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Contents

Figures

Tables

Abstract

We analyze socioemotional skills' role for destination-language proficiency among recent refugees in Germany. While socioemotional skills have been shown to predict educational outcomes, they have been overlooked for immigrants' language acquisition. We extend a well-established model of destination-language proficiency and assume that socioemotional skills' effects manifest through the channels of exposure, efficiency, and incentives. Using longitudinal data and growth curve models, we find that socioemotional skills significantly shape destination-language learning. Openness to new experiences, conscientiousness, risk appetite and locus of control positively relate to language proficiency, while extroversion, agreeableness and neuroticism are insignificant. We observe mediating effects, suggesting that socioemotional skills shape the channels of efficiency or exposure. Moreover, we observe multiplication effects reinforcing other advantageous characteristics' effects on language proficiency. In sum, socioemotional skills affect refugees' destination-language proficiency and thereby contribute to sustainable economic and societal integration processes. We conclude by discussing policy implications.

Zusammenfassung

Wir analysieren die Rolle sozio-emotionaler Fähigkeiten für den Erwerb der deutschen Sprache von Geflüchteten, die zwischen 2013 und 2016 nach Deutschland zugezogen sind. Bisher wurden sozio-emotionale Fähigkeiten im Kontext der Bildungsforschung betrachtet, jedoch wurde ihre Bedeutung für den Spracherwerb von Migranten noch nicht untersucht. Wir erweitern ein bekanntes theoretisches Modell des Spracherwerbs des Aufnahmelandes von Migranten und Migrantinnen und nehmen dabei an, dass sozio-emotionale Fähigkeiten über die Kanäle der Gelegenheiten für, beziehungsweise des Zugans, zum Lernen, der Effizienz und der Motivation wirken. Anhand von Längschnittsdaten und Wachstumskurvenmodellen zeigen wir, dass sozioemotionale Fähigkeiten signifikant den Erwerb der Sprache des Ziellandes prägen. Offenheit für neue Erfahrungen, Gewissenhaftigkeit, Risikofreude und Kontrollüberzeugungen stehen in positivem Zusammenhang mit Sprachkenntnissen. Dahingegen finden wir keine signifikanten Zusammenhänge für Extraversion, Verträglichkeit und Neurotizismus. Mediationseffekte deuten an, dass sozio-emotionale Fähigkeiten die Kanäle der Effizienz und des Kontaktes formen. Darüberhinaus zeigen Multiplikationseffekte, dass sozio-emotionale Fähigkeiten andere vorteilhafte Eigenschaften verstärken. Zusammenfassend beeinflussen sozio-emotionale Fähigkeiten somit den Erwerb der Sprache des Aufnahmelandes und tragen zu einem nachhaltigen ökonomischen und sozialen Integrationsprozess bei. Wir schließen mit einer Diskussion der politischen Implikationen.

JEL classification

Keywords

Acknowledgements

1   Introduction

As a growing number of refugees arrived in countries of the Western Hemisphere in recent decades, their successful integration into the labor market and society has been a major political and societal issue (FitzGerald and Arar 2018; Triandafyllidou 2018). Refugees' proficiency in the destination country's language is one key aspect of sustainable economic and societal integration. The seminal work of Chiswick and Miller (2001) often provides a foundation for analyses of language attainment (for application to refugees, see Kosyakova, Kristen, and Spörlein 2021; Kristen and Seuring 2021; van Tubergen 2010). Prior studies applying this model highlight the importance of certain characteristics for successful language acquisition, such as age and education, the time since arrival in the host country, access to language classes and interethnic networks (for a review, see Kristen 2019).

Thus far, another set of immigrants' characteristics has not been analyzed: socioemotional skills[1], i.e., personal characteristics such as personality traits, motivation, preferences and values (Lechner, Anger, and Rammsted 2019, 427). While socioemotional skills have been identified as shaping educational and labor market outcomes (Borghans et al. 2008; Heckman and Kautz 2012), they are less well understood in the context of immigrants' language acquisition (for an exception, see Asfar et al. 2019). This is surprising insofar as socioemotional skills can be viewed as part of an individual's human capital and, as such, should affect language learning. Combining the migration literature on immigrants' language skills and the psychological literature on socioemotional skills, we adopt a more fine-grained approach to explore the importance of socioemotional skills – in particular, the Big Five personality dimensions, locus of control and risk aversion – for refugees' language attainment.

Beyond their societal importance, focusing on refugees provides several advantages for our analyses. First, while migrants are not a random sample of their home country (Chiswick 1999), compared to economic or family migrants, refugees' migration patterns are less selective (Spörlein et al. 2020), allowing us to mitigate some selectivity concerns. As selectivity may still occur (Guichard 2020; Spörlein et al. 2020), we expect lower variation in socioemotional skills leading to smaller effects compared to a random sample. However, our analyses indicate socioemotional skills' meaningful relative importance, highlighting our finding's contribution. Second, due to their sudden and temporally similar arrival in Germany and exposure to similar post-arrival experiences in a similar social and economic context, the recent refugee cohort represents a more homogeneous population compared to other immigrant cohorts. Third, refugees are unlikely to have prepared extensively for their forced migration (e.g., by taking language classes), thus they entered the destination country with low or no destination-language skills (Brücker, Kosyakova, and Vallizadeh 2020; Kosyakova, Kristen, and Spörlein 2021). Therefore, we can follow learning growth without confounding factors stemming from the period before migration. Fourth, we exploit highly innovative survey data on refugees, the IAB-BAMF-SOEP Sample of Refugees in Germany (Brücker, Rother, and Schupp 2017), the collection of which began shortly after the refugees' arrival in Ger-

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1 Socio-emotional skills are also referred to as noncognitive skills (in contrast to cognitive skills), soft skills or personality traits. These characteristics are considered skills because they "transform cognitive skills into output" (Cunningham, Acosta, and Muller 2016, 7).

many, enabling us to observe the most crucial periods for destination-language acquisition (Stevens 1999). These representative data also cover cognitive skills, allowing us to disentangle the effects of cognitive versus noncognitive skills.

Germany is a leading receiving country for humanitarian migration in Europe and in the OECD both historically (Rotte, Vogler, and Zimmermann 1997) and recently, with approximately 1.6 million first-time asylum applications from 2015 to 2018 (Eurostat 2020). During this time, Germany absorbed more than 50 percent of first-time asylum applications in the EU and, in absolute terms, more than any other OECD country (Brücker, Kosyakova, and Vallizadeh 2020). Despite the large influx of refugees, those who arrived in Germany since 2015 seem to integrate well (Brell, Dustmann, and Preston 2020; Brücker, Kosyakova, and Vallizadeh 2020; Fasani, Frattini, and Minale 2021) and half of Germany's working-age refugees are already gainfully employed (Kosyakova et al. 2021). Refugees' language acquisition follows the pattern of all types of immigrants, with considerable initial increases in language proficiency leveling off with the duration of stay (Kosyakova, Kristen, and Spörlein 2021; Kristen and Seuring 2021). In a recent study, Hahn et al. (2019) showed that socioemotional skills – namely, internal locus of control, risk appetite and reciprocating friendliness – relate to refugees' employment status, cross-cultural networks, and well-being. However, the authors did not focus on destination-language proficiency and merely controlled for it.

This article contributes to the existing literature by extending Chiswick and Miller's (2001) model to include socioemotional skills. While the theoretical model predicts that exposure, efficiency, and incentives determine language proficiency, we additionally assume that socioemotional skills influence these three constructs and thereby language proficiency. Specifically, we seek to answer the following research questions: How do socioemotional skills affect the language attainment of recent refugees? What is the relative importance of socioemotional skills in refugees' language learning process? Given the findings of the prior literature that personality traits may compensate for socioeconomic adversity (e.g., Damian et al. 2015), we further ask whether socioemotional skills may compensate for refugees' resource disadvantages. Empirically, we rely on growth curve models and recent longitudinal data from the IAB-BAMF-SOEP Refugee Sample.

2 Prior research

2.1 The role of destination-language skills in refugees's integration

Language attainment is key for immigrants and refugees' successful integration in a destination country for several reasons. First, better destination-language skills enable immigrants to efficiently exploit the knowledge and skills acquired in their home country and to achieve superior educational results (e.g., Schnepf 2007). Second, greater destination-language proficiency increases access to relevant labor market information, improving labor market opportunities and wages (e.g., Dustmann and Fabbri 2003). Third, destination proficiency facilitates contact with natives fostering societal integration (Martinovic, van Tubergen, and Maas 2009).

As refugees arrive abruptly following war, oppression, discrimination or human rights violations (Hatton 2020), their destination proficiency has a different starting point compared to other (economic) immigrants (Kristen and Seuring 2021). In part, refugees seldom arrive with destination-language proficiency (Brücker, Kosyakova, and Vallizadeh 2020; Kosyakova, Kristen, and Spörlein 2021; Kristen and Seuring 2021). Traumatic experiences before and during flight and postmigration stress may additionally hinder destination-language acquisition (van Tubergen 2010). Unsurprisingly, refugees lag behind other (economic) immigrants in destination-language proficiency upon arrival (Chiswick, Lee, and Miller 2006; Kosyakova, Kristen, and Spörlein 2021; Kristen and Seuring 2021).

2.2   The role of socioemotional skills ini educational processes

Socioemotional skills are defined as a "wide range of personal characteristics such as personality traits, motivation, preferences and values" (Lechner, Anger, and Rammsted 2019, 427), and the literature has shown their importance for educational success (for a review, see Lechner, Anger, and Rammsted 2019). For instance, socioemotional skills affect grades and test scores (e.g., Poropat 2009; Vedel and Poropat 2017) and predict educational attainment processes (e.g., Shanahan et al. 2014; Wiedner and Schaeffer 2020).

The strand of the literature most closely related to our study concerns further training in adulthood because adult's acquisition of a foreign language can be understood as a further training activity. Following a theoretical model of training investment decisions, rational individuals invest in additional education considering future returns to such investments. The behavioral perspective considers the uncertainty of learners about potential returns and suggests that locus of control influences individual beliefs about one's own actions and their consequences (Rotter 1954). Correspondingly, high internal locus of control promotes further occupational training participation (Caliendo et al. 2020). Likewise, socioemotional skills, particularly openness to new experiences, seem to predict further training participation decisions for both private and occupational further training (Laible, Anger, and Baumann 2020).

2.3   Socioemotional skills in a migration context

Migration research mainly focused on differences in socioemotional skills between immigrants and stayers. For example, the skill of adaptability reduces migration propensity since it may reduce nonmonetary migration costs, particularly for migrants with lower cognitive skills (Butikofer and Peri 2017), while risk aversion relates to lower migration probabilities (Jaeger et al. 2010). Likewise, internal migration between US states seems to correlate with personality traits (Jokela 2009).

Several cross-country comparisons have shown that different cultures or nations differ in their average personality traits (McCrae and Terracciano 2005). Digging deeper, it seems that different socioemotional skills, particularly preferences, may result from ancient migration patterns after early humanity migrated out of Africa (Becker, Enke, and Falk 2020). The longer populations are separated, the more different they become due to their exposure to different biogeography and cultures.

Turning to the question of socioemotional skills' role in refugees' integration process, Ryan, Dooley, and Benson (2008) proposed a "resource-based model" that explicitly incorporates socioemotional skills as part of the psychological resources affecting refugee integration. The authors distinguished between skills-based resources, such as problem-solving and social skills, and trait-based resources, such as self-esteem, optimism, self-efficacy and hope (Ryan, Dooley, and Benson 2008, 7). Correspondingly, previous research revealed that locus of control, risk aversion and reciprocity relate to employment status, cross-cultural networks, health, self-esteem and life satisfaction (Hahn et al. 2019).

To date, only one study by Asfar et al. (2019) addressed selected socioemotional skills – conscientiousness and openness to experiences – in the process of immigrants' language proficiency. The findings indicate no direct link between the two skills and destination-language proficiency. However, this study covered a non-representative sample of Syrian and Eritrean refugees in the Netherlands with a short duration of stay (less than 18 months). Another relevant study by Spörlein and Kristen (2019), while not measuring socioemotional skills directly, examined the role of educational selectivity – an individual's educational attainment relative to others in the origin country – on immigrants' destination proficiency, which approximated unmeasured characteristics such as motivation and drive to succeed (Spörlein and Kristen 2019, 1150). The results revealed that positively selected migrants are less proficient upon arrival but acquire the destination language faster, suggesting that individual agency may be an important predictor of language learning.

We go one step further to examine how socioemotional skills affect the learning process of recently arrived refugees, relying on representative longitudinal data for Germany. Furthermore, we consider a large set of socioemotional skills, namely, the Big Five personality dimensions, locus of control and risk aversion. In the following, we link the well-established model of immigrants' language skill acquisition (Chiswick and Miller 2001) with the psychological literature on socioemotional skills.

3 Theoretical model of destination-language acquisition

We follow the seminal contribution of Chiswick and Miller's (2001) model of language attainment and its extensions for refugees (Kosyakova, Kristen, and Spörlein 2021; Kristen and Seuring 2021; van Tubergen 2010). This model assumes that language skills are an investment in human capital aimed at improving economic opportunities. The decision to invest in human capital undergoes cost-benefit calculations whereby the rational individual considers expected benefits and anticipated costs when making the decision to invest in destination-language acquisition. These cost-benefit calculations are influenced by a function of economic incentives and resources, exposure and efficiency (Chiswick and Miller 2001).

The driving incentives to invest in language acquisition relate to potential economic returns (e.g., higher employment prospects or earnings) and noneconomic returns (e.g., greater involvement in political, societal, and cultural events). These incentives are weighed against the material costs

associated with learning a new language (e.g., expenses for language learning), time constraints (e.g., effort required to study and practice a new language, forgone income due to not working) and available resources (Espinosa and Massey 1997; van Tubergen 2010). Exposure refers to the appropriate learning environment with the two dimensions of time units of exposure to the language and exposure's intensity per unit of time (Chiswick and Miller 2001). Efficiency describes the learning capability allowing the translation of learning effort into language fluency.

We expand this theoretical model by including personality traits. An empirical model's residual would capture individual characteristics, including innate language ability and personality (Chiswick and Miller 2001), as would the educational selectivity idea introduced by Spörlein and Kristen (2019). However, we explicitly model socioemotional skills to decrease the residual's size and understand the importance of these traits.

3.1   Linking socioemotional skills with destination-language acquisition

We assume that socioemotional skills affect second language acquisition through the mechanisms of exposure, efficiency and incentives and ultimately help to explain the speed and quality of an immigrant's language acquisition.

Several socioemotional skills may affect exposure, i.e., the time and intensity of being exposed to a language. Thus, individuals who are open to new experiences (curious), extroverted (sociable, talkative) and agreeable (flexible, cooperative) are more likely to expose themselves to language learning opportunities and therefore increase the time spent learning the new language. However, in a review by Dewaele (2013), the results of extraversion on second-language achievement are inconclusive, particularly for written language. It seems that introverts may do better on written tests, while extroverts have higher oral language abilities (Dewaele 2013). In contrast, neurotic individuals (anxious, insecure, and embarrassed) are less likely to expose themselves to language learning opportunities.

Efficiency, which is related to learning capabilities, may be increased by a high internal locus of control. Similarly, individuals who are open to new experiences (eager for knowledge) are more likely to efficiently learn as this trait is related to intelligence and perceived as a good predictor of foreign language attainment in a nonmigratory context (Dewaele 2013). Conscientious individuals (organized and achievement-oriented), despite being hard-working, may not learn languages better, but have a higher likelihood of completing language courses (Dewaele 2013).

Incentives, i.e., potential (non)economic returns, are more likely reflected in cost-benefit considerations of conscientious (planful) individuals. Similarly, internal locus of control may shape subjective beliefs about the returns to language acquisition, thereby influencing language proficiency. Finally, under the assumption that second-language acquisition is an uncertain human capital investment, we expect risk-affine individuals to have higher incentives to invest in language acquisition.

3.2 Socioemotional skills: Resource compensation or resource multiplication?

Previous social psychology research noted socioemotional skills' compensatory effects on status attainment (e.g., Damian et al. 2015). For instance, interpersonal skills such as agreeableness, emotional stability, extraversion, and imagination may compensate for initial educational and resource disadvantages in later life (Ng-Knight and Schoon 2017; Shanahan et al. 2014). This research follows the "resources substitution hypothesis", predicting a larger beneficial impact of personality traits for those with fewer alternative resources (Mirowsky and Ross 2003). Applying these ideas to refugees' integration, certain socioemotional skills might compensate for initial disadvantages and contribute to destination language proficiency. Accordingly, if compensatory processes are at work, socioemotional skills may alleviate initial disadvantages linked to lower learning efficiency (older age, lack of cognitive skills or human capital, poor health), lower exposure to learning possibilities (reduced exposure to structured and informal learning via language courses and social contacts) or lack of incentives.

However, the model of language learning suggests that efficient learners should benefit more from exposure to the destination language (Chiswick and Miller 2001; Esser 2006). Hence, refugees with more productive socioemotional skills may be able to multiply their advanced pool of resources (approximated via the mechanisms of efficiency, exposure, and incentives). Likewise, interpersonal skills may disproportionately benefit those with greater social interactions with the majority population.

3.3 Stability of socioemotional skills: Assumptions

When analyzing socioemotional skills, several crucial assumptions are necessary to alleviate potential concerns about reverse causality. The first prerequisite is that socioemotional skills are stable. The psychological literature seems to agree that adult's skills fluctuate around a stable core. On the one hand, socioemotional skills develop primarily in childhood through young adulthood, with possible variations in later life (Roberts and Davis 2016). On the other hand, genetics shape socioemotional skills (Kandler et al. 2010), and these skills become increasingly stable throughout life (for a review, see Roberts and DelVecchio 2000). While variability can occur throughout life, the stable core of socioemotional skills may outweigh malleability due to situational fluctuations (Ferguson 2010). Even major life events, such as unemployment, do not lead to sizable changes in socioemotional skills (Anger, Camehl, and Peter 2017).

While no prior literature focuses on the stability or malleability of migrants' socioemotional skills, particularly forced migration, is likely a life-altering event. Defining forced migration as an external shock, we can transfer evidence from Schildberg-Hörisch (2018) showing that external shocks affect risk preference. These shocks might be economic crises, natural or human-made catastrophes, and (temporary) stress or fear that occurs due to flight. Accordingly, while forced migration may alter skills, these alterations are negligible for our estimations, as we are only interested in the post migration skills manifesting during language acquisition. We fulfil this prerequisite by measuring both socioemotional skills and language proficiency after arrival in the destination country. Thus, potential alterations of socioemotional skills due to migrating should not affect our analyses.

4   Data and method

4.1   The IAB-BAMF-SOEP Sample of Refugees in Germany

The empirical analysis is based on the IAB-BAMF-SOEP Sample of Refugees (Brücker, Rother, and Schupp 2017), a large-scale longitudinal survey of refugees and their household members in Germany. This survey started in 2016 and is conducted annually. The survey's anchor persons were drawn from the Central Register of Foreigners, Germany's national registry of foreign citizens. The data comprises three subsamples that cover slightly different target populations, referred to as M3, M4, and M5. M3 and M4 respondents were first surveyed in 2016 and are representative for adult refugees who arrived in Germany between January 1, 2013, and January 31, 2016. M5 respondents refer to refreshment sample first interviewed in 2017. Since behaviors and attitudes were not surveyed in the M5 sample (SOEP Group 2019), this sample is excluded from the analyses.

The first wave's household response rate was approximately 50 percent (Kühne, Jacobsen, and Kroh 2019). Of the sampled anchor persons who could be contacted by an interviewer, 72 percent participated in the first survey. We use data from 4 waves for the M3/4 sample. At the individual level, panel attrition in the M3/4 sample amounts to 23 percent between waves 1 and 2 and is reduced to 6 percent between waves 3 and 4 (Siegers, Belcheva, and Silbermann 2021, 48). The face–to-face interviews were conducted with computer assistance (CAPI) and, if needed, supported by translators, auditory instruments, and questionnaires in seven languages (Arabic, English, Farsi/Dari, German, Kurmanji, Pashtu, and Urdu). During the interview, the respondent and interviewer used a joint screen with both languages (German and the respondent's language) (Jacobsen 2018).

Only panel respondents in the second wave answered items on behaviors and attitudes (47 percent of the participants in the second wave; Brücker, Kosyakova, and Vallizadeh 2020). Hence, we only consider M3/4 respondents who participated in 2017, received the refugee questionnaire, and were panel respondents[2]. For these respondents, we pool all available observations for the four survey years (2,638 individuals with 8,542 observation-years). We further restrict our data to respondents who arrived in Germany in 2013 or later (excluding 63 respondents) and to individuals aged 18 to 55 at arrival (excluding 139 respondents). Finally, we only consider refugees with valid information on language proficiency (excluding 4 respondents). Overall, our analyses cover 2,432 individuals. Of these, 1,167 respondents participated in all four waves, 725 were observed three times, and 540 were observed twice.

4.2   Variables

Dependent variable

Language proficiency in German is based on a mean score comprising information on respondents' self-rated competences in speaking, reading, and writing. Each scale ranges from 0 ("very good") to 4 ("not at all"). We reversed these scales before calculating the index so that greater values in a range between 0 and 4 indicate higher proficiency. The measure shows a high degree of

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2 Language proficiency is not significantly related to selection into the analytical sample (coef: 0.000, p<0.865, linear probability model with robust standard errors).

internal consistency (Cronbach's alpha = 0.94), with individual variables loading on a single factor (eigenvalue = 2.66). Table 1 presents the distributions of dependent and further variables. Appendix Table A1 presents the definitions of all variables.

Table 1:   Descriptive statistics

	Mean	SD	Share of missing values	Range
Language proficiency	1.57	0.93	0	0–4
Duration of stay (in months)	18.72	8.98	3.37	0–47
Socioemotional skills				
Extroversion	-0.02	1.01	4.66	-4.2–1.4
Neuroticism	0.01	1.01	1.52	-1.9–2.9
Agreeableness	-0.01	1.01	1.77	-5.5–0.6
Conscientiousness	-0.02	1.02	2.59	-6.0–0.7
Openness to experiences	-0.01	1.00	4.85	-4.4–1.3
Risk appetite	0.00	1.00	0.12	-1.3–1.7
Locus of control	-0.01	1.00	27.55	-3.3–2.7
Efficiency				
Age at immigration	32.34	9.00	0.00	18–55
Cognitive skills	-0.01	1.04	25.00	-9-0–0.4
Premigration education			6.25	
Less than primary	0.17			0/1
Primary	0.19			0/1
Lower secondary	0.24			0/1
Upper secondary	0.23			0/1
Postsecondary nontertiary	0.02			0/1
Tertiary	0.15			0/1
Country-of-origin literacy	0.84		0.04	0/1
Mental health index	48.36	10.10	3.41	10.9–72.1
Incentives				
Economic orientation	0.44		1.11	0/1
Family orientation	0.15		1.11	0/1
Intention to stay (permanently)	0.95		0.70	0/1
Residence permit			1.27	
Residence permission	0.58			0/1
No residence permission	0.05			0/1
Temporary residence permission	0.33			0/1
Other title	0.04			0/1
Length of asylum procedure	10.45	9.20	17.06	0–57
Connection to country of origin	3.49	1.28	2.30	1–5
Premigration position in income distribution			5.06	
Below average	0.24			0/1
Average	0.45			0/1
Above average	0.31			0/1

	Mean	SD	Share of missing values	Range
Labor market participation	0.70		2.18	0/1
Premigration exposure				
Premigration proficiency	0.09		0.29	0–4
Premigration stay in Germany	0.01		0	0/1
Postmigration exposure				
Language course	0.73		0.08	0/1
Education in Germany	0.06		0.29	0/1
Contact with Germans	0.58		0.41	0/1
Shared accommodation	0.32		0.70	0/1
Single	0.25		0.25	0/1
Controls				
Female	0.37		0	0/1
Child < age 16	0.68		0.70	0/1
Country of origin			0	
Syria	0.53			0/1
Afghanistan	0.12			0/1
Iraq	0.12			0/1
Eritrea	0.07			0/1
Other MENA	0.03			0/1
West Balkan	0.02			0/1
Former USSR	0.03			0/1
Other Africa	0.04			0/1
Other	0.02			0/1
Stateless	0.01			
Sample			0	
M3	0.46			0/1
M4	0.54			0/1

Source: IAB-BAMF-SOEP Survey of Refugees (M3, M4) 2016-2019.

Socioemotional skills

We analyze the Big Five personality dimensions, locus of control and risk aversion. The Big Five personality dimensions framework or Five Factor Model, postulates that five dimensions describe personality. Each of these dimensions has an underlying cluster of characteristics (Barrick and Mount 1991), which sort themselves along a continuum between two poles. For example, the dimension of extroversion, with its counter-pole introversion, describes individuals who are sociable, talkative, and active. Extroversion, neuroticism, agreeableness, and conscientiousness are surveyed with three items each, while openness to experiences is surveyed with four. For each item, respondents answer whether the characteristic describes them on a seven-point Likert scale. For ease of interpretation, we calculate a standardized index for each dimension with a mean of zero and standard deviation of one.

Locus of control measures the degree to which respondents believe that they control their life outcomes. Two items measure internal locus of control and six items measure external locus of control, each with a seven-point Likert scale answer option. As for the Big Five dimensions, we compute a standardized index from the eight items.

Risk appetite is surveyed with one question asking respondents to rate their willingness to take risks on an eleven-point Likert scale ranging from not risk taking at all to very risk taking. Like the other socioemotional skills, we standardize this question.

Efficiency, exposure, incentives, and controls

The literature provides well established indicators for the language acquisition of immigrants (for an overview, see Kristen 2019) and of refugees (Kosyakova, Kristen, and Spörlein 2021; Kristen and Seuring 2021; van Tubergen 2010) that we implement.

We measure efficiency through age at immigration; cognitive skills measured by the Symbol-Digit Test, a speed-constrained measure of information-processing capacities (Lang et al. 2007); premigration education, i.e., highest education level acquired in the country of origin; country of origin literacy; and mental health measured via a mental component summary scale (Andersen et al. 2007).

Measures for incentives comprise respondents' migration motive, distinguishing between economic and family-related migration motives; intention to stay in Germany and the degree of connection to the country of origin as an indicator of individuals' emotional attachment to their country of origin. Premigration status, referring to respondents' self-assessed position in the economic distribution prior to migration and premigration market participation likely affect incentives because of the economic returns to learning. The type of residency title, which provides the legal basis for an individual's prospects for permanent residence, the length of the asylum process are refugee specific indicators.

We distinguish between premigration and postmigration exposure. Premigration exposure is measured by self-reported premigration language proficiency and premigration stay in Germany. Postmigration exposure, capturing activities that signal exposure to the destination language after arriving in Germany, includes language course participation, education in Germany at the time of the interview, and contact with Germans. We further include the type of accommodation, which, especially in the early days after immigration is shared accommodations with other refugees.

We additionally control for the respondent's gender, whether children under the age of 16 live in the household, the country of origin and the sample to which the respondent belongs.

4.3   Method

To examine the role of socioemotional skills in refugees' destination-language acquisition, we proceed in two steps.

First, we model the development of language acquisition over the duration of stay with random effects growth curves (Hox, Moerbeek, and Schoot 2017). Growth curve models estimate each individual's intercept and slope describing their growth trajectory based on the values of the language proficiency at each time point. From these individual intercepts and slopes, average intercepts and slopes are computed as well as individual deviations from the averages. We also model

the covariance between random intercepts and random slopes, considering the initial level of proficiency's relevance (at t0 of the panel) for the speed of language growth. A negative covariance could indicate that individuals with greater destination-language skills at t0 , have less room for improvement and therefore slower progress.

Formally, we model the German language proficiency of individual i at time t ($Lang_{it}$):

$$Lang_{it} = \beta_{0i} + \beta_{1i}(Duration\ of\ stay)_{it} + \beta_2(Duration\ of\ stay)^2_{it}$$
$$+ \beta_3 SoEmS'_i + \beta_4 Efficiency'_i + \beta_5 Incentives'_{it} + \beta_6 Exposure'_{it}$$
$$+\beta_7 Controls'_i + \varepsilon_{it} + u_{0i}$$

with random intercept β_{0i} and β_{1i} slope, where ε_{it} is a standard error term and u_{0i} is a person-specific random intercept. The vector $SoEmS'_i$ denotes variables that measure time-invariant individual socioemotional skills, the vectors $Efficiency'_i$, $Incentives'_{it}$, and $Exposure'_{it}$ denote variables associated with the corresponding time-varying or time-invariant constructs of destination-language acquisition, and the vector $Controls'_i$ denotes control variables. The growth curve models are estimated with a random slope for the duration of stay.

Second, improving on previous analyses of destination-language acquisition, we estimate sheaf coefficients (see also Kosyakova, Kristen, and Spörlein 2021). By allowing comparison of the relative influence of a group of variables, we can assess socioemotional skills' importance for the individual's learning process. Sheaf coefficients are standardized multiple-partial regression coefficients that summarize the coefficients of a set of variables when other variables are controlled for (Heise 1972)[3]. Sheaf coefficients assume that a group of variables influences the dependent variable through latent variables, which in our analyses are socioemotional skills, efficiency, incentives, and exposure. Because the coefficients of these latent variables are standardized to a mean of 0 and a standard deviation of 1, their comparison allows us to disentangle their relative importance for language learning.

To address item nonresponse, we apply multiple imputation using chained equations (van Buuren 2012). We estimate 25 imputed datasets with complete information. Following Rubin's (1987) approach, we then combine the results of the analyses performed on each dataset. Table 1 (column 4) illustrates that missing information was present to varying degrees across measures.

5 Results

5.1 Descriptive results

Figure 1 shows the development of refugees' German language proficiency since arrival in Germany. For each refugee in the sample, we plotted learning trajectories for German language proficiency that reflect proficiency at arrival and in the last interview (gray lines). The last interviews were conducted between October 2017 and January 2020, i.e., the observed duration of stay since arrival is 13-82 months and individual lines can end anywhere within this range. We additionally depict the linear fit (dotted line) and the locally weighted lowess smoother (solid black line) to

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3 For the empirical implementation in Stata, we use SHEAFCOEF by Buis (2009).

examine trends. Lowess is based on linear and nonlinear least squares regression; a separate weighted regression is performed for every point in the data (Cleveland 1979).

Figure 1:   Language proficiency upon arrival and at the time of the last interview
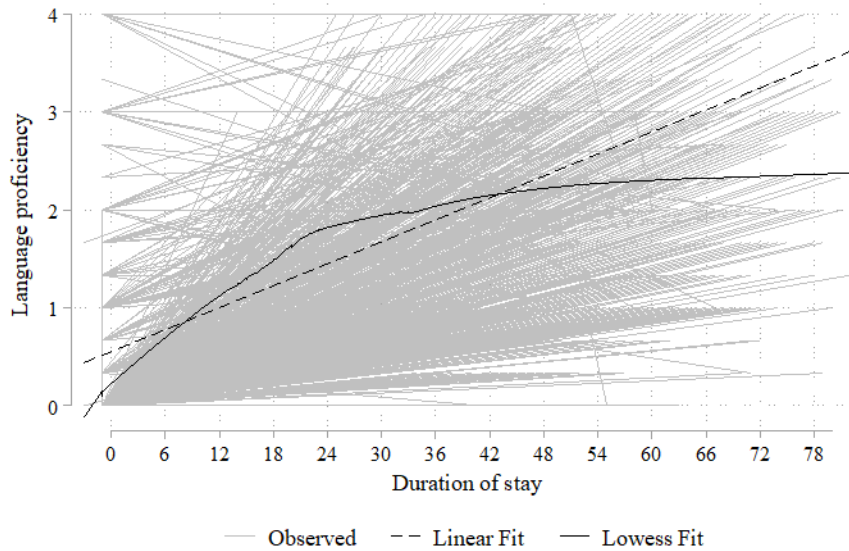
Several findings become apparent. First, in line with previous empirical evidence for Germany (Brücker, Kosyakova, and Vallizadeh 2020; Kosyakova, Kristen, and Spörlein 2021; Kristen and Seuring 2021), most refugees possess, on average, little to no language skills upon their arrival in Germany. Second, most individuals develop their language proficiency considerably during their stay, which is noteworthy considering the relatively low starting point. The lowess curve implies that refugees achieve a proficiency level of approximately 2.5 points during their duration of stay, corresponding to "fair" to "good" proficiency levels. Third, we observe language acquisition's typical pattern in the process of, with more rapid initial progress (reflected in a steeper learning curve) particularly in the first year since arrival compared to refugees with previously acquired skill levels (Hartshorne, Tenenbaum, and Pinker 2018).

Figure 2 describes the relationship between refugees' language proficiency and socioemotional skills. To examine the overall trend, we rely on the lowess (solid line) and the linear (dashed line) fit. Additionally, two-sided T-tests describe the statistical correlation between refugees' language proficiency and socioemotional skills.

Figure 2 : Socioemotional skills and refugees' language proficiency
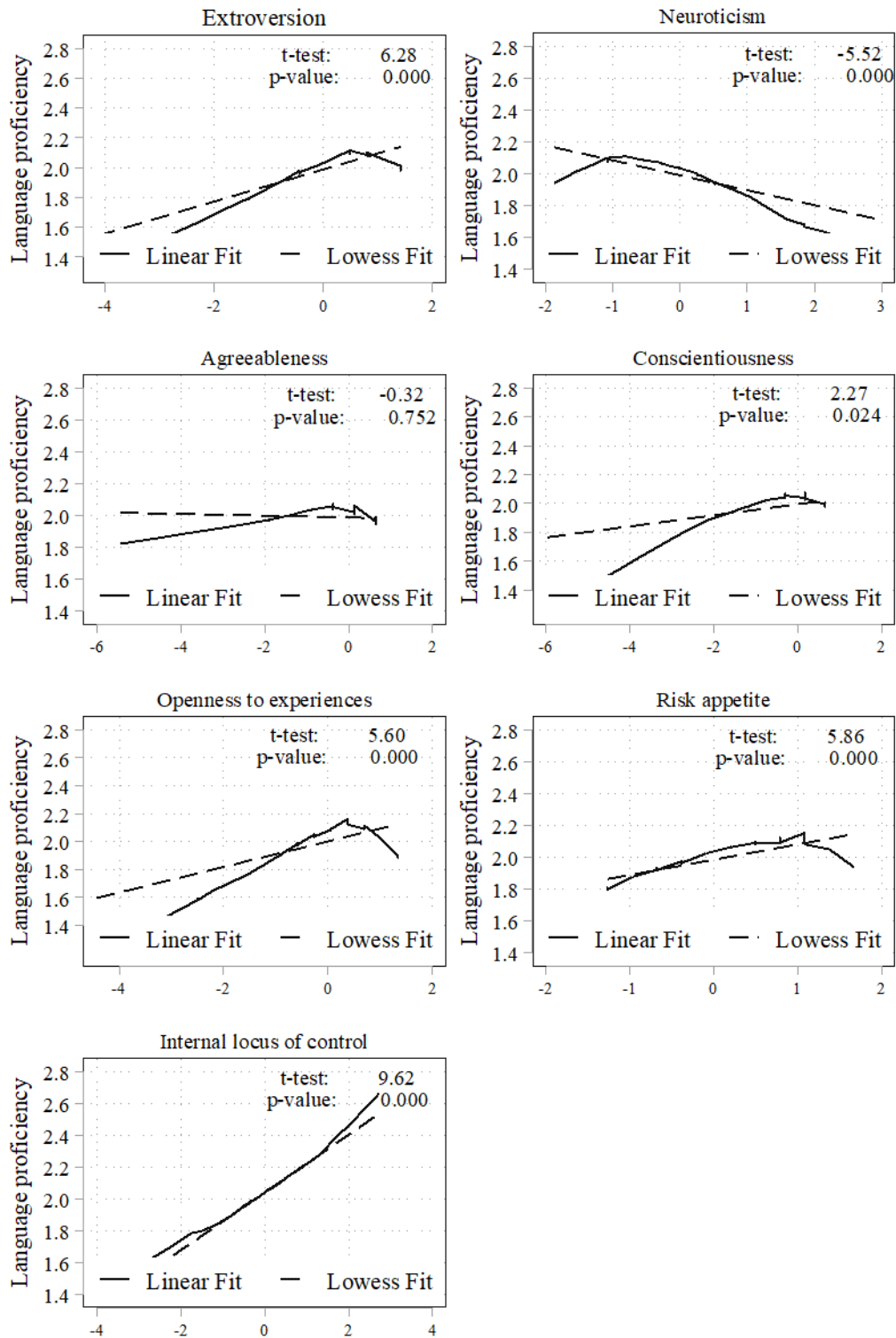
Source: IAB-BAMF-SOEP Survey of Refugees (M3, M4) 2016-2019.

Figure 2 indicates that noncognitive skills are not equally favorable for destination-language pro-
ficiency. Extroversion, conscientiousness, openness to experiences, risk preferences and internal

locus of control positively correlate with German proficiency, while neuroticism implies a negative correlation. These results are not unexpected as the literature points to these skills' importance for second-language acquisition (Dewaele 2013), human capital accumulation (Laible, Anger, and Baumann 2020; Lechner, Anger, and Rammsted 2019), and immigrants' integration prospects (Hahn et al. 2019). Agreeableness does not seem to relate to language proficiency.

5.2   Destination-language skills growth

Next, we investigate how socioemotional skills affect refugees' development of destination-language skills when controlling for the primary theoretical constructs that affect immigrants' language acquisition: efficiency, incentives and exposure. Table 2 presents the results from random-effects growth curve regressions. Model 1 illustrates the baseline relationship between socioemotional skills and language proficiency, accounting for controls. Models 2, 3, and 4 further introduce measures for – efficiency, incentives, and exposure, respectively. In Model 5, we include all theoretical constructs simultaneously. We emphasize that Models 2 and 5 account for cognitive skill, which does not detract from socioemotional skills' importance, indicating that we are not merely capturing omitted variable biases.

The baseline relationship between extroversion and language proficiency is positive (Model 1), and one standard deviation increase in extroversion is associated with a 0.04 increase in language proficiency on a scale between 0-4. When accounting for all covariates, extroversion's effect reduces in size and becomes marginally statistically significant (Model 5). Examination of Models 2-4 implies that the measures for efficiency (Model 2) and exposure (Model 4) mediate this positive relationship. Following the neurolinguistic literature, extroverts have better attention and working memory processes than introverts, particularly in stressful and multitasking situations (Lieberman and Rosenthal 2001). Accordingly, extroverts initially may attain greater human capital, which in turn drives the efficient destination-language learning process. At the same time, extraverts have a "natural advantage" in language acquisition because of their preference for interpersonal activities, which likely aids practical exercise (Dewaele 2013, 2) and increases exposure to the destination language.

The results further imply a negative impact of neuroticism on proficiency (Model 1), which is explained by the full model (Model 5). While Barrick and Mount (1991) show that emotionally stable individuals are more productive and attain higher wages, empirical evidence on human capital acquisition is less clear cut (Dewaele 2013; Laible, Anger, and Baumann 2020). Like extroversion, the impact of neuroticism seems to be offset by exposure and efficiency. Similarly, while openness to experiences' coefficient significantly predicts proficiency in the baseline model, it reduces in size when controlling for exposure (Model 4) and, particularly, efficiency (Model 3) and barely remains significant in the full model (Model 5). The baseline correlation conforms to previous findings on second-language acquisition among children (Verhoeven and Vermeer 2002), and the full model suggests that openness to experiences translates to better learning strategies in refugees' initial human capital acquisition.

Table 2: Multilevel growth curve models of language proficiency

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Duration of stay	0.05**	(0.00)	0.05**	(0.00)	0.05**	(0.00)	0.03**	(0.00)	0.03**	(0.00)
Duration of stay, squared	-0.00**	(0.00)	-0.00**	(0.00)	-0.00**	(0.00)	-0.00**	(0.00)	-0.00**	(0.00)
Socioemotional skills										
Extroversion	0.04*	(0.02)	0.03*	(0.01)	0.04*	(0.02)	0.03*	(0.01)	0.02+	(0.01)
Neuroticism	-0.04**	(0.02)	-0.03*	(0.01)	-0.04*	(0.02)	-0.03*	(0.01)	-0.02	(0.01)
Agreeableness	-0.02	(0.02)	0.00	(0.01)	-0.02	(0.02)	-0.02	(0.01)	-0.00	(0.01)
Conscientiousness	0.02	(0.02)	0.03+	(0.01)	0.02	(0.02)	0.03+	(0.02)	0.04**	(0.01)
Openness to experiences	0.06**	(0.02)	0.03*	(0.01)	0.06**	(0.02)	0.05**	(0.01)	0.02+	(0.01)
Risk appetite	0.09**	(0.02)	0.04**	(0.01)	0.08**	(0.02)	0.07**	(0.01)	0.03*	(0.01)
Internal locus of control	0.15**	(0.02)	0.07**	(0.02)	0.13**	(0.02)	0.12**	(0.02)	0.06**	(0.01)
Efficiency										
Age at immigration			-0.02**	(0.00)					-0.02**	(0.00)
Cognitive skills			0.05**	(0.01)					0.04**	(0.01)
Premigration education (Ref. less than primary)										
Primary			0.20**	(0.04)					0.15**	(0.04)
Lower secondary			0.37**	(0.04)					0.31**	(0.04)
Upper secondary			0.65**	(0.05)					0.52**	(0.04)
Postsecondary nontertiary			0.78**	(0.10)					0.66**	(0.09)
Tertiary			0.91**	(0.05)					0.77**	(0.05)
Country-of-origin literacy			0.24**	(0.04)					0.21**	(0.03)
Mental health			-0.00	(0.00)					-0.00	(0.00)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Incentives										
Economic orientation					0.07*	(0.03)			0.04	(0.02)
Family orientation					0.02	(0.04)			0.03	(0.03)
Intention to stay					-0.06	(0.05)			0.03	(0.04)
Residence title (Ref. residence permission)										
No residence permission					-0.11*	(0.04)			-0.06	(0.04)
Temporary residence permission					-0.04+	(0.03)			-0.02	(0.02)
Other title					-0.02	(0.04)			-0.02	(0.04)
Length of asylum procedure					-0.00	(0.00)			-0.00	(0.00)
Connection to country of origin					-0.01	(0.01)			-0.01	(0.01)
Premigration position in income distribution (Ref. below average)										
Average					0.18**	(0.04)			0.10**	(0.03)
Above Average					0.26**	(0.04)			0.12**	(0.03)
Labor market participation					-0.03	(0.04)			-0.04	(0.03)
Exposure										
Premigration German proficiency							0.21**	(0.03)	0.16**	(0.03)
Premigration stay in Germany							0.27+	(0.14)	0.25*	(0.12)
Language course							0.54**	(0.03)	0.52**	(0.03)
Education in Germany							0.29**	(0.03)	0.24**	(0.03)
Contact with Germans							0.26**	(0.02)	0.25**	(0.02)
Shared accommodation							-0.11**	(0.02)	-0.10**	(0.02)
Single							0.16**	(0.03)	0.09**	(0.03)
_cons	1.24**	(0.04)	1.33**	(0.10)	1.17**	(0.08)	0.77**	(0.05)	0.89**	(0.11)
var(duration)	0.00**	(0.00)	0.00**	(0.00)	0.00**	(0.00)	0.00	(.)	0.00	(.)
var(_cons)	0.47**	(0.04)	0.35**	(0.03)	0.45**	(0.04)	0.26	(.)	0.18	(.)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
corr(duration,_cons)	-0.36**	(0.11)	-0.52**	(0.09)	-0.34**	(0.11)	1.00	(.)	1.00	(.)
var(Residual)	0.31**	(0.01)	0.31**	(0.01)	0.31**	(0.01)	0.31	(.)	0.30	(.)
N observations	7923		7923		7923		7923		7923	
N individuals	2432		2432		2432		2432		2432	
N imputations used	25		25		25		22		23	

Notes: + $p<0.1$, * $p<0.05$, ** $p<0.01$. All models control for gender, children under the age of 16, country of origin, and sample.

Source: IAB-BAMF-SOEP Survey of Refugees (M3, M4) 2016-2019.

Agreeableness seems to be unfavorable for language proficiency, although the effect is statistically insignificant (Models 1-5). While conscientiousness is not significant in the baseline specification (Model 1), we detect a positive significant relationship when accounting for all model covariates (Model 5): An increase of one standard deviation in conscientiousness is associated with a 0.04-point increase in proficiency. The relationship's significance arises when controlling for efficiency (Model 2) and exposure (Model 4). Conscientious individuals tend to be hard-working and ambitious learners with a high level of self-control (Roberts et al. 2014). Consequently, they prepare well and follow through with language classes (Dewaele 2013).

Both risk appetite and internal locus of control have a positive impact on refugees' language proficiency: a one standard deviation increase in locus of control and risk preference are associated with 0.03- and 0.06-point increases in proficiency, respectively (Model 5). As with the other socio-emotional skills, the efficiency with which immigrants learn a new language appears to mediate this positive relationship (Models 2-4). Internal locus of control reflects individuals' perception of control of their life and perceived causes and consequences of their own actions. Following the previous literature, locus of control affects human capital investments through greater perception of structural constraints or previous academic success (Ng-Knight and Schoon 2017). Hence, refugees with better learning conditions have higher levels of internal control, which partly explains its positive effect on proficiency. Similarly, Dohmen et al. (2011) find that risk appetite positively correlates with education and negatively with age, which is why we observe reduced effects after controlling for the corresponding measures.

Table 2 shows the trend in language growth with the duration of stay and the variation in these trends across individuals. The baseline specification in Model 1 implies that a one-month increase in the duration of stay increases language proficiency by 0.05 points, which translates to a one point (1/0.05) increase in language proficiency requiring twenty months. The negative quadratic term implies that this increase lessens with the duration of stay. However, the baseline association between duration of stay and language proficiency is reduced in the full model to 0.03 points, suggesting that a larger share of progress is attributed to individual covariates (Model 5).

5.3   Importance of socioemotional skills for language components

Do socioemotional skills equally impact different language components? Applied linguistic research implies that productive skills such as conscientiousness and locus of control may be more relevant for functional proficiency such as reading and writing. In turn, extroversion and openness to experiences, which may affect exposure and lower communication anxiety (MacIntyre and Charos 1996), are more likely related to speaking proficiency. Accordingly, Table 3 presents the results from the growth curve model for self-reported speaking, reading, and writing in German while controlling for the full set of covariates (see Model 5 in Table 2).

With some notable differences, we observe similar effects as reported in Table 2. Compared to the benchmark results (Model 5 in Table 2), extroversion significantly correlates with speaking skills (Table 3). Openness to experiences mainly relates to reading and somewhat to writing skills. Hence, our results imply that openness shapes the development of learning abilities and the acquisition of pragmatic skills (Verhoeven and Vermeer 2002). Higher risk preferences favor reading and writing skills, whereas locus of control shapes speaking and writing skills slightly more strongly than reading skills.

Table 3: Multilevel growth curve models of language proficiency components (speaking, reading and writing) and interviewer assessment

	Speaking German		Reading German		Writing German	
	Coef.	SE	Coef.	SE	Coef.	SE
Duration of stay	0.04**	(0.00)	0.03**	(0.00)	0.03**	(0.00)
Duration of stay, squared	-0.00**	(0.00)	-0.00**	(0.00)	-0.00**	(0.00)
Socioemotional skills						
Extroversion	0.03*	(0.01)	0.02	(0.01)	0.02+	(0.01)
Neuroticism	-0.02	(0.01)	-0.02	(0.01)	-0.02	(0.01)
Agreeableness	0.01	(0.01)	-0.00	(0.01)	-0.01	(0.01)
Conscientiousness	0.04**	(0.01)	0.03*	(0.01)	0.04*	(0.01)
Openness to experiences	0.02	(0.01)	0.03*	(0.01)	0.02+	(0.01)
Risk appetite	0.02*	(0.01)	0.03**	(0.01)	0.03*	(0.01)
Locus of control	0.06**	(0.01)	0.05**	(0.02)	0.06**	(0.02)
Model covariates	YES		YES		YES	
_cons	0.99**	(0.11)	0.89**	(0.12)	0.75**	(0.13)
var(duration)	0.00	(.)	0.00**	(0.00)	0.00**	(0.00)
var(_cons)	0.15	(.)	0.27**	(0.04)	0.27**	(0.04)
corr(duration,_cons)	1.00	(.)	-0.48**	(0.12)	-0.37*	(0.16)
var(Residual)	0.35	(.)	0.42**	(0.01)	0.42**	(0.01)
N observations	7923		7923		7923	
N individuals	2432		2432		2432	
N imputations	25		25		25	

Notes: + p<0.1, * p<0.05, ** p<0.01. All models control for the same variables as Model 5 in Table 3.

Source: IAB-BAMF-SOEP Survey of Refugees (M3, M4) 2016-2019.

5.4 Relative importance of socioemotional skills for language proficiency

To assess socioemotional skills' relative importance, Table 4 presents the standardized sheaf coefficients, where one single effect size summarizes grouped variables. For comparison, we illustrate the standardized sheaf coefficients for variable groups according to the theoretical constructs efficiency, incentives, and exposure.

The results confirm our conclusion that socioemotional skills are relevant in determining immigrants' host-country proficiency. Specifically, Table 4 shows that socioemotional skills are less important than efficiency and exposure but are slightly more important than incentives. Regarding the language proficiency components, socioemotional skills appear to be slightly more relevant for communication skills than for functional language skills. Efficiency seems to be particularly decisive for functional language skills, while it is much less important for communication skills.

Table 4: Relative influence of socioemotional skills on language proficiency, with standardized sheaf coefficients

	Language proficiency	Speaking	Reading	Writing
Socioemotional skills	0.08	0.09	0.07	0.07
Efficiency	0.35	0.29	0.36	0.34
Incentives	0.07	0.07	0.07	0.06
Exposure	0.34	0.32	0.32	0.33
Controls	0.26	0.32	0.22	0.22

Source: IAB-BAMF-SOEP Survey of Refugees (M3, M4) 2016-2019.

5.5 Can socioemotional skills compensate for or promote resource disadvantages?

Lastly, we test the social psychology literature' idea that socioemotional skills may compensate for a lack of exposure to the destination-language or poor endowments shaping language proficiency. Therefore, we introduce a interaction effects between socioemotional skills and proxies for efficiency, exposure, and incentives, as well as gender and children living in the household. Previous research indicates that men and women differ in their personality traits (e.g., Croson and Gneezy 2009) and that female refugees face pronounced integration disadvantages (Cheung and Phillimore 2017). Similar arguments may apply to parents. Several interaction effects are statistically significant (at $p<0.05$) and are visualized in Figure 3. For statistical tests and full models, refer to Appendix Tables A2 and A3, respectively.

The extroversion's effect seems to boost the beneficial impact of language courses. Specifically, while the benchmark model suggests no significant average effect of extroversion on refugees' language proficiency, we observe that a positive effect arises when refugees participate in language courses. Neuroticism seems to shape only male language proficiency, thereby reducing the gender gap to the advantage of females. Conscientiousness boosts the language proficiency of refugees with family-related migration reasons and strengthens the positive effect of language courses. In turn, conscientiousness is beneficial for refugees without minors living in the household, whereas parental responsibilities seem to negate this effect. Openness to experiences is particularly beneficial for refugees with a residence permit and hence those with greater incentives to learn the destination language. Moreover, openness to experiences seems to promote a positive impact of postmigration exposure indicated by positive interaction effects between openness to experiences and language course participation. The positive effect of risk appetite on language proficiency varies by measures of efficiency. For instance, risk appetite is particularly important at younger ages, while the positive effect recedes for refugees who arrive later in life. Likewise, we observe this skill's boosting effect for refugees with higher cognitive skills. Finally, the positive effect of locus of control is offset when residing in a shared accommodation.

Figure 3: Average marginal effects (AME) of socioemotional skills on refugees' language proficiency: Interaction plots with 95% CI
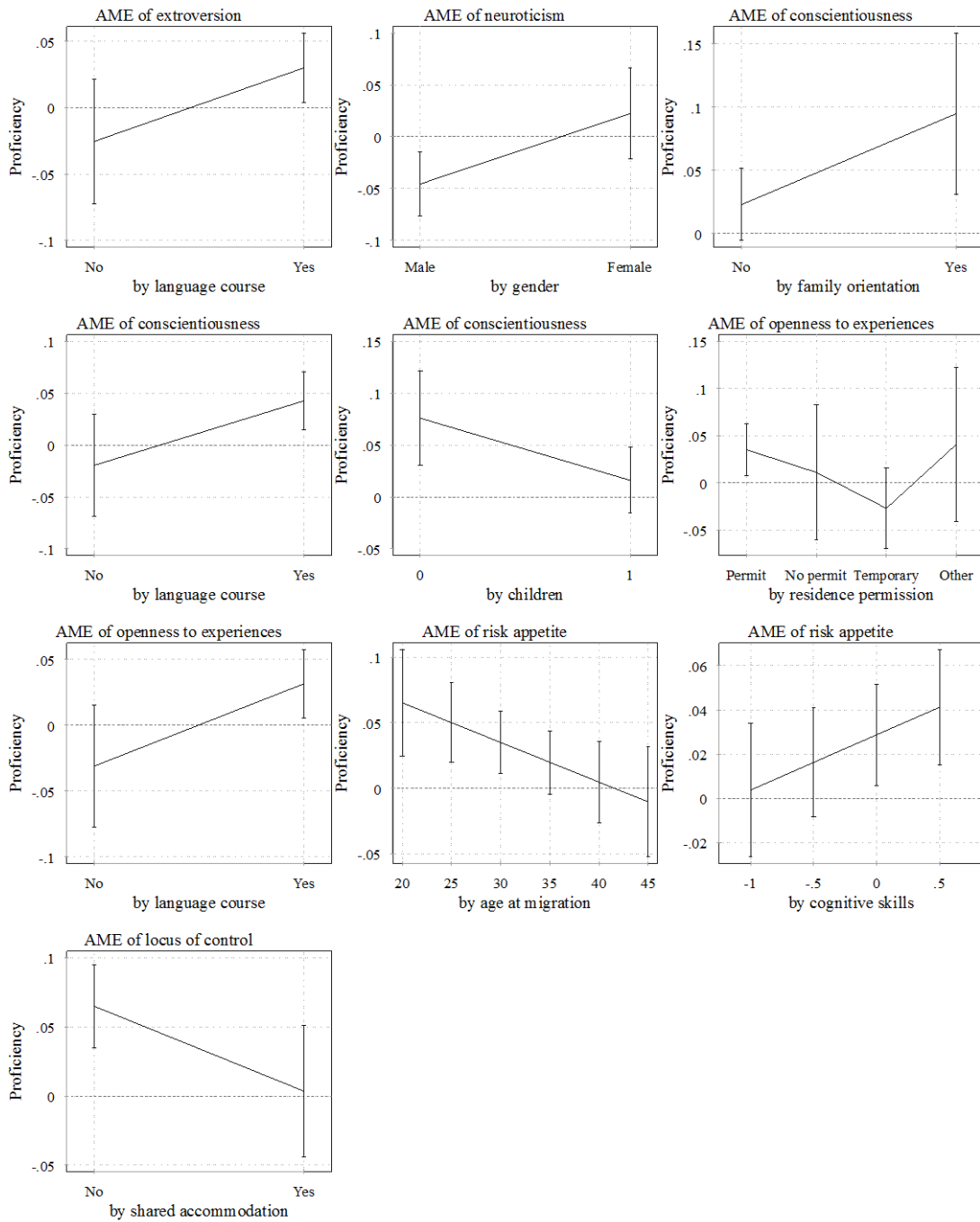
Notes: CI = confidence interval.

Source: IAB-BAMF-SOEP Survey of Refugees (M3, M4) 2016-2019.

5.6   Robustness checks

Respondents may systematically overestimate their self-reported German language proficiency due to socioemotional skills. Therefore, we perform a series of robustness checks using our benchmark model (Model 5 in Table 2). The results are presented in Table A4 in the Appendix.

First, we model the interviewer's assessment of the respondent's German communication proficiency (Model A5.1). The exact question was "How well could you conduct the interview in German?" with a five-point answer scale ranging from 1, "very well" to 5, "very bad", which we recoded so that higher values denote higher proficiency. In most cases, we observe a similar relationship between socioemotional skills and the interviewer's assessment as for our benchmark model. Similar to speaking skills (Table 3), extroversion significantly impacts the interviewers' positive assessment of respondents' proficiency. Note, however, that openness is negatively related to the interviewers' assessment. Two possible explanations could drive this result. First, respondents who are open to new experiences may more easily admit to lower language proficiency while still volunteering to conduct the interview in German instead of requesting translation. Second, open individuals are generally more talkative regardless of language proficiency. In both cases, the interviewer has more opportunities to judge language proficiency.

The interviewers were further asked about the frequency of using written translations during the interview. Written translation for the entire questionnaire was used in 60 percent of the interviews in the first wave, reducing to 47 percent in wave 4. We replicated our results excluding interviews where the entire interview was translated (Model A5.2). The results conform to the benchmark model, although conscientiousness is now only marginally significant, while risk affinity's effect is no longer statistically significant.

Next, as research shows that self-assessed language skills may be biased (Edele et al. 2015), we replicate our findings with a more "objective" measure of language proficiency, i.e. the respondent's highest certified language proficiency level (Models A5.3)[4]. The corresponding variable varies between 0 ("no certificate/no participation") and 6 ("C1/C2", proficient user). The results suggest that agreeableness negatively relates to the CEFR level (negative but insignificant in the benchmark model). While agreeable individuals are cooperative, success may negatively relate to extreme agreeableness due to a strong desire to please others (cf. Mueller and Plug 2006). In contrast, openness is a positive and significant predictor of CEFR level (positive and marginally significant in the benchmark model), while conscientiousness is not significantly related to the language attainment level. Dewaele (2013) reported that conscientious individuals are more likely to complete a course, but conscientiousness does not affect actual learning proficiency and therefore may not affect the CEFR level. Similar to the benchmark model, locus of control and risk affinity increase the CEFR level.

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4 The Common European Framework of References for Languages (CEFR) specifies different language proficiency levels that can be linked to the number of hours of study necessary to reach each level (Council of Europe 2001).

6 Discussion

This study offered a dynamic analysis of second-language proficiency among recent refugees in Germany with a focus on the role of socioemotional skills. Our underlying theoretical framework was based on Chiswick and Miller's (2001) well-established model of language acquisition, according to which language fluency is a function of exposure, efficiency, and incentives. We complement this individual-centered approach with expectations rooted in the socioecological model of agency, which has recently gained attention in research on immigrants' integration (Hahn et al. 2019; Ryan, Dooley, and Benson 2008). Empirically, we relied on the most recent longitudinal data from the IAB-BAMF-SOEP Survey of Refugees (2016-2019) and multilevel growth curve models. By means of sheaf coefficients, we additionally tested socioemotional skills' relative importance for refugees' language proficiency. We draw four conclusions from our study.

First, we found evidence that socioemotional skills play an important role in immigrants' destination-language skills even when we control for efficiency, including cognitive skills, exposure, and incentives. In particular, we assumed that curiosity and eagerness for knowledge affect learning, and we observed a positive relationship between openness to experiences and language skills. Organized, achievement-oriented, and hard-working individuals were expected to have a greater drive to succeed in efficient cost-benefit planning and ensuing language acquisition, which empirically translates to conscientiousness' positive impact. Internal locus of control was expected to relate to learning capabilities and beliefs about language acquisition's returns, thereby driving learning efficiency. In confirmation, internal locus of control's effect on language proficiency is positive. We also observed higher proficiency among risk-affine individuals.

Second, we cannot empirically support some of our expectations. For instance, while we expected that anxious or insecure individuals acquire German language skills less efficiently, our results provide no support for a negative relation of neuroticism and language acquisition. Note that both extroversion and neuroticism were significant (following the predictions) in the baseline models, but their effects were offset efficiency and exposure. For all measures of socioemotional skills, we observed mediating effects of efficiency or exposure; thus, it seems that socioemotional skills shape both the efficiency of learning and exposure to learning opportunities. These shaping effects then indirectly translate into destination-language proficiency.

Third, using sheaf coefficients, we compared socioemotional skills' relative importance to the well-established mechanisms of efficiency, exposure, and incentives. Although exposure and efficiency are the main predictors of language proficiency, socioemotional skills have a discernable influence, particularly when compared to incentives. This is remarkable given that the migration literature emphasizes the role of (economic) incentives as major drivers of migration decisions (e.g., Chiswick 1999) and integration processes (e.g., Cortes 2004), including destination-language learning (Chiswick and Miller 2001; Esser 2006).

Fourth, analyzing resource accumulation or compensation, our results indicate multiplication effects: For instance, extroverted, conscientious and open individuals experience larger positive effects of language courses, which implies resource multiplication for exposure to destination language. Since shared accommodation leads to reduced exposure, internal locus of control's ob-

served positive effect for refugees in nonshared accommodation additionally supports the resource multiplication idea. Solidifying the argument, risk appetite reduces age's negative effect and heightens cognitive skills' positive effects. Openness to experiences also boosts the incentive, measured as permission to stay in the country, to learn the destination language. Given that family orientation is linked with voluntary migration (though to a lesser extent than economic orientation), conscientiousness' stronger positive effect for family-oriented refugees additionally reinforces resource accumulation; as does conscientiousness' positive effect for childless refugees and the absence of this effect for parents. We only observe a compensation effect for gender: while neuroticism's negative effect for male refugees does not directly support the idea of compensation, it contributes to reduced female disadvantages in language proficiency. Overall, we conclude that socioemotional skills multiply the effects of exposure, efficiency and incentives – again highlighting the relevance of socioemotional skills in the language acquisition process.

We need to address some limitations. First, this study's focus was on the dynamics of refugees' language proficiency in Germany. Despite being a smaller country, we consider Germany to be of general interest for understanding the drivers of refugees' acquisition of the destination language in developed countries. Germany plays a predominant role as a receiving country for asylum migration in Europe, not only historically but also in the recent European refugee immigration surge (Brücker, Kosyakova, and Vallizadeh 2020). Thus, Germany is one of the most important cases in the OECD. Second, socioemotional skills' measurement faces two potential restrictions. First, socioemotional skills are measured with short scales, but at the same time, these are well-established measures that have been implemented in the SOEP for years (Richter et al. 2017). Second, socioemotional skills may be ethnocentric and might not work due to culture-specific answer behaviors. However, cross-country research on socioemotional skills has implemented the same scales successfully across cultures and concluded that they are universally valid (Hofstede and McCrae 2004).

Our study lends itself to policy implications. The psychological literature implies that socioemotional skills are relatively stable and therefore do not offer much potential for long-lasting changes beneficial to language attainment. However, the way language is taught can be altered to fit specific socioemotional skills. The analyses of the three components of language proficiency – speaking, reading, and writing – showed that certain skills are better suited for the acquisition of specific language components; for example, extroversion and speaking proficiency. Thus, to increase language proficiency among refugees and immigrants, language courses and interventions could be tailored such that the teaching mode best matches an individual's socioemotional skills (see Dewaele 2013).

In sum, this study contributes by providing first results on socioemotional skills' importance for immigrants' language attainment processes based on large-scale representative survey data. While prior research has shown that socioemotional skills affect educational and labor market outcomes, this study goes a step further and combines the migration literature with the psychological literature to illuminate socioemotional skills' effects in a migration context. Therefore, this study deepens our understanding of the integration process, of which language acquisition is a major component. Overall, our results reveal that socioemotional skills serve as an overlooked but important mechanism, particularly when we assess the relative importance of these skills and com-

pare it to the relative importance of incentives. Socioemotional skills thus shape refugees' language acquisition and thereby contribute to their successful integration into a destination country. We conclude that combining insights from sociology and personality psychology in the study of immigrants' integration process is a fruitful avenue for research.

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Appendix Table A1: Variable definitions

Dependent variable	
Language proficiency (TV)	Mean index of how well respondents can speak, read, and write German. Answer categories range from 0 "very well" to 4 "not at all". Scales were reversed so that a higher score indicates a higher level of proficiency.
Duration of stay	Difference in months between the date of the interview and the date of arrival (i.e., the last entry into Germany).
Socioemotional skills	
Extroversion	Extroversion is a unidimensional factor based on participants' agreement with three items on a 7-point scale (from applies completely to does not apply): 1. Communicative, talkative 2. Outgoing, sociable 3. Reserved The response scale of item 3 was reversed so that higher values denote higher levels of disagreement. All three items were used to create a mean index. The index is standardized with a mean of zero and a standard deviation of one. Higher values of the index indicate higher levels of extroversion.
Neuroticism	Neuroticism is a unidimensional factor based on participants' agreement with three items on a 7-point scale (from applies completely to does not apply): 1. A worrier 2. Nervous 3. Relaxed, able to deal with stress The response scale of item 3 was reversed so that higher values denote higher levels of disagreement. All three items were used to create a mean index. The index is standardized with a mean of zero and a standard deviation of one. Higher values of the index indicate higher levels of neuroticism.
Agreeableness	Agreeableness is a unidimensional factor based on participants' agreement with three items on a 7-point scale (from applies completely to does not apply): 1. Sometimes somewhat rude to others 2. Forgiving 3. Considerate and kind to others The response scale of item 1 was reversed so that higher values denote higher levels of disagreement. All three items were used to create a mean index. The index is standardized with a mean of zero and a standard deviation of one. Higher values of the index indicate higher levels of agreeableness.
Conscientiousness	Conscientiousness is a unidimensional factor based on participants' agreement with three items on a 7-point scale (from applies completely to does not apply): 1. A thorough worker 2. Somewhat lazy 3. Effective and efficient in completing tasks The response scale of item 2 was reversed so that higher values denote higher levels of disagreement. All three items were used to create a mean index. The index is standardized with a mean of zero and a standard deviation of one. Higher values of the index indicate higher levels of conscientiousness.
Open to experience	Open to experience is a unidimensional factor based on participants' agreement with four items on a 7-point scale (from applies completely to does not apply): 1. Original, someone who comes up with new ideas 2. Someone who values artistic, aesthetic experiences 3. Imaginative 4. Eager for knowledge All four items were used to create a mean index. The index is standardized with a mean of zero and a standard deviation of one. Higher values of the index indicate higher levels of openness to experience.

Locus of control	Locus of control is a unidimensional factor based on participants' agreement with eight items on a 7-point scale (from applies completely to does not apply): 1. How my life goes depends on me (I) 2. One has to work hard in order to succeed (I) 3. Compared to other people, I have not achieved what I deserve (E) 4. What a person achieves in life is above all a question of fate or luck (E) 5. I frequently have the experience that other people have a controlling influence over my life (E) 6. If I run up against difficulties in life, I often doubt my abilities (E) 7. The opportunities that I have in life are determined by social conditions (E) 8. I have little control over the things that happen in my life (E) For the six external items (E), the coding of the response scale was reversed so that higher values denote higher levels of disagreement. All eight items were used to create a mean index. The index is standardized with a mean of zero and a standard deviation of one. Higher values of the index indicate higher levels of internal control.
Risk appetite	Willingness to take risks versus avoidance of risks was measured on an 11-point scale (from fully unwilling to take risks to fully willing to take risks). We considered the first reported non-missing value over the observation period. For ease of interpretation, the index was standardized to have a mean of zero and a standard deviation of one. Higher values of risk appetite indicate higher levels of risk willingness.
Efficiency	
Age at immigration	Difference between the year of arrival (i.e., the last entry into Germany) and the year of birth.
Cognitive skills	Digit-Symbol Test The test assesses perceptual information-processing speed (Lang et al., 2007). Respondents had to match symbols with numbers using a correspondence table in which nine symbols were assigned to numbers. Within 90 seconds, symbols were randomly shown, and the respondents had to enter the corresponding number (1-9). Test scores denote the share of correctly solved items. The measure is standardized with a mean of zero and a standard deviation of one. Higher values of the index indicate higher levels of cognitive skills.
Premigration education	Based on a variant of the International Standard Classification of Education with 0 "less than primary", 1 "primary", 2 "lower secondary", 3 "upper secondary", 4 "postsecondary nontertiary", and 5 "tertiary" (Brücker, Rother, and Schupp 2017:34–36).
Country-of-origin literacy	Based on self-reports of how well respondents can read and write in their country of origin language, with answer categories ranging from 1 "not at all" to 5 "very good". Average scores were used to construct a dummy variable that distinguishes between respondents who 1 "can read and write their country of origin language at least well" (i.e., average scores of 2.5 and above) and respondents who 0 "score below 2.5".
Mental health (TV)	Mental health scores are calculated based on four subscales: mental health, role emotional, social functioning and vitality (Andersen et al. 2007). The index can take values between 0 and 100, with higher values indicating better health.
Incentives	
Economic orientation	A dummy variable based on the main reasons for leaving origin country (multiple choice was possible). The dummy refers to 1 "economic" if the reasons were "personal living conditions" or "economic situation in country" versus 0 "not mentioned".
Family orientation	A dummy variable based on the main reasons for leaving origin country (multiple choice was possible). The dummy refers to 1 "family" if the reasons were "wanted to be with family members" or "family members left country" versus 0 "not mentioned"
Intention to stay (TV)	Dummy variable indicating whether respondents intend to stay in Germany permanently, with 1 "permanently" and 0 "return within a year/stay for several years".

Residence title (TV)	Variable is coded based on the question, "Which residence permit do you currently have? Please look at the label for the immigration office on your passport." The variable can take the following values: 1. Residence permission (Residence permit under Sect. 25, para. 1 of the German Residence Act (entitled to asylum); residence permit under Sect. 25, para. 2, alternative 1 of the German Residence Act (recognized refugee according to the Geneva Convention); residence permit under Sect. 25, para. 2, alternative 2 of the German Residence Act (subsidiary protection); residence permit under Sects 22, 23, 23a, or 25, paras 3, 4, or 5 of the German Residence Act (miscellaneous humanitarian residence); residence permit under Sects 28, 29, 30, 31, 32, 34, or 36 of the German Residence Act (family reunification); settlement permit under Sect. 26, para. 3 of the German Residence Act (unrestricted right to reside)) 2. No residence permission (temporary suspension of deportation under Sect. 60a of the German Residence Act (Duldung); no residence permit) 3. Temporary resident permission (temporary residency permit under Sect. 55 of the German Asylum Act (asylum seeker), application for new residence permit, including extension of old permit (particularly a probationary certificate)) 4. Other title (another residence title).
Length of pending asylum procedure (TV)	The length is calculated as the difference between the date of the asylum request and the date of asylum decision. For those with a pending decision, it is calculated as the difference between the date of the asylum request and the date of the interview.
Connection to country of origin (TV)	Continuous measure based on the question "How strongly do you feel connected with your country of origin?" Values range from 1 "not at all" to 5 "very much".
Premigration position in income distribution	Mean index of how well respondents could speak, read, and write German before moving to Germany. Answer categories ranged from 0 "very well" to 4 "not at all". Scales were reversed so that a higher score indicates a higher level of proficiency.
Labor market participation	Variable indicating whether respondents worked before migration, with 1 "yes" and 0 "no".
Exposure	
Premigration proficiency	Mean index of how well respondents could speak, read, and write German before moving to Germany. Answer categories ranged from 0 "very well" to 4 "not at all". Scales were reversed so that a higher score indicates a higher level of proficiency.
Premigration stay in Germany	Variable indicating whether respondents had previously immigrated to Germany and left again (1) or whether this was their first immigration to Germany (0).
Language course (TV)	Variable indicating whether respondents participated in a language course or not.
Education in Germany (TV)	Variable indicating whether respondents had been or were enrolled in education in Germany (including school education, vocational training, apprenticeship, higher education and other forms of training) at the time of the interview. This information was derived either from calendar data of individuals' life histories or from survey questions.
Contact with Germans (TV)	Variable indicating how often respondents spend time with Germans, with 1 "every day/several time per week/every week" and 0 "every month/less often/never".
Shared accommodation (TV)	Variable indicating the kind of current accommodation, with 1 "shared accommodation", and 0 "private accommodation".
Single (TV)	Variable indicating whether respondents are single (1) or in a relationship (0).
Controls	
Female	Variable indicating whether respondents are female (1) or male (0).
Child < age 16 (TV)	Variable indicating whether children below the age of 16 live in the household.
Country of origin	Variable indicating whether respondents are citizens of 1 "Syria", 2 "Afghanistan", 3 "Iraq", 4 "Eritrea", 5 "Other MENA", 6 "West Balkan", 7 "Former USSR", 8 "Other Africa", or 9 "other states" or whether they are 10 "stateless".
Sample	Variable indicating whether respondents belong to 1 "M3" or 2 "M4".

Notes: TV indicates "time varying"; variables without this addition refer to time-invariant measures.

Source: Own work.

Table A2: Multilevel growth curve models of language proficiency: Test of interaction effects

	Coef.	t-test	p
Model 6: AME of extroversion by language course			
at language course = No	-0.03	-1.07	0.286
at language course = Yes	0.03	2.25	0.024
Model 7: AME of neuroticism by gender			
at gender = male	-0.05	-2.87	0.004
at gender = female	0.02	1.00	0.315
Model 9: AME of conscientiousness			
by family orientation			
at family orientation = No	0.02	1.59	0.113
at family orientation = Yes	0.09	2.91	0.004
by language course			
at language course = No	-0.02	-0.78	0.435
at language course = Yes	0.04	2.99	0.003
by children			
at children = No	0.08	3.27	0.001
at children = Yes	0.02	0.98	0.325
Model 10: AME of openness to experiences			
by residence title			
at residence title = 1 "Permission"	0.04	2.51	0.012
at residence title = 2 "No permission"	0.01	0.30	0.764
at residence title = 3 "Temporary"	-0.03	-1.24	0.216
at residence title = 4 "Other"	0.04	0.98	0.329
by language course	-0.03	-1.31	0.191
at language course = No	0.03	2.38	0.017
at language course = Yes	0.03	2.38	0.017
Model 11: AME of risk appetite			
by age at migration			
at age at migration = 20	0.07	3.14	0.002
at age at migration = 25	0.05	3.24	0.001
at age at migration = 30	0.03	2.90	0.004
at age at migration = 35	0.02	1.61	0.107
at age at migration = 40	0.00	0.29	0.770
at age at migration = 45	-0.01	-0.49	0.625
by cognitive skills			
at cognitive skills = -1	0.00	0.24	0.807
at cognitive skills = -0.5	0.02	1.30	0.195
at cognitive skills = 0	0.03	2.46	0.014
at cognitive skills = 0.5	0.04	3.10	0.002
Model 12: AME of internal locus of control by shared accommodation			
at shared accommodation = No	0.06	4.21	0.000
at shared accommodation = Yes	0.00	0.15	0.884

Notes: All models control for the same variables as Model 5 in Table 2.

Source: Source: IAB-BAMF-SOEP Survey of Refugees (M3, M4) 2016-2019.

Table A3: Multilevel growth curve models of language proficiency: Interaction effects

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Duration of stay	0.03**	(0.00)	0.03**	(0.00)	0.03**	(0.00)	0.03**	(0.00)	0.03**	(0.00)	0.03**	(0.00)	0.03**	(0.00)
Duration of stay, squared	-0.00**	(0.00)	-0.00**	(0.00)	-0.00**	(0.00)	-0.00**	(0.00)	-0.00**	(0.00)	-0.00**	(0.00)	-0.00**	(0.00)
Socioemotional skills														
Extroversion	0.05	(0.10)	0.02+	(0.01)	0.02+	(0.01)	0.02	(0.01)	0.03*	(0.01)	0.02+	(0.01)	0.02+	(0.01)
Neuroticism	-0.02	(0.01)	-0.06	(0.10)	-0.02	(0.01)	-0.02+	(0.01)	-0.02+	(0.01)	-0.02+	(0.01)	-0.02	(0.01)
Agreeableness	-0.00	(0.01)	0.00	(0.01)	-0.05	(0.10)	-0.00	(0.01)	-0.00	(0.01)	-0.00	(0.01)	-0.00	(0.01)
Conscientiousness	0.04**	(0.01)	0.03**	(0.01)	0.04**	(0.01)	0.04	(0.10)	0.03*	(0.01)	0.03**	(0.01)	0.04**	(0.01)
Openness to experiences	0.03*	(0.01)	0.02+	(0.01)	0.02+	(0.01)	0.02*	(0.01)	-0.02	(0.10)	0.02+	(0.01)	0.02+	(0.01)
Risk appetite	0.03**	(0.01)	0.03*	(0.01)	0.03**	(0.01)	0.03**	(0.01)	0.03*	(0.01)	0.23*	(0.10)	0.03**	(0.01)
Internal locus of control	0.05**	(0.01)	0.06**	(0.01)	0.05**	(0.01)	0.06**	(0.01)	0.05**	(0.01)	0.06**	(0.01)	0.31**	(0.11)
Efficiency														
Age at immigration	-0.02**	(0.00)	-0.02**	(0.00)	-0.02**	(0.00)	-0.02**	(0.00)	-0.02**	(0.00)	-0.02**	(0.00)	-0.02**	(0.00)
x Extroversion	-0.00	(0.00)												
x Neuroticism			-0.00+	(0.00)										
x Agreeableness					-0.00	(0.00)								
x Conscientiousness							-0.00	(0.00)						
x Openness to experiences									-0.00	(0.00)				
x Risk appetite											-0.00*	(0.00)		
x Internal locus of control													-0.00+	(0.00)
Cognitive skills	0.03**	(0.01)	0.04**	(0.01)	0.04**	(0.01)	0.04**	(0.01)	0.04**	(0.01)	0.04**	(0.01)	0.03**	(0.01)
x Extroversion	-0.02	(0.01)												

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
x Neuroticism			-0.01	(0.01)										
x Agreeableness					0.00	(0.01)								
x Conscientiousness							0.00	(0.01)						
x Openness to experiences									0.01	(0.01)				
x Risk appetite											0.02*	(0.01)		
x Internal locus of control													-0.01	(0.01)
Premigration education (Ref. less than primary)														
Primary (Edu I)	0.14**	(0.04)	0.16**	(0.04)	0.15**	(0.04)	0.15**	(0.04)	0.15**	(0.04)	0.15**	(0.04)	0.15**	(0.04)
Lower secondary (Edu II)	0.29**	(0.04)	0.32**	(0.04)	0.32**	(0.04)	0.31**	(0.04)	0.30**	(0.04)	0.30**	(0.04)	0.31**	(0.04)
Upper secondary (Edu III)	0.51**	(0.04)	0.52**	(0.04)	0.52**	(0.04)	0.52**	(0.04)	0.51**	(0.04)	0.52**	(0.04)	0.52**	(0.04)
Postsecondary nontertiary (Edu IV)	0.62**	(0.09)	0.66**	(0.09)	0.67**	(0.09)	0.66**	(0.09)	0.65**	(0.09)	0.65**	(0.09)	0.65**	(0.09)
Tertiary (Edu V)	0.76**	(0.05)	0.78**	(0.05)	0.78**	(0.05)	0.78**	(0.05)	0.77**	(0.05)	0.78**	(0.05)	0.77**	(0.05)
Edu I x Extroversion	-0.05	(0.04)												
Edu II x Extroversion	-0.04	(0.04)												
Edu III x Extroversion	-0.05	(0.04)												
Edu IV x Extroversion	0.05	(0.09)												
Edu V x Extroversion	-0.05	(0.05)												
Edu I x Neuroticism			-0.01	(0.04)										
Edu II x Neuroticism			-0.01	(0.04)										
Edu III x Neuroticism			-0.03	(0.04)										
Edu IV x Neuroticism			0.03	(0.08)										
Edu V x Neuroticism			0.01	(0.04)										
Edu I x Agreeableness					-0.01	(0.04)								
Edu II x Agreeableness					-0.04	(0.04)								

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Edu III x Agreeableness					0.01	(0.04)								
Edu IV x Agreeableness					0.08	(0.07)								
Edu V x Agreeableness					-0.01	(0.05)								
Edu I x Conscientiousness							-0.03	(0.04)						
Edu II x Conscientiousness							-0.01	(0.04)						
Edu III x Conscientiousness							-0.02	(0.04)						
Edu IV x Conscientiousness							0.01	(0.08)						
Edu V x Conscientiousness							-0.04	(0.05)						
Edu I x Openness to experiences									-0.05	(0.04)				
Edu II x Openness to experiences									-0.03	(0.04)				
Edu III x Openness to experiences									-0.05	(0.04)				
Edu IV x Openness to experiences									0.03	(0.08)				
Edu V x Openness to experiences									-0.08+	(0.05)				
Edu I x Risk appetite											-0.05	(0.04)		
Edu II x Risk appetite											-0.04	(0.04)		
Edu III x Risk appetite											-0.06	(0.04)		
Edu IV x Risk appetite											-0.03	(0.09)		
Edu V x Risk appetite											-0.07	(0.05)		
Edu I x Internal locus of control													-0.01	(0.05)
Edu II x Internal locus of control													-0.02	(0.05)
Edu III x Internal locus of control													-0.01	(0.05)
Edu IV x Internal locus of control													0.04	(0.09)
Edu V x Internal locus of control													-0.01	(0.05)
Country-of-origin literacy	0.22**	(0.03)	0.20**	(0.03)	0.22**	(0.03)	0.21**	(0.03)	0.21**	(0.03)	0.21**	(0.03)	0.21**	(0.04)

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
x Extroversion	-0.04	(0.03)												
x Neuroticism			0.01	(0.03)										
x Agreeableness					-0.06+	(0.03)								
x Conscientiousness							-0.06+	(0.03)						
x Openness to experiences									0.02	(0.03)				
x Risk appetite											0.03	(0.03)		
x Internal locus of control													-0.04	(0.04)
Mental health	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)
x Extroversion	-0.00	(0.00)												
x Neuroticism			0.00+	(0.00)										
x Agreeableness					0.00	(0.00)								
x Conscientiousness							-0.00	(0.00)						
x Openness to experiences									-0.00	(0.00)				
x Risk appetite											0.00	(0.00)		
x Internal locus of control													-0.00	(0.00)
Incentives														
Economic orientation	0.04	(0.02)	0.04	(0.02)	0.03	(0.02)	0.03	(0.02)	0.04	(0.02)	0.04	(0.02)	0.03	(0.02)
x Extroversion	0.01	(0.02)												
x Neuroticism			0.02	(0.02)										
x Agreeableness					0.03	(0.02)								
x Conscientiousness							0.04+	(0.02)						
x Openness to experiences									-0.02	(0.03)				
x Risk appetite											-0.04+	(0.02)		
x Internal locus of control													-0.03	(0.03)

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Family orientation	0.03	(0.03)	0.04	(0.03)	0.03	(0.03)	0.03	(0.03)	0.03	(0.03)	0.03	(0.03)	0.03	(0.03)
x Extroversion	0.01	(0.03)												
x Neuroticism			-0.04	(0.03)										
x Agreeableness					-0.01	(0.03)								
x Conscientiousness							0.07*	(0.03)						
x Openness to experiences									0.07+	(0.03)				
x Risk appetite											-0.05	(0.03)		
x Internal locus of control													0.00	(0.04)
Intention to stay	0.03	(0.04)	0.02	(0.04)	0.02	(0.04)	0.03	(0.04)	0.03	(0.04)	0.03	(0.04)	0.03	(0.04)
x Extroversion	-0.01	(0.05)												
x Neuroticism			0.03	(0.05)										
x Agreeableness					0.00	(0.04)								
x Conscientiousness							0.06	(0.04)						
x Openness to experiences									-0.00	(0.04)				
x Risk appetite											-0.05	(0.04)		
x Internal locus of control													-0.01	(0.04)
Residence title (Ref. residence permission)														
No residence permission (R I)	-0.07+	(0.04)	-0.06	(0.04)	-0.07	(0.04)	-0.06	(0.04)	-0.07+	(0.04)	-0.07	(0.04)	-0.08+	(0.04)
Temporary residence permission (R II)	-0.02	(0.02)	-0.02	(0.02)	-0.02	(0.02)	-0.02	(0.02)	-0.03	(0.02)	-0.02	(0.02)	-0.02	(0.02)
Other title (R III)	-0.02	(0.04)	-0.02	(0.04)	-0.01	(0.04)	-0.02	(0.04)	-0.02	(0.04)	-0.02	(0.04)	-0.01	(0.04)
R I x Extroversion	-0.03	(0.04)												
R II x Extroversion	0.03	(0.02)												
R III x Extroversion	-0.08+	(0.04)												
R I x Neuroticism			-0.02	(0.04)										

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
R II x Neuroticism			0.01	(0.02)										
R III x Neuroticism			0.05	(0.04)										
R I x Agreeableness					0.02	(0.04)								
R II x Agreeableness					0.02	(0.02)								
R III x Agreeableness					0.04	(0.04)								
R I x Conscientiousness							0.06+	(0.04)						
R II x Conscientiousness							0.02	(0.02)						
R III x Conscientiousness							-0.07	(0.05)						
R III x Conscientiousness							-0.07	(0.05)						
R I x Openness to experiences									-0.02	(0.04)				
R II x Openness to experiences									-0.06**	(0.02)				
R III x Openness to experiences									0.01	(0.04)				
R I x Risk appetite											0.06	(0.04)		
R II x Risk appetite											-0.04+	(0.02)		
R III x Risk appetite											0.02	(0.04)		
R I x Internal locus of control													-0.05	(0.04)
R II x Internal locus of control													-0.01	(0.03)
R III x Internal locus of control													0.01	(0.05)
Length of asylum procedure	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)	-0.00	(0.00)
x Extroversion	-0.00	(0.00)												
x Neuroticism			0.00	(0.00)										
x Agreeableness					-0.00	(0.00)								
x Conscientiousness							-0.00	(0.00)						
x Openness to experiences									0.00	(0.00)				

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
x Risk appetite											0.00	(0.00)		
x Internal locus of control													-0.00	(0.00)
Connection to country of origin	-0.01	(0.01)	-0.01	(0.01)	-0.01	(0.01)	-0.01	(0.01)	-0.01	(0.01)	-0.01	(0.01)	-0.01	(0.01)
x Extroversion	0.01	(0.01)												
x Neuroticism			-0.00	(0.01)										
x Agreeableness					0.01	(0.01)								
x Conscientiousness							0.01	(0.01)						
x Openness to experiences									0.01	(0.01)				
x Risk appetite											-0.00	(0.01)		
x Internal locus of control													-0.01	(0.01)
Premigration position in income distribution (Ref. below average)														
Average (SES I)	0.09**	(0.03)	0.09**	(0.03)	0.09**	(0.03)	0.09**	(0.03)	0.09**	(0.03)	0.10**	(0.03)	0.10**	(0.03)
Above Average (SES II)	0.12**	(0.03)	0.12**	(0.03)	0.12**	(0.03)	0.12**	(0.03)	0.12**	(0.03)	0.12**	(0.03)	0.12**	(0.03)
SES x Extroversion			-0.02	(0.03)										
SES II x Extroversion			-0.05	(0.03)										
SES I x Neuroticism	0.01	(0.03)												
SES II x Neuroticism	0.03	(0.03)												
SES I x Agreeableness					0.00	(0.03)								
SES II x Agreeableness					0.03	(0.03)								
SES I x Conscientiousness							0.01	(0.03)						
SES II x Conscientiousness							0.03	(0.03)						
SES I x Openness to experiences									-0.01	(0.03)				
SES II x Openness to experiences									-0.03	(0.03)				
SES I x Risk appetite											0.00	(0.03)		

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
SES II x Risk appetite											0.03	(0.03)		
SES I x Internal locus of control													0.02	(0.03)
SES II x Internal locus of control													0.02	(0.04)
Labor market participation	-0.03	(0.03)	-0.04	(0.03)	-0.04	(0.03)	-0.04	(0.03)	-0.04	(0.03)	-0.04	(0.03)	-0.03	(0.03)
x Extroversion	0.01	(0.03)												
x Neuroticism			0.02	(0.03)										
x Agreeableness					0.03	(0.03)								
x Conscientiousness							0.04	(0.03)						
x Openness to experiences									0.03	(0.03)				
x Risk appetite											-0.00	(0.03)		
x Internal locus of control													0.00	(0.03)
Exposure														
Premigration German proficiency	0.16**	(0.03)	0.16**	(0.03)	0.16**	(0.03)	0.16**	(0.03)	0.16**	(0.03)	0.16**	(0.03)	0.15**	(0.03)
x Extroversion	0.01	(0.03)												
x Neuroticism			-0.02	(0.03)										
x Agreeableness					-0.04	(0.03)								
x Conscientiousness							0.01	(0.03)						
x Openness to experiences									0.05+	(0.03)				
x Risk appetite											-0.01	(0.03)		
x Internal locus of control													0.04	(0.03)
Premigration stay in Germany	0.27*	(0.13)	0.32*	(0.13)	0.25*	(0.12)	0.26*	(0.12)	0.25+	(0.13)	0.28*	(0.14)	0.23	(0.15)
x Extroversion	0.06	(0.11)												
x Neuroticism			-0.16	(0.12)										
x Agreeableness					-0.22+	(0.13)								

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
x Conscientiousness							-0.13	(0.12)						
x Openness to experiences									0.04	(0.10)				
x Risk appetite											-0.02	(0.14)		
x Internal locus of control													-0.05	(0.16)
Language course	0.51**	(0.03)	0.52**	(0.03)	0.51**	(0.03)	0.51**	(0.03)	0.52**	(0.03)	0.52**	(0.03)	0.52**	(0.03)
x Extroversion	0.06*	(0.02)												
x Neuroticism			-0.03	(0.02)										
x Agreeableness					0.04	(0.03)								
x Conscientiousness							0.06*	(0.02)						
x Openness to experiences									0.06**	(0.02)				
x Risk appetite											-0.03	(0.02)		
x Internal locus of control													0.01	(0.03)
Education in Germany	0.23**	(0.03)	0.24**	(0.03)	0.23**	(0.03)	0.24**	(0.03)	0.23**	(0.03)	0.24**	(0.03)	0.24**	(0.03)
x Extroversion	-0.01	(0.03)												
x Neuroticism			0.04	(0.03)										
x Agreeableness					-0.01	(0.03)								
x Conscientiousness							-0.02	(0.03)						
x Openness to experiences									-0.04	(0.03)				
x Risk appetite											-0.05+	(0.03)		
x Internal locus of control													-0.01	(0.03)
Contact with Germans	0.25**	(0.02)	0.25**	(0.02)	0.25**	(0.02)	0.25**	(0.02)	0.25**	(0.02)	0.25**	(0.02)	0.25**	(0.02)
x Extroversion	0.02	(0.02)												
x Neuroticism			-0.01	(0.02)										
x Agreeableness					-0.01	(0.02)								

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
x Conscientiousness							0.00	(0.02)						
x Opennesss to experiences									0.01	(0.02)				
x Risk appetite											-0.02	(0.02)		
x Internal locus of control													0.00	(0.02)
Contact with Germans	0.25**	(0.02)	0.25**	(0.02)	0.25**	(0.02)	0.25**	(0.02)	0.25**	(0.02)	0.25**	(0.02)	0.25**	(0.02)
x Extroversion	0.02	(0.02)												
x Neuroticism			-0.01	(0.02)										
x Agreeableness					-0.01	(0.02)								
x Conscientiousness							0.00	(0.02)						
x Opennesss to experiences									0.01	(0.02)				
x Risk appetite											-0.02	(0.02)		
x Internal locus of control													0.00	(0.02)
Shared accommodation	-0.10**	(0.02)	-0.10**	(0.02)	-0.09**	(0.02)	-0.10**	(0.02)	-0.10**	(0.02)	-0.09**	(0.02)	-0.10**	(0.02)
x Extroversion	-0.02	(0.02)												
x Neuroticism			-0.00	(0.02)										
x Agreeableness					0.01	(0.02)								
x Conscientiousness							-0.02	(0.02)						
x Openness to experiences									-0.01	(0.02)				
x Risk appetite											-0.03	(0.02)		
x Internal locus of control													-0.06*	(0.03)
Single	0.08**	(0.03)	0.09**	(0.03)	0.09**	(0.03)	0.10**	(0.03)	0.08**	(0.03)	0.09**	(0.03)	0.09**	(0.03)
x Extroversion	-0.04+	(0.03)												
x Neuroticism			-0.01	(0.03)										
x Agreeableness					0.02	(0.02)								

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
x Conscientiousness							0.00	(0.02)						
x Openness to experiences									-0.01	(0.03)				
x Risk appetite											-0.01	(0.03)		
x Internal locus of control													0.03	(0.03)
Controls														
Female	-0.18**	(0.03)	-0.18**	(0.03)	-0.18**	(0.03)	-0.17**	(0.03)	-0.18**	(0.03)	-0.17**	(0.03)	-0.17**	(0.03)
x Extroversion	0.05+	(0.03)												
x Neuroticism			0.07*	(0.03)										
x Agreeableness					0.04	(0.03)								
x Conscientiousness							0.04	(0.03)						
x Openness to experiences									0.04	(0.03)				
x Risk appetite											0.00	(0.03)		
x Internal locus of control													-0.04	(0.03)
Children below 16	-0.06*	(0.03)	-0.06*	(0.03)	-0.06*	(0.03)	-0.06*	(0.03)	-0.06*	(0.03)	-0.06*	(0.03)	-0.06*	(0.03)
x Extroversion	-0.01	(0.03)												
x Neuroticism			0.01	(0.03)										
x Agreeableness					-0.02	(0.03)								
x Conscientiousness							-0.06*	(0.03)						
x Openness to experiences									-0.01	(0.03)				
x Risk appetite											0.02	(0.03)		
x Internal locus of control													0.00	(0.03)
_cons	0.91**	(0.11)	0.91**	(0.11)	0.88**	(0.11)	0.88**	(0.11)	0.89**	(0.11)	0.88**	(0.11)	0.87**	(0.11)
var(duration)	0.00	(.)	0.00**	(0.00)	0.00	(.)	0.00+	(0.00)	0.00	(.)	0.00	(.)	0.00	(.)
var(_cons)	0.18	(.)	0.18**	(0.02)	0.18	(.)	0.18**	(0.02)	0.19	(.)	0.18	(.)	0.18	(.)

	Model 6		Model 7		Model 8		Model 9		Model 10		Model 11		Modell 12	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
corr(duration,_cons)	1.00	(.)	1.00	(.)	1.00	(.)	1.00	(.)	0.97	(.)	1.00	(.)	1.00	(.)
var(Residual)	0.30	(.)	0.30**	(0.01)	0.30	(.)	0.30**	(0.01)	0.30	(.)	0.30	(.)	0.30	(.)
N observations	7923		7923		7923		7923		7923		7923		7923	
N individuals	2432		2432		2432		2432		2432		2432		2432	
N imputations used	25		24		25		24		24		24		24	

Notes: + p<0.1, * p<0.05, ** p<0.01. All models control for gender, children under the age of 16, country of origin, and sample.

Source: IAB-BAMF-SOEP Survey of Refugees (M3, M4) 2016-2019.

Table A4: Multilevel growth curve models of language proficiency: Robustness checks

	Interviewers' assessment		Language proficiency; without entire translation		Highest language certificate	
	Coef.	SE	Coef.	SE	Coef.	SE
Duration of stay	0.06**	(0.00)	0.03**	(0.00)	0.03**	(0.01)
Duration of stay, squared	-0.00**	(0.00)	-0.00**	(0.00)	-0.00**	(0.00)
Socioemotional skills						
Extroversion	0.06**	(0.02)	0.03+	(0.01)	0.06*	(0.02)
Neuroticism	0.00	(0.02)	-0.01	(0.01)	0.01	(0.02)
Agreeableness	0.01	(0.02)	-0.01	(0.01)	-0.05*	(0.02)
Conscientiousness	0.04*	(0.02)	0.03+	(0.02)	-0.01	(0.02)
Openness to experiences	-0.04*	(0.02)	0.04*	(0.01)	0.05*	(0.02)
Risk appetite	0.06**	(0.02)	0.02	(0.01)	0.04+	(0.02)
Locus of control	0.08**	(0.02)	0.05**	(0.02)	0.09**	(0.03)
Model covariates	YES		YES		YES	
_cons	0.62**	(0.16)	1.05**	(0.14)	0.31	(0.24)
var(duration)	0.00**	(0.00)	0.00	(.)	0.00**	(0.00)
var(_cons)	0.40**	(0.07)	0.24	(.)	1.06	(0.19)
corr(duration,_cons)	-0.61**	(0.10)	-0.99	(.)	-0.60**	(0.08)
var(Residual)	0.90**	(0.02)	0.28	(.)	0.51**	(0.02)
N observations	7923		4026		5401	
N individuals	2432		1962		2419	
N imputations	25		25		25	

Notes: + p<0.1, * p<0.05, ** p<0.01. All models control for the same variables as Model 5 in Table 3.

Source: IAB-BAMF-SOEP Survey of Refugees (M3, M4) 2016-2019.

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