*Research Report*

# Temperament and Migration Patterns in Finland

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**ABSTRACT—***Migration is a central determinant of population dynamics and structure. We examined whether three major temperament traits—sociability, emotionality, and activity—predicted migration propensity, selective urban-rural migration, and migration distance in a 9-year prospective study in Finland. The participants were Finnish women and men (*N = *1,733) ages 15 to 30 years at baseline. The home municipality's position on the urban-rural continuum was assessed on the basis of the municipality's population density. We found that high sociability predicted migration to urban areas and longer migration distances. High activity increased general migration propensity (including migration to both urban and rural areas). High emotionality increased the likelihood of leaving the home municipality and decreased migration distances, but was not associated with selective urban-rural migration. These data suggest that temperament predicts the self-selection of environments on a demographic scale and may be relevant in understanding population dynamics.*

Migration is a basic demographic process influencing the dynamics of populations and neighborhoods (McFalls, 2003). Given its central role in social life, migration is of interest not only to demographers, but also to personality and social psychologists (Fawcett, 1985). Yet little is known about the role of personality and temperament in migration behavior.

Cross-sectional and retrospective studies have associated personality traits such as extraversion and openness to experience with migration propensity (Camperio Ciani, Capiluppi, Veronese, & Sartori, 2007) and with residence in urban areas (Murray et al., 2005). However, such studies are not informative in evaluating whether personality influences migration or whether migration influences personality development. In a recent prospective study, Silventoinen et al. (2008) found that high extraversion and neuroticism increased the probability of international migration. However, we are unaware of longitudinal studies examining whether more refined characterizations of temperament predict migration in general and selective migration to urban or rural areas in particular.

Temperament refers to individual differences in behavioral and emotional tendencies that are partly biological in origin (A.H. Buss & Plomin, 1984). The temperament model of A.H. Buss and Plomin (1984) postulates three temperament traits: emotionality, sociability, and activity. People with high sociability prefer the company of others to solitary life; high emotionality is reflected as a tendency to experience negative emotions, particularly fear and anger; and high activity is expressed as energetic and vigorous behavior in daily routines. Given that temperament may influence the way individuals select social situations (D.M. Buss, 1987; Ickes, Snyder, & Garcia, 1997; Scarr & McCartney, 1983), one might also hypothesize that it plays a role in individuals' migration decisions.

Previous studies have associated extraversion with increased migration propensity (Silventoinen et al., 2008). Sociability may also influence how individuals perceive the attractiveness of different residential locations. Behavioral theories of migration postulate that individuals select residential locations that offer the highest utility to them (Lu, 1999). Urban areas are more densely populated than rural areas and may therefore provide more opportunities for social interactions. For instance, in a previous study with the same sample as in the study reported here, perceived social support was higher in urban than in remote rural residential areas (Jokela, Lehtimäki, & Keltikangas-Järvinen, 2007). Given that sociable people tend to prefer sociable environments, we hypothesized that high sociability increases migration to urban areas specifically.

We considered two competing hypotheses regarding emotionality. On the one hand, emotionality is associated with high proneness to distress and with avoidant behavior (A.H. Buss & Plomin, 1984), which might decrease the likelihood of residential mobility. On the other hand, emotionality (or neuroti-

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cism) has been shown to correlate with measures of dissatisfaction, including relationship, work, and life dissatisfaction (Lehnart & Neyer, 2006; van Aken, Denissen, Branje, Dubas, & Goossens, 2006; Van Den Berg & Feij, 1993). Individuals who are dissatisfied with their current residence are more likely to move than those who are satisfied (Lu, 1999). Assuming that emotionality may be associated with low neighborhood satisfaction, we hypothesized that high emotionality increases the probability of migration.

High activity level is reflected in vigorous physical behavior, but may also be associated with an outgoing behavioral disposition more generally (Eaton, 1994; Graziano, Jensen-Campbell, & Sullivan-Logan, 1998). Individuals with high activity are often described as people who cannot sit still and become restless if they have to stay in one place for a long time (Windle & Lerner, 1986). Hence, we hypothesized that high activity predicts high migration propensity.

We tested these hypotheses regarding migration propensity and selective migration to urban areas in a 9-year prospective study of a Finnish sample. We examined moves between municipalities because such moves have a more important effect on population dynamics on a demographic scale than do moves within municipalities. We also examined whether temperament was related to the distance that individuals migrated.

## METHOD

### Participants

The participants were 1,733 women ($n$ = 1,007) and men ($n$ = 726) from the population-based Cardiovascular Risk in Young Finns study (Åkerblom et al., 1991; Raitakari et al., in press). The original sample consisted of 3,596 healthy Finnish children and adolescents derived from six birth cohorts: ages 3, 6, 9, 12, 15, and 18 years at baseline in 1980. So that the sample would be broadly representative in terms of sociodemographic background, Finland was divided into five areas, each including a city that has a university with a medical school (Helsinki, Kuopio, Oulu, Tampere, and Turku). In each area, urban and rural boys and girls were randomly selected on the basis of their social security numbers. In the present study, data from the fourth (in 1992) and sixth (in 2001) follow-up periods were used (referred to as Year 0 and Year 9); at those times, the participants were 15 to 30 and 24 to 39 years of age, respectively.

A multivariate logistic regression analysis of attrition between Years 0 and 9 indicated that men were more likely to drop out than women, odds ratio ($OR$) = 1.89, $SE$ = 0.24, $p < .001$, and that younger participants were more likely to drop out than older participants, $OR$ = 1.05, $SE$ = 0.02, $p$ = .01. Other Year 0 covariates (i.e., temperament traits and sociodemographic factors) did not predict the probability of participating in the Year 9 follow-up, all $p$s > .14.

### Measures

Temperament was assessed in Year 0 with an instrument constructed by A.H. Buss and Plomin (1984). The 5 items assessing sociability, 10 items assessing activity, and 12 items assessing emotionality were self-rated on a 5-point scale. Sociability correlated with emotionality, $r = -.25$, and activity, $r = .17$, and emotionality correlated with activity, $r = .10$, all $p$s < .001.

In Year 9, the participants reported the number of times they had moved between municipalities after the follow-up in Year 0. This number ranged from 0 to 9 ($M$ = 1.0, $SD$ = 1.3). This indicator was used both as a dichotomous variable (0 = had not moved, 1 = had moved) and as a continuous variable to characterize general migration propensity.

Finland is divided into municipalities much as U.S. states are divided into counties. At the time of the present study, Finland was divided into 452 municipalities, ranging from 6 to 17,333 $km^2$ in size ($Mdn$ = 462) and from 127 to 560,905 in the number of inhabitants ($Mdn$ = 4,874). In Years 0 and 9, the participants were residing in 189 and 191 different municipalities, respectively. We determined urbanicity of residence using population-density data obtained from a database of a governmental agency (Statistics of Finland). Population density of the home municipalities ranged from 0.5 to 2,923.9 inhabitants/$km^2$; these values were log-transformed, ln(density + 0.5), to correct positive skewness, resulting in a scale ranging from 0 to 8.0 (Year 0: $M$ = 4.4, $SD$ = 1.9; Year 9: $M$ = 4.8, $SD$ = 2.0). A measure of selective urban-rural migration was created by categorizing the participants into three groups on the basis of their residential locations in Years 0 and 9: individuals living in the same municipality in both years, individuals living in a more densely populated municipality in Year 9 than in Year 0 (indicating urban migration), and individuals living in a less densely populated municipality in Year 9 than in Year 0 (indicating rural migration).

The distance between home municipalities in Year 0 and Year 9 was determined using the coordinates of the municipalities' centers. Among participants who migrated between municipalities during the follow-up, migration distances ranged from 6 to 891 km ($Mdn$ = 80 km). Distance was log-transformed to correct skewness, and this variable was used to characterize migration distance.

As gender, age, education, marital status, parenthood, and employment status may influence migration decisions (Detang-Dessendre, Piguet, Schmitt, & Rabenoro, 2002), we used these as control variables. Completed level of education was assessed in Year 9 with a 7-point scale (1 = mandatory schooling up to 9 years or less, 7 = university degree; $M$ = 3.5, $SD$ = 1.9). We used Year 9 rather than Year 0 to assess education because the youngest participants had not yet completed their schooling in Year 0. Dichotomous variables were created for Year 0 parenthood status (0 = no children, 1 = one or more children) and marital status (0 = living alone, 1 = married or cohabiting). For employment status, working was the reference category, and

three dummy variables were used for coding (student, unemployed, other). We also included dichotomous variables indicating whether the participant had gotten married or divorced, become a parent, or been unemployed during the follow-up period (reported by the participants in Year 9). These four variables assessed changes in marital, parenthood, and employment status after baseline.

### Statistical Analysis

Migration probability during the 9-year follow-up period was assessed with logistic and Poisson regression models. We also assessed whether the association between temperament and likelihood of leaving the Year 0 residence depended on Year 0 urbanicity by testing the interaction of temperament and Year 0 urbanicity. Selective urban-rural migration was assessed with multinomial regression; we examined the relative risk ratio (RRR) of moving to a municipality more or less urban than the Year 0 municipality versus the likelihood of staying in the same municipality. Among participants who had migrated during the follow-up period, migration distance was assessed with linear regression analysis. To facilitate the evaluation of effect magnitudes, we calculated regression coefficients for standardized temperament scales ($M = 0$, $SD = 1$).

## RESULTS

At the end of the 9-year period, 917 participants (53%) had moved between municipalities. Logistic regression analysis indicated that high activity, $OR = 1.17$, $SE = 0.06$, $p = .003$ (see Table 1, Model 1), and high emotionality, $OR = 1.12$, $SE = 0.06$, $p = .03$, increased migration probability, whereas the main effect of sociability was not significant, $OR = 1.00$, $SE = 0.05$, $p = .94$. However, an interaction effect between Year 0 urbanicity and sociability indicated that high sociability increased the likelihood of leaving rural municipalities and decreased the likelihood of leaving urban municipalities (see Table 1, Model 1, and Fig. 1). Furthermore, a significant Emotionality × Year 0

**TABLE 1**

***Predicting Migration Behavior by Sociodemographic Covariates and Temperament***

| Predictor | Model 1: migration probability (odds ratio) | Model 2: number of moves (incidence-rate ratio) | Model 3: migration distance (*b*) |
|---|---|---|---|
| Baseline covariates | | | |
| Gender | 0.86 (0.10) | 0.86** (0.05) | −0.06 (0.09) |
| Birth year | 1.06*** (0.02) | 1.03*** (0.01) | 0.01 (0.01) |
| Marital status | 1.16*** (0.17) | 1.00 (0.07) | 0.05 (0.12) |
| Parenthood | 0.72$^{\dagger}$ (0.14) | 0.63*** (0.07) | −0.35* (0.17) |
| Employment status | | | |
| Working | 1.00 | 1.00 | — |
| Student | 1.62*** (0.27) | 1.23* (0.10) | 0.07 (0.13) |
| Unemployed | 0.90 (0.18) | 1.06 (0.11) | 0.10 (0.17) |
| Other | 0.81 (0.19) | 1.09 (0.14) | 0.16 (0.21) |
| Urbanicity | 0.89*** (0.02) | 0.93*** (0.01) | −0.16*** (0.02) |
| Follow-up covariates | | | |
| Parenthood | 1.16 (0.16) | 1.10 (0.07) | 0.15 (0.11) |
| Married | 1.84*** (0.24) | 1.24*** (0.07) | −0.04 (0.10) |
| Divorced | 1.20 (0.26) | 1.03 (0.10) | 0.12 (0.17) |
| Unemployment | 1.40** (0.16) | 1.30*** (0.07) | 0.05 (0.09) |
| Education | 1.18*** (0.04) | 1.11*** (0.02) | 0.15*** (0.02) |
| Temperament | | | |
| Sociability | 1.52*** (0.19) | 1.17** (0.06) | 0.15*** (0.05) |
| Urbanicity × Sociability | 0.91*** (0.02) | 0.97* (0.01) | — |
| Emotionality | 1.42** (0.18) | 1.08 (0.06) | −0.08$^{\dagger}$ (0.05) |
| Urbanicity × Emotionality | 0.94* (0.03) | 0.99 (0.01) | — |
| Activity | 1.17** (0.06) | 1.10*** (0.03) | 0.00 (0.04) |

**Note.** Standard errors are given in parentheses. Model 1 used logistic regression, Model 2 used Poisson regression, and Model 3 used linear regression. The baseline covariates included gender (0 = women, 1 = men), marital status (0 = living alone, 1 = married or cohabiting), and parenthood (0 = no children, 1 = children). The follow-up covariates assessed changes in parenthood (0 = no change in parenthood status, 1 = became a parent during the follow-up), whether the participant had gotten married during the follow-up (0 = did not get married, 1 = got married during the follow-up), whether the participant had gotten divorced during the follow-up (0 = did not get divorced, 1 = got divorced during the follow-up), and whether the participant had been unemployed during the follow-up (0 = was not unemployed, 1 = was unemployed at some time during the follow-up).

$^{\dagger}p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

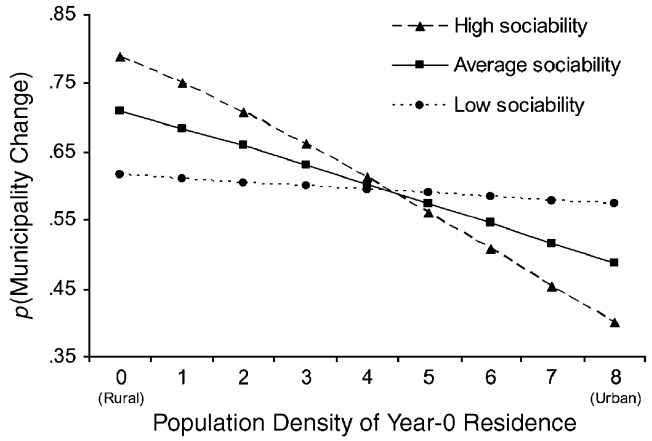


**Fig. 1.** Predicted probability of migration among individuals with low sociability (1 *SD* below the mean), average sociability (mean), and high sociability (1 *SD* above the mean) as a function of population density of the Year 0 residence.

Urbanicity interaction indicated that high emotionality increased the likelihood of migration from rural areas and tended to decrease migration from urban areas (see Table 1, Model 1, and Fig. 2).

The Poisson regression analysis (Table 1, Model 2) assessing the number of moves provided results similar to those of the logistic regression analysis just discussed, with the exception that emotionality was not associated with the number of moves (Model 2), although it was associated with the probability of migration (Model 1).

Next, we assessed whether temperament predicted selective urban-rural migration. In Year 9, 479 participants (28%) were living in a municipality that was more densely populated than their home municipality in Year 0 (urban migration), and 266 participants (15%) were living in a municipality that was less densely populated than their home municipality in Year 0 (rural migration).

Figure 3 illustrates the general pattern of urban-rural migration between Years 0 and 9 as a function of urbanicity of Year 0 residence. The probability of urban migration decreased with increasing Year 0 urbanicity, and the probability of rural migration increased with increasing Year 0 urbanicity. However, irrespective of urbanicity of Year 0 residence, rural migration was less likely than staying in the same municipality, relative risk $< 1.0$.

Table 2 shows the results of multinomial regression models assessing the association between temperament and selective migration to urban areas and to rural areas. An increase of 1 standard deviation in sociability increased the probability of urban migration by 24%, but sociability was not associated with rural migration. Emotionality was not associated with either urban or rural migration. When activity was entered as the only temperament trait in the multinomial model, high activity predicted increased urban migration, $RRR = 1.15$, $SE = 0.07$, $p = .02$, and increased rural migration, $RRR = 1.19$, $SE = 0.10$, $p = .02$. However, including sociability and emotionality in the model attenuated the association between activity and urban migration, $RRR = 1.10$, $SE = 0.07$, $p = .15$ (see Table 2).

Finally, we examined whether temperament predicted migration distance among participants who had moved away from their Year 0 home municipality. When temperament traits were assessed in separate models, high sociability predicted longer migration distance, $b = 0.18$, $SE = 0.04$, $p < .001$, and high emotionality predicted shorter migration distance, $b = -0.12$, $SE = 0.04$, $p = .006$. When temperament traits were assessed in a single model, sociability remained a significant predictor, whereas emotionality was only a marginal predictor, $p = .08$ (see Table 1, Model 3). In this model, an increase of 1 standard deviation in sociability increased average migration distance by 12.5 km, and an increase of 1 standard deviation in emotionality decreased average migration distance by 5.9 km. Activity was not associated with migration distance, and there were no interactions between Year 0 urbanicity and temperament, all $p$s $> .60$.

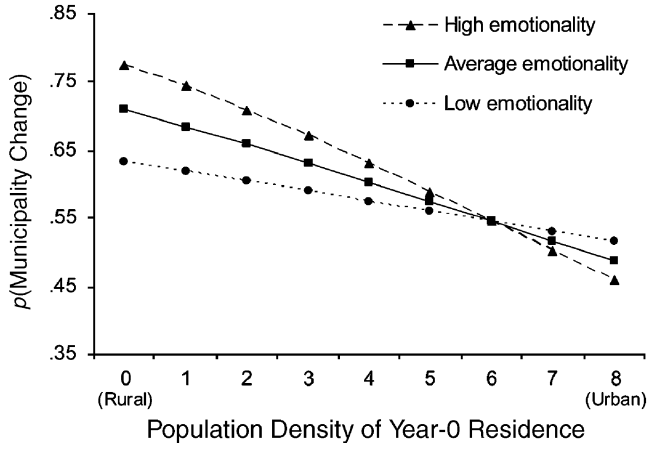


**Fig. 2.** Predicted probability of migration among individuals with low emotionality (1 *SD* below the mean), average emotionality (mean), and high emotionality (1 *SD* above the mean) as a function of population density of the Year 0 residence.

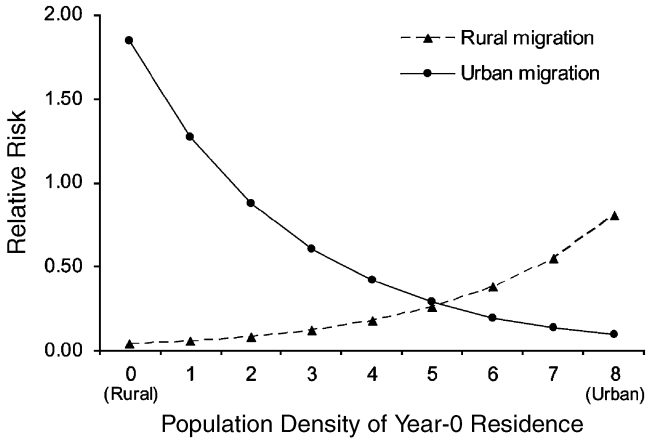


**Fig. 3.** Relative risk of rural migration and of urban migration (i.e., probability of migration relative to probability of staying in the Year 0 municipality) as a function of population density of the Year 0 residence.

**TABLE 2**

***Predicting the Probability of Urban and Rural Migration Relative to the Probability of Staying in the Same Municipality Over Time***

| Predictor | Urban migration | Rural migration |
|---|---|---|
| Baseline covariates | | |
| Gender | 1.03 (0.14) | 0.80 (0.13) |
| Birth year | 1.05* (0.02) | 1.03 (0.02) |
| Marital status | 1.08 (0.20) | 1.17 (0.23) |
| Parenthood | 0.53* (0.14) | 1.16 (0.29) |
| Employment status | | |
| Working | 1.00 | 1.00 |
| Student | 1.49† (0.31) | 1.69* (0.40) |
| Unemployed | 1.23 (0.31) | 1.45 (0.40) |
| Other | 0.97 (0.31) | 0.94 (0.30) |
| Urbanicity | 0.68*** (0.02) | 1.47*** (0.07) |
| Follow-up covariates | | |
| Parenthood | 1.45* (0.24) | 0.54** (0.11) |
| Married | 1.28 (0.20) | 2.09*** (0.36) |
| Divorced | 1.60† (0.42) | 0.78 (0.23) |
| Unemployment | 0.97 (0.13) | 1.36† (0.22) |
| Education | 1.27*** (0.05) | 0.96 (0.04) |
| Temperament | | |
| Sociability | 1.24** (0.09) | 0.89 (0.07) |
| Emotionality | 1.07 (0.07) | 0.93 (0.08) |
| Activity | 1.10 (0.07) | 1.22** (0.11) |

**Note.** The table presents relative risk ratios from a multinomial regression model. Standard errors are given in parentheses. The baseline covariates included gender (0 = women, 1 = men), marital status (0 = living alone, 1 = married or cohabiting), and parenthood (0 = no children, 1 = children). The follow-up covariates assessed changes in parenthood (0 = no change in parenthood status, 1 = became a parent during the follow-up), whether the participant had gotten married during the follow-up (0 = did not get married, 1 = got married during the follow-up), whether the participant had gotten divorced during the follow-up (0 = did not get divorced, 1 = got divorced during the follow-up), and whether the participant had been unemployed during the follow-up (0 = was not unemployed, 1 = was unemployed at some time during the follow-up).
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

## DISCUSSION

The present findings suggest that temperament may influence migration behavior even when several established sociodemographic determinants of migration are taken into account. Over a 9-year period, high sociability predicted rural-to-urban migration and longer migration distances. High activity increased general migration propensity (i.e., probability of migrating to both urban and rural areas). Emotionality increased the likelihood of leaving the home municipality, particularly in the case of rural areas, and decreased migration distances, but was not associated with selective urban or rural migration.

Compared with less sociable people, individuals with high sociability were more likely to leave rural areas, to stay in urban areas, and to migrate to urban rather than rural areas. Being more densely populated, urban locations may provide more rewarding environments for sociable persons than rural locations do. Sociable individuals' attraction to urban locations may therefore reflect a preference for environments with more opportunities for social interactions (Camperio Ciani et al., 2007; Jokela et al., 2007; Murray et al., 2005). Curiously, a recent study on common lizards found that lizards with high social tolerance were more likely to disperse to densely populated patches than were those with low social tolerance (Cote & Clobert, 2007). Apparently human and animal migration behaviors share some commonalities with respect to temperament.

The activity trait reflects the energy, tempo, and vigor with which a person performs everyday activities (A.H. Buss & Plomin, 1984). We found that high activity increased migration propensity, such that more active individuals were more likely to migrate to new urban and rural areas. Although the association between activity and migration propensity may seem intuitive, it is by no means self evident. In light of migration theories emphasizing the role of rational preferences (Lu, 1999), it is actually quite surprising that a tendency to act with vigor and fast pace increases the likelihood of packing up and moving to another municipality. This implies that activity may have an influence on complex adult social behaviors that goes beyond its role in physical activity (cf. Eaton, 1994).

Emotionality increased the likelihood of leaving the home municipality, particularly when that municipality was rural. However, emotionality was not associated with the number of moves or with selective urban-rural migration. Thus, its role in migration propensity does not appear to be as consistent as that of sociability and activity. With this reservation, we suggest that more emotional people may be more likely to change residential location because they are less satisfied with their residential areas (cf. Silventoinen et al., 2008). Further evidence is needed to confirm this possibility.

Temperament predicted not only migration probability, but also the distance covered by individuals who migrated. Higher sociability predicted longer migration distances, a finding in line with the role of sociability in increased migration behavior observed in the present study and also in previous studies (Camperio Ciani et al., 2007; Silventoinen et al., 2008). Higher emotionality predicted shorter migration distances, which may reflect the association between emotionality and proneness to distress. Long-distance migration is likely to be more stressful than short-distance migration, so highly emotional individuals may tend to prefer shorter moves. Hence, emotionality appears to have a dual role in migration by increasing migration probability but decreasing migration distance.

Migration is a complex process that can be conceptualized in various ways, and the present investigation inevitably provides a limited perspective on such behavior. For instance, a municipality's mean population density provides an objective and demographically relevant indicator of position on the urban-rural continuum, but more refined measures of residential locations are feasible. These measures might take into account local characteristics, including amenities such as coffee shops, music

venues, and parks, which may be related to the attractiveness of neighborhoods (cf. Clark, 2003). Furthermore, we had only limited data for assessing potential mediating mechanisms linking temperament with migration propensity. These mediating mechanisms may include, among others, economic factors such as housing circumstances, as well as psychological factors such as attachment to the home neighborhood.

Overall, the present findings imply that temperament may influence the self-selection of environments (i.e., active person-environment correlation) on a demographic scale (see D.M. Buss, 1987; Scarr & McCartney, 1983). Selecting a specific home neighborhood is likely to have important consequences, for example, for physical and mental health (Blazer et al., 1985; Jokela et al., 2007; see Verheij, 1996), opportunities for socioeconomic achievement (Rodgers & Rodgers, 1997; Rye, 2006), and marriage prospects (Edlund, 2005). Temperament-related self-selection may also modify population structures, and in the long run, genetic variation underlying temperament differences (Oniszczenko et al., 2003) may become differentially distributed across geographic regions (cf. Chen, Burton, Greenberger, & Dmitrieva, 1999; Whitfield, Zhu, Heath, & Martin, 2005; Willemsen, Posthuma, & Boomsma, 2005). Our study thus demonstrates that personality psychology focusing on individual differences may elucidate the nature of migration behavior and have implications at the population level. We hope that these findings will stimulate further research on the psychological determinants of migration.

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