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Predictors of Refugee Adjustment: The Importance of Cognitive Skills and Personality

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In light of the recent worldwide migration of refugees, determinants of a more or less successful integration are heavily discussed, but reliable empirical investigations are scarce and have often focused on sociodemographic factors. In the present study, we explore the role of several individual characteristics for refugee adjustment in the areas of (a) institutional, (b) interpersonal and (c) intrapersonal adaptation. In a sample of 4,527 refugees (M = 33.6 years, 38% women), we investigated the effect of sociodemographic characteristics (age, gender, months in Germany, religious affiliation), cognitive factors (cognitive ability, educational history, language skills, integration-course participation), and personality (locus of control, risk appetite, willingness to reciprocity) on adjustment parameters. Both, cognitive skills (especially language skills) and personality, showed incremental validity beyond sociodemographic factors for refugee adjustment comparable across contextual factors. Even with respect to contextual factors such as residency status and living situation, results remained largely stable. The study provides first hints on the importance of personality, thereby providing important implications for understanding integration processes and optimizing interventions on personal, social, and societal levels.

In the last few years, the world has been facing an unprecedented refugee movement with over 65 million people worldwide being forced to leave their homes (The UN High Commissioner for Refugees, UNHCR, 2017). Consequently, many European countries have experienced a massive influx of refugees, posing major challenges to policy and society. Besides immediate help and a rapid decision about refugees' legal status, a successful sustainable integration of refugees who hope to gain permanent residence in the host country involves actions for their adjustment on institutional, interpersonal, and intrapersonal levels. To become successfully integrated, refugees should be able to become economically self-sufficient, socially embedded, psychologically healthy, and satisfied.

In contrast to other types of immigrants (who have voluntarily left their countries in search of e.g. better economic opportunities), forced migrants or refugees (who have fled their countries due to fear of political, religious, or ethnic persecution) are a special group of concern, facing specific and typically greater difficulties

adapting to the host country. Refugees migration is more the result of a previous unbearable living situation and, thus, likely unplanned, disorganized or forced. Therefore, refugees often struggle the most with poor knowledge in the host country's language (Bloch, 2004) caused by a lack of preparedness and fewer social connections to locals (although they are potentially well educated compared to other immigrant groups; Liebau & Salikutluk, 2016). For refugees, entry into the labor market takes longer, and they tend to have lower employment rates and incomes than other immigrants (Fix & Passel, 1994; Salikutluk et al., 2016). Refugees face a heightened risk for loneliness (Dolberg, Shiovitz-Ezra, & Ayalon, 2016) because they have had to leave behind former relationships, a practice that is associated with poor health and increased mortality (Luo, Hawkley, Waite, & Cacioppo, 2012). Moreover, refugees are at higher risk for a variety of psychiatric disorders such as post-traumatic stress disorder, chronic pain, and depression, mostly related to their exposure to violence, forced migration, and uncertainty in the host country (Fazel et al., 2005; Hollifield et al., 2002). Given these challenges, predictors of refugees' successful integration into the host country's mainstream society have become the subject of an intensive and ongoing debate. In the present research, we move beyond general insights into migration and the examination of sociodemographic factors by adding both cognitive factors and personality traits to the investigation of refugee adjustment. In a primarily exploratory approach, we examined a selection

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of potentially relevant personality factors within a large, unique and diverse sample of refugees.

Previous Research on Refugee Adjustment

Despite the rich tradition on the study of immigration and integration processes more generally (e.g., Alba & Foner, 2014; Berry, 1997), only a few studies have specifically investigated refugee adjustment with the available data being mostly restricted to small, nonrepresentative samples (except studies on physical and mental health, see e.g., Porter & Haslam, 2005). In fact, the overwhelming focus in research on refugees has been on mental health (Fazel et al., 2005) rather than social or economic integration. Moreover, most studies have followed a "group"-centered perspective by identifying contextual and economic factors common to most individuals under study.

In line with Kuhlmans *comprehensive model of refugee integration* (Kuhlman, 1991), previous empirical research has mainly analyzed the effects of sociodemographic factors and previous education. Studies of migrants more generally have, for example, shown that length of time in the host country predicted employment (Correa-Velez et al., 2013) and interpersonal adaptation in terms of contacts with natives (Martinovic et al., 2009). Also, formal education predicted occupational status and labor market integration (Jackson et al., 2005). Accordingly, studies investigating refugee populations have also found that education, language acquisition, gender, citizenship, ethnicity, previous work experiences, and participation in training courses are powerful predictors of employment status and household income (Potocky-Tripodi, 2003; Renner & Senft, 2013). In addition, sex differences have been identified, indicating that women were less likely to be employed than men (Potocky-Tripodi, 2001). With respect to intrapersonal adjustment, Berry and Hou (2016) found that years since immigration, age at arrival, perceived discrimination, and unemployment were negatively associated with life satisfaction. However, the role of other personal characteristics is largely unclear.

A Personality Approach to Refugee Adjustment

The power of cognitive skills and personality in predicting consequential outcomes in native populations is well-established in the personality literature (Roberts et al., 2007). By incorporating these individual differences, we aimed to develop a more complete and fine-grained explanation for the varying degrees of refugee adjustment. Research on integration indeed hints at the potential importance of personality by emphasizing the role of personal agency, abilities, and adaptability to find niches (e.g., in the labor market) or to establish a helpful social network (Smither & Rodriguez-Giegling, 1982; Tabor et al., 2015). The *Resource-Based Model of Migrant Adaptation* (Ryan et al., 2008), an extension of the 'acculturative stress' model by Berry (1997), for example, explicitly mentions personal resources including personality traits as a 'toolkit' that is provided by one's culture and previous experience to manage the new situation and demands. Moreover, the *Conservation of Resources Theory* (Hobfoll, 2001) outlines

that individuals seek to satisfy their basic psychological needs, which for refugees includes a sense of living in a safe and stable environment, a sense of belonging to a community and the feeling of being esteemed. To fulfill these needs, an elevated internal locus of control as well as an active striving such as a willingness to take risks rather than only reacting to the environment seems to be important for refugee integration processes in general but also consequential with respect to individual differences within the refugee population.

In personality research, the *theory of personality coherence* (Caspi & Moffitt, 1993) suggests external life changes and transition periods to be major catalysts for personality differences to be magnified. When environmental events, particularly those characterized by novelty, ambiguity and uncertainty – such as the forced resettlement – disrupt previously existing life conditions, the theory assumes an accentuation of personality differences with a powerful organizing effect on behavior during those periods of change. Broken down, differences in risk taking, for instance, are hardly visible under normal conditions but might be elevated in periods of change leading the one to actively seek for job opportunities while the other remains passive. Swidler (1986) already stated the move to a new cultural community as "culture shock" requiring people to reorganize their activities and to regain control over the changing situation and their lives. Because of the novelty and uncertainty along the process of adaption refugees are faced with, there is a press to behave fast and efficient which leads to an activation of deep and familiar personality characteristics (Caspi & Moffitt, 1993).

We, therefore, expected both cognitive skills and personality traits to be meaningful in the explanation of institutional adjustment, particularly labor market participation. With respect to cognitive skills, human intelligence is a powerful predictor of occupational success (Roberts et al., 2007) and is thought to particularly manifest itself in novel situations requiring change or adaptation. Integration into a new social and economic system can be seen as such a situation requiring the optimal use of existing cognitive skills.

In navigating through a new system, refugees also need to actively seek opportunities, to present their own abilities, and to compete in the job market. Such a process should be facilitated by proactive and resilient personality aspects. Here, Thum (2014) has already shown that internal locus of control (i.e., a strong belief that one has control over one's life) is related to immigrant employment status. Another potential personality factor constitutes risk-taking tendencies as they have been shown to be important for entry into professional life (Pfeifer, 2008) and educational decisions (Obermeier & Schneider, 2015), also representing the situation refugees face in their host country.

Apart from institutional adjustment, personality should also be important for adjustment in inter- and intrapersonal domains. Social dynamics (e.g., a more or less smooth selection and maintenance of social interactions and relationships) are intimately connected to personality differences, and they feed back into a more or less positive

self and satisfied identity (Back et al., 2011). Consequently, personality aspects, particularly individual differences in communion (warmth, prosociability, tendency to get along with others) and agency (assertiveness, tendency to get ahead) have been shown to be associated to social outcomes such as friendship quality and quantity (Back & Vazire, 2015) as well as intrapsychic adjustment, including self-esteem, subjective health, and well-being (Roberts et al., 2007). Whereas the role of personality differences for inter- and intrapersonal adjustment of refugees has not yet been investigated, there is indirect evidence for such influences from the field of migration research. Communal personality factors such as likeability exert an effect on acculturation over sociodemographic factors (Smither & Rodriguez-Giegling, 1982). Also, integration was associated with agentic and proactive characteristics such as sociability, activity level, and sensation seeking (Schmitz & Berry, 2009).

The present study used a large, representative sample of refugees to provide initial empirical evidence on individual influences on refugee adjustment. We investigated three main adjustment domains: (a)

institutional adaptation represented by employment status, (b) interpersonal adaptation in the sense of cross-cultural social networks, and (c) intrapersonal adaptation operationalized through a person's current subjective health status, life satisfaction, and self-esteem. To explain individual differences in adjustment, we defined three sets of influencing variables, sociodemographic characteristics, cognitive factors, and personality characteristics (see **Figure 1**). Regarding personality, we focused on proactive, agentic characteristics, including willingness to take risks, sense of control, and communal characteristics, including an individual's tendency to reciprocate social behavior. At this point, the presented selection of potential personality factors should not be understood as definite analysis of all potentially relevant personality factors but as a first exploratory approach towards incorporating personality differences into the study of refugee adjustment. To provide an even more nuanced view on the effects of individual differences and given the importance of environmental conditions for integration processes (Schachner et al., 2017), we also explored the role of certain contextual factors (residency
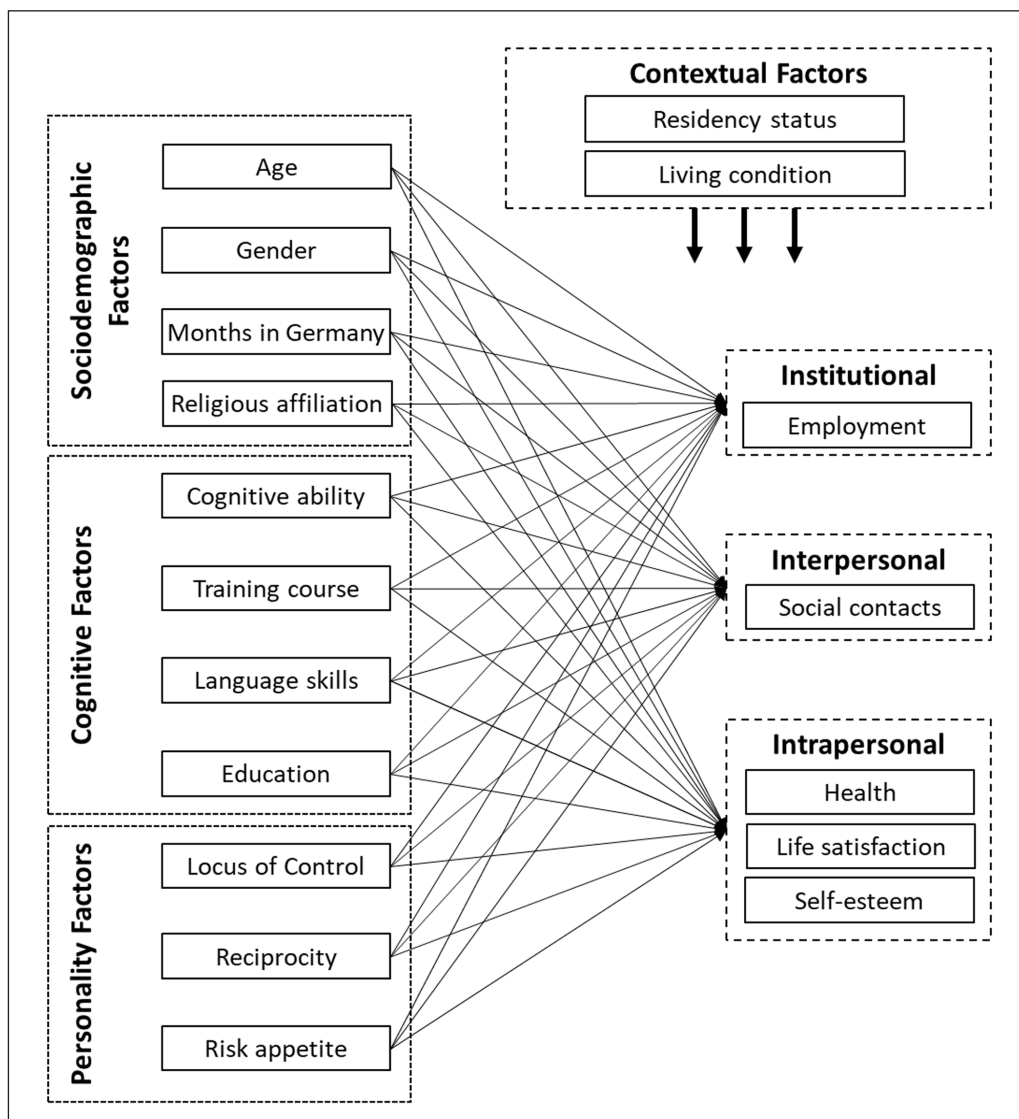
Figure 1: Illustration of the prediction model for refugee adjustment.

status and living conditions). This also allowed us to test whether the effects of individual differences are stronger in less restricted as opposed to highly structured settings (Caspi & Moffitt, 1993).

Method
Participants

The present study was based on a representative survey of recently arrived refugees to Germany carried out collectively by the Institute for Employment Research (IAB), the Research Centre of the Federal Office for Migration and Refugees (BAMF-FZ), and the German Socio-Economic Panel (SOEP). The so-called IAB-BAMF-SOEP Refugee Survey is conceptualized as a longitudinal study that provides an outstanding database for analyzing the processes by which refugees become integrated into German society (for more information on the study survey itself see Jacobsen, Klikar & Schupp, 2017). The first available wave of the so-called IAB-BAMF-SOEP Refugee Survey (conducted in 2016) comprises a sample of 4,527 individuals aged 18 and older (M = 33.6 years, 38% women). The target population was randomly drawn from the German Central Register of Foreigners and consisted of individuals who entered Germany between January 1, 2013, and January 31, 2016, and officially submitted an application for asylum, irrespective of the outcome and their current legal status. The majority of individuals in our target population arrived in 2015 and were still in the application process at the time of fieldwork. The overall response rate was 48.7% which can be seen as excellent compared to other sub-samples of that kind in Germany. The survey was conducted in person by trained interviewers with the assistance of computers. The questionnaire was available in seven languages (English, Arabic, Farsi, Pashto, Urdu, Kurmanji; 65% were presented in German/Arabic) to ensure a correct understanding and the interviewer could contact a hotline provided by the survey institute to assist for special questions (Kroh et al., 2017). All participants provided informed consent; ethical permission was granted by the Scientific Advisory Board of DIW Berlin (For more information on sampling and non-responses, see Kroh et al., 2017).

Multiple regression models were computed to explain variation within each indicator of adjustment in three areas of integration (see **Table 1** for descriptive statistics). Given that some of the adjustment indicators were more important or desirable for certain ages, we excluded all participants older than 60 years (N = 60). We further excluded individuals who had immigrated to Germany before 2013 (N = 128) or had missing information on the basic household questionnaire (N = 21). The final sample comprised 4,318 individuals. The majority of refugees (50% total, 37% women) were Syrian nationals, whereas the second (13% total, 37% women) and third (12%, 38% women) largest groups were from Iraq and Afghanistan, respectively. At the time of the interview, 54% of the total sample (37% women) indicated their status as having a residence permit, which usually includes unrestricted access to the labor market.

Measures

All instruments were established SOEP instruments that were available in the questionnaire we used (for details, see TNS Infratest Sozialforschung; 2016). All data is provided for scientific purposes to the international research community via the SOEP Research Data Center at the German Institute for Economic Research, Berlin, Germany.[1] Code for all analyses performed in this manuscript can be accessed at osf.io/8xpb7.

Integration outcomes. Employment status was coded within a binary variable where 1 indicated any kind of employment (e.g., full-time or marginal employment) and 0 indicated no employment. Concerning social contacts, respondents stated the number of Germans they had gotten to know and had frequently been in touch with since their arrival. As an extremely high number of new contacts did not seem realistic, we set outliers exceeding 20 contacts (3.98% of the sample) to 20.[2] For the assessment of life satisfaction, participants indicated how satisfied they felt with their current lives overall on an 11-point scale (from *completely dissatisfied* to *completely satisfied*). Subjective health was measured with the item "How would you describe your current health?" on a 5-point scale (from *bad* to *very good*). Finally, self-esteem ("I take a positive attitude toward myself.") was assessed on a 7-point scale (from *not at all* to *totally agree*).

Sociodemographic factors. We included age centered and quadratic age to observe nonlinear effects. The number of months in Germany was calculated as the difference between the time of the interview and the month of arrival. Religious affiliation was represented by two binary dummy variables indicating participants' affiliation with Islam and other religions, respectively in reference to affiliation to Christianity.

Cognitive factors. Cognitive factors included a measure of cognitive ability, integration program participation, self-rated language skills, and educational attainment. For cognitive ability, participants were administered the Symbol Digit Test, which is a validated speed-constrained ultra-short test of cognitive ability constructed for the SOEP (Lang et al., 2007). The raw score for the number of correct items was used largely representing processing speed. Participation in a training course ("integration course") was assessed with a single binary coded item. Furthermore, respondents rated their German language skills (speaking only) on a 5-point scale (from *very good* to *not at all*; reverse coded for analyses). Finally, dummy variables were generated to identify level of education. Thus, there were four educational variables (for middle school degree, high school degree, vocational education, and university degree), each coded 1 (*yes*) or 0 (*no*).

Personality characteristics. We measured locus of control as a unidimensional factor by asking participants agreement on seven items (e.g., "*How my life goes depends on me*") on a 7-point scale (from *applies completely* to *does not apply*), reverse coded. For the total score, higher values of locus of control indicate higher levels of internal control. Willingness to reciprocity was assessed on 7-point scales, with three items each assessing the willingness to engage in positive (willingness to return favors) and

Table 1: Descriptive Statistics.

	Total *N* = 4,318	Men *N* = 2,689 (62%)	Women *N* = 1,629 (38%)
Integration outcomes			
Employment (% yes)	10.4%	14.1%	4.2%
New social contacts *M* (*SD*)	4.74 (5.73)	5.21 (5.97)	3.97 (5.21)
Subjective health *M* (*SD*)	3.92 (1.13)	4.05 (1.09)	3.71 (1.15)
Life satisfaction *M* (*SD*)	7.26 (2.32)	7.13 (2.43)	7.48 (2.12)
Self-esteem *M* (*SD*)	6.28 (1.13)	6.31 (1.11)	6.24 (1.16)
Sociodemographic factors			
Age *M* (*SD*)	33.13 (9.76)	32.83 (10.0)	33.63 (9.26)
Months in Germany *M* (*SD*)	18.99 (9.22)	18.61 (8.81)	19.61 (9.84)
Religious affiliation: Islam (% yes)	69.8%	71.1%	67.7%
Religious affiliation: Christianity (% yes)	14.6%	13.5%	16.3%
Cognitive factors			
Cognitive ability *M* (*SD*)	24.73 (8.58)	25.53 (8.70)	23.39 (8.19)
Training course (% yes)	34.6%	39.2%	27.1%
Language skills *M* (*SD*)	2.57 (0.92)	2.69 (0.92)	2.36 (0.89)
School degree: Medium (% yes)	23.6%	24.5%	22.1%
School degree: High (% yes)	30.7%	31.7%	29.0%
Vocational education (% yes)	6.1%	7.5%	3.9%
University (% yes)	13.2%	13.4%	12.9%
Personality characteristics			
Locus of Control *M* (*SD*)	4.23 (1.08)	4.30 (1.08)	4.11 (1.07)
Reciprocity: positive *M* (*SD*)	6.68 (0.65)	6.67 (0.65)	6.68 (0.64)
Reciprocity: negative *M* (*SD*)	1.79 (1.28)	1.84 (1.30)	1.71 (1.23)
Risk appetite *M* (*SD*)	4.51 (3.29)	4.80 (3.30)	4.04 (3.23)
Contextual Factors			
Residency Status (% residence permit)	54.4%	55.5%	52.6%
Residency Status (% residence permit)	54.4%	55.5%	52.6%
Living situation (% private)	66.2%	62.3%	72.7%

Note: *M* = mean, *SD* = standard deviation.

negative (willingness to harm those who previously harmed you) reciprocity. Finally, 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*). Cronbach's α values for the scales were acceptable to good (between .55 and .75). More information on scale development, (retest) reliability, and mean scores for SOEP participants are provided in SOEP Scales Manuals (Richter et al., 2017; Jacobsen et al., 2017).

Contextual factors. Current status of residency was represented by a binary variable coded 1 for permission to reside (e.g., entitled to asylum or settlement permit) and 0 for all other types of residency status. Living situation was captured within a variable differentiating shared (communal) accommodation (0) from private homes (1).

Strategy for Analysis

Prior to testing our regression models, we inspected each influencing factor and all adjustment parameters for gender differences. We used stepwise multiple regression analyses to develop models for explaining variation in each of the adjustment indicators of our defined areas of institutional, interpersonal, and intrapersonal adjustment. We first included sociodemographic factors in the model, followed by the group of cognitive factors in the second step, and finally by the personality characteristics.

The best model was chosen based on the explanatory power of the independent variables over and above the group of influencing factors in the previous step as well as whether an additional group offered, at least, one additional significant effect. For our dichotomous outcome (i.e., employment), we computed logistic

regression models, which provided odds ratios that could be interpreted as the probability of employment for a one-unit change in the predictor. For the remaining adjustment parameters, we computed multiple linear regressions. With respect to interpersonal adjustment, subjective health, life satisfaction, and self-esteem were z-standardized to determine the change in standard deviations resulting from a one-unit change in the predictor. For a better interpretation, the number of new German contacts was included as a continuous variable without any standardization. For all regression models, continuous variables (i.e., months in Germany, self-rated language skills, locus of control, reciprocity, risk appetite) were centered, whereas cognitive ability was z-standardized. Missing values were generally sparse (between .05% for months in Germany and 8.64% for self-esteem and a somewhat higher probability of 26.15% for the cognitive ability score) and have been replaced using STATA's "impute" command, a regression-based method to estimate missing values based on all other variables in the data set.[3] To further inspect gender effects, we computed moderated multiple regression models that included gender as a moderator with interaction terms for each predictor. Moreover, we performed moderated multiple regression models with our two contextual factors (i.e., residency status and living situation).

Because of the large sample size, statistical power in the final multiple regression analyses was excellent for detecting even small effects (e.g., the statistical power was > .99 for $r = .10$ and .91 for $r = .05$).

Results

As shown in **Table 1**, about 10% of the sample indicated being officially employed (6% full time, 2% part time, and 2% marginally employed), while men were more likely to have a job than women (Cohen's $d = 0.33$, $p < .001$). On average, men had made five new German contacts compared with fewer than four contacts for women (Cohen's $d = 0.22$, $p < .001$). The average levels of subjective health, life satisfaction, and self-esteem were at the upper ends of the respective scales with higher levels of subjective health for men (Cohen's $d = 0.31$, $p < .001$) in contrast to higher levels of life satisfaction for women (Cohen's $d = 0.15$, $p < .001$). With respect to the set of predictors, participants were 33 years old on average with an average duration of 19 months in Germany. All influencing factors showed reasonable variation across scales, while differences between men and women stood out for participation in training courses (Cohen's $d = 0.26$, $p < .001$), self-rated language skills (Cohen's $d = 0.37$, $p < .001$), locus of control (Cohen's $d = 0.17$, $p < .001$), negative reciprocity (Cohen's $d = 0.10$, $p < .001$), and risk appetite (Cohen's $d = 0.22$, $p < .001$) with higher values for men than women. Taken together, all observed gender differences were in the range of small effects. A table including all zero-order correlations between predictors and outcome variables is presented in the supplemental material (Table S1). Inspecting the correlational pattern, all effects were in the expected direction as well as reasonably strong.

The results from the final multiple regression analyses are illustrated in **Figures 2, 3** and **4** (see **Table 2** for unstandardized estimates, standardized results are presented in the Supplemental Material, Table S2). For each stepwise multiple regression model, including the second and last group of influencing factors (i.e., cognitive skills and personality factors) led to an increase in explained variance (see **Table 2**) hence showed additional factors with predictive power. Therefore, results for the full regression models including all sets of predictors are presented.

Institutional adjustment (odds ratios shown in Figure 2). The regression model for employment with all predictors produced a pseudo R^2 of .15. For the sociodemographic factors, months in Germany was
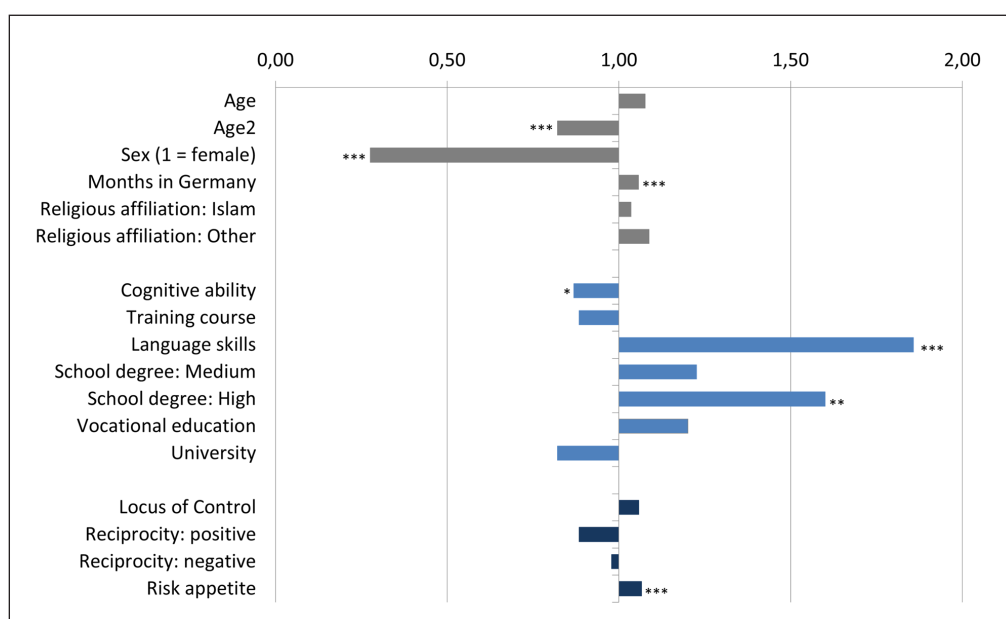
Figure 2: Odds ratios for employment in the area of institutional adjustment. A single asterisk indicates a significance level of $p < .05$, two asterisks indicate $p < .01$, and three asterisks indicate $p < .001$.
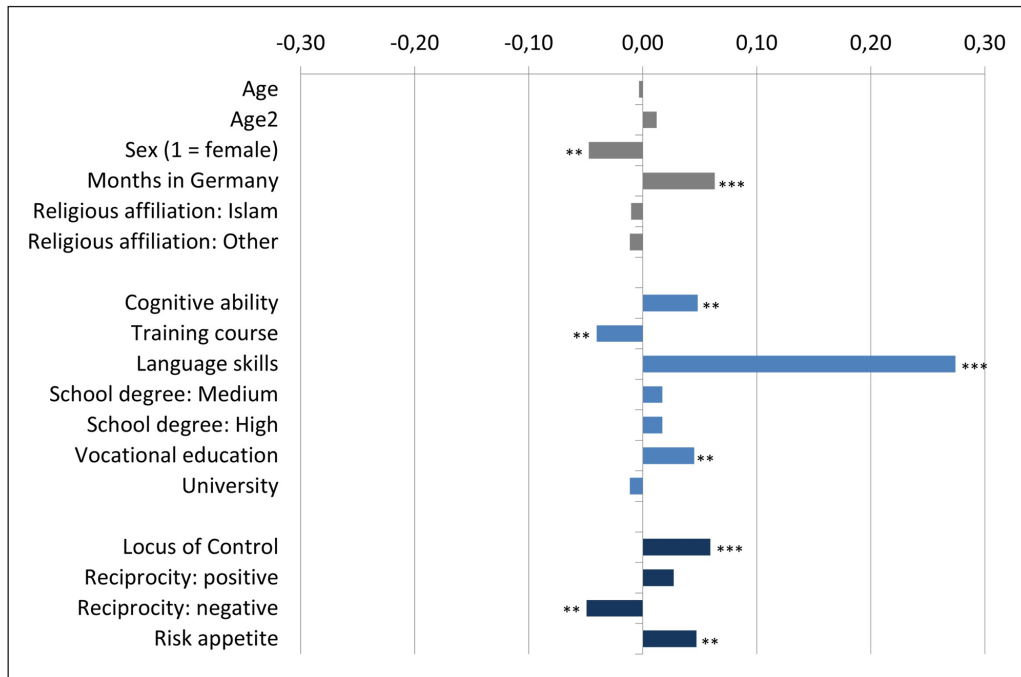
Figure 3: Standardized beta coefficients for new German contacts in the area of interpersonal adjustment. A single asterisk indicates a significance level of *p* < .05, two asterisk indicates *p* < .01, and three asterisks indicate *p* < .001.
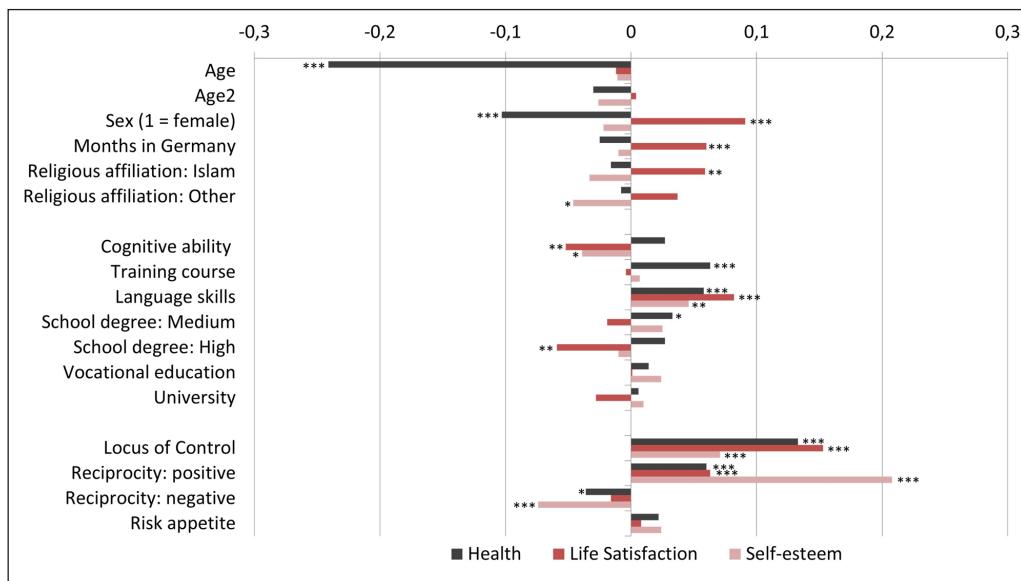
Figure 4: Standardized beta coefficients for health (black), life satisfaction (dark red), and self-esteem (light red) in the area of intrapersonal adjustment. A single asterisk indicates a significance level of *p* < .05, two asterisks indicate *p* < .01, and three asterisks indicate *p* < .001.

positively associated with employment status, indicating an increased opportunity for employment with the duration of time spent in the host country. For age[2] and gender, beta coefficients were negative, suggesting that women were less likely to be employed and that the positive age effect was more pronounced at younger ages. For cognitive factors, lower cognitive ability, greater self-rated language skills and having a higher school degree were positively associated with the likelihood of employment.[4] For the personality factors, risk appetite showed a positive effect, suggesting that a greater willingness to take risks was positively related to employment.

Interpersonal adjustment (standardized betas shown in Figure 3). In the group of sociodemographic factors, months in Germany was a positive predictor of the number of new German contacts, whereas gender had a negative coefficient, indicating less interpersonal adjustment for women. Greater self-rated language skills were positively associated with the number of friends. Participation in training courses was negatively associated holding the effect of all other predictors constant.[5] Vocational education as well as cognitive ability were positively related to the number of new social contacts. Finally, within the personality factors,

Table 2: Unstandardized regression estimates of the final multiple regression analyses.

	Employment	New contacts	Health	Life satisfaction	Self-esteem
Age	0.075	−0.003	−0.247***	−0.012	−0.011
	(−0.061, 0.211)	(−0.037, 0.032)	(−0.281, −0.212)	(−0.048, 0.024)	(−0.047, 0.025)
Age^2	−0.197***	0.010	−0.025	0.003	−0.022
	(−0.306, −0.088)	(−0.016, 0.036)	(−0.051, 0.000)	(−0.024, 0.030)	(−0.049, 0.005)
Sex	−1.287***	−0.097**	−0.212***	0.188***	−0.045
	(−1.567, −1.006)	(−0.157, −0.037)	(−0.272, −0.153)	(0.125, 0.250)	(−0.107, 0.017)
Months in Germany	0.056***	0.007***	−0.003	0.007***	−0.001
	(0.045, 0.067)	(0.004, 0.010)	(−0.006, 0.000)	(0.003, 0.010)	(−0.004, 0.002)
Religious: Islam	0.034	−0.022	−0.034	0.129**	−0.073
	(−0.258, 0.325)	(−0.104, 0.060)	(−0.116, 0.047)	(0.044, 0.215)	(−0.157, 0.012)
Religious: Other	0.085	−0.031	−0.021	0.101	−0.128*
	(−0.284, 0.454)	(−0.135, 0.072)	(−0.123, 0.082)	(−0.006, 0.209)	(−0.234, −0.021)
Cognitive ability	−0.140*	0.048**	0.027	−0.052**	−0.039*
	(−0.262, −0.019)	(0.015, 0.081)	(−0.005, 0.060)	(−0.086, −0.018)	(−0.073, −0.005)
Training course	−0.123	−0.084**	0.133***	−0.009	0.015
	(−0.345, 0.098)	(−0.146, −0.022)	(0.071, 0.194)	(−0.074, 0.055)	(−0.049, 0.079)
Language skills	0.619***	0.296***	0.063***	0.089***	0.050**
	(0.485, 0.754)	(0.260, 0.332)	(0.027, 0.099)	(0.052, 0.127)	(0.013, 0.087)
School degree: middle	0.204	0.041	0.077*	−0.045	0.059
	(−0.074, 0.482)	(−0.032, 0.115)	(0.004, 0.149)	(−0.121, 0.032)	(−0.016, 0.135)
School degree: high	0.471**	0.036	0.060	−0.129**	−0.022
	(0.187, 0.754)	(−0.042, 0.114)	(−0.018, 0.137)	(−0.210, −0.048)	(−0.102, 0.059)
Vocational education	0.183	0.188**	0.057	0.006	0.099
	(−0.198, 0.564)	(0.068, 0.308)	(−0.062, 0.176)	(−0.119, 0.131)	(−0.042, 0.223)
University	−0.197	−0.034	0.018	−0.084	0.030
	(−0.527, 0.134)	(−0.129, 0.061)	(−0.076, 0.112)	(−0.183, 0.016)	(−0.068, 0.128)
Locus of Control	0.056	0.054***	0.123***	0.142***	0.066***
	(−0.046, 0.158)	(0.027, 0.081)	(0.096, 0.150)	(0.113, 0.170)	(0.038, 0.094)
Reciprocity: positive	−0.123	0.042	0.093***	0.097***	0.321***
	(−0.280, 0.034)	(−0.002, 0.086)	(0.049, 0.136)	(0.051, 0.143)	(0.276, 0.367)
Reciprocity: negative	−0.021	−0.038**	−0.028*	−0.012	−0.058***
	(−0.108, 0.066)	(−0.061, −0.015)	(−0.051, −0.005)	(−0.036, 0.012)	(−0.081, −0.034)
Risk appetite	0.064***	0.014**	0.007	0.002	0.007
	(0.030, 0.097)	(0.005, 0.023)	(−0.002, 0.015)	(−0.007, 0.012)	(−0.002, 0.016)
Constant	−2.136***	0.049	0.043	−0.116*	0.086
	(−2.482, −1.790)	(−0.046, 0.143)	(−0.051, 0.137)	(−0.214, −0.017)	(−0.012, 0.184)
$R^2_{\text{Model I}}$	.106	.034	.092	.013	.003
$R^2_{\text{Model II}}$	.146	.116	.116	.022	.008
$R^2_{\text{Model III}}$	.152	.125	.140	.049	.068
Adj. $R^2_{\text{Model III}}$		.121	.136	.045	.064
Observations	4318	4318	4318	4318	4318

Note: For employment, pseudo R2 were presented. The remaining adjustment outcomes were standardized. For all adjustment parameters, unstandardized beta coefficients were presented, confidence intervals in parentheses, Model I includes all sociodemographic characteristics, Model II includes sociodemographic characteristics and cognitive factors, Model III includes sociodemographic characteristics, cognitive and personality factors. * $p < .05$, ** $p < .01$, *** $p < .001$.

locus of control and willingness to take risks were positively associated with social contacts while a negative reciprocity such as the willingness to harm someone who previously harmed you predicted less social contacts. Overall, 13% of the variation in new social contacts could be explained.

Intrapersonal adjustment (standardized betas shown in Figure 4). For health, 14% of the variance could

be explained. With respect to sociodemographic factors, a younger age and being a man were associated with better self-rated health. As was found for interpersonal adjustment, cognitive skills were important in explaining variation in subjective health — especially training course participation, greater self-rated language skills, and middle school degree. Adding personality factors to the regression model showed that locus of control and to a smaller degree, positive reciprocity were positively related to subjective health ratings whereas a negative reciprocity was negatively associated. Exploring the next indicator of intrapersonal adjustment, a total of only 5% of the variance could be explained in overall life satisfaction. Here, being female and living in Germany for longer as well as being affiliated to Islam was associated with higher levels of life satisfaction. For the cognitive factors, greater self-rated language skills were positively related to life satisfaction, whereas higher cognitive ability and a high school degree showed negative coefficients. For personality, perceived internal locus of control was positively related indicating that individuals who had a higher sense of control over their lives had more satisfaction. In addition, positive reciprocity also had a positive effect. For the third indicator of intrapersonal adjustment, self-esteem, the personality factors of locus of control, positive reciprocity, and negative reciprocity were among the strongest predictors. Within sociodemographic factors, only another religious affiliation than Islam showed a small negative effect on self-esteem. In addition, cognitive ability was negatively associated while greater self-rated German language skills predicted self-esteem in a positive way. In total, up to 7% of the variance in self-esteem could be explained, mostly by the personality factors.

Follow-up analyses included gender as a moderator (see Table S3 in the Supplemental Material for detailed results). Overall, interaction effects observed for gender were in the range of small effects. On the level of $p < .01$ (which should be applied here given the number of multiple effects tested), only the models for intrapersonal adjustment revealed interaction effects with respect to life satisfaction for age in the direction of a more negative effect for women. For self-esteem, internal locus of control showed an interaction with stronger effects for women. Moderation effects are shown in **Figure 5**.

The role of contextual factors. (see Table S4 and S5 in the Supplemental Material for detailed results) Overall, the models including residency status (i.e., having a long-term goal to stay in the country) and respectively living condition (i.e. collective vs. private accommodation) as moderators showed only a few moderation effects (see **Figure 5** for moderations with a significance of $p < .01$). In the explanation of differences in the amount of new German contacts, residency status showed interaction effects with the number of months in Germany showing lower effects for individuals with a secure status of residency. Within intrapersonal adjustment, we found an interaction between the willingness to take risks and residency status on life satisfaction in the direction of lower effects in the context of permission to reside.

For self-esteem, an interaction with positive reciprocity reached significance showing higher self-esteem for individuals with positive reciprocity within the context of a secure status of residency. For the remaining adjustment outcomes as well as the contextual factor living condition, there were no further interaction effects reaching a significance of $p < .01$. Overall, effects were in general comparable across contextual factors with only a few specific moderator effects for residency status.

Discussion

The present study was based on a large and diverse, representative sample of refugees. To extend our understanding of refugee integration, we applied an individual-centered approach focusing on the role of cognitive skills and personality traits for adjustment outcomes. The most important implication from this study is that successful refugee adjustment to a new country is not only related to sociodemographic factors but also to a certain degree to individual differences in personality traits and competencies. Consistent with previous research, sociodemographic characteristics were among the most important factors to explain differences in adjustment. Duration of stay was positively related to all outcome domains, whereas age was negatively linked only to health. Female refugees had lower chances of employment (see also Lamba, 2003), lower chances of making new social contacts, and a lower health status, but they were more satisfied than male refugees were. The increased likelihood of employment for men compared to women can be interpreted as a reflection of the broader literature on gendered inequalities in the workplace.

Beyond sociodemographic characteristics, cognitive factors were of importance across all adjustment domains. Especially, self-rated language skills and previous education explained variation in institutional, inter- and intrapersonal adjustment, which is in line with previous research on education (Potocky-Tripodi, 2003) and language capacities (Hayfron, 2001). Following the European Commission (2011), 'it is broadly agreed that the acquisition of language skills is critical for integration' which highlights the knowledge of the host country language as a necessary prerequisite to advancing one's education. Given that education is generally amenable to intervention, a big impact on refugee adjustment can be made through interventions targeting already existing education and potential educational enhancement.

We also found some unexpected results that warrant further investigation, such as the negative effect of a school degree (high or even university degree) on employment and life satisfaction or self-esteem. This could be understood on the basis that refugees were not able to rebuild their previous occupational status especially at the upper end of the occupational system, at least within this short period of time since their arrival in Germany. Also, embracing Islam or Christianity did not predict institutional or interpersonal refugee adjustment. This is surprising given that European citizens favor asylum seekers with a Christian rather than a Muslim orientation (Bansak et al., 2016). Within
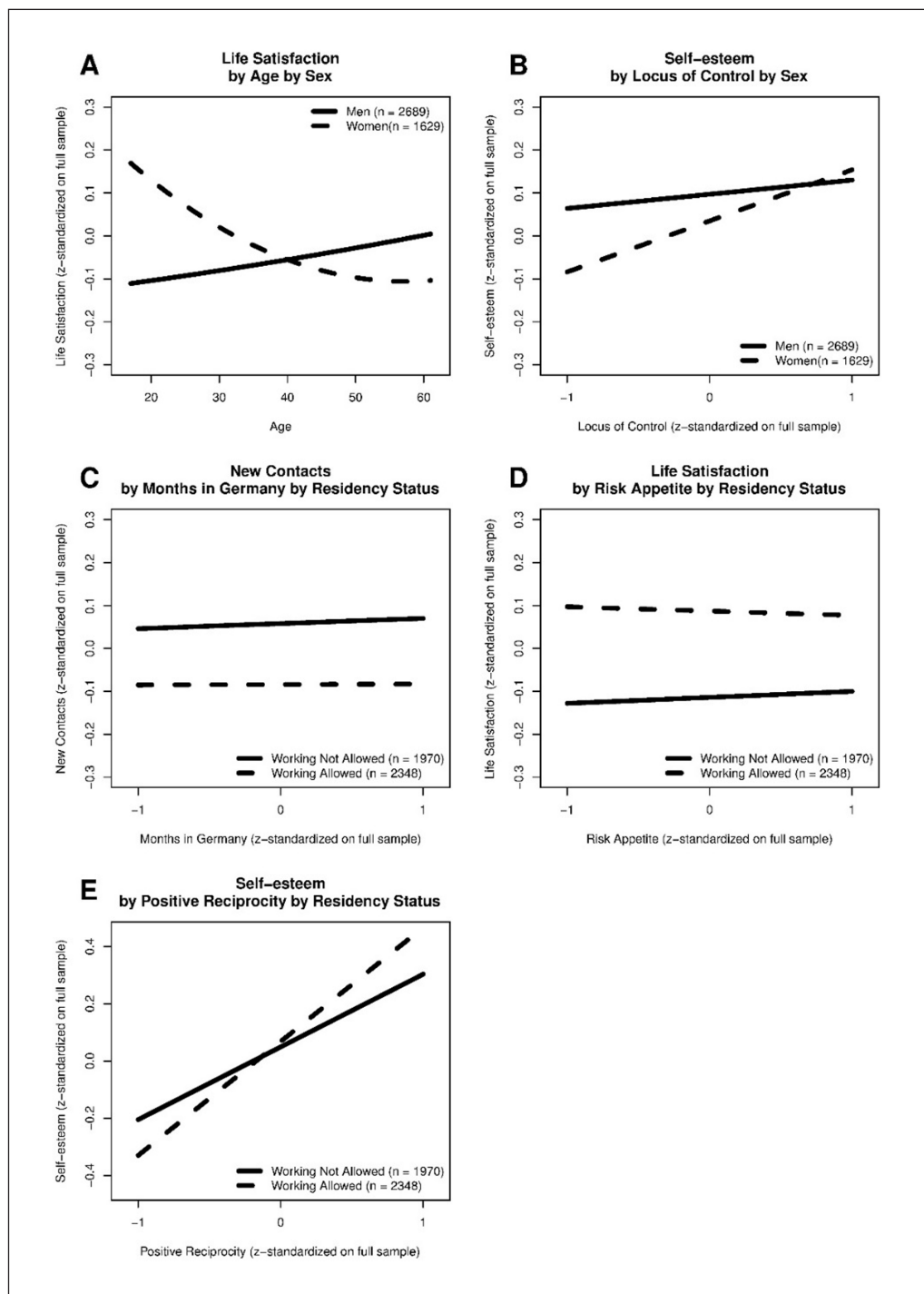
Figure 5: Interaction plots for all significant interaction effects ($p < .01$). For residency status, individuals with a permission to reside were labelled as "working allowed".

intrapersonal adjustment, we found an exception in the direction of a positive relation between Islam and life satisfaction and other religious affiliation be negatively related to self-esteem which fits into research presented by Schweitzer, Greenslade and Kagee (2007) emphasizing religious coping as a successful coping style for many refugees buffering personal stress. Also, a strong belief system can help refugees cope with past traumas (Brune, Haasen, Krausz et al., 2002) while believing in a higher power allows refugees to regain control of their lives and find emotional stability (Schweitzer et al., 2007).

Results indicate that not only does the successful adjustment of refugees to a new country depend on sociodemographic factors, language skills, and a solid education, but it is also shaped by individual differences in personality traits. Refugees with a higher appetite for risks also exhibit a higher likelihood of employment and to find new social contacts, whereas a sense of internal control and the willingness to reciprocate in a positive way was associated with the number of new social contacts, greater self-esteem, life satisfaction, and a better health status. These findings represent first signs that personality differences (Roberts et al., 2007) could be of importance

in the context of refugee adjustment. Personality traits may shape how refugees perceive a given situation (Rauthmann et al., 2015), and how they cope with and recover from a stressor such as fleeing their country of origin (Carver & Connor-Smith, 2010). The latter idea is also in line with research on posttraumatic growth (PTG), as a favorable developmental course after such a forced displacement (Tedeschi et al., 1998). Indeed, facets of PTG such as *relating to others* or *personal strength* have shown strong conceptual commonalities with the personality aspects we measured, namely, positive reciprocity and perceived locus of control. Considering the specific context, which includes more or less uncertainty and unpredictability, our results suggested that the positive effect of risk appetite was more pronounced in the context of an unsecure residency status for inter- and intrapersonal adjustment parameters. However, within this first period of the integration process investigated in the present study, effects of individual differences in personality on integration outcomes were rather small and should be investigated with respect to their potential long-term effect.

Theories on personality development (Eysenck, 1967; McGrae et al., 2000) state that personality traits develop in infancy and are relatively stable over the life course, whereas other specific behavioral patterns and tendencies (e.g. attitudes towards work, subjective well-being) develop in adulthood, which often leads to the assumption that personality traits cause the subsequent development of other behavioral patterns. In the current study, we've also implied such a causal impact of personality differences on the ability of refugees to adjust to a new society, however, at this very early stage, we can only investigate whether personality differences within the group of refugees are related to differences in adjustment indicators and therefore important to understand integration processes. Moreover, the observed personality differences do not have to be representative of the population in the countries of origin, since selection processes can be involved in the sense that certain personality characteristics and values lead some people to leave their homes and others to stay. This phenomenon is often called the 'migrant personality' and has been observed primarily in migrants that voluntarily left their country. For the present sample, analyses revealed mean differences between refugees and comparable groups of native residents with and without migration background in terms of a higher tendency to take risks (small effect), a higher positive reciprocity and lower negative reciprocity (medium effect) as well as lower internal locus of control (medium effect; for details see: Brücker et al., 2016). To increase our current understanding of the role of personality within the group of refugees over the course of integration, further studies are needed.

Moreover, future research that builds on the present large-scale investigation might add other potentially relevant factors. This might include host-related characteristics, such as the population size of refugees' local communities, proportion of foreign-born residents, and strength of the local economy (cf. Potocky-Tripodi, 2003) as well as other personal characteristics that have been shown to predict psychological adjustment, such as sense of coherence (Ying & Akutsu, 1997) and sense of belonging (Berry & Hou, 2016). In doing so, future work might also try to unravel the intertwined nature of the various intrapsychic, interpersonal, and institutional adjustment indicators. Social support, for example, can be seen as an aspect of successful social integration, but it also represents an important resilience factor for health (e.g., Schweitzer et al., 2006). For the validation of such causal relationships and to identify interaction effects among different adjustment areas, further longitudinal investigations are necessary.

Applying an individual differences approach to the study of refugee adjustment underscored the importance of cognitive skills and personality factors: Even if all refugees face the same challenges in the same context, some of them will be able to take full advantage of opportunities, whereas others will have difficulties. Hence, perhaps one of the most important challenges for host societies is to consider this diversity in order to release the full potential of those seeking integration. Refugee resettlement policies and programs are well advised to tailor interventions to refugees' cognitive skills and to promote noncognitive skills such as a greater sense of control over one's life and a positive attitude toward others.

Data Accessibility Statement

All data is provided for scientific purposes to the international research community via the SOEP Research Data Center at the German Institute for Economic Research, Berlin, Germany.[6] Code for all analyses performed in this manuscript can be accessed at osf.io/8xpb7.

Notes

[1] Signing a data distribution contract is a precondition for getting access to the SOEP data. The scientific use file of the SOEP with anonymous microdata is made available free of charge to universities and research institutes for research and teaching purposes. Please contact soepmail@diw.de for more information on using SOEP data.

[2] Analyses without adjusting outliers lead to comparable results in terms of the direction and magnitude of effects.

[3] The results remained almost similar comparing listwise deletion of missing values with imputation.

[4] Given the positive correlation (.05; p < .001) between cognitive ability and employment status, the negative *b*-coefficient can likely be interpreted as suppressor effect. Follow-up analyses revealed that the prediction weight for cognitive ability alone is positive and significant. By adding education, the effect went insignificant and by adding months in Germany it turned negative.

[5] Given the original positive correlation between training course participation and social contact, this effect likely be a suppressor effect and should be interpreted with caution.

Additional Files
The additional files for this article can be found as follows:

- **Table S1.** Correlations among all predictors and adjustment outcomes. DOI: https://doi.org/10.1525/collabra.212.s1
- **Table S2.** Standardized regression estimates of the final multiple regression analyses. DOI: https://doi.org/10.1525/collabra.212.s2
- **Table S3.** Unstandardized regression estimates for the regression models testing sex as moderator. DOI: https://doi.org/10.1525/collabra.212.s3
- **Table S4.** Unstandardized regression estimates for the regression models testing residency status as moderator. DOI: https://doi.org/10.1525/collabra.212.s4
- **Table S5.** Unstandardized regression estimates for the regression models testing living condition as moderator. DOI: https://doi.org/10.1525/collabra.212.s5

Competing Interests
The authors declare that they have no conflicts of interest with respect to their authorship or the publication of this article. Any opinions, findings, and conclusions expressed are those of the authors and do not necessarily reflect the views of the Institutes that carried out the IAB-BAMF-SOEP Refugee Survey.

Author Contributions
All authors contributed to the study concept and design. Statistical analyses were performed by DR and EH. JS is member of the PI-team of the IAB-BAMF-SOEP Refugee Survey. Results were discussed with MB and JS. EH drafted the manuscript, and all remaining authors provided critical revisions. All authors approved the final version of the manuscript.

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