed data better than a simple first-order model with covarying language-specific factors. This ambiguity exists because both models are

mathematically equivalent and, therefore, not testable against each other. Nevertheless, the second-order model carries more theoretical information about an integrated construct of multilingual writing competence, as it allows us to analyze the nature of the relationships between the language-specific skill-level constructs instead of making no claims about their relationships, as in the first-order model (Brown, 2015, p. 288).

To challenge our interpretation of the second-order factor as a construct of multilingual writing competence, we then extended our model in a further step by adding the students' cognitive ability to control for a possible confounding effect. Including information about the students' cognitive ability as an exogenous cause for the language-specific proficiency factors in the model increases the second-order factors' construct validity because it separates the covariance related to cognitive ability from multilingual writing competence. This model expansion ensures that the second-order factor of multilingual writing competence does not just represent students' cognitive ability.

Figure 1

Measurement Model of Multilingual Writing Competence (n = 965, Standardized Parameter Estimates)



Note. MULT denotes the second-order factor for multilingual writing ability. ML (meaning majority language) FL (foreign language), and HL (heritage language) denote first-order factors for German, English, and HL writing proficiencies. The observed indicators for each language are task accomplishment (TA), verbs (VB), conjunctions (CO), and text length (TL). Lambda (λ) denotes first-order factor loadings (i.e., regressions) representing the observed indicators' explained variances by the language-specific competence factors. Gamma (γ) denotes the second-order factor loadings representing the amount of the language-specific competence factors' variance explained by the multilingual writing factor. Psi (ψ) denotes the second-order factors' variance (fixed to one for model identification). Epsilon (ε) denotes indicator-specific and random residual variance that is separated to keep the latent part of the model free of measurement error. Zeta (ζ) denotes the first-order factors' residual variances, representing variance unique to the language-specific competence factors, i.e., unexplained by the construct of multilingual writing competence.

For model evaluation, we relied on the root mean square error of approximation (RMSEA; Steiger, 1998; Steiger & Lind, 1980) as a global measure (RMSEA < .01, “great

fit;" < .05, "good or close fit;" < .08, "acceptable fit;" < .10, "mediocre fit;" and > .10 "poor fit;" Little 2013). It tests the degree of the models' approximation to the data, thus accounting for models being always only approximations of the actual processes that gave rise to the data (Little, 2013, p. 108-112). By contrast, the χ^2-test, which tests the absolute fit of a model, is too strict for complex models with large samples owing to the test power against the null hypothesis of a perfect model fit. Thus, even trivial deviations from a perfect fit lead to model rejection (Brown, 2015; Little, 1997; Wang & Wang, 2012). We also used the standardized root mean square residual (SRMR; Bentler, 1995) as a global fit index that quantifies the deviation of the model-implied variance or covariance matrix compared with the empirical variance or covariance matrix in terms of residuals (SRMR < .08, "good fit;" < .10 "acceptable fit;" Hu & Bentler, 1999; Kline, 2016). Concerning relative model fit indices, we applied the comparative fit index (CFI; Bentler, 1995) and Tucker–Lewis Index, TLI; Tucker & Lewis, 1973), which compares the specified model with its null model (>.99, "outstanding fit;" .95 to .99, "very good fit;" .90 to .95, "acceptable fit;" .85 to .90, "mediocre fit;" < .85, "poor fit;" Little, 2013).

Results

Table 2 contains the descriptive statistics of the observed data for the four indicators of writing proficiency in German, the HL, and English. The indicators are scored in percentage of maximum possible (POMP) metric, and their distributions are fairly symmetrical to moderately skewed with a leptokurtic tendency (i.e., heavier tails due to outliers). This asymmetry is because we capture a relatively wide range of individual writing proficiencies with a set of indicators of which only one (i.e., TA) has a scale limitation. However, because we did not observe disturbed parameter estimates, we chose not to eliminate outliers and instead, used an MLR estimator.

Table 2
Descriptive Statistics of Writing Proficiency Indicators

Variable	*Min*	*Max*	*M*	*SD*	Skewness	Kurtosis
German (n = 703; missing = 16.6%)						
Task accomplishment	0.0	100.0	66.2	10.7	-.380	2.50
Verbs	7.3	87.8	43.6	12.4	.666	.586
Conjunctions	0.0	84.6	37.2	15.2	.505	-.014
Text length	10.0	88.5	35.0	9.3	1.04	2.70
Heritage language (n = 703; missing = 27.2%)						
Task accomplishment	0.0	100.0	49.2	19.7	-.419	.309
Verbs	0.0	100.0	38.8	18.1	.110	1.00
Conjunctions	0.0	100.0	33.3	19.6	.261	-.149
Text length	0.3	100.0	29.1	12.3	.562	2.92
English (n = 781; missing = 19.1%)						
Task accomplishment	0.0	88.9	33.1	14.8	.438	.102
Verbs	0.0	91.4	37.1	16.2	.232	.042
Conjunctions	0.0	64.7	17.0	11.1	.714	.542
Text length	1.0	81.5	29.2	12.5	.313	.534

Figure 2 shows the measurement model for multilingual writing proficiency fitted to the writing task data of the 965 secondary students in this study. The models' data fit is very good ($\chi^2 = 201.46$, $df = 48$, $p = .000$; RMSEA = .058, CI(90%) = .049 .066; SRMR = .056; CFI = .970; TLI = .958), meaning that the theory of an integrated construct of multilingual writing competence, as we translated it into an empirical model, is consistent with the observed data.

In the following, we report the results of the models' parameter estimation. The coefficients are in a standardized metric ranging from 0 to 1 and significant with $p < .001$. We report the results bottom-up—from the language-specific writing proficiencies (first-order factors) to the integrated construct of multilingual writing competence (second-order factor), following the model tiers' increasing abstraction.

The construct of *ML writing proficiency (German)* shows strong relations with the indicators TL (.96) and verbs (.77), and medium relations with conjunctions (.56) and TA (.44). In the explained variance, this means 91.2% for TL, 58.6% for verbs, 31.3% for conjunctions, and 19.1% for TA. The residual correlation between verbs and conjunctions (.36) accounts for model misspecification caused by the linguistic dependency of the frequency of verbs and conjunctions in a written text independent of the text quality. The scale reliability of the latent factor (Bollen, 1980; Jöreskog, 1971; Raykov, 2004) is $\rho = .76$.

The construct of *FL writing proficiency (English)* also shows strong relations with TL (.96) and verbs (.91), and medium relations with conjunctions (.64) and TA (.62). In addition, there is the mentioned residual correlation between verbs and conjunctions (.21). Overall, the relations between construct and indicators are stronger than in the German model, thus enhancing explained variance and scale reliability. The explained variance is 92.9% for TL, 82.1% for verbs, 40.8% for conjunctions, and 38.6% for TA. The scale reliability is $\rho = .84$.

The construct of *HL writing proficiency (Russian or Turkish)* shows a more balanced pattern of factor loadings ranking TL (.88), TA (.81), verbs (.80), and conjunctions (.75) with the known residual correlation (.34). The explained variance is 77.4% for TL, 65.9% for TA, 64.2% for verbs, and 56.3% for conjunctions. The scale reliability is $\rho = .84$.

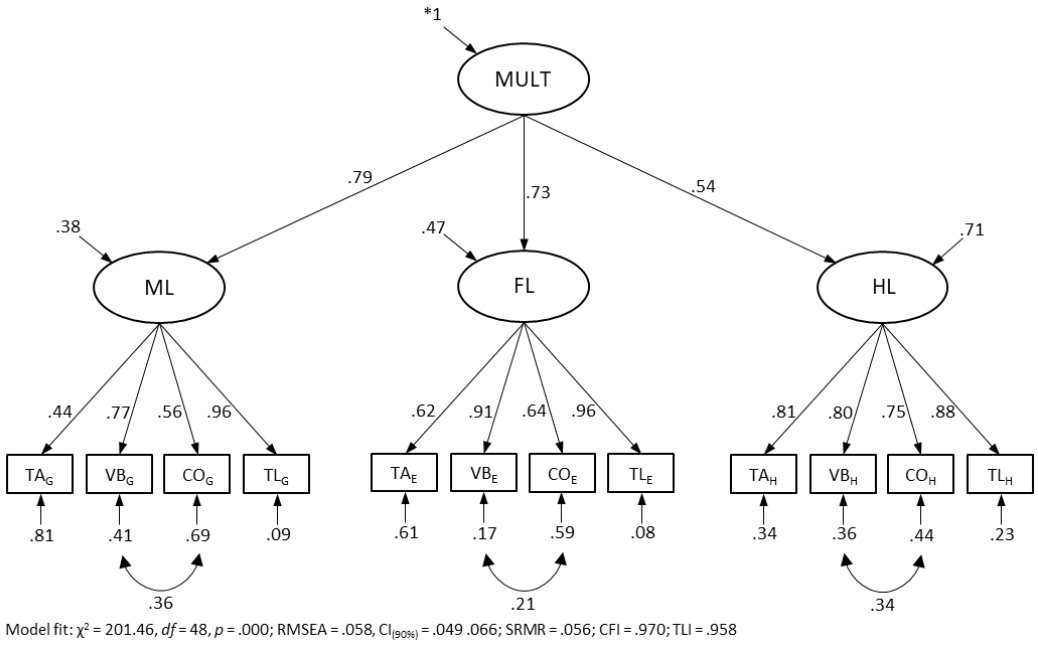
Deviating from the structural model shown in Figure 1, we added residual covariances between verbs and conjunctions for each language. These added freely estimated parameters account for the theoretical part of the single language-specific proficiency factors (ML, FL, and HL), explaining that the hole indicator covariance is too restrictive (Pan et al., 2017).[3] This modification is not because of a shortage of theory regarding the structure of the underlying competency model for multilingual writing ability, but the occurrence of method-specific covariance due to the data collection procedure itself.

The construct of *multilingual writing competence* shows substantial relationships with ML (.79), FL (.73), and HL (.54) writing proficiencies, indicating that every skill component represents an integral part of the construct. The amount of variance of the three writing proficiencies explained by the construct of multilingual writing competence is 62.2%, 52.9%, and 29.1% for the ML, FL, and HL, respectively. This relationship pattern between the writing proficiencies constructs shows that writing proficiencies in the ML

and FL, complemented by the HL, represent the basis of the students' multilingual writing competence.

Figure 2

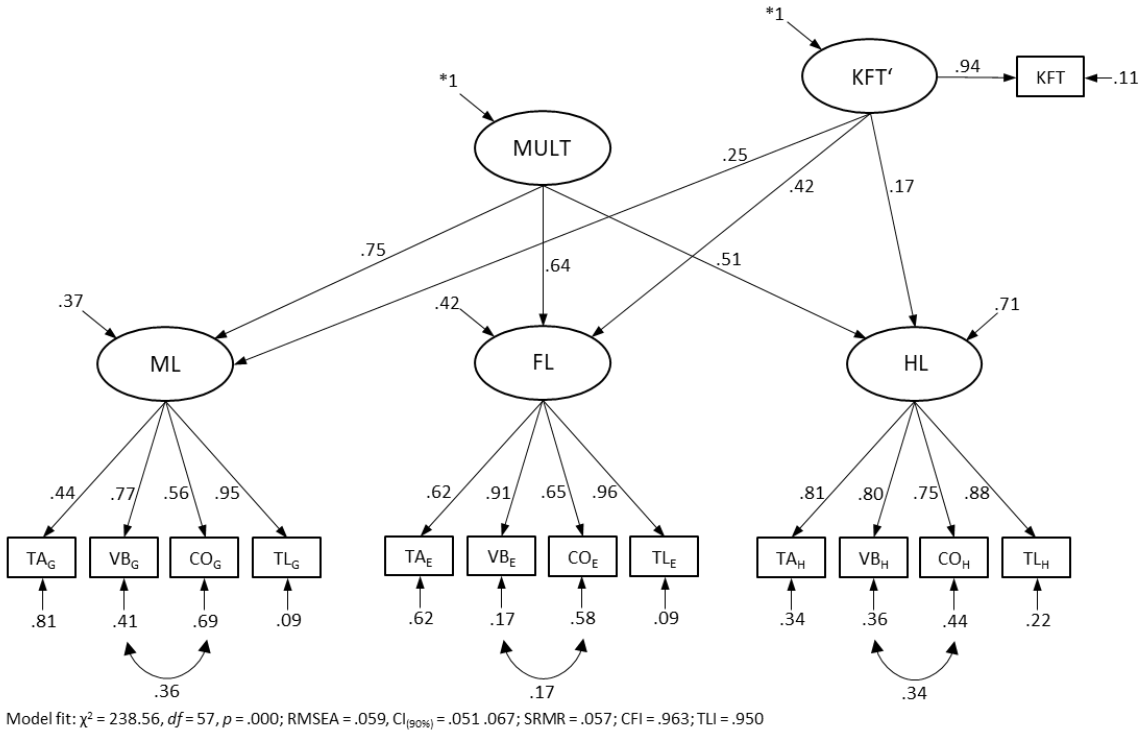
Measurement Model of Multilingual Writing Competence (n = 965, Standardized Parameter Estimates)



Although we have strong theoretical arguments that the second-order factor represents multilingual writing competence, potential confounding with cognitive abilities can change the meaning of the factors. Therefore, in the next step, we examine the argument that we merely measure students' cognitive abilities at this level of abstraction.

Figure 3 shows an extended version of the measurement model of multilingual writing competence accounting for cognitive ability. The findings reveal that the meaning of the second-order factor does not change after adding students' cognitive ability to the model. First, the cognitive ability factor shows positive effects on the language-specific writing proficiencies with small to medium regression coefficients in ML (.25), FL (.42), and HL (.17) writing proficiencies. This effect pattern is expected because students with better cognitive abilities are generally assumed to produce better texts in each language. Second, the second-order factor loadings are not affected after incorporating the measures of students' cognitive ability into the model. This complete coefficient stability delivers strong evidence that the construct of multilingual writing competence is not confounded with cognitive ability. Although we cannot prove that our interpretation of the factors' meaning as multilingual writing competence is true, we take these results as a strong indication.

Figure 3
Extended Measurement Model of Multilingual Writing Competence, Controlling for Cognitive Ability (n = 965, Standardized Parameter Estimates)



Discussion

The aim of the current study was to propose a statistical approach to model multilingual writing competence. Therefore, the current study focused on elaborating a measurement model that responses to the high demand for operationalizing existing theory on multilingual writing to open them for empirical testing (see Schissel et al., 2019). For this purpose, we referred to theoretical approaches that allowed us to explore the multilingual dimension of multiliteracies (Cope & Kalantzis, 2000, 2009; New London Group, 1996) and conceptualize multilingual writing competence as a synthesized competence of all language proficiencies in a person's multilingual writing repertoire (Cangarajah, 2015; Cenoz & Gorter, 2011).

Upon this theoretical foundation, we elaborated a conceptual model of multilingual writing with proficiency and competence levels. The proficiency level represents students' writing skills in specific languages used as resources in writing. The competence level represents students' conceptual knowledge of writing shared across languages.

We draw on the cross-sectional data from the German panel study "Multilingual Development: A Longitudinal Perspective" (MEZ; Gogolin et al., 2017). For our analyses, we used writing competence data of 965 bilingual secondary students (364 German–Russian and 601 German–Turkish) in German (ML), Russian or Turkish (HL), and English

(FL). As a statistical method, we used second-order CFA to translate the theory on multilingual writing into an integrated measurement model.

Regarding our first research question, which focused on the theory's translation into a statistical model, our analysis has shown that such a model of multilingual writing fits the data very well. This data fit means that the assumptions derived from the theory and translated into the measurement models' structure are consistent with the observed data. The first-order proficiency factors show substantial connections to the observed data (indicators) as well as to the second-order competence factor, indicating that each type of proficiency is an integral component of the synthesized competence of multilingual writing competence. Our model corresponds to previous findings on the positive interrelation of languages in writing (e.g., Böhmer, 2015; Cenoz & Gorter, 2011; Payant, 2020; Riehl, 2021; Uluçam-Wegmann et al., 2019). Moreover, our study provides an empirical approach that integrates the proficiency and competence levels of multilingual writing within the same statistical measurement model. The amount of the first-order proficiency factors' variance explained by the second-order competence varies with the ML and FL contributing more to the construct than the HL. The finding is quite expected since writing proficiencies in HL are very heterogeneous in second-generation immigrant students, owing to the limited learning opportunities given within a migration situation (Usanova & Schnoor, 2021a, 2021b).

Regarding our second research question, controlling for cognitive ability supports our notion of the second-order factor representing conceptual knowledge about writing. Students' cognitive ability shows the expected positive effects on writing skills at the proficiency level. That is, students with better cognitive abilities produce better texts in each language. However, the first-order proficiency factors' ties to the second-order competence factor stay unaffected by this model extension. Therefore, this failed attempt of falsifying the assumptions made by the theory demonstrated the models' discriminant validity.

Consequently, our study successfully provides an empirical approach to multilingual writing competence, integrating contemporary theoretical frameworks into a statistical measurement model fitted to multilingual competence data. Our latent modelling approach to multilingual writing competence has several advantages. First, it captures the complexity of the construct, making explicit translations of the referred theory into the models' structure. Second, it allows testing a theoretically specified model of multilingual writing competence to observed competence data. Third, it accounts for measurement error using multiple indicators for writing skills to control for measurement error at the models' proficiency and competence levels, which increased the validity of the results. Fourth, it allows controlling for other external variables suspected to have a confounding effect on the construct under study, for example, cognitive ability.

Overall, our empirical approach to multilingual writing shows that within multilingual measurement and testing, it is possible to implement a construct of multilingual writing competence that accounts for the theoretically proposed assumptions and therefore, moves the empirical research from exclusively considering the specific observed measures toward the construct of multilingual literacy. By doing so, we go one step further toward responding to the high demand for operationalizing theoretical concepts of multilingualism in empirical testing (see Schissel et al., 2019). Our model shows that despite the given complexity of the underlying theoretical concepts and approaches to

multilingualism, it is possible to express them in a practical empirical model applicable for language measuring in linguistically diverse settings. While converging both theory and providing rich evidence for the positive interrelation of languages in writing (e.g., Böhmer, 2015; Cenoz & Gorter, 2011; Riehl, 2021), we offer an empirical model that is guided by a resources-oriented perspective toward multiliteracies as representing valuable resources within rich multilingual repertoires. However, we acknowledge that further research is needed to validate the proposed model.

In empirical research, the elaborated model of multilingual writing competence should contribute to changing the monolingual paradigm in language testing and measurement into a multilingual one in linguistically diverse contexts. Implementing this comprehensive approach that considers literacy skills in the languages of a person's repertoire should clarify the challenges and opportunities connected to the successful acquisition of multiliteracies and uncover their potential for multilingual language learning in linguistically diverse contexts.

Further, our findings have promising implications for language teaching and learning. In our model, multiliteracy represents a synthesized competence or strategic knowledge about writing shared across languages. Teachers should raise students' awareness about this internal strategic potential and the possibilities of its access and use. Thus, it is essential to integrate the explicit training of writing strategies into teaching and raise the students' awareness that they may use what they know about composing texts in a specific language to compose texts in other languages. While raising students' awareness of shared knowledge about literacy and its strategic use, teachers may simultaneously foster the development of literacy skills within the languages of multilingual repertoire. Thus, this approach helps in developing multiliterate skills not only in the ML or FLs but also in HLs with individuals that have only limited learning opportunities within the migration situation. This language support strategy is aligned with the EU language policy aimed at fostering multilingual and multiliterate repertoires. These repertoires may be and should be strengthened not only by acquiring new languages but also by maintaining and developing HLs (see Le Pichon-Vorstman et al., 2021). By implementing teaching and learning practices aimed at transferring skills-strengthening multiliterate repertoires (Le Pichon-Vorstman et al., 2021), we go one step further in responding to the high need for linguistically and culturally inclusive pedagogical approaches that shift dominant monolingual ideologies in teaching and learning (Payant & Galante, 2022).

Regarding limitations, the current study has one that is methodological. We conducted higher-order CFA to translate the theory of an integrated construct of multilingual writing competence into a statistical measurement model. The CFA assumes a person's scores in a test to be manifestations (indicators) of the influence of one (or more) hypothetical construct(s) at a higher level of abstraction. The bottom level of our model represents the first-order latent factors of language-specific writing proficiencies. Each of these three factors is measured by four observed indicators derived from the students' text products and thus, has a direct link to the observed empirical data. However, the second-order factor of multilingual writing competence is only indirectly linked to the observed data and therefore, completely theory-based. This theory-based nature is also reflected in a rather technical issue of the model equations. It is impossible to test statistically whether introducing the second-order factor of multilingual writing competence represents the observed data better than a simple first-order model with covarying language-specific

factors. Thus, both models are mathematically equivalent and therefore, not testable against each other. Nevertheless, the second-order model carries more theoretical information about an integrated construct of multilingual writing competence because it allows us to analyze the nature of the relationships between the language-specific skill-level constructs instead of making no claims about their relationships, like in the first-order model.

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Notes

[1] English: Multiliteracies as a Resource for the Labor Market

[2] English: Multilingual Development: A Longitudinal Perspective

[3] However, these post hoc modifications are neither an indication of model misspecification because they are not theory-relevant (Hutchinson, 1998), nor do they affect measurement invariance, since they do not affect any relevant model parameters (Cheung & Rensvold, 2002).

Acknowledgements

The study was funded by the German Federal Ministry of Education and Research (Grant: MARE [01JG2101]).

References

Agirdag, O. (2014a). The long-term effects of bilingualism on children of immigration: Student bilingualism and future earnings. *International Journal of Bilingual Education and Bilingualism, 17*(4), 449–464. https://doi.org/10.1080/13670050.2013.816264

Agirdag, O. (2014b). The literal cost of language assimilation for the children of immigration: The effects of bilingualism on labor market outcomes. In R. M. Callahan, & P. C. Gándara (Eds.), *The bilingual advantage: Language, literacy, and the labor market* (pp. 160–181). Multilingual Matters. https://doi.org/10.21832/9781783092437-008

Angay-Crowder, T., Choi, J., & Yi, Y. (2013). Putting multiliteracies into practice: Digital storytelling for multilingual adolescents in a summer program. *TESL Canada Journal, 30*(2), 36–45. http://doi.org/10.18806/tesl.v30i2.1140

Bentler, P. M. (1995). *EQS structural equations program manual*. Multivariate Software.

Berthele, R., & Vanhove, J. (2020). What would disprove interdependence? Lessons learned from a study on biliteracy in Portuguese heritage language speakers in Switzerland. *International Journal of Bilingual Education and Bilingualism*, *23*(5), 550–566. https://doi.org/10.1080/13670050.2017.1385590

Bollen, K. A. (1980). Issues in the comparative measurement of political democracy. *American Sociological Review, 45*(3), 370–390.

Böhmer, J. (2015). *Biliteralität. Eine Studie zu literalen Strukturen in Sprachproben von Jugendlichen im Deutschen und Russischen*. Waxmann.

Brehmer, B., & Mehlhorn, G. (2018). Unterricht in den Herkunftssprachen Russisch und Polnisch –Einstellungen und Effekte. In G. Mehlhorn & B. Brehmer (Eds.), *Potenziale von Herkunftssprachen. Sprachliche und außersprachliche Einflussfaktoren* (pp. 259–293). Stauffenburg.

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2 nd ed.). *Methodology in the social sciences*. The Guilford Press.

Canagarajah, S. (2015). Clarifying the relationship between translingual practice and L2 writing: Addressing learner identities. *Applied Linguistics Review*, *6*(4), 415–440. https://doi.org/10.1515/applirev-2015-0020

Cenoz, J., & Gorter, D. (2011). Focus on multilingualism: A study of trilingual writing. *The Modern Language Journal*, *95*(3), 356–369. https://doi.org/10.1111/j.1540-4781.2011.01206.x

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233–255.

Coleman, J. S. (1990). *Foundations of social theory*. Belknap Press of Harvard University Press.

Cope, B., & Kalantzis, M. (2000). Introduction: Multiliteracies: The beginnings of an idea. In B. Cope, & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 3–8). Routledge. https://doi:10.4324/9780203979402-5

Cope, B., & Kalantzis, M. (2009). "Multiliteracies": New literacies, new learning. *Pedagogies: An International Journal, 4*(3), 164–195. https://doi:10.1080/15544800903076044

Council of Europe. (2001). Common European framework of reference for languages. Cambridge University Press. http://www.coe.int/t/dg4/linguistic/source/framework_en.pdf

Cummins, J. (1979). Cognitive/academic language proficiency, linguistic interdependence, the optimum age question and some other matters. *Working Papers on Bilingualism*, *19*, 121–129.

Danzak, R. L., & Arfé, B. (2016). Globally minded text production: Bilingual, expository writing of Italian adolescents learning English. *Topics in Language Disorders, 36*(1), 35–51. http://doi.org/10.1097/tld.0000000000000077

De Bot, K., Wander, L., & Verspoor, M. (2007). A dynamic systems theory approach to second language acquisition. *Bilingualism: Language and Cognition*, *10*(1), 7–21.

Dempster, A. P., Laird, N. M., & Rubin, D. B. (1977). Maximum likelihood from incomplete data via the EM algorithm. *Journal of Royal Statistical Society*, *39*(1), 1–38.

Effatpanah, F., & Baghaei, P. (2021). Cognitive components of writing in a second language: An analysis with the linear logistic test model. *Psychological Test and Assessment Modeling, 63*(1), 13–44

Enders, C. K. (2010). *Applied missing data analysis*: *Methodology in the social sciences*. Guilford Press.

Enders, C., & Bandalos, D. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling: A Multidisciplinary Journal*, *8*(3), 430–457. https://doi.org/10.1207/S15328007SEM0803_5

European Commission/EACEA/Eurydice. (2016). *Structural indicators on achievement in basic skills in Europe – 2016. Eurydice report.* Luxembourg: Publications Office of the European Union. https://op.europa.eu/de/publication-detail/-/publication/94fc76f3-f997-11e6-8a35-01aa75ed71a1.

Francis, N. (2012). *Bilingual competence and bilingual proficiency in child development*. The MIT Press.

Gándara, P. (2018). The economic value of bilingualism in the United States. *Bilingual Research Journal, 41*(4), 334–343, https://doi.org/10.1080/15235882.2018.1532469

García, O., & Kleifgen, J.A. (2020). Translanguaging and Literacies. *Reading Research Quarterly, 55*(4), 553–571. https://doi.org/10.1002/rrq.286

Gogolin, I., Klinger, T., Lagemann, M., & Schnoor, B. (2017). *Indikation, Konzeption und Untersuchungsdesign des Projekts Mehrsprachigkeitsentwicklung im Zeitverlauf (MEZ)* (MEZ Arbeitspapiere Nr. 1). Universität Hamburg. http://www.pedocs.de/volltexte/2017/14825/pdf/Gogolin_et_al_2017_Indikation_Konzeption_Untersuchungsdesign.pdf

Gogolin, I., Klinger, T., Schnoor, B., & Usanova, I. (2022). The competence model of writing skills in MEZ. In H. Brandt, M. Krause, & I. Usanova (Eds.), *Language development in linguistically diverse settings: Interdisziplinäre Ergebnisse aus dem Projekt "Mehrsprachigkeitsentwicklung im Zeitverlauf" (MEZ) (pp. 35–73).* Springer VS.

Gogolin, I., Schnoor, B., & Usanova, I. (2021). Crossing the bridge to literacy in foreign languages: C-test as a measure of language development. *Multilingua.* Advance online publication. https://doi.org/10.1515/multi-2021-0018

Heller, K. A., & Perleth, C. (2000). *Kognitiver Fähigkeitstest für 4. bis 12. Klassen, Revision: KFT 4-12+R*. Beltz.

Hiver, P. and Al-Hoorie, A. H. (2020). *Research methods for complexity theory in applied linguistics*. Multilingual Matters.

Hornberger, N. H. (2003). *Continua of Biliteracy: An ecological framework for educational policy, research, and practice in multilingual settings*. Multilingual Matters. https://doi.org/10.21832/9781853596568

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives: Structural equation modeling: *A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hutchinson, S. R. (1998). The stability of post hoc model modifications in confirmatory factor analysis models, *The Journal of Experimental Education, 66*(4), 361–380.

IEA Hamburg. (2017a). *Methodenbericht: MEZ - Mehrsprachigkeitsentwicklung im Zeitverlauf. Erhebung in den Jahrgangsstufen 7 und 9*. 1. Messzeitpunkt - Januar bis März 2016. IEA Hamburg.

IEA Hamburg. (2017b). *Methodenbericht: MEZ - Mehrsprachigkeitsentwicklung im Zeitverlauf. Erhebung in den Jahrgangsstufen 8 und 10*. 2. Messzeitpunkt - Oktober bis Dezember 2016. IEA Hamburg.

IEA Hamburg. (2018a). *Methodenbericht: MEZ - Mehrsprachigkeitsentwicklung im Zeitverlauf. Erhebung in den Jahrgangsstufen 8 und 10*. 3. Messzeitpunkt - Mai bis Juli 2017. IEA Hamburg.

IEA Hamburg. (2018b). *Methodenbericht: MEZ - Mehrsprachigkeitsentwicklung im Zeitverlauf. Erhebung in den Jahrgangsstufen 9 und 11*. 4. Messzeitpunkt - Mai bis Juni 2018. IEA Hamburg.

Jöreskog, K. G. (1967). Some contributions to maximum likelihood factor analysis. *Psychometrika*, *32*, 443–477.

Jöreskog, K. G. (1969). A general approach to confirmatory maximum likelihood factor analysis. *Psychometrika*, *34*, 182–202.

Joreskog, K. G. (1971). Simultaneous factor analysis in several populations. *Psychometrika, 36*(4), 409–426. https://doi.org/10.1007/BF02291366

Kato-Otani, E. (2008). Writing development of a bilingual child: Japanese and English. *Child Language Seminar*. University of Reading.

Kleifgen, J. (2013). *Communicative practices at work: Multimodality and learning in a high-tech firm.* Multilingual Matters.

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). The Guilford Press.

Klinger, T., Brandt, H., & Dittmers, T. (2022). The making of MEZ – Multilingual development: A longitudinal perspective. Study design and methods. In H. Brandt, M. Krause, & I. Usanova (Eds.), *Language development in linguistically diverse settings: Interdisziplinäre Ergebnisse aus dem Projekt "Mehrsprachigkeitsentwicklung im Zeitverlauf" (MEZ)* (pp. 1–35). Springer VS.

Klinger, T., & Schnoor, B. (2020). *Prüfung der Messinvarianz über die Zeit: Das Konstrukt Schreibfähigkeit im Deutschen (MEZ Arbeitspapiere Nr. 6)*. Hamburg, Germany: Universität Hamburg.

Klinger, T., Usanova, I., & Gogolin. I. (2019). Entwicklung rezeptiver und produktiver schriftsprachlicher Fähigkeiten im Deutschen. *Zeitschrift für Erziehungswissenschaft, 22*(1), 75–103.

Kubota, R., & Bale, J. (2020). Bilingualism—but not plurilingualism—promoted by immersion education in Canada: Questioning equity for students of English as an additional language. *TESOL Quarterly, 54*(3), 773–785. https://doi.org/10.1002/tesq.575

Larsen–Freeman, D. (2012). Complex, dynamic systems: A new transdisciplinary theme for applied linguistics? *Language Teaching, 45*(2), 202–214. http://doi.org/10.1017/s0261444811000061

Le Pichon-Vorstman, E., Siarova, H., & Szonyi, E. (2021). The future of language education in Europe: case studies of innovative practices. *European Journal of Language Policy, 13*(1), 114–120. https://doi.org/10.3828/ejlp.2021.7c

Little, T. D. (1997). Mean and covariance structures (macs) analyses of cross-cultural data: practical and theoretical issues. *Multivariate Behavioral Research, 32*(1), 53–76. https://doi.org/10.1207/s15327906mbr3201_3

Little, T. D. (2013). *Longitudinal structural equation modeling*. Guilford Press.

MacSwan, J. (2017). A multilingual perspective on translanguaging. *American Educational Research Journal, 54,* 167–201. http://doi.org/10.3102/0002831216683935

Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika*, *58*(4), 525–543. https://doi.org/10.1007/BF02294825

Nauck, B., & Schnoor, B. (2015). Against all odds? Bildungserfolg in vietnamesischen und türkischen Familien in Deutschland. *Kölner Zeitschrift für Soziologie und Sozialpsychologie (KZfSS), 67*(4), 633–657. https://doi.org/10.1007/s11577-015-0345-2

New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review, 66*(1), 60–92. https://doi:10.17763/haer.66.1.17370n67v22j160u

Otheguy, R., García, O., & Reid, W. (2015). Clarifying translanguaging and deconstructing named languages: A perspective from linguistics. *Applied Linguistics Review, 6*(3), 281–307. https://doi.org/10.1515/applirev-2015-0014

Otheguy, R., García, O. & Reid, W. (2019). A translanguaging view of the linguistic system of bilinguals. *Applied Linguistics Review, 10*(4), 625–651. https://doi.org/10.1515/applirev-2018-0020

Pan, J., Ip, E. H., & Dubé, L. (2017). An alternative to post hoc model modification in confirmatory factor analysis: The Bayesian lasso. *Psychological Methods, 22*(4), 687–704. https://doi.org/10.1037/met0000112

Payant, C. (2020). Exploring multilingual learners' writing practices during an L2 and an L3 individual writing task. *The Canadian Modern Language Review, 76*(4), 313–334.

Payant, C., & Galante, A. (2022). Plurilingualism and translanguaging: pedagogical approaches for empowerment and validation— An introduction. *TESL Canada Journal, 38*(2), vi–xxii. https://doi.org/10.18806/tesl.v38i2.1363

Puranik, C. S., Lombardino, L. J., & Altmann, L. J. P. (2008). Assessing the microstructure of written language using a retelling paradigm. *American Journal of Speech-Language Pathology*, *17*(2), 107–120. https://doi.org/10.1044/1058-0360

Raykov, T. (2004). Behavioral scale reliability and measurement invariance evaluation using latent variable modeling. *Behavior Therapy, 35*, 299–331.

Riehl, C. M. (2021). The interplay of language awareness and bilingual writing abilities in heritage language speakers. *Languages, 6*(2), 94. https://doi.org/10.3390/languages6020094

Rumbaut, R. G. (2014). English plus: Exploring the socioeconomic benefits of bilingualism in Southern California. In R. M. Callahan & P. C. Gándara (Eds.), *The bilingual advantage: Language, literacy, and the labor market* (pp. 182–205). Multilingual Matters.

Schissel, J. L., Leung, C., & Chalhoub-Deville, M. (2019). The construct of multilingualism in language testing. *Language Assessment Quarterly*, *16*(4–5), 373–378. https://doi.org/10.1080/15434303.2019.1680679

Schoonen, R., Van Gelderen, A., De Glopper, K., Hulstijn, J., Simis, A., Snellings, P., & Stevenson, M. (2003). First language and second language writing: The role of linguistic fluency, linguistic knowledge and metacognitive knowledge. *Language Learning, 53*(1), 165–202. http://doi.org/10.1111/1467-9922.00213

Schoonen, R., van Gelderen, A., Stoel, R. D., Hulstijn, J., & de Glopper, K. (2011). Modeling the development of L1 and EFL writing proficiency of secondary school

students. *Language Learning*, *61*(1), 31–79. https://doi.org/10.1111/j.1467-9922.2010.00590.x

Schnoor, B., & Usanova, I. (2022). Multilingual writing development: Relationships between writing proficiencies in German, heritage language and English. *Reading and Writing*. https://doi.org/10.1007/s11145-022-10276-4

Skerrett, A. (2013). Building multiliterate and multilingual writing practices and identities. *English Education, 45*(4), 322–360.

Skerrett, A., & Bomer, R. (2013). Recruiting languages and lifeworlds for border-crossing compositions. *Research in the Teaching of English, 47*(3), 313–337.

Soltero-González, L., Escamilla, K., & Hopewell, S. (2012). Changing teachers' perceptions about the writing abilities of emerging bilingual students: Towards a holistic bilingual perspective on writing assessment. *International Journal of Bilingual Education and Bilingualism, 15*(1), 71–94. http://doi.org/10.1080/13670050.2011.604712

Sparrow, W., Butvilofsky, S., Escamilla, K., Hopewell, S., & Tolento, T. (2014). Examining the longitudinal biliterate trajectory of emerging bilingual learners in a paired literacy instructional model. *Bilingual Research Journal, 37*(1), 24–42. http://doi.org/10.1080/15235882.2014.89327

Steiger, J. H., & Lind, J. C. (1980). *Statistically based tests for the number of common factors.* Unveröffentlichtes Manuskript zu einer Präsentation dem Psychometric Society Annual Meeting in Iowa City, USA.

Steiger, J. H. (1998). A note on multiple sample extensions of the RMSEA fit index: Structural equation modeling. *A Multidisciplinary Journal, 5*(4), 411–419. https://doi.org/10.1080/10705519809540115

Thurstone, L. L. (1947). *Multiple-factor analysis*. University of Chicago Press.

Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika, 38*(1), 1-10.

Uluçam-Wegmann, I., Akın, S., Akkuş, N., Enzenbach, C., Gürsoy, E., Haller, P., Kaulvers, J., Roll, H. & Steck, C. (2019). Schreiben und Mehrschriftlichkeit – Eine analyse schriftsprachlicher Fähigkeiten im Deutschen und Türkischen in der Sekundarstufe I und Ansätze für eine koordinierte Förderung mehrsprachiger Literalität. In H. Roll, M. Bernhardt, C. Enzenbach, H. E. Fischer, E. Gürsoy, H. Krabbe, M. Lang, S. Manzel, & I. Uluçam-Wegmann (Eds.), *Schreiben im Fachunterricht der Sekundarstufe I unter Einbeziehung des Türkischen. Empirische Befunde aus den Fächern Geschichte, Physik, Technik, Politik, Deutsch und Türkisch* (pp. 51–129). Waxmann. Mehrsprachigkeit.

Usanova, I., & Schnoor, B. (2021a). Exploring multiliteracies in multilingual students: Profiles of multilingual writing skills. *Bilingual Research Journal, 44*(1), 56-73. https://doi.org/10.1080/15235882.2021.1890649

Usanova, I., & Schnoor, B. (2021b). Biscriptuality as a bridge to biliteracy: The development of scriptual skills in reading and writing in Russian as a heritage language in Germany. *Journal of Home Language Research*, *4*(1), 1–14. https://doi.org/10.16993/jhlr.40

Verhoeven, L., Steenge, J., & van Balkom, H. (2012). Linguistic transfer in bilingual children with specific language impairment. *International Journal of Communication Disorders, 47*(2), 76–183

Victori, M. (1999). An analysis of writing knowledge in EFL composing: A case study of two effective and two less effective writers. *System, 27*(4), 537–555. https://doi.org/10.1016/S0346-251X(99)00049-4

Wagner, R. K., Puranik, C. S., Foorman, B., Foster, E., Wilson, L. G., Tschinkel, E., & Kantor, P. T. (2011). Modeling the development of written language. *Reading and Writing*, *24*(2), 203–220. https://doi.org/10.1007/s11145-010-9266-7

Wang, J., & Wang, X. (2012). *Structural Equation Modeling: Applications Using Mplus*. Hoboken, NJ: John Wiley & Sons.