Justus-Liebig University Giessen

Department of Economics and Business Studies

Empirical Analysis of Non-Monetary Benefits of Education, Social Networks and Trust

Doctoral Thesis

Kyra Selina Hagge

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Supervisors

Prof. Dr. Peter Winker
Professor of Statistics and Econometrics
Justus-Liebig University Giessen

Prof. Dr. Jürgen Meckl
Professor of International Economics
Justus-Liebig University Giessen

FOR ALL THE WONDERFUL PEOPLE I HAVE AND HAD THE PLEASURE OF WALKING BESIDE – KEEP SHINING.

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Chapter 1: Introduction

In a time when humans revert more and more to the use of technology to mediate human interaction, it remains vital to underline the importance of resources embedded in social ties to individual as well as collective well-being. Alongside economic returns, we now recognize a host of non-monetary returns from human connection, such as social support, trust, and networks (Domínguez & Watkins, 2003; Gagliardi et al., 2020; Viry et al., 2017). Under contemporary challenges such as increasing geographic mobility, migration, and environmental degradation, there is a need to understand how these social resources are accessed and mobilized, and which individual characteristics help people to do so.

Education is not only connected to increased labor market returns; higher levels of schooling go along with improved mental and physical health, including self-rated health, higher life expectancy and lower incidences of disease, among others (Herd et al., 2007; Link et al., 2008). One possible pathway goes through social networks; education leads to denser social networks, which expand the access to social support (Coleman, 1988; Lin, 2001). Having access to education is therefore crucial for personal success, health and well-being. Migrants often have more patchy education paths, their degrees might not be equivalent in the host country (Sentell & Braun, 2012) and do not speak the host country's language as proficiently (Walton et al., 2009) which raises concerns about inequality in access to social resources.

Additionally, migrants are also more likely to have significant geographical distances between themselves and their family and kin networks. Residential mobility is reshaping the structure wherein social support is provided, which sometimes leads to weaker relationships (Litwak & Kulis, 1987; Mulder & Cooke, 2009). People in spatially disjointed networks are using technology to bridge the physical distance, however, face-to-face interactions remain critical in providing social support (Wöhler & Hinz, 2007).

Feelings of trust, which are also embedded in and shaped by social relationships, and knowledge of eco-labels matter for sustainable consumer behavior (Giddens, 1990; Thøgersen, 2000). In understanding sustainable behavior too, education and social resources lead to an array of non-monetary benefits.

While each contribution addresses a distinct question - ranging from migrants' access to social support, to the effects of residential mobility on family ties, to the role of education in bridging spatial distances within social networks, to the importance of trust and eco-label knowledge in promoting sustainable consumption—together they advance a common argument: that individual well-being and behavior are shaped by intangible resources embedded in social relationships, institutions and knowledge systems. These resources are present independent of economic returns, which underlines the need for a deeper understanding of the value of education and social support.

This research is grounded in large scale survey analysis (German Socio-Economic Panel (G-SOEP) and U.S. National Marketing Institute (NMI)) and spanning two different geographies (Germany and the United States). It is furthermore strongly rooted in empirics: I am employing statistical methods such as logit and ordered logit regressions and mediation analysis to answer the hypotheses in each of the studies.

In the first paper, "*Education and Social Support: Do Migrants Benefit as much as Natives"* (Chapter 2), my co-author Dr. Jana Brandt-Gkovas and I explored the role of education in enabling individuals to access different forms of social support—emotional, instrumental, informational, and appraisal—and how these effects differ for migrants compared to people born in Germany. Using data from the G-SOEP, our analyses found that higher levels of education significantly increase the probability of receiving social support, as well as the number of support providers within one's network. We furthermore find that while migrants are disadvantaged in their overall access to social support, education helps to mitigate these inequalities, as there are no significant negative returns in our mediation analyses of education on social support. These findings highlight education as a powerful resource for social integration, extending beyond its labor market value.

The second paper, *"Spatial Dispersion of Social Networks: Bridging Geographical Distances"* (Chapter 3) that I again co-authored with Dr. Jana Brandt-Gkovas, delves deeper into the aspect of space, asking: does education help bridge physical distances in receiving social support? Secondly, if so, are effects different for people dependent on their migration experience? Using ordinal logit models on cross sectional data from the 2011 wave of the G-SOEP, and drawing on House's (1981) framework of support types, our analyses show that education substantially enhances individuals' ability to receive social support from geographically distant contacts. This effect holds across multiple dimensions of support and is particularly pronounced for migrants with university education; migrants who obtained tertiary education are significantly more likely to uphold social support over long distances than less-educated migrants. Our findings are contrary to literature that finds negative returns to education for migrants, and our findings illustrate education's role in fostering not just local integration but also transnational and geographically dispersed forms of social support.

After I had written these first two papers, another wave of the G-SOEP was available, which allowed me to look at the developments of individual support networks over a 10 year period, which my co-author Prof. Dr. Diana Schacht and I did in our article *"Variations in Access to Social Support: the Effects of Residential Mobility and Spatial Proximity to Kin and Family"* (Chapter 4). This article also paints a more wholistic picture of existing mobility trajectories, as we compared people who stay in the same geographical area, people who move within Germany, and people who moved to Germany from abroad. Doing so, we found that individuals who moved within Germany reported accessing more support from family and kin compared to those who remain in the same geographical location. In contrast, international mobility is associated with lower access to familial social support. However, through mediation analyses we uncover

that spatial proximity largely accounts for the negative effect of international migration – having a more geographically dispersed social network leads to less access to social support for migrants. Fragmentation of social networks, however, does not fully explain the positive association between internal mobility and kin support. These results complicate the prevailing assumption that mobility necessarily weakens family bonds, suggesting that under certain conditions, residential change can reinforce supportive kin relationships.

The last paper diverged from the G-SOEP and the mobility/education/social network sphere and examined a different but related dimension of non-monetary benefits: the role of trust and knowledge in shaping sustainable consumer behavior. In "*Knowledge, trust, and environmental labelling - On the importance of trust and the knowledge of eco-labels in the sustainable food and beverage consumption in the United States*", I investigated how institutional trust, trust in NGOs, and trust in individuals (embedded trust), alongside knowledge of eco-labels such as Marine Stewardship Council (MSC), U.S. Department of Agriculture (USDA) Organic, and the Non-Genetically Modified (GMO) Project, influenced U.S. consumers' willingness to make environmentally sustainable purchases. With this article, I add a cognitive dimension to the analysis of non-monetary benefits, as sustainable consumption requires not only income but also confidence in the credibility of information provided by labels and institutions (Giddens, 1990; Thøgersen, 2000). Through logit regressions and mediation analysis I found that both trust in environmental governance and recognition of eco-labels significantly increased the likelihood of choosing sustainable food products, however, the impact of trust was mediated by the level of knowledge of the eco-label. This yields interesting recommendations for policy makers and producers, who can use trust and knowledge as crucial non-monetary resources that shape pro-environmental behavior.

Although the four studies focus on different domains, they are united by a common thread: the importance of *non-monetary resources* in shaping behavior and well-being on different scales: at the individual, the communities, and even extending to the planetary scale in terms of the discussion about sustainability. Education hereby plays an important role, not only improving labor market outcomes but also enabling individuals to expand and sustain social networks, bridge spatial distances, and engage more effectively in pro-environmental behavior. Geographic mobility alters access to social support in complex ways, underscoring the dynamic interplay between individual life courses and broader structural conditions. Trust, whether interpersonal or institutional, "greases the gears" of the social machine and improves collective action for sustainable behavior.

My contributions provide a more well-rounded perspective on the value of education and social resources. They challenge the narrower economic framing of human capital by demonstrating how education interacts with mobility, networks, and trust to influence outcomes that have a large impact on individual and societal well-being. At a time when societies grapple with rising migration, increasing geographical mobility, environmental challenges, and rapid technological

advancements, understanding these non-monetary benefits is both theoretically and practically critical.

The remainder of this dissertation is organized as follows. Chapter 2 examines the relationship between education and access to social support, with a focus on differences between native and migrant populations in Germany. In Chapter 3, the role of education in enabling individuals to sustain supportive ties across larger geographical distances is analyzed, particularly in the context of migrant networks. Chapter 4 explores how residential mobility shapes access to kin support, highlighting the contrasting effects of internal versus international migration. To complement, Chapter 5 shifts to the domain of sustainable consumption, analyzing the influence of trust in institutions and knowledge of eco-labels on pro-environmental purchasing behavior in the United States.

Each of these articles is presented as a separate work. Chapters 2 and 4 are already published and their layout follows the respective journals. Chapter 3 is a published working paper, available through the German Institute for Economic Research (Deutsches Institut für Wirtschaftsforschung (DIW)). Chapter 5 is currently an unpublished working paper and is being prepared for submission after the defense.

Together, the four articles in this dissertation illustrate how spatial mobility, education and trust shape human interactions, connections and behavior which in turn affects individual and collective well-being and sustainability – all without being counted in monetary terms.

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Chapter 2: Education and Social Support: Do Migrants Benefit as much as Natives?

References for this paper:

Jana Brandt and Kyra Hagge. Education and Social Support: Do Migrants Benefit as much as Natives? Comparative Migration Studies,8:41, https://doi.org/10.1186/s40878-020-00199-w, 2020.

Chapter 3: Spatial Dispersion of Social Networks: Bridging Geographical Distances

References for this paper:

Kyra Hagge and Jana Brandt. Spatial Dispersion of Social Networks: Bridging Geographical Distances. (an earlier version of this paper is available in the archive of the German Institute of Economic Research (DIW) at https://www.diw.de/documents/dokumentenarchiv/17/diw_01.c.594187.de/087_soep2018_ps15_paper_brandt-hagge.pdf) 2020.

Conferences with review process:

13th SOEP User Conference, "Spatial Dispersion of Social Networks: The Realized Ability to Bridge Geographical Distances",19.-20. July 2018, Berlin, Germany.

6th EARLI-SIG 13 & 2nd InZentIM Conference, "Spatial Dispersion of Social Networks: The Realized Ability to Bridge Geographical Distances"27.-29. August 2018, Essen, Germany

2nd North American Social Network Conference (NASN), "Spatial Dispersion of Social Networks: The Realized Ability to Bridge Geographical Distances", 27. November -01. December 2018, Washington, D.C., USA.

Chapter 4: Variations in Access to Social Support: the Effects of Residential Mobility and Spatial Proximity to Kin and Family

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Kyra Hagge and Diana Schacht. Variations in Access to Social Support: the Effects of Residential Mobility and Spatial Proximity to Kin and Family. Social Indicators Research, 172, 99–120, https://link.springer.com/article/10.1007/s11205-023-03280-w 2024

Conferences with review process:

XXXIX Sunbelt, "Nearer Kin, More Support? Residential Mobility and Spatial Dispersion of Kin Support Networks: Effects on Social Support", 18.-23. June 2019, Université du Québec à Montréal (UQAM), Montréal, Canada

International Society of Quality of Life Studies annual conference, "Variations in Access to Social Support - the Effects of Residential Mobility and Spatial Proximity to Kin and Family", 21.-25. August 2023, Rotterdam, Netherlands.

Chapter 5: Knowledge, trust, and environmental labelling - On the importance of trust and the knowledge of sustainable labels in the eco-conscious food and beverage consumption in the United States

References for this paper:

Kyra Selina Hagge, Knowledge, trust, and environmental labelling - On the importance of trust and the knowledge of sustainable labels in the eco-conscious food and beverage consumption in the United States, unpublished manuscript, 2025.

Conferences with review process:

4th UAS Spring Campus Conference 2019, "Bridging Social Capital and Sustainable Behavior", 01.-05. April 2019, FU Berlin, Berlin, Germany.

Affidavit

Ich erkläre hiermit, dass ich die vorgelegten und nachfolgend aufgelisteten Aufsätze selbst-ständig und nur mit den Hilfen angefertigt habe, die im jeweiligen Aufsatz angegeben oderzusätzlich in der nachfolgenden Liste aufgeführt sind. In der Zusammenarbeit mit den ange-führten Koautoren war ich mindestens anteilig beteiligt. Bei den von mir durchgeführten und in den Aufsätzen erwähnten Untersuchungen habe ich die Grundsätze guter wissenschaftlicher Praxis, wie sie in der Satzung der Justus-Liebig-Universität Gießen zur Sicherung guter wissenschaftlicher Praxis niedergelegt sind, eingehalten.

Kyra Selina Hagge

Greenville, NC, 08.10.2025

Submitted Papers:

1. Jana Brandt and Kyra Selina Hagge. Education and Social Support: Do Migrants Benefit as much as Natives? Comparative Migration Studies,8:41, https://doi.org/10.1186/s40878-020-00199-w, 2020.
2. Kyra Selina Hagge and Jana Brandt. Spatial Dispersion of Social Networks: Bridging Geographical Distances. An earlier version of this paper is available online at: https://www.diw.de/documents/dokumentenarchiv/17/diw_01.c.594187.de/087_soep2018_ps15_paper_brandt-hagge.pdf, 2020.
3. Kyra Hagge and Diana Schacht. Variations in Access to Social Support: the Effects of Residential Mobility and Spatial Proximity to Kin and Family. Social Indicators Research, 172, 99–120, https://link.springer.com/article/10.1007/s11205-023-03280-w 2024.
4. Kyra Selina Hagge, Knowledge, trust, and environmental labelling - On the importance of trust and the knowledge of sustainable labels in the eco-conscious food and beverage consumption in the United States, unpublished manuscript, 2025.

Comparative Migration Studies

ORIGINAL ARTICLE Open Access

Education and social support: do migrants benefit as much as natives?

Jana Brandt[1] and Kyra Selina Hagge[2*]

* Correspondence: Kyra.Hagge@wirtschaft.uni-giessen.de
[2]Faculty of Economics and Business Science, Justus Liebig University Giessen, Licher Strasse 64, 35394 Giessen, Germany
Full list of author information is available at the end of the article

Abstract

Education and having access to social support play a vital role in the human life. Integrated and better-educated people demonstrate an increased personal health and well-being. Social isolation, on the contrary, can affect not only the personal development, but also pertains to society. These topics are especially relevant in the current migration debate. Our paper examines the link between schooling and the individuals' probability to receive different types of social support, in particular emotional, instrumental, informational, and appraisal support. Using logit and ordinal logit regressions on cross-sectional micro-data provided by the SOEP, we distinguish between two subgroups, the native population and people who migrated to Germany. Our findings confirm that higher levels of education increase the probability to access social support as well as the number of support providers in the network. Migrants are disadvantaged when it comes to the access of social support. However, our results suggest no significant negative returns to education for people with migration experiences.

Keywords: Returns to education, Social support, Social networks, Migrants, Logit-regression, Interaction effects

JEL: Classification: I26, I14, C30

Introduction

Apart from monetary benefits, like increased chances of getting a job in the first place or a higher income, there are also non-monetary benefits from education. Increased levels of schooling are highly positively correlated with improved mental and physical health, including self-rated health, higher life expectancy and lower incidences of disease, among others (Herd et al. 2007; Link et al. 2008). One explanation is that education leads to denser social networks, which provide larger extents of social support. According to House (1981), the term social support refers to the content of social relationships, and the material and immaterial resources therein, like the provision of empathy, needed tangible aid, the sharing of useful information or suggestions and constructive feedback. House (1981) theoretically conceptualizes four types of social support according to their influence on health: emotional support, instrumental support, informational support, and appraisal support.

In this study, we provide an empirical analysis of the link between level of education and two issues concerning social support: first the probability to have *access to social support*, and second the probability to have *access to a bigger support network*, which can provide a more diverse array of social support as well as exert less social pressure (Lewis and Rook 1999). We contribute to the literature in three ways: 1) Using cross-sectional microdata provided by the German Socio-Economic Panel (G-SOEP) and employing logit and ordered logit regressions, we estimate the association of education and the four different types of social support as mentioned in House (1981). We thereby expand the body of studies, adding more dimensions to the mere existence of social support. 2) We include Germany as a target country to broaden the geographical extent of empirical studies, as most of the current studies focus on the US. Furthermore, we are focusing on a group less studied in social network research: the migrant community. 3) We address the paradoxical finding of several previously conducted studies that migrants seem to benefit less from education with regard to access of social support than their native counterparts do. Only a limited number of studies have tried to investigate the reasons for this phenomenon. Walton et al. (2009) explain the difference between the two groups by the fact that migrants oftentimes acquired their education abroad, which, according to their results, impedes the possibility to benefit from the education-health gradient. They also discovered that people with a foreign education exhibit a lower extent of positive social interaction than the native population. The inclusion of interaction effects of individuals' migrant background and their degree of education in our study enables us to estimate whether migrants actually receive less social support than natives based on data from the G-SOEP.

The remainder of this paper is organized as follows. Section 2 provides an overview of the related literature concerning the link between education and social support for migrants and natives. We also touch upon the topic of social isolation and related current developments. The data and methodological approach are described in Section 3, including a description of how the different types of social support are measured by the German-SOEP and a detailed specification of the empirical model. The results of the logit regressions estimating the probability to have access to the different types of social support –separately and simultaneously– are presented in Section 4. In addition, this section presents the result of the ordered logit regression regarding the probability to have a larger network of support giving persons. Section 5 concludes.

Related literature

Access to social support is related to a multitude of personal as well as societal benefits, as for example increased health and well-being. Some scholars argue, that higher levels of education also lead to an increased quality of social networks meaning that larger amounts of material and immaterial resources, like social support, are exchanged between the members of these networks (Mirowsky and Ross 2003a, 2003b). Lower education can harm personal well-being, as Stansfeld (2009) points out. Low education is often accompanied by stressful social networks, which affect individuals' mental and physical health status negatively. More educated individuals have larger discussion networks, and therefore have potentially access to a broader range of social support (McPherson et al. 2006).

Since the key terms of this study *social support* and *social networks* have been used in various connections, we want to clarify how they are used in our work within the following

paragraph. The term *social network* covers the whole web of an individual's social relationships. If we are looking at the analysis of egocentric networks, it consists of a person at the center of the research, the *ego*, and their contacts, the *alteri*. Following Granovetter (1973), the ties between the actors of a social network can be divided into strong ties, i.e. relationships to family members, close friends and significant other, and weak ties, which are the remaining social relationships to acquaintances, neighbors, and colleagues. One of the most important features of social relationships is the provision of social support, which can, in the form of material and immaterial resources, increase individuals' utility (Flap 2002). This increase of utility is often described using the term social capital, which stands for the resources embedded in social networks (Lin 2001). As for *social support*, House (1981, p. 22) argues in his seminal work that the concept of social support needs to address the question "*Who* gives *what* to *whom* regarding *which* problems?". Based on this question he defines four categories of social support: emotional support, appraisal support, informational support, and instrumental support. All types of support can be provided for by either informal/nonprofessional sources like family members or friends or professional support givers like childcare workers or financial advisors. Emotional support refers to actions like listening, showing empathy, trust, and caring. Appraisal support covers the provision of information that a person can use to evaluate his/her own behavior, e.g. affirmation, feedback, and social comparison. In contrast, informational support stands for the provision of information in order to help someone to solve problems, like advices or suggestions. The last category, instrumental support, comprises direct help given to a person in need including physical assistance, money or time. Social support therefore corresponds to the content of social relationships. Moreover, it is highly specialized according to the target. A person emptying my letterbox during my absence might not be the right place to go to obtain job related information. As noted by Heaney and Israel (2002), it is difficult to measure the different theoretical categories of social support empirically, because most of the available data rather provide information about the existence of social relationships than their content. We also usually rely on data based on information about the ego, but not on the reciprocal relationship from the alteri back to the ego or on the density of the network, the ties between the alteri. This study is therefore contributing to the current research regarding a more in-depth analysis of the content of social relationships. Since the four support types require different characteristics of individuals' social network and hence might be affected differently by the level of education, it is important to examine each of them individually.

Scholars have focused on researching the absence of social support especially after McPherson et al. (2006) released their seminal work in which they find an increase of the degree of social isolation within the US society over the last 25 years. Their discovery underlines previously published work from Putnam (2000), who also records a lower participation of Americans in social events and a decreasing number of active members in voluntary organizations and sports clubs. Social isolation therefore not only has negative effects on the individual, it also pertains to society as a whole. In an effort to transfer McPherson et al.'s (2006) results to Germany, documenting the state of social isolation, Wöhler and Hinz (2007) recreate their study setting. Germany, as Wöhler and Hinz (2007) find, does not suffer from a similar deterioration of social capital as the US, which they explain through the change of the value of family in each of the countries alongside with technological change in the communication sector. Although we, resulting from the underlying dataset, cannot make implications about the

evolution of access to social capital, we are still able to infer about social isolation as a current snapshot of Germany's society.

Only a limited number of studies have tried to investigate potentially differentiated influence of education on social support between migrants and natives. Heller et al. (2004) find a negative link between non-native origin and access to social resources beyond the family. Ryan et al. (2008) lay out the shortcomings of migration literature in disregarding the difference in social network ties, spatially as well as content-wise. Migrants, especially shortly after immigration, do not have the same possibilities to access social capital due to lack of trust (Putnam 2007), mastery of the local language (Walton et al. 2009), a lower socio-economic status (Lubbers et al. 2010) and a disruption in their original social networks (Ahmad et al. 2004; Carswell et al. 2011). The adjustment process, furthermore, is also associated with a lower level of social support: migrants need to accustom themselves with different forms of social norms and institutions, which inhibits their use of the host countries' social capital (Friesen 2011; Girard and Bauder 2007). Because of these and more migrant specific characteristics, we expect to find significantly different effects of education on the accessibility of social support for migrants and natives.

Data and methodological approach

Measurement of social support

Our analysis is based on the 2011 wave of the German Socio-Economic Panel (G-SOEP) (Goebel et al. 2018). The G-SOEP is a panel dataset providing representative household data for about 12.000 households and 21.000 individuals and has been sampled every year since 1984.[1] The question module of four items concerning the social network of individuals, which we use as the basis of our analysis, collects information about the received social support. It has been included into the questionnaire since 2006 and is part of the core questions every 5 years. Due to a change in question design, the 2006 wave and the subsequent 2011 wave cannot be combined, which forces us to do a cross-sectional analysis using the 2011 wave only.

Since we are interested in observing potential differences between the four dimensions of social support, we are approximating the dimensions by exploiting the following sub-questions of the SOEP questionnaire. The first item "With whom do you talk about personal thoughts and feelings, or things you wouldn't tell just anyone?" reflects emotional support (es). In the second item "Who supports your advancement in your career or educational training and fosters your progress?" informational support (ios) is investigated. The third item "Now a hypothetical question: If you were to need long-term care (for example, in the case of an accident), who would you ask for help?" aims to measure instrumental support (its). Finally, the last item of the module "Who can you tell the truth even if it is unpleasant?" refers to appraisal support (as). For each item, the respondent can name up to 5 people from a list of family members and other significant others or they can tick the box "nobody". Since these questions are only posed to the ego, not its network contacts, they can only be interpreted unidirectional. Furthermore, they do not reflect the full spectrum of social support in one of the dimensions, as for example instrumental support also comprises different actions such as monetary support and childcare. However, these questions can help to underline the

[1] Details about the survey methodology and how the data has been collected can be found in Wagner et al. (2007).

concepts and already point towards variations according to the content of the social tie (Wöhler and Hinz 2007). We therefore derive the following information from the module: we know whether an individual receives a specific type of social support or not and reveal how many support persons are available in each support category. Receiving social support by more than one person can be beneficial, as a potential support giver can also become the source of stress and social pressure (Portes 1998). Consequently, it is problematic if a potential support giver is causing a conflict without other potential support givers available.

We use the information provided to construct two sets of dependent variables. The first set contains four binomial variables referring to the four types of social support (emotional, instrumental, informational, and appraisal support) which are one if the respondent has named at least one support giver for the specific support type and zero otherwise. Furthermore, we construct a fifth binomial variable which is one if the respondent has named at least one person in each of the four support categories and zero if she does not have access to all support categories simultaneously. The second set of dependent variables also contains four variables referring to the different support types and one variable referring to all support types simultaneously. In contrast to the binomial variables of the first set, the variables of the second set measure the number of support givers named in each support category. The resulting ordinal variable can take values between zero and five.[2] In addition to counting the number of alters mentioned in each support dimension, we also calculate the sum of persons mentioned in total. For this purpose, we add the number of the four items´ unique entries.[3] To differentiate between the access to support in general, as modelled by the first set of dependent variables, and the size of the support providing network, as being reflected in the second set of dependent variables, is important. There has been evidence that the number of alteri in a network and the mere access measure slightly different structural characteristics (Wöhler and Hinz 2007). The number of alteri in an egocentric network sheds a light on the potential support providers, albeit the quality of the support provided cannot be recorded, as the connections between the alteri or the density of the network is not known (Coleman 1994; Flap 2002). The first set of dependent variables provides insight into the phenomenon of social isolation, which has been the concern of various works in the field of social network analysis (McPherson et al. 2006; Putnam 2000; Wöhler and Hinz 2007).

Estimation strategy and model specification

Referring to the two different groups of outcome variables, we proceed in two steps. First, we investigate the category of binary outcome variables *Existence of Social Support (ESS)*. Second, we analyze the ordinal outcome variables for the category *Number of Persons Providing Social Support (NSS)*. We use logit regressions with interaction terms[4] between respondents' migration background and their school-leaving certificate. If applicable, we furthermore use the respondents' university degree to test whether the probability of having

[2]We do not distinguish whether a person is mentioned uniquely or multiple times. E.g., if the code number 9 for daughter is entered twice in the first item, we count a network size of two, if the remaining entry fields stay empty. We do so because the respondent might think of two different daughters. Moreover, depending on the support type, only 1.5–4.9% of the respondents have mentioned a person more than once per item.
[3]Calculating the sum of all the items' entries would over-quantify the amount of accessible support: for example, if the father is mentioned in all four categories, calculating the sum of the entries would suggest that four persons offer social support even if it is, in fact, just one person.
[4]See Buis (2010) for an explanation of the interpretation of interaction effects in logit models.

access to a specific type of social support or all support types simultaneously is affected by the respondents' degree of general and higher education and whether these effects differ for natives and migrants. The empirical estimation strategy is given in Eqs. (1) and (2).

$$ESS_i = \beta_o + \beta_1 Migrant_j + \beta_2 Education_j + \beta_3 Migrant_j * Education_j + \theta X_j \quad (1)$$

$$NSS_i = \beta_o + \beta_1 Migrant_j + \beta_2 Education_j + \beta_3 Migrant_j * Education_j + \theta X_j \quad (2)$$

with $i \in \{es, ios, its, as, all\}$. The dummy variable $Migrant_j$ reflects the respondents' migration background and takes a value of one if the respondent has a direct, indirect, or no further specified migration background referring to the G-SOEP categorization[5] and zero otherwise. $Education_j$ is a vector containing dummy variables that are one for respondents' highest school-leaving certificate and zero otherwise. The variable *University* corresponds to higher education. The categories of school-leaving degrees are: lowest general education (Hauptschule), intermediate general education (Realschule), technical college degree (Fachabitur), highest general education (Abitur), other school-leaving degree,[6] and drop out. In Germany, compulsory schooling encompasses 10 years with a potential extension of 2 or 3 years to receive the highest general education certificate. Students, who have either completed the highest general education or obtained the technical college certificate, qualify for higher education such as university or technical college.[7] Due to the lack of school-leaving certificate, we exclude observations of students that still attended school in 2010. X_j is a vector of covariates for respondent *j*. An overview of the covariates and their operationalization is given in Table 7 in the Appendix. The results are presented in odds ratios to show the potential differences in the effect of education for migrants and natives in multiplicative terms.[8] The odds ratio of $Migrant_j$, β_1, represents the ratio of odds of migrants compared to their native counterparts for having the value one in the outcome variable: the odds of having $ESS_i = 1$ for migrants is β_1 times the odds of their native counterpart. For natives the change in odds compared to the odds of the corresponding reference group due to holding a specific degree of education is given by β_2. The odds of having $ESS_i = 1$ are β_2 times higher for natives holding the corresponding degree of general education compared to natives holding the lowest degree of general education. For migrants the corresponding effect is β_3 times the effect for natives with the same level of education: $\beta_2 * \beta_3$.

Considering the family and partner as important social resources, we include control variables that reflect whether the respondent lives in a permanent relationship or not and the number of relatives in model 2, following the findings of Wöhler and Hinz (2007). They find the importance of the partner and close family members to be especially pronounced in Germany. In addition, we add the squared family size to take into account on the one hand the possibility of decreasing marginal effects of the family size

[4]See Buis (2010) for an explanation of the interpretation of interaction effects in logit models.
[5]People with direct migration background are born outside of Germany. The category "indirect migration background" refers to people born to at least one parent of non-German nationality but within Germany. "Not further specified are people who, according to their family biography, have a migration background but the SOEP lacks complete information (see Scheller (2011)).
[6]The educational degrees covered by the term other degree are not further differentiated by the G-SOEP.
[7]The term technical college therefore is been used to classify the school-leaving certificate, not the actual certificate obtained after a successful completion of technical college. Persons with a degree from technical college are accounted for within the variable *university*.
[8]We present the results in odds ratios and not in marginal effects because interaction effects in odds ratios refer to the baseline odds within their own category and therefore control for differences in the baseline odds between the group of natives and migrants (see Buis (2010) for more details regarding the interpretation of odds ratios).

on peoples' access to the social resources investigated, and on the other hand that migrants have comparatively larger families.[9]

The third extension –model 3– additionally includes four variables that contain information on the respondents' level of formal social participation: a dummy variable that is one if the respondent is employed and zero if not, and three ordinal variables reflecting the frequency of participation in voluntary work, local politics, and religious events. Individuals with higher levels of social participation have more social relationships at their disposal which are a potential source of social support (Putnam 2000; 1993; Wellman and Wortley 1990). Hence, the probability to have access to social support will potentially increase with the level of social participation.

Considering that the geographical distance between the respondents and their network members may determine the degree to which they expect to receive social support, we additionally control for the distance to other family members in model 4.[10] We extend our model with dummy variables for the minimum spatial distance in which family members live, because the different dimensions of social support demand for other levels of physical presence of the supporting person.

Sample description

In 2011 the questions regarding the received social support were not asked to participants of the 2011 refreshment sample (5.161 persons) and to all respondents that are part of the youth population (267 persons).[11] Hence, we are only able to use a reduced sample size of about 16.000 observations. Moreover, we exclude 3.856 observations of respondents that are older than 65 years of age. We do so because one of the questions in the module (the one regarding help with advancement in career-related questions, which we use as a proxy for informational support) has only been given to people who are still part of the active working force according to legal standards. Since the retiring age in Germany is 65, this particular sub-question has only been posed to people below this age limit. Table 1 gives an overview of the sociodemographic composition of the sample.[12] About 49% of the respondents are male and 22.9% have a migration background, whereby 12.3% have a direct and 10.5% have an indirect migration background corresponding to the SOEP classification of migration backgrounds.[13] Respondents' age range between 17 and 64 years and the average age is 42.4 years. Regarding the highest level of general education, 25.5% of the respondents hold the lowest level of general education, 34.1% the intermediate and 23.5% finished the highest level of general education. A smaller fraction of 6.2% obtained a technical school degree and 7.1% hold another degree, which is not further differentiated. 2.1% of the respondents dropped out

[9]For 2011 the average family size of migrants is about 20% higher than the average family size of natives.
[10]Due to the lack of information about the location of non-kin ties, we are constrained to control only for the location of family members.
[11]The G-SOEP interviews all household members that are at least 16 years of age. For young respondents questioned the first time a special youth questionnaire is used. Seventy-four respondents are both, part of the youth population and the refreshment sample. Thus, the relevant question modules are not asked to 5.354 persons.
[12]We use the weighting factor for wave 2011 to calculate the mean and standard deviation of the variables presented in Tables 1 and 2.
[13]The G-SOEP differentiates between direct, indirect, and not further specified migration background. According to this classification, respondents have a direct migration background if they are not born in Germany, an indirect migration background if they are born in Germany but do not have the German citizenship or have at least one parent that is born outside Germany. The migration background is not further specified if the respondent's place of birth is not known.

Table 1 Sociodemographic composition

	N	Mean	SD	Min.	Max.
Sex (1 = male)	11,758	0,490	0,500	0	1
Age	11,758	42,422	13,093	17,112	64,975
Migration background	11,758	0,228	0,420	0	1

of school without any school-leaving certificate and 1.5% are currently in school. Beside the general education degree, 20.3% of the respondents hold a university degree.

The differences between migrants and natives according to their level of general and higher education are presented in Table 2. In all categories related to the German education system, low, intermediate and high degree of general education, technical school, and university degree, the share of migrants falls behind the share of natives. A huge intergroup difference can also be found in the category *no degree*, where 4.7% of the migrants dropped out of school with no school-leaving certificate whereas this only applies for 1.3% in the group of natives. The category *other degree* it is not as easy to interpret as the other school-leaving degrees, as it can include foreign degrees obtained outside of Germany as these degrees might not have an equivalent within the German education system. Migrants display a higher share of school-leaving certificates classified as *other,* which complicates the analysis in the later chapters of this paper. However, there remain enough observations to make inferences about the remaining school-leaving degrees.

As mentioned earlier, students who are still enrolled in school will not be part of the analysis, since they lack a school-leaving certificate and are therefore missing an important independent variable.

Results: education and social support

The analysis of our results follows the same strategy, presenting the results using the dependent variable “access to social support” first, followed by the analysis of the dependent variable “number of support providers”. In all the models, the group of native females that are 16–25 years old holding the lowest level of general education serves as the reference group. Model 0 starts with only including dependent variables such as sex, income, age and migrant background, model 1 introduces the degrees of education obtained. Model 2 adds several familial characteristics such as family size. In model 3 we add characteristics that demonstrate social commitment like employment

Table 2 Educational degrees: natives vs. migrants

	Natives					Migrants				
	N	*Mean*	*SD*	*Min*	*Max*	*N*	*Mean*	*SD*	*Min*	*Max*
Lowest general education	2190	0,255	0,436	0	1	466	0,256	0,436	0	1
Intermediate general education	3527	0,382	0,486	0	1	431	0,200	0,400	0	1
Highest general education	2587	0,255	0,436	0	1	361	0,161	0,368	0	1
Technical college	623	0,068	0,251	0	1	91	0,043	0,202	0	1
Other degree	102	0,013	0,115	0	1	479	0,272	0,445	0	1
Dropout, no degree	81	0,013	0,113	0	1	78	0,047	0,213	0	1
Currently in school	177	0,014	0,116	0	1	48	0,021	0,144	0	1
University degree	2331	0,210	0,408	0	1	417	0,178	0,382	0	1

Results are based on respondents younger than 65 years of age and that are not part of the refreshment sample or youth population in the 2011 wave

Table 3 Overview of the results

Dependent variable: Access to social support	**Result can be found in Table**
• Education has a moderating role on the access to social support between migrants and non-migrants.	6 (model 0 vs. models 1–4)
• Migrants benefit in the access to instrumental support.	4 (row 1)
• A higher degree of education increases the probability to have access to social support in all dimensions.	4 (rows 2–7)
• Education does not influence the probability to have access to all dimensions of social support for migrants, except for instrumental support.	4 (rows 8–12)
• For instrumental support: higher education decreases migrants' probability to receive instrumental support.	4 (column 2, rows 8 & 10)
Dependent variable: Number of support providers	**Result can be found in Table**
• A higher level of general education increases the probability of having access to a bigger network of support providers.	5 (rows 2–7)

or voluntary work. Model 4 finally represents the full model, additionally controlling for the physical distance of the potential support providers. The results are summarized in Table 3 and explained in detail in the following subsections.

Results Logit regression: access to social support

Using a very simple model specification without educational degrees leads to a skewed observation: as reported by model 0, which can be found in Table 7 in the Appendix, migrants are disadvantaged when it comes to access to social support. They can only access 74.8% of the social support in all dimensions as compared to their native counterparts. The only support dimension where they do not fall back is instrumental support, where the odds are not statistically significant. However, this result has to be viewed with caution as already implied: when adding school-leaving certificates, the resulting odds ratios become insignificant (models 1–4, Table 7 in the Appendix). This is one important finding, as it will also hold when we are using the number of potential support providers as independent variable, which is presented in Table 12 in the Appendix. We therefore infer a moderating role of education when it comes to the influence of migration background on access to social support.

From the results of model 4 (presented in Table 4), including all independent variables, migrants even benefit in the access to instrumental support. The odds of having access to instrumental support are 1.605 times higher than the odds of natives. For all other dimensions including the aggregation of all four support types simultaneously, having a migrant background does not statistically matter for the access to social support.

Having a higher degree of education increases the probability to have access to the different types of social support as the analysis shows. Compared to the reference group,[14] native respondents' holding the highest degree of general education are in a superior position. Even so, the magnitude of the positive effect resulting from holding the highest degree of general education varies according to the different support types: with an odds ratio of 2.338 it is highest for emotional support and with 1.667 smallest for instrumental

[14]The reference group is native females who are between 16 and 25 years old holding the lowest degree of general education and did not obtain a university degree. Their odds of having access to all social support dimensions simultaneously are 2.098. This means that within the reference group we expect to find 2.098 females with access to all support dimensions for every female not having access to all dimensions simultaneously. For (i) emotional support, (ii) instrumental support, (iii) informational support, and (iv) appraisal support, the odds ratios of persons having access to persons not having access are (i) 16.209 to 1, (ii) 11.482 to 1, (iii) 4.698 to 1, and (iv) 6.759 to 1 respectively.

support. Moreover, the odds for native respondents holding an intermediate general education degree to have access to appraisal support and informational support are 1.385 times and 1.187 times the odds of the reference group respectively. In contrast, holding an intermediate level of general education does not affect the probability to receive emotional support. For natives holding a degree that allows them to enroll in technical college goes hand in hand with a larger and robust probability to have access to appraisal support, but to none of the other support dimensions. Getting a degree from secondary education also benefits with respect to access to informational support. The odds of obtaining support in terms of job related questions are 1.329 times higher for respondents with a university degree, as compared to their counterparts with a lower educational degree.

The advantage in obtaining informational support also drives the statistical significance of the access to all dimensions simultaneously, which is with an odds ratio of 1.394 almost as pronounced as the access to informational support for university graduates. Having access to all social support dimensions simultaneously is 1.254 times more likely for respondents with the intermediate level of general education and 1.232 times for respondents with a degree which allows to enroll in technical college compared to the reference group.

Our most staggering result, however, is the lack of significance in interaction effects between the respondents' school-leaving certificate and their migration background. In all support dimensions except in case of instrumental support, we do not find any significant effect of education and migration background on social support. Instrumental support – e.g. help in case of need for long-term care – is less likely to be provided for migrants who hold the highest degree of general education. They can only access 61% of the support which natives receive holding a similar degree. Which translates to: holding the highest level of general education as a migrant is leading to a reduction in odds for having access to instrumental support.[15] The same pattern can be found for migrants holding an intermediate general education degree: the expected effect is only 64.5% of the expected effect for similarly educated natives. All other support dimensions do not show any significant effect resulting from migration background and education level.

To check for robustness of our results, we introduce various control variables, starting from model 2–4, which can be found in Tables 7, 8, 9, 10 and 11 in the Appendix. The effects of education for both, natives and migrants, do not differ much in terms of magnitude and significance levels.

Results ordered Logit regression: number of support givers

In addition to the question whether a person has access to a certain kind of social support we also investigate the effect of education on the probability of having access to a larger number of support givers, as a diverse network can be associated with less social control and a larger variety of provided content. There are differences between the pure access, as described in Section 4.1 and the network extent measured in support providing alters. The most important deviation is that, even if we control for the degree of general and higher education, the odds for having a migrant background remain significant and lower than 1, as reported in Table 5. This means, migrants have, irrespective of their education, a lower probability to have a larger support network providing support of all dimensions

[15]Logit regressions in odds ratios provide multiplicative effects relative to the baseline odds in the group of migrants or natives.

Table 4 Results logit regression in odds ratios: access to social support by support dimension (model 4)

	Emotional Support		Instrumental Support		Informational Support		Appraisal Support		All Dimensions	
Migrant	0.793	(0.292)	**1.605****	(0.042)	0.809*	(0.071)	0.774	(0.105)	0.816*	(0.094)
Intermed. gen. edu.	1.294*	(0.055)	1.255**	(0.036)	**1.187*****	(0.007)	**1.385*****	(0.001)	**1.217*****	(0.002)
Technical college	1.263	(0.369)	1.497*	(0.053)	1.189	(0.112)	**1.870*****	(0.002)	1.201*	(0.095)
Highest gen. edu.	**2.338*****	(0.000)	**1.718*****	(0.001)	**1.667*****	(0.000)	**2.012*****	(0.000)	**1.686*****	(0.000)
Other degree	1.057	(0.908)	1.221	(0.627)	1.155	(0.540)	0.775	(0.419)	1.068	(0.781)
Dropout	1.131	(0.802)	1.277	(0.582)	0.965	(0.897)	0.829	(0.584)	1.023	(0.918)
University	1.450*	(0.087)	1.206	(0.206)	**1.329*****	(0.000)	1.273*	(0.092)	**1.394*****	(0.000)
Mig.*Intermed. gen. edu.	1.009	(0.979)	**0.514****	**(0.029)**	1.235	(0.202)	1.053	(0.829)	1.139	(0.461)
Mig.*Technical college	1.041	(0.948)	0.773	(0.670)	1.505	(0.166)	0.573	(0.178)	1.153	(0.573)
Mig.*Highest gen. edu.	0.707	(0.461)	**0.355*****	(0.006)	1.119	(0.587)	0.712	(0.263)	0.981	(0.874)
Mig.*Other degree	1.022	(0.970)	0.507	(0.180)	1.244	(0.436)	0.735	(0.404)	1.025	(0.949)
Mig.*Dropout	0.653	(0.535)	0.258**	(0.028)	0.550	(0.141)	0.769	(0.584)	0.485*	(0.072)
Migrant*University	1.031	(0.941)	1.115	(0.728)	0.918	(0.605)	1.054	(0.832)	0.870	(0.337)
Male	**0.417*****	(0.000)	**0.762*****	(0.001)	0.968	(0.475)	**0.752*****	(0.000)	0.900**	(0.016)
Age group 26–35	0.905	(0.654)	1.008	(0.965)	0.358***	(0.000)	1.164	(0.300)	0.551***	(0.000)
Age group 36–45	0.642**	(0.029)	0.785	(0.131)	0.174***	(0.000)	1.169	(0.262)	0.315***	(0.000)
Age group 46–55	0.613**	(0.014)	0.769*	(0.092)	0.120***	(0.000)	1.036	(0.795)	0.229***	(0.000)
Age group 56–64	0.434***	(0.000)	0.815	(0.218)	0.0647***	(0.000)	1.080	(0.588)	0.126***	(0.000)
Household income	1.017**	(0.017)	0.998	(0.658)	1.005**	(0.028)	1.003	(0.429)	1.003	(0.229)
Perm. relationship	**4.225*****	(0.000)	**2.280*****	(0.000)	**1.398*****	(0.000)	**1.479*****	(0.000)	**1.657*****	(0.000)
Family size	**1.031*****	(0.004)	**1.037*****	(0.000)	**1.017*****	(0.000)	**1.056*****	(0.000)	**1.028*****	(0.000)
Squared family size	1.000	(0.175)	1.000*	(0.083)	1.000**	(0.016)	1.000***	(0.000)	1.000***	(0.008)
Employed	1.126	(0.339)	0.948	(0.602)	**1.556*****	(0.000)	1.056	(0.532)	**1.542*****	(0.000)
Volunteer Work	0.952	(0.412)	0.937	(0.164)	**0.927*****	(0.002)	**0.787*****	(0.000)	**0.890*****	(0.000)

Table 4 Results logit regression in odds ratios: access to social support by support dimension (model 4) *(Continued)*

	Emotional Support		Instrumental Support		Informational Support		Appraisal Support		All Dimensions	
Local politics	0.970	(0.819)	1.021	(0.838)	0.958	(0.407)	0.838	(0.109)	0.952	(0.298)
Religious events	0.874**	(0.048)	**0.796*** **	(0.000)	1.001	(0.961)	1.091**	(0.043)	1.014	(0.722)
Family in neighborhood	1.075	(0.773)	0.758	(0.177)	0.778*	(0.078)	0.958	(0.835)	0.744**	(0.037)
Family (15 min by foot)	1.374	(0.161)	0.693**	(0.031)	**0.648*** **	(0.000)	0.942	(0.732)	0.744**	(0.016)
Family (1 h drive)	1.071	(0.734)	**0.561*** **	(0.000)	0.778**	(0.028)	0.826	(0.218)	0.819*	(0.075)
Family in Germany	1.310	(0.397)	0.896	(0.659)	0.769	(0.118)	1.336	(0.293)	0.945	(0.726)
Family abroad	0.958	(0.970)			0.135*	(0.076)	0.812	(0.807)	0.244	(0.210)
N	10,331		10,295		10,041		10,284		10,045	
Pseudo R-sq	0.107		0.056		0.120		0.060		0.101	

Exponentiated coefficients (odds ratios); *p*-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 Results ordered logit regression in odds ratios: Number of social support providers by support dimension (model 4)

	Emotional Support		Instrumental Support		Informational Support		Appraisal Support		All Dimensions	
Migrant	**0.797****	(0.017)	**0.858**	(0.112)	**0.779****	(0.018)	**0.699*****	(0.000)	**0.787****	(0.013)
Intermed. gen. edu.	**1.296*****	(0.000)	**1.164*****	(0.003)	**1.238*****	(0.000)	**1.400*****	(0.000)	**1.354*****	(0.000)
Technical college	**1.341*****	(0.001)	**1.396*****	(0.000)	**1.353*****	(0.001)	**1.685*****	(0.000)	**1.730*****	(0.000)
Highest gen. edu.	**1.943*****	(0.000)	**1.605*****	(0.000)	**2.057*****	(0.000)	**2.125*****	(0.000)	**2.217*****	(0.000)
Other degree	1.067	(0.731)	1.024	(0.898)	1.074	(0.728)	0.829	(0.339)	1.005	(0.979)
Dropout, no degree	0.747	(0.189)	0.763	(0.222)	0.829	(0.453)	0.728	(0.156)	0.588**	(0.016)
University	**1.184*****	(0.004)	1.039	(0.518)	**1.263*****	(0.000)	1.068	(0.254)	**1.207*****	(0.001)
Mig.*Intermed. gen. edu.	1.022	(0.869)	0.826	(0.158)	1.171	(0.274)	1.140	(0.333)	0.976	(0.855)
Mig.*Technical college	1.053	(0.824)	0.825	(0.397)	1.483*	(0.095)	1.227	(0.378)	1.076	(0.747)
Mig.*Highest gen. edu.	0.880	(0.426)	0.816	(0.215)	1.012	(0.946)	0.996	(0.981)	0.831	(0.249)
Mig.*Other degree	0.826	(0.401)	0.945	(0.802)	1.278	(0.320)	0.922	(0.729)	0.849	(0.470)
Mig.*Dropout	0.730	(0.321)	0.708	(0.276)	0.668	(0.285)	0.805	(0.496)	0.783	(0.435)
Migrant*University	1.160	(0.256)	0.974	(0.840)	1.022	(0.873)	**1.314****	(0.042)	1.137	(0.327)
Male	0.618***	(0.000)	0.745***	(0.000)	0.950	(0.183)	0.830***	(0.000)	0.733***	(0.000)
Age group 26–35	0.855**	(0.033)	0.725***	(0.000)	0.356***	(0.000)	0.944	(0.434)	0.693***	(0.000)
Age group 36–45	0.585***	(0.000)	0.462***	(0.000)	0.145***	(0.000)	0.807***	(0.003)	0.469***	(0.000)
Age group 46–55	0.559***	(0.000)	0.393***	(0.000)	0.102***	(0.000)	0.747***	(0.000)	0.381***	(0.000)
Age group 56–64	0.468***	(0.000)	0.372***	(0.000)	0.0531***	(0.000)	0.585***	(0.000)	0.261***	(0.000)
Household income	1.006***	(0.002)	1.003	(0.131)	1.002	(0.247)	1.005***	(0.004)	1.008***	(0.000)
Perm. relationship	1.473***	(0.000)	1.675***	(0.000)	1.263***	(0.000)	1.204***	(0.001)	1.218***	(0.000)
Family size	1.041***	(0.000)	1.045***	(0.000)	1.020***	(0.000)	1.044***	(0.000)	1.070***	(0.000)
Squared family size	1.000***	(0.000)	1.000***	(0.000)	1.000***	(0.002)	1.000***	(0.000)	0.999***	(0.000)
Employed	1.154***	(0.002)	1.103**	(0.030)	1.404***	(0.000)	1.192***	(0.000)	1.359***	(0.000)
Volunteer Work	0.907***	(0.000)	0.868***	(0.000)	0.887***	(0.000)	0.862***	(0.000)	0.835***	(0.000)

Table 5 Results ordered logit regression in odds ratios: Number of social support providers by support dimension (model 4) *(Continued)*

	Emotional Support		Instrumental Support		Informational Support		Appraisal Support		All Dimensions	
Local politics	0.932*	(0.094)	0.915**	(0.034)	0.895**	(0.012)	0.906**	(0.017)	0.922*	(0.052)
Religious events	0.868***	(0.000)	0.875***	(0.000)	1.001	(0.964)	0.997	(0.879)	0.884***	(0.000)
Family in neighborhood	**1.277****	(0.035)	1.025	(0.829)	0.814	(0.105)	1.219*	(0.084)	1.239*	(0.054)
Family (in 15 min by foot)	**1.395*****	(0.001)	0.847*	(0.092)	0.724***	(0.004)	1.246**	(0.024)	1.124	(0.215)
Family (1 h drive)	0.974	(0.766)	0.688***	(0.000)	0.819**	(0.044)	1.027	(0.760)	0.933	(0.428)
Family in Germany	1.008	(0.952)	0.936	(0.616)	0.908	(0.492)	1.055	(0.677)	1.121	(0.376)
Family abroad	1.931	(0.253)	0.826	(0.745)	0.134*	(0.075)	1.177	(0.800)	0.870	(0.814)
N	10,331		10,303		10,041		10,284		10,337	
Pseudo R-sq	0.035		0.035		0.088		0.031		0.052	

Exponentiated coefficients (odds ratios); *p*-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

simultaneously (all models presented in Table 12 in the Appendix) as well as for emotional (Table 13 in the Appendix), informational (Table 15 in the Appendix) and appraisal support (Table 16 in the Appendix) The only exception is again instrumental support: For this type of social support the odds become insignificant once the variable for education has been introduced (model 1–4, Table 14 in the Appendix).

The impact of higher levels of general education on the probability of having access to a larger number of support givers is significantly positive for all support types. The odds of having access to a larger number of support persons is between 1.6 and 2.2 times the odds of the reference group for individuals holding the highest level of education. Similar results can be observed for graduates of intermediate general education or who obtained a certificate permitting them to study at a technical college. Following these results, the effect of education on the extent of the network is stronger than on the access to social support itself. Tertiary education, i.e. obtaining a university degree does only benefit in the dimensions of emotional and informational support. In these two dimensions, the odds are again significantly higher to have a larger support providing network measured in number of alters.

Similar to the presentation of the results in 4.1, we find no significant interaction effects of migrant background and school-leaving certificate on the number of support providing alters in the network. Again, with one exception: migrants with a university degree have a 1.40 higher probability of having a higher number of people providing appraisal support.

The remaining significant results do resemble the results already found in the first model, describing the access to social support.

Critical discussion of the empirical results

Our study explores the link between education and the access to social support, adding to the literature by distinguishing between four different dimensions as introduced by House (1981). Access to social support as well as the extent of the network demonstrate a positive education gradient within all dimensions, which means the results are in line with the theoretical argumentation that education has an additional beneficial impact through the channel of individuals' social networks.

We are partly able to confirm the hypothesis of a disadvantageous effect of migrant background on the number of social support providing people. Having a migrant background reduces the probability of having access to a larger number of support providers in almost all dimensions except for instrumental support. With respect to access in general, having a migrant background increases the probability to receive instrumental support, which is complementing the non-significant finding regarding the extent of the network within this dimension. However, the positive connection is dissolved once controlled for education: we find a negative impact of the interaction effect of education and migrant background. Following the underlying theoretical model, the results suggest a lower probability of having access to social support for migrants with a certain school-leaving certificate as compared to their native counterparts, but only regarding instrumental support.

Interpreting the lack of statistically significant odds ratios in the interaction variables of all other support dimensions, leads to concluding that there are no negative returns to education for migrants. Although migrants are worse off when it comes to the access to a larger support network, it does not seem to stem from a negative education effect. Migrants and natives alike benefit from a higher level of education, which increases

their access to social support as well as the number of support providing persons in their network. This finding is interesting and leaves room for further research.

Other control variables increase the access to social support as well. Having a permanent relationship, a larger household income and a larger family are all socio-demographic characteristics that lead to a higher probability to access social support as well as to a larger network providing all dimensions of social support. Our study, as a by-product, also confirms findings regarding the age of egos: having access to social support as well as being part of an extensive social network decreases over time. Social isolation therefore is more common with increasing age, as Fischer and Beresford (2015) find too. Furthermore, we find that men are less connected to their social networks. The gender dummy reports significant lower odds of having access to social support within all dimensions and of all dimensions simultaneously, except for informational support. This is in line with previous conducted research: Wöhler and Hinz (2007) also find that German men have fewer support providing persons in their network then women.

Additionally, we point out that the results of this study face the problem of endogeneity between education and social support. On the one hand, individuals who are equipped with a well-functioning social network will probably achieve higher levels of education because they are supported by their social ties. On the other hand education increases individuals' social capital by spreading social norms and responsibilities. Education therefore forms social skills and abilities that enable individuals to build up beneficial social relationships. The problem of endogeneity could have been circumvented by using panel regressions. Unfortunately, the information about individuals' social networks has just been collected in two waves of the G-SOEP, namely in 2006 and 2011, whereby the conception of the question module changed.[16] Thus, it is difficult to combine the data collected in 2006 and 2011, which leaves us with a solely cross-sectional dataset.

Summary and conclusion

Education is one of the key determinants of personal development. Overall, individuals with higher levels of education benefit in terms of better mental and physical health, more risk-adverse behavior, increased lifespan and well-being. One channel through which education unfolds its positive influence is social networks. They provide material and immaterial resources like social support, which in turn are positively affected by an increase in education. However, the direction of the effect does not remain the same if the population is divided into groups according to their geographical and/or cultural background. Several studies find a significantly smaller effect of education on health for migrants as compared to natives (Gorman et al. 2010; Walton et al. 2009). This finding can theoretically be explained by the lower ability of migrants to make use of their education. Another channel through which personal well-being is influenced is social support: having access to social support is vital for a successful acculturation with the host society (Ryan et al. 2008). To the best of our knowledge, no empirical evidence exists which examines whether the returns to education in form of social support are actually smaller for migrants than for natives. To close this gap, we therefore analyze the effect of education on the probability of having access to social support.

[16]In 2006 respondents could name up to three support persons, whereas in 2011 this number has been increased to a total of five support persons, which renders the analysis inconclusive.

Our findings indicate a positive link between education and the probability of having access to all types of social support: the odds ratio of individuals holding the highest level of general education are higher than the odds of the baseline group of individuals holding the lowest level of general education irrespective of the dimension of social support.

Since we find a negative relationship of migrant background in accessing social support as well as regarding the size of the network, we conclude that migrants are disadvantaged when it comes to receiving social support in Germany. However, we do not find any negative returns to education for migrants, demonstrated by the mediating effect of education and migrant background on access to social support and extent of social network. The odds ratio of the interaction effects of education and migrant background are not significantly different for emotional, appraisal and informational support as well as for all support dimensions simultaneously.

The only exception is instrumental support, which is, in our study, approximated by the question on help in times of need for longtime care. For migrants, holding the highest level of general education goes hand in hand with a reduction in odds of having access to instrumental support. Migrants, by leaving their home country, lose their original support network and have to build new relationships in the host country. This experience can lead to a lower amount of social capital in form of social networks (Ryan et al. 2008). Especially in dimensions where the need for physical presence is high, migrants display a lower amount of providers of these services. As instrumental support is queried in terms of care within the SOEP questionnaire, this question implies geographical closeness of the care-giver and therefore cannot be provided by a network living outside of the ego's country of residence (Willmott 1987). This study therefore sheds some light on the question why migrants experience lower returns to education than natives in form of better mental and physical health as instrumental support is directly related to care giving in times of illness or need for long-term care.

As we are not entirely confident why migrants who hold the highest level of general education face a reduction in their probability to have access to instrumental support, we ask for additional theoretical and empirical research.

By basing our empirical estimations on the SOEP dataset, we broaden the literature on social network analysis and education regarding non-US studies. Being able to draw country comparisons in a further step, investigations on the cultural differences between countries regarding the evolution of society are made possible. Especially with respect to the development of social isolation and integration of migrant population into host societies, these analyses can provide valuable insights for policy makers. Integrating advancements in communication and transportation technologies enables to depict a more accurate current state of the state of a society's social capital.

Further research should also address the question of which types of how the different social support dimensions affect individuals and how they benefit from a higher amount of these.

Concluding, we want to answer the question posed in the title "Do migrants benefit as much as natives?" with a yes, as we do not find negative returns to education for migrants. However, there is still ample ground for research within the topic of benefits of education and migration, which will increase the understanding of the effect of migration experience on the personal and social outcomes of migrants.

Appendix

Table 6 Covariates

Variable	Type	Characteristics	Description
Migrant	Dummy variable	1=Migrant and 0=Native	The variable Migrant takes the value one if the respondent is not born in Germany, born in Germany but not having German citizenship or having at least one parent not born in Germany or not holding the German citizenship, or if his place of birth is not known. The variable is zero for respondents born in Germany and whose both parents are born in Germany and holding German citizenship.
Education	Six dummy variables	Intermediate general education; Technical college; Highest general education; Other school leaving degree; Drop out, no school leaving degree; University	The corresponding variable is one for the highest level of completed school degree or completed higher education and zero otherwise.
Sex	Dummy variable	1=male and 0=female	
Age group	Five dummy variables	1. Group: Age 16-25; 2. Group: Age 26-35; 3. Group: Age 36-45; 4. Group: Age 46-55; 5. Group: Age 56-64	The corresponding variable is one if the respondents' age is covered by the corresponding age group and zero otherwise.
Household income	Continuous variable	$Household\ income = \frac{Monthly\ household\ net\ income}{1 + 0.5 * Adults + 0.3 * Kids}$	The variable household income refers to the equivalent household income in 100 Euro and is calculated using modified OECD equivalence weights. with adults being the number of adults living in the household in addition to the respondent and kids being number of children younger age 14 living in the household.
Permanent relationship	Dummy variable	1=In permanent relationship and 0=Single	The takes the value one if the respondent is married, in a registered partnership and lives together with his spouse or partner or lives in a serious permanent relationship and zero otherwise.
Family size	Continuous variable		We adjust this number of named relatives if a family member is mentioned to be support giver in one of the four support dimensions but not as an existing family member. For these cases we increase the number of family members by one unit. We do not adjust the number of family members if question regarding the number of relatives is not answered.
Squared family size	Continuous variable	$Squared\ family\ size = (Family\ size)^2$	
Employment status	Dummy variable	1=Employed and 0=Unemployed	I just differentiate between employed, independent of working hours, and not employed by using a dummy variable that takes the value one if a person is employed and zero otherwise.
Volunteer work	Ordinal variable	1= Dayly participation, 2=Participation at least once a week, 3= Participation at least once a month, 4= Participation less frequently	The variables reflect the respondents' frequency of performance of volunteer work, participation in local politics, and attendance of church or other religious events. Each variable contains four characteristics: daily, at least once a week, at least once a month, and less frequently. Therefore, an increase in the value of one of these variables means a reduction in the frequency of participation in the corresponding activity.
Local politics	Ordinal variable		
Religious events	Ordinal variable		
Minimum spatial distance of relatives	Six dummy variables	Special distance categories: 1. Family in the same household or house, 2. Family in neighborhood, 3. Family in 15 minutes walking distance, 4. Family within one hour drive, 5. Family in Germany, 6. Family abroad	Each dummy variable is one if the respondent has a relative in the corresponding distance but not in a smaller distance category and zero otherwise.

Table 7 Results logit regression for access to social support in odds ratios (model 0–4), all types simultaneous

Access to all support	Model 0		Model 1		Model 2		Model 3		Model 4	
Migrant	**0.748*** **	(0.000)	0.819*	(0.077)	0.803*	(0.057)	0.824*	(0.094)	0.816*	(0.094)
Intermed. gen. edu.			**1.254*** **	(0.000)	**1.259*** **	(0.000)	**1.220*** **	(0.002)	**1.217*** **	(0.002)
Technical college			**1.232** **	(0.045)	**1.241** **	(0.041)	1.194*	(0.095)	1.201*	(0.095)
Highest gen. edu.			**1.654*** **	(0.000)	**1.711*** **	(0.000)	**1.683*** **	(0.000)	**1.686*** **	(0.000)
Other degree			0.999	(0.995)	1.033	(0.886)	1.066	(0.781)	1.068	(0.781)
Dropout			0.964	(0.888)	0.979	(0.937)	1.028	(0.918)	1.023	(0.918)
University			**1.471*** **	(0.000)	**1.455*** **	(0.000)	**1.401*** **	(0.000)	**1.394*** **	(0.000)
Mig.*Intermed. gen. edu.			1.057	(0.725)	1.127	(0.454)	1.126	(0.461)	1.139	(0.461)
Mig.*Technical college			1.098	(0.727)	1.159	(0.586)	1.166	(0.573)	1.153	(0.573)
Mig.*Highest gen. edu.			0.963	(0.847)	0.929	(0.707)	0.969	(0.874)	0.981	(0.874)
Mig.*Other degree			1.052	(0.848)	0.978	(0.935)	1.018	(0.949)	1.025	(0.949)
Mig.*Dropout			0.517	(0.103)	0.464*	(0.061)	0.476*	(0.072)	0.485*	(0.072)
Migrant*University			0.876	(0.399)	0.888	(0.457)	0.858	(0.337)	0.870	(0.337)
Male	0.908**	(0.018)	0.931*	(0.089)	0.966	(0.415)	0.899**	(0.016)	0.900**	(0.016)
Age group 26–35	0.736***	(0.000)	0.671***	(0.000)	0.560***	(0.000)	0.534***	(0.000)	0.551***	(0.000)
Age group 36–45	0.409***	(0.000)	0.411***	(0.000)	0.331***	(0.000)	0.306***	(0.000)	0.315***	(0.000)
Age group 46–55	0.286***	(0.000)	0.290***	(0.000)	0.241***	(0.000)	0.221***	(0.000)	0.229***	(0.000)
Age group 56–64	0.136***	(0.000)	0.140***	(0.000)	0.119***	(0.000)	0.121***	(0.000)	0.126***	(0.000)
Household income	1.019***	(0.000)	1.008***	(0.000)	1.006***	(0.007)	1.003	(0.229)	1.003	(0.229)
Perm. relationship					1.856***	(0.000)	1.810***	(0.000)	1.657***	(0.000)
Family size					1.031***	(0.000)	1.029***	(0.000)	1.028***	(0.000)
Squared family size					1.000***	(0.008)	1.000***	(0.008)	1.000***	(0.008)
Employed							1.536***	(0.000)	1.542***	(0.000)
Volunteer Work							0.890***	(0.000)	0.890***	(0.000)

Table 7 Results logit regression for access to social support in odds ratios (model 0–4), all types simultaneous *(Continued)*

Access to all support	Model 0		Model 1		Model 2		Model 3		Model 4	
Local politics							0.949	(0.298)	0.952	(0.298)
Religious events							1.009	(0.722)	1.014	(0.722)
Family in neighborhood									0.744**	(0.037)
Family (in 15 min by foot)									0.744**	(0.016)
Family (1 h drive)									0.819*	(0.075)
Family in Germany									0.945	(0.726)
Family abroad									0.244	(0.210)
N	10,874		10,172		10,111		10,057		10,045	
Pseudo R-sq	0.072		0.082		0.094		0.100		0.101	

Exponentiated coefficients (odds ratios) reported; *p*-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8 Results logit regression for access to social support in odds ratios (model 0–4), emotional support

Access to emotional support	Model 0		Model 1		Model 2		Model 3		Model 4	
Migrant	**0.774****	(0.026)	0.748	(0.158)	0.758	(0.198)	0.777	(0.249)	0.793	(0.292)
Intermed. gen. edu.			**1.257***	(0.079)	**1.287***	(0.059)	**1.285***	(0.061)	**1.294***	(0.055)
Technical college			**1.244**	(0.393)	**1.280**	(0.341)	1.266	(0.363)	1.263	(0.369)
Highest gen. edu.			**2.177*****	(0.000)	**2.402*****	(0.000)	**2.381*****	(0.000)	**2.338*****	(0.000)
Other degree			0.908	(0.839)	1.031	(0.949)	1.059	(0.906)	1.057	(0.908)
Dropout			0.978	(0.963)	1.108	(0.835)	1.136	(0.796)	0.131	(0.802)
University			**1.529****	(0.047)	**1.473***	(0.073)	**1.449***	(0.087)	**1.450***	(0.087)
Mig.*Intermed. gen. edu.			1.086	(0.797)	1.079	(0.819)	1.027	(0.936)	1.009	(0.979)
Mig.*Technical college			1.049	(0.937)	1.085	(0.895)	1.031	(0.961)	1.041	(0.948)
Mig.*Highest gen. edu.			0.820	(0.667)	0.738	(0.517)	0.702	(0.450)	0.707	(0.461)
Mig.*Other degree			1.573	(0.415)	1.126	(0.834)	1.032	(0.957)	1.022	(0.970)
Mig.*Dropout			1.052	(0.939)	0.696	(0.597)	0.670	(0.561)	0.653	(0.535)
Migrant*University			0.922	(0.843)	1.041	(0.923)	1.064	(0.882)	1.031	(0.941)
Male	0.423***	(0.000)	0.429***	(0.000)	0.426***	(0.002)	0.423***	(0.000)	0.417***	(0.000)
Age group 26–35	1.559**	(0.017)	1.425*	(0.091)	0.931	(0.743)	0.947	(0.803)	0.905	(0.654)
Age group 36–45	1.174	(0.316)	1.192	(0.346)	0.681*	(0.051)	0.675**	(0.048)	0.642	(0.029)
Age group 46–55	1.015	(0.921)	1.057	(0.761)	0.651**	(0.024)	0.645**	(0.022)	0.613	(0.014)
Age group 56–64	0.689**	(0.013)	0.718	(0.071)	0.462***	(0.000)	0.465***	(0.000)	0.434***	(0.000)
Household income	1.049***	(0.000)	1.034***	(0.000)	1.019***	(0.006)	1.016**	(0.021)	1.017**	(0.017)
Perm. relationship					4.032***	(0.000)	3.910***	(0.000)	4.225***	(0.000)
Family size					1.034***	(0.001)	1.031***	(0.004)	1.031***	(0.004)
Squared family size					1.000***	(0.132)	1.000***	(0.168)	1.000***	(0.175)
Employed							1.120	(0.385)	1.126	(0.339)
Volunteer Work							0.951	(0.401)	0.952	(0.412)

Table 8 Results logit regression for access to social support in odds ratios (model 0–4), emotional support *(Continued)*

Access to emotional support	Model 0	Model 1	Model 2	Model 3		Model 4	
Local politics				0.970	(0.822)	0.970	(0.819)
Religious events				0.878*	(0.057)	0.874**	(0.048)
Family in neighborhood						1.075	(0.773)
Family (in 15 min by foot)						1.374	(0.161)
Family (1 h drive)						1.071	(0.734)
Family in Germany						1.310	(0.397)
Family abroad						0.958	(0.970)
N	11,183	10,465	10,399	10,343		10,311	
Pseudo R-sq	0.044	0.056	0.105	0.107		0.107	

Exponentiated coefficients (odds ratios) reported; *p*-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9 Results logit regression for access to social support in odds ratios (model 0–4), instrumental support

Access to instrumental support	Model 0		Model 1		Model 2		Model 3		Model 4	
Migrant	1.058	(0.576)	**1.552****	(0.047)	**1.668****	(0.027)	**1.630****	(0.035)	**1.605****	(0.042)
Intermed. gen. edu.			1.206*	(0.074)	1.224*	(0.059)	**1.275****	(0.034)	**1.255****	(0.036)
Technical college			1.469*	(0.061)	1.493*	(0.053)	1.468*	(0.064)	1.497*	(0.053)
Highest gen. edu.			**1.618*****	(0.002)	**1.761*****	(0.000)	**1.706*****	(0.001)	**1.718*****	(0.001)
Other degree			1.099	(0.815)	1.189	(0.672)	1.199	(0.658)	1.221	(0.627)
Dropout			1.121	(0.792)	1.238	(0.629)	1.270	(0.589)	1.277	(0.582)
University			1.239	(0.140)	1.198	(0.218)	1.216	(0.186)	1.206	(0.206)
Mig.*Intermed. gen. edu.			**0.537****	(0.033)	**0.523****	(0.033)	**0.502****	(0.024)	**0.514****	(0.029)
Mig.*Technical college			0.792	(0.694)	0.797	(0.707)	0.793	(0.701)	0.773	(0.670)
Mig.*Highest gen. edu.			**0.428****	(0.020)	**0.356*****	(0.006)	**0.348*****	(0.005)	**0.355*****	(0.006)
Mig.*Other degree			0.730	(0.523)	0.558	(0.248)	0.531	(0.210)	0.507	(0.180)
Mig.*Dropout			0.399	(0.125)	0.272**	(0.034)	0.264**	(0.030)	0.258**	(0.028)
Migrant*University			1.031	(0.921)	1.091	(0.780)	1.121	(0.715)	1.115	(0.728)
Male	0.709***	(0.000)	0.719***	(0.000)	0.751***	(0.000)	0.760***	(0.001)	0.762***	(0.001)
Age group 26–35	1.146	(0.353)	1.187	(0.298)	0.892	(0.501)	0.934	(0.690)	1.008	(0.965)
Age group 36–45	0.931	(0.585)	1.025	(0.872)	0.711**	(0.031)	0.720**	(0.039)	0.785	(0.131)
Age group 46–55	0.826	(0.127)	0.926	(0.602)	0.683**	(0.013)	0.691**	(0.017)	0.769*	(0.092)
Age group 56–64	0.820	(0.132)	0.950	(0.738)	0.738*	(0.061)	0.713**	(0.037)	0.815	(0.218)
Household income	1.013***	(0.001)	1.005	(0.236)	0.999	(0.724)	0.998**	(0.662)	0.998	(0.658)
Perm. relationship					2.816***	(0.000)	2.750***	(0.000)	2.280***	(0.000)
Family size					1.042***	(0.000)	1.038***	(0.000)	1.037***	(0.000)
Squared family size					1.000***	(0.055)	1.000***	(0.078)	1.000***	(0.083)
Employed							0.951	(0.623)	0.948	(0.602)
Volunteer Work							0.934	(0.142)	0.937	(0.164)

Table 9 Results logit regression for access to social support in odds ratios (model 0–4), instrumental support *(Continued)*

Access to instrumental support	Model 0	Model 1	Model 2	Model 3		Model 4	
Local politics				1.026	(0.798)	1.021	(0.838)
Religious events				0.788***	(0.000)	0.796**	(0.000)
Family in neighborhood						0.758	(0.177)
Family (in 15 min by foot)						0.693**	(0.031)
Family (1 h drive)						0.561***	(0.000)
Family in Germany						0.896	(0.659)
Family abroad							
N	11,149	10,435	10,371	10,315		10,295	
Pseudo R-sq	0.007	0.013	0.047	0.053		0.056	

Exponentiated coefficients (odds ratios) reported; p-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10 Results logit regression for access to social support in odds ratios (model 0–4), informational support

Access to informational support	Model 0		Model 1		Model 2		Model 3		Model 4	
Migrant	**0.858*** **	(0.006)	0.814*	(0.072)	0.809*	(0.068)	0.821*	(0.092)	0.809*	(0.071)
Intermed. gen. edu.			**1.222*** **	(0.001)	**1.229*** **	(0.001)	**1.187*** **	(0.007)	**1.187*** **	(0.007)
Technical college			1.211*	(0.076)	1.222*	(0.065)	1.181	(0.128)	1.189	(0.112)
Highest gen. edu.			**1.632*** **	(0.000)	**1.680*** **	(0.000)	**1.649*** **	(0.000)	**1.667*** **	(0.000)
Other degree			1.071	(0.765)	1.116	(0.638)	1.153	(0.544)	1.155	(0.540)
Dropout			0.914	(0.735)	0.926	(0.776)	0.969	(0.908)	0.965	(0.897)
University			**1.392*** **	(0.000)	**1.378*** **	(0.000)	**1.336*** **	(0.000)	**1.329*** **	(0.000)
Mig.*Intermed. gen. edu.			1.142	(0.411)	1.205**	(0.255)	1.215	(0.239)	1.235	(0.202)
Mig.*Technical college			1.461	(0.192)	1.499	(0.165)	1.516	(0.159)	1.505	(0.166)
Mig.*Highest gen. edu.			1.099	(0.644)	1.064	(0.763)	1.093	(0.667)	1.119	(0.587)
Mig.*Other degree			1.305	(0.330)	1.214	(0.485)	1.239	(0.444)	1.244	(0.436)
Mig.*Dropout			0.564	(0.149)	0.522	(0.105)	0.536	(0.123)	0.550	(0.141)
Migrant*University			0.923	(0.621)	0.937	(0.693)	0.920	(0.612)	0.918	(0.605)
Male	0.982	(0.664)	1.002	(0.966)	1.025	(0.582)	0.965	(0.429)	0.968	(0.475)
Age group 26–35	0.445***	(0.000)	0.419***	(0.000)	0.361***	(0.000)	0.340***	(0.000)	0.358***	(0.000)
Age group 36–45	0.212***	(0.000)	0.218***	(0.000)	0.183***	(0.000)	0.166***	(0.000)	0.174***	(0.000)
Age group 46–55	0.141***	(0.000)	0.147***	(0.000)	0.126***	(0.000)	0.114***	(0.000)	0.120***	(0.000)
Age group 56–64	0.066***	(0.000)	0.0696***	(0.000)	0.0605***	(0.000)	0.0605***	(0.000)	0.0647***	(0.000)
Household income	1.022***	(0.000)	1.011***	(0.000)	1.009***	(0.000)	1.005**	(0.020)	1.005**	(0.028)
Perm. relationship					1.647***	(0.000)	1.608***	(0.000)	1.398***	(0.000)
Family size					1.019***	(0.000)	1.018***	(0.000)	1.017***	(0.000)
Squared family size					1.000**	(0.013)	1.000**	(0.016)	1.000**	(0.016)
Employed							1.553***	(0.000)	1.556***	(0.000)
Volunteer Work							0.926***	(0.001)	0.927***	(0.002)

Table 10 Results logit regression for access to social support in odds ratios (model 0–4), informational support *(Continued)*

Access to informational support	Model 0	Model 1	Model 2	Model 3		Model 4	
Local politics				0.956	(0.377)	0.958	(0.407)
Religious events				0.996	(0.894)	1.001	(0.961)
Family in neighborhood						0.778*	(0.078)
Family (in 15 min by foot)						0.648***	(0.000)
Family (1 h drive)						0.778**	(0.028)
Family in Germany						0.769	(0.118)
Family abroad						0.135*	(0.076)
N	10,868	10,163	10,107	10,053		10,041	
Pseudo R-sq	0.105	0.107	0.113	0.119		0.120	

Exponentiated coefficients (odds ratios) reported; p-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11 Results logit regression for access to social support in odds ratios (model 0–4), appraisal support

Access to appraisal support	Model 0		Model 1		Model 2		***Model 3***		***Model 4***	
Migrant	**0.543*** **	(0.000)	0.767*	(0.084)	0.745*	(0.061)	0.775	(0.107)	0.774	(0.105)
Intermed. gen. edu.			**1.421*** **	(0.000)	**1.417*** **	(0.000)	**1.397*** **	(0.001)	**1.385*** **	(0.001)
Technical college			**1.978*** **	(0.001)	**1.973*** **	(0.001)	**1.876*** **	(0.002)	**1.870*** **	(0.002)
Highest gen. edu.			**2.108*** **	(0.000)	**2.118*** **	(0.000)	**2.046*** **	(0.000)	**2.012*** **	(0.000)
Other degree			0.762	(0.380)	0.762	(0.386)	0.773	(0.414)	0.775	(0.419)
Dropout			0.768	(0.434)	0.789	(0.486)	0.830	(0.585)	0.829	(0.584)
University			**1.333** **	(0.041)	1.312*	(0.055)	1.279*	(0.086)	1.273*	(0.092)
Mig.*Intermed. gen. edu.			1.049	(0.838)	1.072	(0.769)	1.043	(0.859)	1.053	(0.829)
Mig.*Technical college			0.537	(0.126)	0.563	(0.163)	0.528	(0.190)	0.573	(0.178)
Mig.*Highest gen. edu.			0.720	(0.270)	0.682	(0.201)	0.715	(0.269)	0.712	(0.263)
Mig.*Other degree			0.760	(0.448)	0.689	(0.310)	0.724	(0.382)	0.735	(0.404)
Mig.*Dropout			0.941	(0.896)	0.753	(0.552)	0.766	(0.578)	0.769	(0.584)
Migrant*University			1.029	(0.907)	1.076	(0.764)	1.016	(0.950)	1.054	(0.832)
Male	0.743***	(0.000)	0.765***	(0.000)	0.800***	(0.002)	0.753***	(0.000)	0.752***	(0.000)
Age group 26–35	1.428***	(0.003)	1.296*	(0.065)	1.139	(0.367)	1.161	(0.305)	1.164	(0.300)
Age group 36–45	1.312**	(0.014)	1.335**	(0.027)	1.161	(0.276)	1.159	(0.286)	1.169	(0.262)
Age group 46–55	1.067	(0.534)	1.116	(0.386)	1.018	(0.891)	1.026	(0.848)	1.036	(0.795)
Age group 56–64	0.961	(0.714)	1.095	(0.495)	1.048	(0.734)	1.069	(0.635)	1.080	(0.588)
Household income	1.021***	(0.000)	1.006	(0.138)	1.004	(0.340)	1.002	(0.539)	1.003	(0.429)
Perm. relationship					1.525***	(0.000)	1.512***	(0.000)	1.479***	(0.000)
Family size					1.057***	(0.000)	1.056***	(0.000)	1.056***	(0.000)
Squared family size					1.000***	(0.000)	1.000***	(0.000)	1.000***	(0.000)
Employed							1054	(0.545)	1.056	(0.000)
Volunteer Work							0.792***	(0.000)	0.787***	(0.000)

Table 11 Results logit regression for access to social support in odds ratios (model 0–4), appraisal support *(Continued)*

Access to appraisal support	Model 0	Model 1	Model 2	***Model 3***		***Model 4***	
Local politics				0.833*	(0.099)	0.838	(0.109)
Religious events				1.086*	(0.056)	1.091**	(0.043)
Family in neighborhood						0.958	(0.835)
Family (in 15 min by foot)						0.942	(0.732)
Family (1 h drive)						0.826	(0.218)
Family in Germany						1.336	(0.293)
Family abroad						0.812	(0.807)
N	11,129	10,416	10,353	10,296		10,284	
Pseudo R-sq	0.020	0.035	0.052	0.059		0.060	

Exponentiated coefficients (odds ratios) reported; *p*-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12 Results ordered logit regression for number of social support providing people in odds ratios (model 0–4), all types simultaneous

Number of all types of support persons	Model 0		Model 1		Model 2		Model 3		Model 4	
Migrant	**0.680*** **	(0.000)	**0.817** **	(0.032)	**0.775*** **	(0.008)	**0.784** **	(0.011)	**0.787** **	(0.013)
Intermed. gen. edu.			**1.382*** **	(0.000)	**1.386*** **	(0.000)	**1.353*** **	(0.000)	**1.354*** **	(0.000)
Technical college			**1.779*** **	(0.000)	**1.815***	(0.000)	1.735***	(0.000)	1.730	(0.000)
Highest gen. edu.			**2.250*** **	(0.000)	**2.295*** **	(0.000)	**2.223*** **	(0.000)	**2.217*** **	(0.000)
Other degree			0.952	(0.792)	0.992	(0.967)	1.008	(0.968)	1.005	(0.979)
Dropout			**0.512*** **	(0.002)	**0.554*** **	(0.007)	**0.588** **	(0.016)	**0.588** **	(0.016)
University			**1.267*** **	(0.000)	**1.263*** **	(0.000)	**1.208*** **	(0.001)	**1.207*** **	(0.001)
Mig.*Intermed. gen. edu.			0.941	(0.643)	0.994	(0.962)	0.979	(0.876)	0.976	(0.855)
Mig.*Technical college			0.994	(0.977)	1.083	(0.723)	1.072	(0.760)	1.076	(0.747)
Mig.*Highest gen. edu.			0.847	(0.295)	0.826	(0.232)	0.838	(0.270)	0.831	(0.249)
Mig.*Other degree			0.900	(0.637)	0.826	(0.232)	0.841	(0.443)	0.849	(0.470)
Mig.*Dropout			1.037	(0.907)	0.787	(0.444)	0.788	(0.448)	0.783	(0.435)
Migrant*University			1.150	(0.279)	1.144	(0.300)	1.136	(0.328)	1.137	(0.327)
Male	0.734***	(0.000)	0.733***	(0.000)	0.771***	(0.000)	0.734***	(0.000)	0.733***	(0.000)
Age group 26–35	0.445***	(0.000)	0.419***	(0.000)	0.361***	(0.000)	0.340***	(0.000)	0.358***	(0.000)
Age group 36–45	0.212***	(0.010)	0.218***	(0.000)	0.183***	(0.000)	0.166***	(0.000)	0.174***	(0.000)
Age group 46–55	0.141***	(0.000)	0.147***	(0.000)	0.126***	(0.000)	0.114***	(0.000)	0.120***	(0.000)
Age group 56–64	0.066***	(0.000)	0.0696***	(0.000)	0.0605***	(0.000)	0.0605***	(0.000)	0.0647***	(0.000)
Household income	1.022***	(0.000)	1.010***	(0.000)	1.011***	(0.000)	1.008**	(0.000)	1.008**	(0.000)
Perm. relationship					1.224***	(0.000)	1.183***	(0.000)	1.218***	(0.000)
Family size					1.076***	(0.000)	1.070***	(0.000)	1.070***	(0.000)
Squared family size					0.999**	(0.000)	0.999**	(0.000)	0.999**	(0.000)
Employed							1.355***	(0.000)	1.359***	(0.000)
Volunteer Work							0.836***	(0.000)	0.835***	(0.000)

Table 12 Results ordered logit regression for number of social support providing people in odds ratios (model 0–4), all types simultaneous *(Continued)*

Number of all types of support persons	Model 0	Model 1	Model 2	Model 3		Model 4	
Local politics				0.918**	(0.042)	0.922*	(0.052)
Religious events				0.884***	(0.000)	0.884***	(0.000)
Family in neighborhood						1.239*	(0.054)
Family (in 15 min by foot)						1.124	(0.215)
Family (1 h drive)						0.933	(0.428)
Family in Germany						1.121	(0.376)
Family abroad						0.870	(0.814)
N	11,188	10,471	10,406	10,349		10,337	
Pseudo R-sq	0.023	0.034	0.045	0.051		0.052	

Exponentiated coefficients (odds ratios) reported; *p*-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13 Results ordered logit regression for number of social support providing people in odds ratios (model 0–4), emotional support

Number of emotional support persons	Model 0		Model 1		Model 2		Model 3		Model 4	
Migrant	**0.748*** **	(0.000)	**0.810** **	(0.026)	**0.787** **	(0.012)	**0.792** **	(0.014)	**0.797** **	(0.017)
Intermed. gen. edu.			**1.297*** **	(0.000)	**1.300*** **	(0.000)	**1.292*** **	(0.000)	**1.296*** **	(0.000)
Technical college			**1.379*** **	(0.000)	**1.379*** **	(0.000)	**1.344*** **	(0.000)	**1.341*** **	(0.001)
Highest gen. edu.			**1.963*** **	(0.000)	**2.008*** **	(0.000)	**1.946*** **	(0.000)	**1.943*** **	(0.000)
Other degree			0.973	(0.883)	1.060	(0.760)	1.075	(0.705)	1.067	(0.731)
Dropout			0.628**	(0.033)	0.674*	(0.073)	0.741	(0.177)	0.747	(0.189)
University			**1.218*** **	(0.001)	**1.206*** **	(0.001)	**1.181*** **	(0.004)	**1.184*** **	(0.004)
Mig.*Intermed. gen. edu.			1.024	(0.855)	1.064	(0.641)	1.034	(0.802)	1.022	(0.869)
Mig.*Technical college			0.999	(0.998)	1.082	(0.732)	1.041	(0.862)	1.053	(0.824)
Mig.*Highest gen. edu.			0.930	(0.648)	0.898	(0.499)	0.892	(0.477)	0.880	(0.426)
Mig.*Other degree			0.951	(0.823)	0.845	(0.458)	0.825	(0.398)	0.826	(0.401)
Mig.*Dropout			0.985	(0.960)	0.806	(0.496)	0.754	(0.372)	0.730	(0.321)
Migrant*University			1.164	(0.241)	1.173	(0.222)	1.169	(0.232)	1.160	(0.256)
Male	0.619***	(0.000)	0.613***	(0.000)	0.634***	(0.000)	0.620***	(0.000)	0.618***	(0.000)
Age group 26–35	0.979	(0.729)	0.940	(0.382)	0.859**	(0.035)	0.870*	(0.056)	0.855**	(0.033)
Age group 36–45	0.657***	(0.000)	0.689***	(0.000)	0.617***	(0.000)	0.596***	(0.000)	0.585***	(0.000)
Age group 46–55	0.592***	(0.000)	0.639***	(0.000)	0.595***	(0.000)	0.572***	(0.000)	0.559***	(0.000)
Age group 56–64	0.445***	(0.000)	0.504***	(0.000)	0.492***	(0.000)	0.481***	(0.000)	0.468***	(0.000)
Household income	1.018***	(0.000)	1.007***	(0.000)	1.006***	(0.000)	1.005***	(0.004)	1.006**	(0.002)
Perm. relationship					1.430***	(0.000)	1.391***	(0.000)	1.437***	(0.000)
Family size					1.045***	(0.000)	1.041***	(0.000)	1.041***	(0.000)
Squared family size					1.000***	(0.000)	1.000***	(0.000)	1.000***	(0.000)
Employed							1.153***	(0.002)	1.154***	(0.002)
Volunteer Work							0.907***	(0.000)	0.907***	(0.000)

Table 13 Results ordered logit regression for number of social support providing people in odds ratios (model 0–4), emotional support *(Continued)*

Number of emotional support persons	Model 0	Model 1	Model 2	Model 3		Model 4	
Local politics				0.930*	(0.084)	0.932*	(0.094)
Religious events				0.869***	(0.000)	0.868***	(0.000)
Family in neighborhood						1.277**	(0.035)
Family (in 15 min by foot)						1.395***	(0.001)
Family (1 h drive)						0.974	(0.766)
Family in Germany						1.008	(0.952)
Family abroad						1.931	(0.253)
N	11,183	10,465	10,399	10,343		10,311	
Pseudo R-sq	0.016	0.025	0.031	0.035		0.035	

Exponentiated coefficients (odds ratios) reported; p-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14 Results ordered logit regression for number of social support providing people in odds ratios (model 0–4), instrumental support

Number of instrumental support persons	Model 0		Model 1		Model 2		Model 3		Model 4	
Migrant	**0.754*** **	(0.000)	0.880	(0.177)	0.864	(0.127)	0.866	(0.136)	0.858	(0.112)
Intermed. gen. edu.			**1.172*** **	(0.002)	**1.175*** **	(0.002)	**1.169*** **	(0.003)	**1.164*** **	(0.003)
Technical college			**1.418*** **	(0.000)	**1.444*** **	(0.000)	**1.390*** **	(0.000)	**1.396*** **	(0.000)
Highest gen. edu.			**1.619*** **	(0.000)	**1.672*** **	(0.000)	**1.594*** **	(0.000)	**1.605*** **	(0.000)
Other degree			0.959	(0.821)	1.008	(0.967)	1.016	(0.913)	1.024	(0.898)
Dropout			0.655*	(0.050)	0.723	(0.138)	0.761	(0.216)	0.763	(0.222)
University			1.077	(0.205)	1.063	(0.299)	1.043	(0.479)	1.039	(0.518)
Mig.*Intermed. gen. edu.			0.806	(0.105)	0.837	(0.186)	0.815	(0.130)	0.826	(0.158)
Mig.*Technical college			0.765	(0.230)	0.801	(0.324)	0.823	(0.393)	0.825	(0.397)
Mig.*Highest gen. edu.			0.845	(0.296)	0.802	(0.174)	0.814	(0.206)	0.816	(0.215)
Mig.*Other degree			1.036	(0.876)	0.924	(0.725)	0.948	(0.815)	0.945	(0.802)
Mig.*Dropout			0.916	(0.777)	0.716	(0.288)	0.711	(0.282)	0.708	(0.276)
Migrant*University			0.975	(0.845)	0.976	(0.851)	0.967	(0.797)	0.974	(0.840)
Male	0.732***	(0.000)	0.729***	(0.000)	0.763***	(0.000)	0.745***	(0.000)	0.745***	(0.000)
Age group 26–35	0.858**	(0.014)	0.824**	(0.007)	0.695***	(0.000)	0.712***	(0.000)	0.725***	(0.000)
Age group 36–45	0.562***	(0.000)	0.577***	(0.000)	0.468***	(0.000)	0.455***	(0.000)	0.462***	(0.000)
Age group 46–55	0.448***	(0.000)	0.471***	(0.000)	0.400***	(0.000)	0.386***	(0.000)	0.393***	(0.000)
Age group 56–64	0.387***	(0.000)	0.417***	(0.000)	0.373***	(0.000)	0.316***	(0.000)	0.372***	(0.000)
Household income	1.012***	(0.000)	1.005***	(0.002)	1.004**	(0.023)	1.003	(0.121)	1.003	(0.131)
Perm. relationship					1.846***	(0.000)	1.801***	(0.000)	1.675***	(0.000)
Family size					1.051***	(0.000)	1.045***	(0.000)	1.045***	(0.000)
Squared family size					1.000***	(0.000)	1.000***	(0.000)	1.000***	(0.000)
Employed							1.103**	(0.031)	1.103**	(0.030)
Volunteer Work							0.867***	(0.000)	0.868***	(0.000)

Table 14 Results ordered logit regression for number of social support providing people in odds ratios (model 0–4), instrumental support *(Continued)*

Number of instrumental support persons	Model 0	Model 1	Model 2	Model 3		Model 4	
Local politics				0.915**	(0.036)	0.915**	(0.034)
Religious events				0.871***	(0.000)	0.875***	(0.000)
Family in neighborhood						1.025	(0.829)
Family (in 15 min by foot)						0.847*	(0.092)
Family (1 h drive)						0.688***	(0.000)
Family in Germany						0.936	(0.616)
Family abroad						0.826	(0.745)
N	11,149	10,435	10,371	10,315		10,303	
Pseudo R-sq	0.014	0.018	0.030	0.034		0.035	

Exponentiated coefficients (odds ratios) reported; *p*-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15 Results ordered logit regression for number of social support providing people in odds ratios (model 0–4), informational support

Number of informational support persons	Model 0		Model 1		Model 2		Model 3		Model 4	
Migrant	**0.773*** **	(0.000)	0.781**	(0.017)	0.775**	(0.015)	0.789**	(0.024)	0.779**	(0.018)
Intermed. gen. edu.			**1.270*** **	(0.000)	**1.278*** **	(0.000)	**1.240*** **	(0.000)	**1.238*** **	(0.000)
Technical college			**1.387*** **	(0.000)	**1.399*** **	(0.000)	**1.344*** **	(0.001)	**1.353*** **	(0.001)
Highest gen. edu.			**2.048*** **	(0.000)	**2.089*** **	(0.000)	**2.042*** **	(0.000)	**2.057*** **	(0.000)
Other degree			0.980	(0.918)	1.023	(0.911)	1.071	(0.738)	1.074	(0.728)
Dropout			0.747	(0.226)	0.771	(0.289)	0.833	(0.646)	0.829	(0.453)
University			**1.328*** **	(0.000)	**1.317*** **	(0.000)	**1.271*** **	(0.000)	**1.263*** **	(0.000)
Mig.*Intermed. gen. edu.			1.101	(0.500)	1.155	(0.318)	1.158	(0.309)	1.171	(0.274)
Mig.*Technical college			1.407	(0.143)	1.470	(0.100)	1.490*	(0.091)	1.483*	(0.095)
Mig.*Highest gen. edu.			0.988	(0.940)	0.966	(0.839)	0.995	(0.975)	1.012	(0.946)
Mig.*Other degree			1.327	(0.214)	1.241	(0.378)	1.276	(0.322)	1.278	(0.320)
Mig.*Dropout			0.711	(0.359)	0.654	(0.257)	0.653	(0.260)	0.668	(0.285)
Migrant*University			1.039	(0.780)	1.041	(0.767)	1.021	(0.882)	1.022	(0.873)
Male	0.959	(0.236)	0.977	(0.539)	1.005	(0.897)	0.950	(0.185)	0.950	(0.183)
Age group 26–35	0.467***	(0.000)	0.400***	(0.000)	0.360***	(0.000)	0.348***	(0.000)	0.356***	(0.000)
Age group 36–45	0.181***	(0.000)	0.173***	(0.000)	0.153***	(0.000)	0.142***	(0.000)	0.145***	(0.000)
Age group 46–55	0.121***	(0.000)	0.119***	(0.000)	0.108***	(0.000)	0.0994***	(0.000)	0.102***	(0.000)
Age group 56–64	0.0563***	(0.000)	0.0566***	(0.000)	0.0522***	(0.000)	0.0513***	(0.000)	0.0531***	(0.000)
Household income	1.018***	(0.000)	1.006***	(0.002)	1.005**	(0.008)	1.003	(0.175)	1.002	(0.247)
Perm. relationship					1.411***	(0.000)	1.371***	(0.000)	1.263***	(0.000)
Family size					1.023***	(0.000)	1.021***	(0.000)	1.020***	(0.000)
Squared family size					1.000***	(0.001)	1.000***	(0.002)	1.000***	(0.002)
Employed							1.401***	(0.000)	1.404***	(0.000)
Volunteer Work							0.886***	(0.000)	0.887***	(0.000)

Table 15 Results ordered logit regression for number of social support providing people in odds ratios (model 0–4), informational support *(Continued)*

Number of informational support persons	Model 0	Model 1	Model 2	Model 3		Model 4	
Local politics				0.894**	(0.010)	0.895**	(0.012)
Religious events				0.997	(0.905)	1.001	(0.964)
Family in neighborhood						0.814	(0.105)
Family (in 15 min by foot)						0.724***	(0.004)
Family (1 h drive)						0.819**	(0.044)
Family in Germany						0.908	(0.492)
Family abroad						0.134*	(0.075)
N	10,868	10,163	10,107	10,053		10,041	
Pseudo R-sq	0.076	0.081	0.084	0.088		0.088	

Exponentiated coefficients (odds ratios) reported; *p*-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16 Results ordered logit regression for number of social support providing people in odds ratios (model 0–4), appraisal support

Number of appraisal support persons	Model 0		Model 1		Model 2		Model 3		Model 4	
Migrant	**0.616*** **	(0.000)	0.702***	(0.0002)	0.680***	(0.000)	0.694***	(0.000)	0.699***	(0.013)
Intermed. gen. edu.			**1.430*** **	(0.000)	**1.430*** **	(0.000)	**1.397*** **	(0.000)	**1.400*** **	(0.000)
Technical college			**1.777*** **	(0.000)	**1.776*** **	(0.000)	1.689***	(0.000)	1.685***	(0.000)
Highest gen. edu.			**2.186*** **	(0.000)	**2.206*** **	(0.000)	**2.131*** **	(0.000)	**2.125*** **	(0.000)
Other degree			0.838	(0.353)	0.832	(0.346)	0.830	(0.339)	0.829	(0.339)
Dropout			0.674*	(0.072)	0.706	(0.115)	0.725	(0.149)	0.728	(0.156)
University			**1.113***	(0.063)	**1.099***	(0.100)	**1.067**	(0.265)	**1.068**	(0.254)
Mig.*Intermed. gen. edu.			1.112	(0.424)	1.157	(0.278)	1.146	(0.312)	1.140	(0.333)
Mig.*Technical college			1.144	(0.557)	1.202	(0.424)	1.222	(0.387)	1.227	(0.378)
Mig.*Highest gen. edu.			1.001	(0.994)	0.973	(0.868)	1.006	(0.969)	0.996	(0.981)
Mig.*Other degree			0.908	(0.674)	0.881	(0.586)	0.921	(0.725)	0.922	(0.729)
Mig.*Dropout			0.946	(0.859)	0.792	(0.460)	0.819	(0.530)	0.805	(0.496)
Migrant*University			1.349**	(0.024)	1.350**	(0.025)	1.315**	(0.041)	1.314**	(0.042)
Male	0.822***	(0.000)	0.839***	(0.000)	0.868***	(0.000)	0.831***	(0.000)	0.830***	(0.000)
Age group 26–35	1.096	(0.137)	1.006	(0.937)	0.952	(0.503)	0.960	(0.573)	0.944	(0.434)
Age group 36–45	0.879**	(0.026)	0.891*	(0.088)	0.842**	(0.014)	0.819***	(0.005)	0.807***	(0.003)
Age group 46–55	0.753***	(0.000)	0.802***	(0.001)	0.784***	(0.000)	0.760***	(0.000)	0.747***	(0.000)
Age group 56–64	0.513***	(0.000)	0.581***	(0.000)	0.594***	(0.000)	0.598***	(0.000)	0.585***	(0.000)
Household income	1.018***	(0.000)	1.006***	(0.000)	1.006***	(0.000)	1.005***	(0.007)	1.005**	(0.004)
Perm. relationship					1.162***	(0.002)	1.143***	(0.007)	1.204***	(0.001)
Family size					1.047***	(0.000)	1.044***	(0.000)	1.044***	(0.000)
Squared family size					1.000***	(0.000)	1.000***	(0.000)	1.000***	(0.000)
Employed							1.190***	(0.000)	1.192***	(0.000)
Volunteer Work							0.864***	(0.000)	0.862***	(0.000)

Table 16 Results ordered logit regression for number of social support providing people in odds ratios (model 0–4), appraisal support *(Continued)*

Number of appraisal support persons	Model 0	Model 1	Model 2	Model 3		Model 4	
Local politics				0.903**	(0.014)	0.906**	(0.017)
Religious events				0.998	(0.921)	0.997	(0.879)
Family in neighborhood						1.219*	(0.084)
Family (in 15 min by foot)						1.246**	(0.024)
Family (1 h drive)						1.027	(0.760)
Family in Germany						1.055	(0.677)
Family abroad						1.177	(0.800)
N	11,129	10,416	10,353	10,296		10,284	
Pseudo R-sq	0.012	0.022	0.028	0.031		0.031	

Exponentiated coefficients (odds ratios) reported; *p*-values in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Authors' contributions
Jana Brandt designed the model and the computational framework, analyzed the data and performed the calculations. Kyra Hagge wrote the manuscript. The author(s) read and approved the final manuscript.

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Availability of data and materials
The data is a property of the German Institute for Economic Research (DIW) and therefore cannot be made publicly available. The .do-files used to analyze the data can be obtained upon request.

Competing interests
The authors declare that they have no conflict of interest.

Author details
[1]Department of Economics, Justus Liebig University Giessen, Licher Strasse 64, 35394 Giessen, Germany. [2]Faculty of Economics and Business Science, Justus Liebig University Giessen, Licher Strasse 64, 35394 Giessen, Germany.

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Publisher's Note

Spatial Dispersion of Social Networks: Bridging Geographical Distances

(Running Title: Bridging Geographical Distances)

Kyra Hagge[1] and Jana Brandt[2]

[1] *Kyra Hagge (corresponding author) · Faculty of Economics and Business Science · Justus-Liebig University Giessen, Giessen, Germany · Kyra.Hagge@wirtschaft.uni-giessen.de*

[2] *Jana Brandt · Department of Economics · Justus-Liebig University Giessen · Giessen, Germany · Jana.Brandt@wirtschaft.uni-giessen.de*

CONFIRMATION

We hereby confirm that the submitted manuscript is original and not under consideration for publication elsewhere, neither in part nor full. Furthermore, we have read the journal's aims and scope and believe our manuscript falls within the boundaries of your journal. We have read the author's guidelines and prepared the manuscript accordingly.

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DECLARATION OF INTEREST STATEMENT

No potential conflict of interest was reported by the authors.

ABSTRACT

As a result of social, economic, and civic transformations, individuals face the problem of large spatial distances between themselves and their relatives and friends. Especially in today's age of mass migration, people have to overcome these distances to preserve social connections and access material and immaterial resources embedded in their relationships. Against this background, our paper analyses the general capability of receiving social support over larger distances within social networks, divided according to the different types of social support as introduced by James House (1981). Applying ordinal logit estimations, we find that all individuals with higher levels of education are more likely to receive social support over large geographical distances, irrespective of their migrant background. Migrants benefit most from obtaining a university degree. Our results underline the importance for education in a multicultural society.

Keywords: Returns to Education, Social support, Social networks, Migrants, Geographical distance, Bridging

JEL-Classification: I26, C30, Z13

1 INTRODUCTION

Education is one of the main pillars when it comes to evolving, progressing or reaching the next higher step, for an individual and for a society as a whole. Education enables people to increase their incomes, improve their living standards, and climb the social ladder.

This paper considers aspects of non-monetary benefits of education within the disciplines of social sciences, educational research, and economics to establish a basis for policy design. It follows up on policy related works such as McMahon's (2004) estimation of how much support the government has to provide in order to ensure a working education market.

We focus on establishing the dependence of the ability to receive social support over larger spatial distances on the level of education. Consequently, we address the question: Does the realized likelihood to receive social support over larger spatial distances depend on the level of education? And following: Does education have a different effect on migrants and their ability to bridge geographical distances in social support reception?

Empirically, our study relies on the German socio-economic panel (G-SOEP), a survey which is conducted among 12,000 households in Germany yearly since 1984 (Goebel et al., 2018). In the 2011 iteration of this dataset, participants were asked a set of questions regarding their social networks and a measure of the distance between the interviewee and his/her closest relatives in ordinal categories.[1] We perform ordered logit estimations to see if education and social networks explain the distance categories of the

questionnaire. We use the estimates to find whether there is a difference between migrants and natives in the ability to receive social support over larger spatial distances. Another feature of the underlying dataset is the distinction between different dimensions of social support, which we use to explore the existence of a varying effect of space depending on the support dimension.

In the past decades, migration increased notably, which fosters growing interest in the influence of migration on the link between education and potential benefits. This is especially relevant in the case of the most recent migration waves from Western Africa and the Middle East (Held, 1999; Herz, 2015; King, Findlay, & Ahrens, 2010). Several scholars argue that the link between education and potential benefits is reversed for migrants. They lack the social integration (Avenarius, 2012) and might have attained their education in a foreign country, which does not have a similar impact as if they had acquired it in the country of residence (Walton, Takeuchi, Herting, & Alegría, 2009) or are not as proficient in speaking the local language (Sentell & Braun, 2012). In spite of living far from each other, migrants are able to receive and provide support to their families, as it is not geographic closeness that determines the emotional distance between the family members (Mason, 2004). However, upholding these long-distance ties decreases with time spent in the host country, as elaborated by Carrasco, Miller, and Wellman (2008).

Our paper evaluates the direction of the gradient: whether it is reversed when it comes to migrants or whether there is no difference between the returns to education in terms of receiving social support over larger distances between natives and people with a migrant background.

The remainder of this paper is organized as follows: Section 2 provides an overview of the existing literature and theoretical background, followed by a description of the methodology (Section 3), including the data (3.1.), dependent and independent variables (3.2 and 3.3), and description of the sample (3.4). In Section 4, we outline the results of the empirical analysis. The paper concludes with a discussion in Section 5.

2 BACKGROUND LITERATURE

Due to the difficult attribution of social capital, as it exists between actors and cannot be assigned to a single actor (Coleman, 1988), we first need to clarify which operationalization we are using. The main differences between these notions are the focus on features of social organization vs. embedded resources within social networks, and the influence of the actor (Sato, 2013). Whereas some scholars argue that social capital is more related to the norms and regulations that enable a functioning society (Bourdieu, 1986; Burt, 1992; Coleman, 1988; Putnam, 1993; Woolcock, 1998), others attribute the term to the resources, which lie within human interactions and can be accessed by the actors individually (Bourdieu, 1986; Lin, 2001). As we are interested in the structure of access to social capital, we are following an instrumental approach. Pierre Bourdieu, the main proponent of this interpretation of social capital, describes it as the "entirety of all potential and actual resources which come about by possessing a network of more or less institutionalized relationships, based on mutual acquaintance or recognition" (Bourdieu, 2012).

Our research develops a closer understanding about the link of education towards the bridging capabilities of actors in social networks. Herz (2015) finds a positive gradient between network size and education, which he then argues also opens up more

possibilities in terms of exchanging support. Also Mirowsky and Ross (2003) find that higher levels of education lead to an increased quality of social networks, where larger amounts of material and immaterial resources, social support, amongst others, are exchanged.

Even though it is important how many "nodes" a social network consists of, the structure of these networks determines the extent of social support an actor can access, according to the instrumentalist conception of social capital (Nauck, 2011). In his seminal work, Granovetter (1973) investigates the strength of ties and differentiates between strong ties, which usually appear amongst kin and weak ties, which relate to the interpersonal ties to friends, co-workers and the like. People with a higher level of education are more likely to exhibit less densely-knit networks (Avenarius, 2012; Fischer & Beresford, 2015; Kennedy, 2004), weaker ties within their networks (Herz, 2015), a higher social position and therefore higher economic capital, as well as more transitive relationships with their network members (Viry, 2012).

Through globalization and technological progress in transportation and communication, also known as network capital, demand for mobility within modern societies is increasing steadily (Larsen, Urry, & Axhausen, 2006). People who had difficulties to stay in touch with each other are now able to communicate over large distances, and travelling has become easier, cheaper, more convenient, and faster. Social capital has to be maintained in order to keep its validity. To be able to still access the resources embedded in social networks which are geographically distant, the actor has to frequently stay in touch with the support provider, else the social capital decays (Nauck, 2011).

However, increased mobility can lead to increased pressure on social relationships in terms of upholding these ties over larger distances. Putnam criticizes mobility as it encourages the subversion of civic engagement due to people being less willing to create community-based social capital when they expect to move again (2000, pp. 204–205). Also Magdol (2000) reports increased stress levels and deterioration of social ties after residential moves. Hence, mobility also places a burden on geographically less-rooted people.

In his empirical study, Viry finds that "mobility experiences are linked to individuals' skills and resources, which means in turn that people who experience early residential mobility are able to preserve close social ties over larger distances by using network capital more frequently and efficiently" (2012, p. 68).

Structural differences in social networks can be attributed to a higher mobility during education (e.g. study abroad) and the prospect of an increased labour mobility holding a higher degree (Findlay, King, Smith, Geddes, & Skeldon, 2012). Educated individuals are furthermore able to connect different social circles, which increases their individual economic outcome and can reduce inequality between social classes, which constitutes a benefit for society (Granovetter, 1973; Lin, 2000).

We evaluate whether there is a difference in the effect of education on the reception of support over larger spatial distances within social networks between migrants and the native population. Thereby we are following the lead of Collmer (2002) and Pelizäus-Hoffmeister (2001) in determining the impact of relocation on the migrant population. Their works support the idea that migrants have an increased ability in bridging larger geographic distances. The authors reason that individuals who are frequently relocating are more driven to keep their original network ties as opposed to tie new ones.

Furthermore, maintaining these relationships is vital to the transmission of knowledge within the communities (Herz, 2015; Snel, Engbergsen, & Leerkes, 2006; Zelinsky & Lee, 1998). However, the attainment of education could have a different effect on migrant population, as with regards to their networking behaviour: by sending remittances which increases the dependence, the relationship between the members of a migrant family are consequently closer and more sustained (McKenzie & Rapoport, 2011). Additionally, migrants who obtained education in the host country are much more likely to advance in social status then the ones without a formal proof of their knowledge (Nauck, 2011; Walton et al., 2009). The social status can also provide hints as with regards to the link of education on the ability to maintain social relationships. Since migrants generally belong to lower social classes, especially directly after migrating, education is the key to a societal advancement (Zelinsky & Lee, 1998). Through education, migrants can access local social capital quicker (Popielarz & Cserpes, 2017). Economically better situated migrants can also draw form their higher levels of social capital mostly in form of weak ties, which enable them to assimilate faster and make use of the host countries' social capital (Ryan, Sales, Tilki, & Siara, 2008). Therefore it is important to control for the family background in order to determine the interdependencies between education and migrant background.

3 METHODS

3.1 Data

The dataset used for this analysis has been collected by the German Institute of Economic Research (Deutsches Institut für Wirtschaftsforschung, DIW) since 1984 and encompasses around 12,000 households, which are questioned every year (Goebel et al.,

2018). Although some questions were included every year since the introduction of the SOEP, some were asked less frequently[2], and in the course of more than 30 years some questions were outsourced to sub-questionnaires, which are only posed to certain subgroups within the sample population. The questions this study is concerned with are mainly located in the fourth quarter of the questionnaire. Due to a change of question design[3], there is only one survey year which can be used for the herein conducted analysis, which is 2011. Consequently, applying a panel approach using both survey years will be a part of later investigations within this topical area. The main variable, which is called *the maximal minimal distance* in this paper and describes the maximal distance an ego's family member lives away from the interviewee, is only available for kinships. Hence, the empirical part the following Section focuses solely on family ties, mostly networks characterized by strong ties and high density, in line with Wellman (1989). In any case, the main providers of social support in Germany are family members, especially the partner, the siblings, and children, as reported by Wöhler and Hinz (2007) and also laid out in detail in Section 3.4.

The DIW is concerned with keeping the bias as small as possible by rearranging questions, not posing difficult or nested questions, sending the same interviewer to the same households as in previous periods to increase trust, and providing an English version of the questionnaire to narrow down language barriers (DIW Berlin / SOEP, 2012).

3.2 Dependent variables

In order to compile the dependent variables, and finally obtain a novel variable which is an indicator of social support reception over a larger distance in ordinal categories, we

intertwine the following two questions of the SOEP, which are both resource generators (van der Gaag & Snijders, 2005):

(1) Q125 (2011) The following list is composed of people who could be important for you in some way. How do you feel about the following? (Please name up to five people from the list per question).
   a) With whom do you talk about personal thoughts and feelings, or about things you wouldn't tell just anyone?
   b) (Only for persons under 65 years of age) Who supports your advancement in your career or educational training and fosters your progress?
   c) Now a hypothetical question: If you were to need long-term care (for example, in a case of a bad accident), who would you ask for help?
   d) With whom do you occasionally have arguments or conflicts that weigh upon you?
   e) Who can you tell the truth even when its unpleasant?

(2) Q127 (2011) And now about your close and extended family. Which of the following family members do you have? For each, indicate how many such relatives you have, whether they live in your household, and if not, how far away they reside. (If you have more than one relative in a category, please give only the location of the nearest-residing relative.)[4]

A very important feature of social networks is the social support therein. *Social support* can be defined as "information leading the subject to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligations" (Cobb, 1976, p. 300). Consequently, social support can determine the quality of a social network, complementing social regulation and control, which would be an adverse characteristic

(James House, 1987). According to James S. House, social support can be described in more detail according four main dimensions. The first dimension is called *emotional support* and stands for the care, empathy, love, and trust within a social interaction and is mostly provided by family members and close friends. *Informational support* refers to the exchange of information, advice, and suggestions, and is more common among loser ties. Tangible aid and the provision of services (also monetary transactions) is summarized under *instrumental support* and given by family members, friends but also more distant relationships. The final dimension, *appraisal support*, stands for the exchange of information that is useful for self-evaluation. Since it is sensitive to talk about matters related to the ego and its self-perception, appraisal support is only exchanged between people who are connected by strong network ties. This paper builds on the theoretical framework of James House (1981) and compares the link of education in bridging geographic distance within these four different support dimensions.

The dataset at hand provides the maximum number of five individuals who can be named by the interviewee as primary givers of emotional (Q125 sub-question a), informational (Q125b), instrumental (Q125c) and appraisal support (Q125e). Sub-question d) refers to conflict and is therefore not a dimension of social support but of social regulation and control and hence not included in the analysis. Since we adapted the questions of the SOEP to Houses' (1981) methodology, the questions do not capture every aspect of each support dimension. For example we use a hypothetical question about the provision of long term care for instrumental support, which does not fully encompass all properties of instrumental support, for example other tangible aides such as the provision of money. Similarly for informational support which, in the questionnaire underlying our dataset, is only queried referring to career-related

information. We are drawing conclusions nevertheless, having these limitations in mind.

The respondents can report their five most important providers of each support dimension by indicating their relationship[5]. It is also possible to mark the answer "with no one", in case of a lack of any support providing person within this dimension. Since the instructions accompanying Q125 exempt respondents from providing strictly five support givers, the observation numbers differ according to the position – the first support provider being reported most frequently. There are also differences regarding the relationship status as shown in Tables 3-7, which will be examined in detail in Section 3.4. After gathering the information relating to the relationship status in a first step (whether the support is provided by a family member or a friend, co-worker, superior or other non-kin link) this information is matched to the location indicator of the second question in a next step.

In the SOEP, the distance between family networks is reported in an ordinal scale, ranging from "in the same household" to "abroad". This constitutes an issue regarding the econometric framework used. Because of the instructions preceding the question, respondents are only reporting the distance to the closest family member, moreover omitting any family members possessing the same relationship status (for example multiple brothers, who are located within different distances of the respondent).[6] Matching the rank within each support dimension with the location of the closest relative holding the same relationship status, yields a measure for the minimum distance bridged by the person concerned. This procedure outputs a peak of five different location numbers per support dimension (or in case of no support person mentioned, the bivariate response yes/no).

For the econometric model, ordered logit estimation, we are interested in obtaining one variable per individual. The independent variable *maximum minimum distance* is obtained by taking the row maximum over each interviewee. It is the furthest distance that is bridged by each individual within every support dimension separately, taking into consideration that the distances underlying are minimum distances.

3.3 Independent variables

The independent variables are introduced in different blocks, to control for several influencing factors and check for robustness. Number of respondents and descriptive statistics of each covariate can be found in Table 1. The first covariates included relate to people's socio-demographical characteristics: a dummy variable for sex, which is one for *female* and zero for male, the *age* measured in years, the *household income*, which has been logarithmized to rescale, and a dummy for *migrant* background.

In the SOEP, the household income is reported yearly. By controlling for household income, we account for a possible endogeneity of schooling, where previously accumulated knowledge benefits the current generation, and additionally the increased probability to receive education of better quality with a higher income. Moreover, including income in the regression will help to absorb other indirect market outcomes, for example, the effect of higher income on health and consequently education (McMahon, 2004).

Migrant background in the dataset is coded ordinal, with one being no migration background, two representing a direct background, three an indirect migrant background (at least one parent being born holding a non-German nationality) and four standing for

no further specified migrant background. The last category makes reference to people in the survey who did, in the course of the questionnaire, mention having a foreign origin of some sort, but did not specify whether this link stemmed from a personal migration experience or their family background and could not be traced back including previously mentioned nationalities, parental information, or country of origin (Scheller, 2011). If the dummy variable takes on the value 1, the individual has migrant background, 0 otherwise.

We furthermore control for the *existence of a support provider at long distance*, since the effects can only show up if there actually exists a relative living in another town in Germany or further. A similar rationale led to controlling for *network composition*, to account for the limits of the dataset used which only reports family ties. We construct the dummy as such as aggregating the network composition over all four support dimensions, so it represents the total network composition. It takes on a value of 1 if the individuals' social network consists of 50 per cent or more family members and 0 otherwise.

To measure the influence of education on the ability to bridge larger spatial distances, we include two additional indicators regarding schooling. Education correlates with the socio-economic status, but its characteristics are usually static, as it is reported with either years of schooling (cardinal) or final certificate (ordinal). The first covariate representing an educational characteristic is of ordinal nature and matches the highest general education obtained. In Germany, students can obtain one of the following school leaving certificates: *lowest general education* (Hauptschulabschluss), *intermediate general education* (Realschulabschluss), *technical college* (Fachabitur), *highest general education* (Abitur). Furthermore, there are people included who have obtained an*other*

school leaving degree, for example a foreign degree and individuals who did not complete any school leaving certificate, labelled *dropout*. After mandatory years of schooling, students can enrol into university, which they mostly do after graduating the highest general education. Different pathways are also possible, for example, via the lowest general education and an apprenticeship. Since the numbers of graduates of the highest general education is not equal the number of people who obtained a university degree, we also include a dummy variable for *university* education, which is one for individuals who obtained a degree from any university or technical college, and zero otherwise.

This paper has a special focus on migration as a potential diverging factor of how education is linked to selected structural characteristics of social networks, therefore *interaction indicators* are introduced. Each school leaving certificate, including university education, is interacted with the dummy for migrant background, to determine if migrants have different returns to education.

The ability to bridge larger distances might be inhibited by living together with the most important support provider, the partner. To account for a potential interference of the effect of education on bridging, we control for marital status using a dummy which takes on the value of one when the individual is *married and living together* with the partner. Marital status can also be used as a proxy for social inclusion which is another characteristic of the network structure (Elo & Preston, 1996; James House, 1987). As the *family size* increases, the possibility for long-distance relations increases too, we therefore control for family size.

Being *employed* could have different impacts on the bridging-ability: first, it could

increase the ability, as people are forced to tie different relationships with their surroundings and regarding business travel also with an international community of co-workers. The second and divergent effect can be attributed to the time spent at the office, which cannot be used to maintain current social contacts outside of the occupational field and will consequently dampen the potentially positive effect of education on long-distance bridging. Additionally, the opportunity costs of free time increase with an increase of education. Controlling for employment eliminates the potential indirect effect on maintenance of social relationship via change of time perception.

People who are sending money to their relatives abroad might have a higher probability of receiving support of any kind in return, and hence a potential link could exist as consequence of this dependence. The dummy variable *remittances* is absorbing any financial dependence, being one for individuals who transferred money to any of their relatives.[7]

Residential mobility explains also why people would engage in longer distance relationships, and is controlled for by introducing a variable which accounts for the longest distance between the interviewees and one of their parents (Viry, 2012).

And finally, there might be a difference in the bridging ability if the individual lives in a rural setting or an *urban* area, assuming that people have more dispersed social networks when they live in cities, as also mentioned in Larsen et al. (2006). In response to this influence channel, we control for urban surroundings with a dummy which is one for areas with higher population density according to the categorization done by the federal institute for research on building, urban affairs and spatial development (BBSR) (Lutter, 2001).

[Insert Table 1 here]

3.4 Sample description

The analysis is based on a cross-sectional dataset containing the sampling wave of 2011 and consists of 8,087 individuals, of which 1646 (20.35%) have a migrant background. Of the respondents who answered the question regarding their school leaving certificate sometime between entering the SOEP and 2010, 18.20 per cent obtained the lowest general education, 34.48 per cent hold a certificate from the intermediate general education, 7.25 left with an education enabling to attend technical college, and 32.15 per cent completed the highest general education in Germany. 6.35 per cent did either obtain their certificate in another country or have a different certificate then the ones already mentioned whereas 1.40 per cent of the respondents left school without any certificate. The 260 individuals who were still attending school in 2010 are excluded from further analyses, since it is not possible to attribute a school leaving certificate and therefore we cannot draw any inference upon their educational background. Furthermore excluded are people below the age of 18 as well as above the age of 65, because they did not answer the question about informational support. From the total sample of over 44,000 people, we dropped all individuals with incomplete profiles, as they would have been excluded from the analysis anyways using ordinal logistic regressions. Since the exclusion depended mostly on the completion of the questions used to construct the dependent variables, and the individuals have been asigned to these questions randomly, we do not expect to having inserted a bias through dropping these incomplete observations.[8]

Contrasting different dimensions of social support, we want to point out notable differences when looking at the descriptive statistics. As presented in Table 2, emotional

support is most importantly provided by the partner. Almost 84 per cent of the respondents stated they would talk about their feelings first of all with their partner. Another 9.4 per cent of the interviewees would trust their mother regarding emotional matters, which leaves the remaining 6.6 per cent to be distributed among the other 24 relationship categories. The closest female relatives are second most important source of love, care, and trust: more than 55 per cent of the respondent answered they confided in their mother, daughter or sister with personal affairs. Non-family ties increase in importance as the third to fifth most important emotional support-giver, as a larger fraction of the interviewees answers with "other people". Concerning the male relatives, the father is most important, followed by the son and the brother.

[Insert Table 2 here]

The pattern within the remaining three support dimensions is similar, with the partner being the most important provider of informational support (of more than 79 per cent of the interviewees, see Table 5 in the Appendix), instrumental support (approximately 81 per cent of the respondents answer with "spouse" as their most important provider of long-term care, see Table 6 in the Appendix), and appraisal support (again more than 79 per cent of the respondents would obtain information on self-assessment from their partner, followed by the mother, see Table 7 in the Appendix).

Most respondents not having any person to turn to lack informational support: 6,571 people answered with "no one" in this dimension (see Table 3). Emotional support in contrast is most prevalent; only 657 people do not have anyone to discuss feelings and private matters.

[Insert Table 3 here]

4 RESULTS

According to the estimations, women are disadvantaged maintaining long-distance ties in all four support dimensions compared to men: The odds ratios are significant and smaller than one with respect to the dummy for gender. At a first glance, this finding is inconsistent with previous works from for example McPherson, Smith-Lovin, and Brashears (2006) who also find that women are able to connect easier and remain closer integrated within their support network. As shown in Section 3.4., women are more often the most important support provider. Since women are also the main giver of childcare (Wellman, 1985), responsible of maintaining kinship ties (Mulder & van der Meer, 2009) and hence often migrate with their families (Pedraza, 1991), their geographical social network structure differs in diameter as compared to their male counterparts (Menjívar, 2000).

Whether the bridging of large spatial distances represents another non-monetary benefit of education has been estimated starting from model 2 (which can be found in Tables 8-11 in the Appendix). All odd ratios have to be interpreted taking the holders of the lowest general education degree as a baseline.[9] Consequently, the odds of receiving support over a larger distance are larger within all support dimensions for people who obtained an intermediate general education certificate, being most distinctive for appraisal support (the odds for bridging large distances in relationships that can be used for self-evaluation are 1.435 times higher for people with an intermediate general education diploma than for their counterparts only holding a certificate from the lowest general education). Receiving a degree of the highest general education is even more beneficial, as the odds are around 1.5 times as high within every support dimension to get supported by a distant relative. As all the aforementioned links are significant to at

least the 5 per cent level, they show a positive gradient between education and the behaviour of people within their social networks. Continuing schooling until university graduation is again positively associated with bridging abilities. Since university enrolment in Germany follows the completion of the mandatory schooling, the prerequisite diploma is usually the "Abitur" which is obtained over completion of the highest general education, these odd ratios have to be interpreted additively. Consequently, the bridging ability for a person with a university degree is around three times higher as compared to holders of the lowest general education diploma. However, university education does not play an important role in bridging LDRs in informational support, completing the highest general education is already enough to be able to obtain support through LDRs when it comes to career related questions. This is in line with literature, as for example Granovetter finds that weak ties are more important when getting a job than strong kin-ties (2010). Model 2 also introduces an interaction variable, to detect whether there are differences of the influences of education for migrants in comparison to natives. From Tables 4-7 (Tables 5-7 can be found in the Appendix) it becomes apparent, that migrants benefit from obtaining a university degree: The odds of being able receive support within LDRs are 1.901, 2.084, and 2.304 times higher for migrants in the dimensions of emotional, instrumental, and appraisal support respectively.[10] As already observed in the native population, continuing education until graduating from university is not associated with an increased probability of receiving informational support from distant family relationships. Pertaining to the discussion of model 1, all previously found links remain significant and approximately of similar magnitude.

The next adjustment of the model contours the family composition and geographical

structure. Married individuals, who live together with their spouse, are less likely to receive support over larger distances: the significant odds ratios in all four support dimensions are lower as compared to the baseline of non-married individuals. This arises from the high importance of the marital partner as primary support provider in all dimensions, which renders the upholding of LDRs less relevant if the partner lives in the same place. A larger family does not necessarily mean support provision over larger distances, as shown by the smaller odds ratios for family size. As distance is part of the dependent variable, we explain this finding building upon the previous results from Mulder and van der Meer (2009): the support provision does not increase with family size. Another explanation is the clustering: Families, usually part of the lower income group, where the members need the mutual social support, tend to live in the proximity of each other (Snel et al., 2006). The connections found in earlier models remain significant and are robust regarding the integration of the family-composition parameters. Being employed (which comprises all kinds of employment, from full-time over part-time to voluntary work and military service) has no significant effect on receiving support over larger distances in any of the support dimensions.

Financially supporting a family member does significantly increase the possibility of obtaining emotional and appraisal support over larger distances. Since those two support dimensions are also the ones commonest provided by family members, this result is intelligible and allows conclusions to be drawn about reciprocity. If I am funding some of my family members in terms of remittances, I can also expect to receive social support as a quid pro quo (Snel et al., 2006).

In the last step, we integrate two measures of residential background. Viry (2012) finds that early residential mobility leads individuals to keep more dispersed networks. We

therefore include a measure for residential mobility, which is essentially the longest distance to either one of the ego's parents. The results of model 5 show a similar picture as Viry (2012) draws, except for informational support, where the possibility to receive support over a longer distance is slightly lower as compared to individuals who live closer to their parents. Residential mobility in consequence also leads to an increased likelihood of receiving support over larger spatial distances.

The other independent variable sketches the density of settlement, as some scholars argue that people residing in urban areas are more likely to feature loosely bonded social network ties, which can also influence the ability to bridge (Avenarius, 2012; Mulder & van der Meer, 2009). Inferred from Tables 8-11 (in the Appendix), the type of settlement does not explain the likelihood for being able to bridge LDRs, since none of the coefficients are significant. This can be due to the repeatedly mentioned inability to report kith relationships, because family ties are usually strong and do therefore not depend quite as much on the type of settlement structure the individual resides in. In a final step we estimated all models using an Ordinary Least Squares model specification instead of the ordinal logit setting reported in Tables 8-11. Even though the coefficients cannot be interpreted in a meaningful way, the implications hold. These results can be obtained upon request.

[Insert Table 4 here]

5 DISCUSSION AND CONCLUSION

Bridging long distance relationships is becoming more important as the world is getting less locally and more globally oriented. Education plays a major role in mitigating various aspects of not only the ability to overcome large distances, but also other channels through which social interaction influences different economic, societal, and political mechanisms. Some of these functions have been outlined in the literature review, which then has laid the fundament for the empirical analysis of the bridging ability of German individuals within their social networks. We focus in particular on migration as a biasing factor, to determine whether there are differences of the link of education in managing LDRs between natives and migrants.

According to the results, higher levels of education facilitate the exchange of support within all dimensions over large spatial distances, whereby the benefits are most apparent for individuals who obtained the highest level of general education, and even higher for those who continued academia until graduation from university. This confirms previously conducted studies, which find that higher educated individuals have more supportive and egalitarian networks and are also better at providing emotional, informational, and instrumental support (J. House, Landis, & Umberson, 1988; Magdol, 2000).

The migrants in our sample are not more likely to receive any type of support than the native population, as the interaction terms of education levels and migrant background show. The only significant and robust interaction effect is the one between obtaining a university degree and migrant background. Migrants do not lose or benefit in excess of locals through obtaining higher levels of general education. The odds for maintaining a

LDR are significantly higher for migrants with a university degree[11]. This finding refutes the literature on potential negative returns to education, at least regarding the spatial composition of social networks. According to certain scholars, there are negative effects of education for migrants, as they do not fit into their social networks anymore after completing higher levels of education (McKenzie & Rapoport, 2011). Since we did not find any odds indicating a lower probability of receiving social support over larger distances, we conclude that there are no negative returns to education for migrants. This result underlines the positive influence of education for policy similarly regarding integration into the host society as well as upholding ties to the society of origin. Higher educated migrants can act as brokers between these two worlds and therewith create more advanced societies.

Improvements can be made concerning the data as the SOEP only reports kin-ties, which are, according to Granovetter (1973), mostly strong ties. Weak ties, however, are crucial for job searches and the like, where acquaintanceship is enough to provide the desired information. Furthermore, maintaining loose ties does not require as much time and resources, which is also beneficial in bridging long distance. Applying a similar approach to a dataset which also includes questions about kith therefore increases the validity of the statements previously made.

Due to data limitations and restrictions of model framework it has neither been possible to make comments concerning the causal relationship between the variables nor to exclude potential influence of another covariate which has not been taken into consideration, such as innate talent, which is correlated with education. Therefore, incorporating a panel dataset and applying a different methodology as, for example, an instrument variable approach or fixed effects estimation, in view of similar research

questions could approve or contradict the results of this paper and lead to more grounded results.

It is possible to follow-up with research exceeding the mere observation of differences in bridging behaviour and delving more into the actual benefit for individuals resulting from increased ability to receive support within long distance relationships. This can be undertaken including wave 2016 of the SOEP to construct a panel dataset. Inserting dynamics into the framework can furthermore foster a deeper understanding of mechanisms at work. A distinction between first and consecutive generation migrants as done by Ryan and D'Angelo (2017) can follow, to add further insight into intergenerational differences against the background of the pressing focus on integration policy development.

1) Ranging from living in the same household, in the same house, in the neighbourhood, in the same town, but more than 15 minutes away by foot, in another town, but within a one hour drive, farther away (but in Germany) to abroad (TNS Infratest Sozialforschung (2011, p. 30).
2) Some questions are only asked every two, three or five years (DIW Berlin / SOEP (2012)).
3) Question 115 in 2006 and question 125 in 2011 read the same. However, in 2006 the interviewees could only assign three people for each support category, in 2011 they got given five alters to name (TNS Infratest Sozialforschung , (2011, p. 28)).
4) Interviewees are able to report distances on the following family members: (Marital) partner, former (marital) partner, mother, father, step mother or foster mother, step father or foster father, daughter(s), son(s), sister(s) (including half-sisters), brother(s) (including half-brothers), grandmother(s), grandfather(s), grandchild(ren), aunt(s)/niece(s), uncle(s)/nephew(s), other relatives with whom you have close contact (TNS Infratest Sozialforschung (2011, p. 30)).
5) Possible support providers who can be named are: (marital) partner, former (marital) partner, step mother or foster mother, step father or foster father, mother-in-law, father-in-law, daughter, son, sister, brother, grandmother, grandfather, grandchild, aunt/niece, uncle/nephew, other female relative, other mail relative, work colleagues, superiors at work, people from school/training/education, neighbours, people form clubs or recreational activities, paid assistants/outpatient care providers/social workers, other(s).

6) Using these questions requires some compromising, as it cannot be detected which for example brother is referred to in Q125 and whether that is the same brother of whom the location is known. This, however, has been tested and we found it only affects very few cases for which our estimate will be a little more conservative, which rather underestimates the researched effect.
7) In the SOEP the question referring to remittances is divided into the categories "parents / parents-in-law, children (also son-in-law/daughter-in-law), spouse or divorced spouse, other relatives and unrelated persons", whereas the last category is not included in this paper as only family members are observed (TNS Infratest Sozialforschung (2011, p. 34)).
8) We check for a potential bias by estimating all models using all observations applicable to the model specifications. The results suggest no systematic bias and therefore, for the sake of maintaining comparability between the different support types, the models are being estimated using only the individuals who provided answers to all four support type questions.
9) See Buis (2010) for a detailed explanation on how to read tables in odds ratios and make inferences.
10) To determine the odds ratios of the interaction-term, the odds ratios of the interaction have to be multiplied with the education variable.
11) However, there is the possibility of a selection bias, for individuals who specifically migrated to Germany in order to obtain university education.

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TABLE 1: SUMMARY STATISTICS FOR THE INDEPENDENT VARIABLES

Variable	N	Mean	SD	Min	Max
sex	8087	0.44	0.50	0.00	1.00
age	8087	39.21	10.49	18.00	65.00
ln household income	8087	10.57	0.60	4.14	12.90
migrant	8087	0.20	0.40	0.00	1.00
Existence of support providing person at a distance	8087	0.57	0.49	0.00	1.00
network composition	8087	0.98	0.14	0.00	1.00
lowest general education	8087	0.18	0.39	0.00	1.00
intermediate general education	8087	0.34	0.48	0.00	1.00
technical college	8087	0.07	0.26	0.00	1.00
highest general education	8087	0.32	0.47	0.00	1.00
other school leaving certificate	8087	0.07	0.25	0.00	1.00
dropout	8087	0.01	0.12	0.00	1.00
university degree	8087	0.28	0.45	0.00	1.00
married and living together	8087	0.69	0.46	0.00	1.00
family size	8087	3.53	1.34	1.00	12.00
employed	8087	0.78	0.41	0.00	1.00
remittances	8087	0.10	0.30	0.00	1.00
residential mobility	7169	3.54	1.56	0.00	6.00
urban	8084	0.65	0.48	0.00	1.00

TABLE 2: WHO IS PROVIDING EMOTIONAL SUPPORT? SOURCE: AUTHOR, BASED ON DATA FROM SOEP V32

	[1]		[2]		[3]		[4]		[5]	
Relationship status	N	%	N	%	N	%	N	%	N	%
(Marital) partner	**6,761**	**83.72**	196	2.98	99	2.04	46	1.59	23	1.49
Former (marital) partner	49	0.61	31	0.47	6	0.12	7	0.24	2	0.13
Mother	**759**	**9.40**	**2,506**	**38.12**	384	7.93	154	5.32	39	2.53
Father	56	0.69	585	8.90	**971**	**20.04**	149	5.14	71	4.61
Step or foster mother	4	0.05	9	0.14	22	0.45	10	0.35	4	0.26
Step or foster father	0	0.00	21	0.32	25	0.52	5	0.17	6	0.39
Mother-in-law	3	0.04	105	1.60	109	2.25	91	3.14	37	2.40
Father-in-law	0	0.00	22	0.33	47	0.97	27	0.93	47	3.05
Daughter	75	0.93	**625**	**9.51**	312	6.44	128	4.42	26	1.69
Son	36	0.45	294	4.47	365	7.53	158	5.45	74	4.81
Sister	151	1.87	**572**	**8.70**	**626**	**12.92**	**378**	**13.05**	110	7.15
Brother	37	0.46	252	3.83	335	6.91	**301**	**10.39**	112	7.28
Grandmother	8	0.10	36	0.55	44	0.91	42	1.45	29	1.88
Grandfather	0	0.00	1	0.02	8	0.17	11	0.38	6	0.39
Grandchild	0	0.00	1	0.02	4	0.08	9	0.31	1	0.06
Aunt, Niece	1	0.01	39	0.59	65	1.34	45	1.55	32	2.08
Uncle, Nephew	2	0.02	12	0.18	16	0.33	19	0.66	14	0.91
Other female relatives	9	0.11	73	1.11	96	1.98	81	2.80	42	2.73
Other male relatives	4	0.05	26	0.40	19	0.39	30	1.04	27	1.75
Colleagues at work	17	0.21	179	2.72	215	4.44	243	8.39	137	8.90
Superiors	1	0.01	2	0.03	10	0.21	12	0.41	14	0.91
People from education	18	0.22	173	2.63	213	4.40	194	6.70	128	8.32
Neighbors	6	0.07	82	1.25	99	2.04	113	3.90	71	4.61
People from clubs	12	0.15	136	2.07	155	3.20	120	4.14	135	8.77
Paid support personnel	3	0.04	5	0.08	8	0.17	7	0.24	5	0.32
Other people	64	0.79	591	8.99	**592**	**12.22**	**517**	**17.85**	**347**	**22.55**
Total	8,076	100.00	6,574	100.00	4,845	100.00	2,897	100.00	1,539	100.00

Notes: [1] Important person 1 is providing emotional support, [2] important person 2 is providing emotional support, [3] important person 3 is providing emotional support, [4] important person 4 is providing emotional support, [5] important person 5 is providing emotional support

TABLE 3: NO SUPPORT IN EACH OF THE SUPPORT DIMENSIONS. SOURCE: AUTHOR, BASED ON DATA FROM SOEP V32

	No emotional support	No informational support	No instrumental support	No appraisal support
N	657	6,571	1,014	1,542

TABLE 4: ORDINAL LOGIT ESTIMATION FOR BRIDGING SPATIAL DISTANCES ACCORDING TO SUPPORT DIMENSION, MODEL 5, REPORTING ODDS RATIOS. SOURCE: AUTHOR, BASED ON DATA FROM SOEP V32

	Emotional Support	Informational Support	Instrumental Support	Appraisal Support
Migrant	1.295*	0.995	1.121	1.287*
	[0.051]	[0.974]	[0.390]	[0.062]
Female	**0.621*** **	**0.649*** **	**0.664*** **	**0.698*** **
	[0.000]	[0.000]	[0.000]	[0.000]
Age	0.997	**0.979*** **	**0.985*** **	0.995*
	[0.346]	[0.000]	[0.000]	[0.094]
Ln household income	**0.904** **	**0.594*** **	**0.830*** **	0.902**
	[0.024]	[0.000]	[0.000]	[0.023]
Existence of support provider at long distance	**20.91*** **	**3.515*** **	**9.047*** **	**9.818*** **
	[0.000]	[0.000]	[0.000]	[0.000]
Network composition	**1.949*** **	1.384*	**1.700*** **	**1.859*** **
	[0.000]	[0.093]	[0.004]	[0.001]
Intermediate general education	1.157**	1.214**	1.188**	**1.372*** **
	[0.050]	[0.021]	[0.020]	[0.000]
Technical college	1.029	1.318**	1.068	**1.393*** **
	[0.802]	[0.025]	[0.558]	[0.003]
Highest general education	**1.437*** **	**1.684*** **	**1.368*** **	**1.572*** **
	[0.000]	[0.000]	[0.000]	[0.000]
Other school leaving degree	1.071	1.233	1.124	1.301
	[0.790]	[0.444]	[0.642]	[0.314]
Dropout	1.391	0.912	0.788	1.115
	[0.179]	[0.736]	[0.365]	[0.674]
University	**1.205*** **	1.089	**1.233*** **	**1.212*** **
	[0.009]	[0.279]	[0.004]	[0.007]
Intermediate general education*Migrant	0.827	1.217	0.870	0.794
	[0.265]	[0.299]	[0.415]	[0.180]
Technical college*Migrant	0.852	1.616*	0.888	0.657
	[0.543]	[0.081]	[0.650]	[0.114]
Highest general education*Migrant	0.683*	0.907	0.738	0.645**
	[0.053]	[0.648]	[0.124]	[0.029]
Other school leaving degree*Migrant	**2.341*** **	0.682	1.006	0.707
	[0.006]	[0.250]	[0.984]	[0.270]
Dropout*Migrant	0.504	0.607	0.456*	0.317**
	[0.119]	[0.295]	[0.082]	[0.012]
University*Migrant	1.438**	1.058	**1.552*** **	**1.707*** **
	[0.023]	[0.744]	[0.007]	[0.001]
Married, living together	**0.837*** **	**0.497*** **	**0.834*** **	**0.858*** **
	[0.002]	[0.000]	[0.002]	[0.009]
Family size	**0.887*** **	**0.866*** **	**0.856*** **	**0.835*** **
	[0.000]	[0.000]	[0.000]	[0.000]

Employed	0.977	0.928	1.012	0.933
	[0.689]	[0.231]	[0.839]	[0.236]
Remittances	**1.271*** **	1.169*	1.061	**1.438*** **
	[0.003]	[0.089]	[0.478]	[0.000]
Residential mobility	**1.096*** **	**0.942*** **	1.045**	**1.066*** **
	[0.000]	[0.001]	[0.012]	[0.000]
Urban	1.064	1.059	1.037	1.044
	[0.197]	[0.280]	[0.443]	[0.373]
N	7166	7166	7166	7166
pseudo R2	0.179	0.094	0.122	0.130

Notes: Model 5 including all covariates, reporting odds-ratios and p-values in brackets. ***= Significant to the 1% level, **= significant to the 5% level, *=significant to the 10% level.

6 ENDNOTES

1) Ranging from living in the same household, in the same house, in the neighbourhood, in the same town, but more than 15 minutes away by foot, in another town, but within a one hour drive, farther away (but in Germany) to abroad (TNS Infratest Sozialforschung (2011, p. 30).
2) Some questions are only asked every two, three or five years (DIW Berlin / SOEP (2012)).
3) Question 115 in 2006 and question 125 in 2011 read the same. However, in 2006 the interviewees could only assign three people for each support category, in 2011 they got given five alters to name (TNS Infratest Sozialforschung , (2011, p. 28)).
4) Interviewees are able to report distances on the following family members: (Marital) partner, former (marital) partner, mother, father, step mother or foster mother, step father or foster father, daughter(s), son(s), sister(s) (including half-sisters), brother(s) (including half-brothers), grandmother(s), grandfather(s), grandchild(ren), aunt(s)/niece(s), uncle(s)/nephew(s), other relatives with whom you have close contact (TNS Infratest Sozialforschung (2011, p. 30)).

5) Possible support providers who can be named are: (marital) partner, former (marital) partner, step mother or foster mother, step father or foster father, mother-in-law, father-in-law, daughter, son, sister, brother, grandmother, grandfather, grandchild, aunt/niece, uncle/nephew, other female relative, other mail relative, work colleagues, superiors at work, people from school/training/education, neighbours, people form clubs or recreational activities, paid assistants/outpatient care providers/social workers, other(s).
6) Using these questions requires some compromising, as it cannot be detected which for example brother is referred to in Q125 and whether that is the same brother of whom the location is known. This, however, has been tested and we found it only affects very few cases for which our estimate will be a little more conservative, which rather underestimates the researched effect.
7) In the SOEP the question referring to remittances is divided into the categories "parents / parents-in-law, children (also son-in-law/daughter-in-law), spouse or divorced spouse, other relatives and unrelated persons", whereas the last category is not included in this paper as only family members are observed (TNS Infratest Sozialforschung (2011, p. 34).
8) We check for a potential bias by estimating all models using all observations applicable to the model specifications. The results suggest no systematic bias and therefore, for the sake of maintaining comparability between the different support types, the models are being estimated using only the individuals who provided answers to all four support type questions.
9) See Buis (2010) for a detailed explanation on how to read tables in odds ratios and make inferences.
10) To determine the odds ratios of the interaction-term, the odds ratios of the interaction have to be multiplied with the education variable.

11) However, there is the possibility of a selection bias, for individuals who specifically migrated to Germany in order to obtain university education.

7 APPENDIX

TABLE 5: WHO IS PROVIDING INFORMATIONAL SUPPORT? SOURCE: AUTHOR, BASED ON DATA FROM SOEP V32

	[1]		[2]		[3]		[4]		[5]	
Relationship status	N	%	N	%	N	%	N	%	N	%
(Marital) partner	**6,444**	**79.74**	246	5.59	164	6.64	40	3.49	19	3.23
Former (marital) partner	25	0.31	12	0.27	7	0.28	2	0.17	3	0.51
Mother	**956**	**11.83**	**1,290**	**29.31**	137	5.55	42	3.66	8	1.36
Father	169	2.09	**766**	**17.41**	**716**	**29.00**	56	4.88	27	4.58
Step or foster mother	4	0.05	12	0.27	10	0.41	8	0.70	0	0.00
Step or foster father	5	0.06	23	0.52	24	0.97	6	0.52	9	1.53
Mother-in-law	7	0.09	116	2.64	68	2.75	82	7.15	8	1.36
Father-in-law	2	0.02	29	0.66	60	2.43	27	2.35	57	9.68
Daughter	69	0.85	240	5.45	62	2.51	25	2.18	5	0.85
Son	32	0.40	123	2.79	104	4.21	31	2.70	14	2.38
Sister	61	0.75	151	3.43	151	6.12	84	7.32	24	4.07
Brother	30	0.37	71	1.61	81	3.28	87	7.59	26	4.41
Grandmother	7	0.09	21	0.48	59	2.39	43	3.75	9	1.53
Grandfather	0	0.00	4	0.09	7	0.28	31	2.70	16	2.72
Grandchild	1	0.01	0	0.00	1	0.04	2	0.17	0	0
Aunt, Niece	3	0.04	13	0.30	22	0.89	10	0.87	11	1.87
Uncle, Nephew	0	0.00	7	0.16	10	0.41	9	0.78	7	1.19
Other female relatives	3	0.04	17	0.39	16	0.65	18	1.57	13	2.21
Other male relatives	4	0.05	9	0.20	12	0.49	10	0.87	7	1.19
Colleagues at work	107	1.32	562	12.77	215	8.71	**146**	**12.73**	**60**	**10.19**
Superiors	84	1.04	332	7.54	**240**	**9.72**	91	7.93	58	9.85
People from education	26	0.32	76	1.73	102	4.13	110	9.59	52	8.83
Neighbors	1	0.01	35	0.80	23	0.93	26	2.27	5	0.85
People from clubs	7	0.09	31	0.70	32	1.30	35	3.05	37	6.28
Paid support personnel	3	0.04	15	0.34	6	0.24	7	0.61	3	0.51
Other people	31	0.38	200	4.54	140	5.67	**119**	**10.37**	**111**	**18.85**
Total	8,081	100.00	4,401	100.00	2,469	100.00	1,147	100.00	589	100.00

Notes: [1] Important person 1 is providing informational support, [2] important person 2 is providing informational support, [3] important person 3 is providing informational support, [4] important person 4 is providing informational support, [5] important person 5 is providing informational support

TABLE 6: WHO IS PROVIDING INSTRUMENTAL SUPPORT? SOURCE: AUTHOR, BASED ON DATA FROM SOEP V32

	[1]		[2]		[3]		[4]		[5]	
Relationship status	N	%	N	%	N	%	N	%	N	%
(Marital) partner	**6,562**	**81.19**	173	2.91	123	3.20	27	1.35	23	2.45
Former (marital) partner	24	0.30	26	0.44	9	0.23	1	0.05	2	0.21
Mother	**1,058**	**13.09**	**2,280**	**38.40**	186	4.83	60	3.00	14	1.49
Father	59	0.73	759	12.78	**1,226**	**31.86**	76	3.80	29	3.09
Step or foster mother	6	0.07	15	0.25	18	0.47	7	0.35	0	0.00
Step or foster father	0	0.00	24	0.40	21	0.55	6	0.30	3	0.32
Mother-in-law	10	0.12	157	2.64	143	3.72	198	9.90	30	3.19
Father-in-law	1	0.01	14	0.24	66	1.72	54	2.70	**113**	**12.03**
Daughter	82	1.01	**706**	**11.89**	172	4.47	85	4.25	23	2.45
Son	40	0.49	311	5.24	**388**	**10.08**	97	4.85	42	4.47
Sister	118	1.46	443	7.46	**452**	**11.75**	**361**	**18.06**	57	6.07
Brother	35	0.43	203	3.42	253	6.57	**284**	**14.21**	**114**	**12.14**
Grandmother	6	0.07	11	0.19	46	1.20	35	1.75	20	2.13
Grandfather	0	0.00	1	0.02	6	0.16	16	0.80	17	1.81
Grandchild	0	0.00	1	0.02	1	0.03	2	0.10	1	0.11
Aunt, Niece	5	0.06	20	0.34	40	1.04	36	1.80	28	2.98
Uncle, Nephew	1	0.01	1	0.02	15	0.39	12	0.60	21	2.24
Other female relatives	4	0.05	50	0.84	61	1.59	56	2.80	27	2.88
Other male relatives	3	0.04	11	0.19	22	0.57	24	1.20	12	1.28
Colleagues at work	0	0.00	17	0.29	22	0.57	25	1.25	20	2.13
Superiors	0	0.00	0	0.00	5	0.13	4	0.20	0	0.00
People from education	1	0.01	23	0.39	33	0.86	38	1.90	37	3.94
Neighbors	3	0.04	32	0.54	37	0.96	55	2.75	39	4.15
People from clubs	3	0.04	30	0.51	31	0.81	37	1.85	30	3.19
Paid support personnel	47	0.58	474	7.98	274	7.12	**227**	**11.36**	104	11.08
Other people	14	0.17	155	2.61	198	5.15	176	8.80	**133**	**14.16**
Total	8,082	100.00	5,937	100.00	3,848	100.00	1,999	100.00	939	100.00

Notes: [1] Important person 1 is providing instrumental support, [2] important person 2 is providing instrumental support, [3] important person 3 is providing instrumental support, [4] important person 4 is providing instrumental support, [5] important person 5 is providing instrumental support

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TABLE 7: WHO IS PROVIDING APPRAISAL SUPPORT? SOURCE: AUTHOR, BASED ON DATA FROM SOEP V32

	[1]		[2]		[3]		[4]		[5]	
Relationship status	N	%	N	%	N	%	N	%	N	%
(Marital) partner	**6,399**	**79.18**	284	4.84	124	3.06	35	1.46	19	1.51
Former (marital) partner	34	0.42	41	0.70	13	0.32	5	0.21	3	0.24
Mother	**858**	**10.62**	**2,068**	**35.22**	308	7.59	109	4.54	31	2.46
Father	116	1.44	601	10.24	**1,020**	**25.14**	134	5.59	46	3.65
Step or foster mother	2	0.02	14	0.24	14	0.35	10	0.42	2	0.16
Step or foster father	4	0.05	18	0.31	29	0.71	9	0.38	7	0.56
Mother-in-law	13	0.16	97	1.65	94	2.32	92	3.83	36	2.86
Father-in-law	2	0.02	17	0.29	44	1.08	28	1.17	55	4.37
Daughter	128	1.58	**715**	**12.18**	238	5.87	121	5.04	26	2.07
Son	52	0.64	323	5.50	**414**	**10.20**	178	7.42	72	5.72
Sister	176	2.18	446	7.60	**446**	**10.99**	**323**	**13.46**	69	5.48
Brother	54	0.67	190	3.24	268	6.61	**254**	**10.59**	114	9.05
Grandmother	8	0.10	21	0.36	29	0.71	37	1.54	12	0.95
Grandfather	1	0.01	4	0.07	2	0.05	8	0.33	13	1.03
Grandchild	1	0.01	0	0.00	2	0.05	2	0.08	2	0.16
Aunt, Niece	8	0.10	16	0.27	36	0.89	27	1.13	14	1.11
Uncle, Nephew	2	0.02	2	0.03	7	0.17	7	0.29	9	0.71
Other female relatives	17	0.21	36	0.61	39	0.96	36	1.50	22	1.75
Other male relatives	5	0.06	15	0.26	23	0.57	18	0.75	11	0.87
Colleagues at work	23	0.28	222	3.78	212	5.23	258	10.75	**127**	**10.09**
Superiors	12	0.15	67	1.14	111	2.74	76	3.17	83	6.59
People from education	46	0.57	119	2.03	114	2.81	113	4.71	96	7.63
Neighbors	7	0.09	62	1.06	41	1.01	57	2.38	40	3.18
People from clubs	24	0.30	91	1.55	76	1.87	94	3.92	76	6.04
Paid support personnel	1	0.01	5	0.09	7	0.17	2	0.08	6	0.48
Other people	89	1.10	398	6.78	346	8.53	**366**	**15.26**	**268**	**21.29**
Total	8,082	100.00	5,872	100.00	4,057	100.00	2,399	100.00	1,259	100.00

Notes: [1] Important person 1 is providing appraisal support, [2] important person 2 is providing appraisal support, [3] important person 3 is providing appraisal support, [4] important person 4 is providing appraisal support, [5] important person 5 is providing appraisal support

TABLE 8: ORDINAL LOGIT ESTIMATION FOR BRIDGING SPATIAL DISTANCES IN EMOTIONAL SUPPORT REPORTING ODDS RATIOS. SOURCE: AUTHOR, BASED ON DATA FROM SOEP V32

	[1]	[2]	[3]	[4]	[5]
Maximum distance, emotional support					
Migrant	**1.288*****	1.203	1.257*	1.247*	1.295*
	[0.000]	[0.138]	[0.066]	[0.076]	[0.051]
Female	**0.620*****	**0.621*****	**0.621*****	**0.616*****	**0.621*****
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age	0.999	0.997	0.997	0.996*	0.997
	[0.511]	[0.222]	[0.185]	[0.061]	[0.346]
Ln household income	**0.848*****	**0.771*****	**0.888*****	**0.874*****	**0.904****
	[0.000]	[0.000]	[0.004]	[0.001]	[0.024]
Existence of support provider at long distance	**25.28*****	**24.64*****	**23.87*****	**23.82*****	**20.91*****
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Network composition	**1.590*****	**1.746*****	**1.837*****	**1.842*****	**1.949*****
	[0.008]	[0.002]	[0.001]	[0.001]	[0.000]
Intermediate general education		**1.233*****	**1.197*****	1.192**	1.157**
		[0.002]	[0.009]	[0.011]	[0.050]
Technical college		1.090	1.065	1.059	1.029
		[0.419]	[0.558]	[0.592]	[0.802]
Highest general education		**1.553*****	**1.480*****	**1.483*****	**1.437*****
		[0.000]	[0.000]	[0.000]	[0.000]
Other school leaving degree		1.192	1.149	1.131	1.071
		[0.465]	[0.563]	[0.608]	[0.790]
Dropout		1.490*	1.480	1.476	1.391
		[0.094]	[0.101]	[0.104]	[0.179]
University		**1.301*****	**1.277*****	**1.266*****	**1.205*****
		[0.000]	[0.000]	[0.001]	[0.009]
Intermediate general education*Migrant		0.844	0.853	0.855	0.827
		[0.296]	[0.328]	[0.334]	[0.265]
Technical college*Migrant		0.880	0.870	0.887	0.852
		[0.613]	[0.584]	[0.636]	[0.543]
Highest general education*Migrant		0.684**	0.682**	0.683**	0.683*
		[0.043]	[0.043]	[0.043]	[0.053]
Other school leaving degree*Migrant		**2.219*****	**2.452*****	**2.457*****	**2.341*****
		[0.005]	[0.002]	[0.002]	[0.006]
Dropout*Migrant		0.482*	0.507	0.507	0.504
		[0.081]	[0.106]	[0.106]	[0.119]
University*Migrant		1.461**	1.418**	1.413**	1.438**

		[0.012]	[0.021]	[0.023]	[0.023]
Married, living together			**0.869*****	0.873**	**0.837*****
			[0.010]	[0.012]	[0.002]
Family size			**0.883*****	**0.889*****	**0.887*****
			[0.000]	[0.000]	[0.000]
Employed			1.012	1.011	0.977
			[0.822]	[0.846]	[0.689]
Remittances				**1.290*****	**1.271*****
				[0.001]	[0.003]
Residential mobility					**1.096*****
					[0.000]
Urban					1.064
					[0.197]
N	8087	8087	8087	8087	7166
pseudo R2	0.173	0.180	0.183	0.183	0.179

Notes: Models 1-5 introducing covariates stepwise, reporting odds-ratios and p-values in brackets.
***= Significant to the 1% level, **= significant to the 5% level, *=significant to the 10% level.

TABLE 9: ORDINAL LOGIT ESTIMATION FOR BRIDGING SPATIAL DISTANCES IN INFORMATIONAL SUPPORT REPORTING ODDS RATIOS. SOURCE: AUTHOR, BASED ON DATA FROM SOEP V32

	[1]	[2]	[3]	[4]	[5]
Maximum distance, informational support					
Migrant	**0.789*** **	0.844	0.951	0.950	0.995
	[0.000]	[0.231]	[0.724]	[0.718]	[0.974]
Female	**0.627*** **	**0.650*** **	**0.665*** **	**0.662*** **	**0.649*** **
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age	**0.965*** **	**0.967*** **	**0.976*** **	**0.975*** **	**0.979*** **
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln household income	**0.513*** **	**0.456*** **	**0.630*** **	**0.625*** **	**0.594*** **
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Existence of support provider at long distance	**3.784*** **	**3.558*** **	**3.396*** **	**3.390*** **	**3.515*** **
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Network composition	1.021	1.215	1.442**	1.443**	1.384*
	[0.909]	[0.289]	[0.048]	[0.048]	[0.093]
Intermediate general education		**1.239*** **	1.204**	1.202**	1.214**
		[0.006]	[0.019]	[0.019]	[0.021]
Technical college		**1.396*** **	**1.364*** **	**1.362*** **	1.318**
		[0.004]	[0.008]	[0.009]	[0.025]
Highest general education		**1.801*** **	**1.645*** **	**1.649*** **	**1.684*** **
		[0.000]	[0.000]	[0.000]	[0.000]
Other school leaving degree		1.128	1.056	1.050	1.233
		[0.648]	[0.836]	[0.853]	[0.444]
Dropout		1.047	0.949	0.948	0.912
		[0.863]	[0.846]	[0.842]	[0.736]
University		1.100	1.103	1.100	1.089
		[0.204]	[0.194]	[0.208]	[0.279]
Intermediate general education*Migrant		1.290	1.336	1.335	1.217
		[0.157]	[0.111]	[0.113]	[0.299]
Technical college*Migrant		1.665*	1.565*	1.575*	1.616*
		[0.053]	[0.094]	[0.090]	[0.081]
Highest general education*Migrant		1.058	1.013	1.009	0.907
		[0.781]	[0.952]	[0.966]	[0.648]
Other school leaving degree*Migrant		0.652	0.835	0.832	0.682
		[0.178]	[0.572]	[0.564]	[0.250]
Dropout*Migrant		0.455*	0.585	0.583	0.607
		[0.083]	[0.242]	[0.238]	[0.295]
University*Migrant		1.042	0.988	0.988	1.058

		[0.805]	[0.942]	[0.940]	[0.744]
Married, living together			**0.460*** **	**0.460*** **	**0.497*** **
			[0.000]	[0.000]	[0.000]
Family size			**0.858*** **	**0.860*** **	**0.866*** **
			[0.000]	[0.000]	[0.000]
Employed			0.921	0.921	0.928
			[0.169]	[0.167]	[0.231]
Remittances				1.135	1.169*
				[0.136]	[0.089]
Residential mobility					**0.942*** **
					[0.001]
Urban					1.059
					[0.280]
N	8087	8087	8087	8087	7166
pseudo R2	0.077	0.084	0.100	0.100	0.094

Notes: Models 1-5 introducing covariates stepwise, reporting odds-ratios and p-values in brackets.
***= Significant to the 1% level, **= significant to the 5% level, *=significant to the 10% level.

TABLE 10: ORDINAL LOGIT ESTIMATION FOR BRIDGING SPATIAL DISTANCES IN INSTRUMENTAL SUPPORT REPORTING ODDS RATIOS. SOURCE: AUTHOR, BASED ON DATA FROM SOEP V32

	[1]	[2]	[3]	[4]	[5]
Maximum distance, instrumental support					
Migrant	0.963	1.081	1.141	1.137	1.121
	[0.489]	[0.531]	[0.289]	[0.300]	[0.390]
Female	**0.649*** **	**0.661*** **	**0.658*** **	**0.655*** **	**0.664*** **
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age	**0.986*** **	**0.986*** **	**0.985*** **	**0.984*** **	**0.985*** **
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln household income	**0.775*** **	**0.690*** **	**0.835*** **	**0.827*** **	**0.830*** **
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Existence of support provider at long distance	**10.65*** **	**10.16*** **	**9.747*** **	**9.724*** **	**9.047*** **
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Network composition	1.421**	**1.621*** **	**1.729*** **	**1.730*** **	**1.700*** **
	[0.042]	[0.006]	[0.002]	[0.002]	[0.004]
Intermediate general education		**1.234*** **	1.188**	1.186**	1.188**
		[0.002]	[0.013]	[0.013]	[0.020]
Technical college		1.128	1.096	1.093	1.068
		[0.254]	[0.387]	[0.401]	[0.558]
Highest general education		**1.489*** **	**1.393*** **	**1.394*** **	**1.368*** **
		[0.000]	[0.000]	[0.000]	[0.000]
Other school leaving degree		1.116	1.088	1.080	1.124
		[0.648]	[0.725]	[0.748]	[0.642]
Dropout		0.847	0.844	0.841	0.788
		[0.518]	[0.510]	[0.502]	[0.365]
University		**1.307*** **	**1.266*** **	**1.262*** **	**1.233*** **
		[0.000]	[0.001]	[0.001]	[0.004]
Intermediate general education*Migrant		0.806	0.814	0.813	0.870
		[0.184]	[0.205]	[0.202]	[0.415]
Technical college*Migrant		0.922	0.899	0.908	0.888
		[0.748]	[0.673]	[0.702]	[0.650]
Highest general education*Migrant		0.717*	0.719*	0.720*	0.738
		[0.078]	[0.080]	[0.081]	[0.124]
Other school leaving degree*Migrant		0.966	1.076	1.077	1.006
		[0.905]	[0.799]	[0.798]	[0.984]
Dropout*Migrant		0.457*	0.497	0.497	0.456*
		[0.066]	[0.103]	[0.102]	[0.082]
University*Migrant		**1.594*** **	**1.544*** **	**1.536*** **	**1.552*** **

		[0.003]	[0.005]	[0.006]	[0.007]
Married, living together			**0.840*****	**0.842*****	**0.834*****
			[0.001]	[0.001]	[0.002]
Family size			**0.845*****	**0.849*****	**0.856*****
			[0.000]	[0.000]	[0.000]
Employed			1.024	1.024	1.012
			[0.662]	[0.672]	[0.839]
Remittances				1.158*	1.061
				[0.053]	[0.478]
Residential mobility					1.045**
					[0.012]
Urban					1.037
					[0.443]
N	8087	8087	8087	8087	7166
pseudo R2	0.117	0.122	0.127	0.127	0.122

Notes: Models 1-5 introducing covariates stepwise, reporting odds-ratios and p-values in brackets.
***= Significant to the 1% level, **= significant to the 5% level, *=significant to the 10% level.

TABLE 11: ORDINAL LOGIT ESTIMATION FOR BRIDGING SPATIAL DISTANCES IN APPRAISAL SUPPORT REPORTING ODDS RATIOS. SOURCE: AUTHOR, BASED ON DATA FROM SOEP V32

	[1]	[2]	[3]	[4]	[5]
Maximum distance, appraisal support					
Migrant	0.978	1.198	1.278*	1.267*	1.287*
	[0.687]	[0.151]	[0.052]	[0.061]	[0.062]
Female	**0.685*****	**0.707*****	**0.713*****	**0.702*****	**0.698*****
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age	0.995**	0.996**	0.994**	**0.992*****	0.995*
	[0.021]	[0.038]	[0.011]	[0.000]	[0.094]
Ln household income	**0.851*****	**0.744*****	0.917**	**0.891*****	0.902**
	[0.000]	[0.000]	[0.038]	[0.006]	[0.023]
Existence of support provider at long distance	**11.91*****	**11.36*****	**10.90*****	**10.86*****	**9.818*****
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Network composition	1.534**	**1.815*****	**1.953*****	**1.952*****	**1.859*****
	[0.014]	[0.001]	[0.000]	[0.000]	[0.001]
Intermediate general education		**1.435*****	**1.379*****	**1.373*****	**1.372*****
		[0.000]	[0.000]	[0.000]	[0.000]
Technical college		**1.567*****	**1.518*****	**1.509*****	**1.393*****
		[0.000]	[0.000]	[0.000]	[0.003]
Highest general education		**1.724*****	**1.610*****	**1.620*****	**1.572*****
		[0.000]	[0.000]	[0.000]	[0.000]
Other school leaving degree		1.345	1.281	1.250	1.301
		[0.233]	[0.318]	[0.370]	[0.314]
Dropout		1.196	1.207	1.196	1.115
		[0.477]	[0.459]	[0.481]	[0.674]
University		**1.301*****	**1.270*****	**1.252*****	**1.212*****
		[0.000]	[0.000]	[0.001]	[0.007]
Intermediate general education*Migrant		0.818	0.821	0.820	0.794
		[0.219]	[0.228]	[0.225]	[0.180]
Technical college*Migrant		0.682	0.674	0.687	0.657
		[0.130]	[0.120]	[0.140]	[0.114]
Highest general education*Migrant		0.644**	0.641**	0.640**	0.645**
		[0.020]	[0.020]	[0.019]	[0.029]
Other school leaving degree*Migrant		0.682	0.767	0.772	0.707
		[0.295]	[0.371]	[0.383]	[0.270]
Dropout*Migrant		0.448*	0.329**	0.326**	0.317**
		[0.058]	[0.011]	[0.011]	[0.012]
University*Migrant		**1.771*****	**1.723*****	**1.711*****	**1.707*****

		[0.000]	[0.000]	[0.001]	[0.001]
Married, living together			**0.860*****	**0.867*****	**0.858*****
			[0.005]	[0.008]	[0.009]
Family size			**0.827*****	**0.837*****	**0.835*****
			[0.000]	[0.000]	[0.000]
Employed			0.969	0.967	0.933
			[0.574]	[0.543]	[0.236]
Remittances				**1.531*****	**1.438*****
				[0.000]	[0.000]
Residential mobility					**1.066*****
					[0.000]
Urban					1.044
					[0.373]
N	8087	8087	8087	8087	7166
pseudo R2	0.121	0.128	0.134	0.135	0.130

Notes: Models 1-5 introducing covariates stepwise, reporting odds-ratios and p-values in brackets.
***= Significant to the 1% level, **= significant to the 5% level, *=significant to the 10% level.

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ORIGINAL RESEARCH

Variations in Access to Social Support: the Effects of Residential Mobility and Spatial Proximity to Kin and Family

Kyra Hagge[1] · **Diana Schacht**[2]

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Abstract
Increasing residential mobility is said to challenge existing social support systems as mobility raises geographic distances between family members. Since family social support is essential for health and well-being, this study investigates whether residential mobility affects familial social support following changes in proximity to family and kin. By applying a stepwise linear regression on data from the German Socio-Economic Panel study, this paper is looking at variations between different residential mobility trajectories regarding social support provision and spatial proximity to family members in Germany over a 10-year period. Our findings show that people who are moving within Germany are receiving significantly more social support from their family and kin, while internationally mobile respondents receive less compared to non-mobile people. Mediation analyses show that proximity to family and kin are accounting for the negative effect of international mobility on social support but cannot explain the positive effect of internal migration.

Keywords Residential mobility · Residential proximity · Social support · Family ties

1 Introduction

Being a phenomenon inherently tied to the human race, residential mobility is steadily increasing globally in the current day and age. With more and more people leaving their place of origin to look for better opportunities elsewhere, physical distances between mobile individuals and their original core networks are growing. Even though individuals can have diverse social networks consisting of people with different roles, from friends, to co-workers and neighbors, family networks are still considered the primary source of social

✉ Kyra Hagge
haggek19@students.ecu.edu

Diana Schacht
dschacht@dji.de

[1] Faculty of Economics and Business Science, Justus-Liebig University Giessen, Licher Strasse 64, 35394 Giessen, Germany

[2] Deutsches Jugendinstitut, Nockherstr. 2, 81541 Munich, Germany

support (Magdol & Bessel, 2003; Yilmaz et al., 2022). As familial networks are central in the provision of care, they are most beneficial in a local setting (Spring et al., 2017). Residential mobility[1] consequently changes the core social networks of individuals in terms of geographical proximity to kin, spatial spread, and fragmentation (Koelet et al., 2017; Litwak, 1960), thereby decreasing the frequency of contact between family members. Thus, individuals' mobility trajectories are potentially affecting the access to important social support resources and inhibiting mobile individuals' life satisfaction, health, or status attainment (Arpino & de Valk, 2018; Hendriks & Burger, 2021; Lin, 1999; Thoits, 2011).

Numerous studies show empirical evidence for the disruptive effect of residential mobility on individuals' social embeddedness and access to social support (Axhausen & Frei, 2007; Simoni & Bauldry, 2020; see reviews in: Coleman, 1990; Hagan et al., 1996; Wellman et al., 2001). Following this argument, residential mobility may be one of the core causes for variations in access to family social support (Magdol & Bessel, 2003). As long distance ties between immigrants and their extended families serve as major support providers (Hagan et al., 1996), residential mobility may even predict variations in social support between individuals with different mobility trajectories[2] (Ermisch & Mulder, 2019; Thoits, 2011). In contrast, some empirical studies show that access to support between long-distance (domestically) mobile and non-mobile people does not vary (Viry, 2012), that provision of support does not seem to be affected by proximity (Mok et al., 2007), and that access to social support does not vary by ethnicity and race (Feld et al., 2006), which are often associated with previous experiences of international migration. Following these empirical observations, there is no consensus in the literature about the impact of spatial proximity to family and kin on family social support, and the role residential mobility plays in this relationship.

Using the data from the German Socio-Economic Panel (SOEP) study, a large-scale, long-term, national panel dataset (Goebel et al., 2018 can be accessed at: https://doi.org/https://doi.org/10.5684/soep.v33), we are able to shed more light onto the following research questions: (1) Does individuals' proximity to family and kin vary between non-mobiles, internal and international migrants? (2) And if so, are these variations in social support by kin and family an effect of residential proximity? Thus, we are interested in the effect of a certain mobility trajectory on the access to social support and the mediating effect of proximity to family members and kin.

This study contributes to the literature in at least three different ways.

First, even though a considerable body of literature is examining the impact of geographical distance on intergenerational ties (usually between parents and children, Ermisch & Mulder, 2019; Wing Chan & Ermisch, 2015), many scholars are calling to take also the larger family into consideration, as mobility decisions pertain to all kinship ties available (Mulder et al., 2018). In our paper, we are comparing and contrasting descriptive summary statistics on distances between individuals belonging to different mobility groups and their close and extended family members with an extensive survey dataset featuring a large

[1] We are defining residential mobility as the change of ones' physical location as a result of a move, encompassing both, long and short distance moves.

[2] These different mobility trajectories are hereafter called "mobility groups". We distinguish between internally mobile people, or people who relocated within the same country, internationally mobile people, or people who relocated from abroad, and non-mobile people, referring to people who have not changed their residential location.

number of observations. By using SOEP data for 2006, 2011, and 2016 (Goebel et al., 2018), we are able to paint a broad picture of:

- People's proximity to family and kin and
- Their access to social support across three points in time.

Second, we are not only looking at distance between the individual and their family members, but also at differences in social support between the mobility groups. Even though these analyses do not allow for a causal interpretation, potential differences between the mobility groups point towards significant disruptions of ties and social support to be connected to the mobility trajectory. In an era marked by increasing migration and residential relocation, the corresponding findings of this study are of particular relevance for future research and policies on the impact of geographic distance and mobility on the well-being of individuals. Additionally, comparisons between non-mobile, internally mobile, and internationally mobile people are rarely being done (see for a critical review of this divide King & Skeldon, 2010) and our study is therefore contributing to address this gap.

Third, after the United States, Germany reports the third highest proportion of immigrants internationally (OECD, 2021). The German government considers approximately 24.1 percent of Germany's 82 million residents to have a migration background (Federal Statistical Office of Germany (Destatis), 2019). In addition, approximately three percent of the German population is moving within Germany each year (Rees et al., 2017). Furthermore, social support is particularly important in Germany, e.g. for status attainment (see for a comparison with the US: Wöhler & Hinz, 2007).

1.1 Why Proximity and Mobility Groups Correlate

Residential mobility increases the spatial proximity to family and kin by moving the respective family members apart (Rogerson et al., 1993). The residential relocation over various distances is connected to a set of decisions to be made by the individual, which have been studied intensively in the migration literature. This body of work has identified several factors that encourage mobility, which differ in extent with regards to whether the individual decides to leave or stay and the distance between their origin and destination. Residential mobility has been attributed to be mostly concerned with economic factors such as wage differences or improved job opportunities but also non-monetary factors like a more attractive physical, social, or cultural environment (Massey et al., 1993; Nowok et al., 2013).

Even though we are not looking at the cause for migration, we are interested in looking at the effects, especially concerning the resulting spatial proximity of the family members (Hank, 2007) and their exchange of social support.

Every mobility decision is tied to a set of costs and benefits and the individual is believed to choose migration only if the net benefits outweigh the net costs (Nivalainen, 2004). Therefore, individuals also consider close and extended family when making the decision to move or stay (Ermisch & Mulder, 2019; Mulder et al., 2018). Similarly, Clark et al. (2017) find that stronger connections to friends and relatives are inhibiting the likelihood to move. Especially low-income families (Dawkins, 2006) and people with health issues or elderly individuals (Artamonova et al., 2020) rely on a densely knit family network for care. We hypothesize that factors such as these lead to non-mobile people having

their family members living mostly close by, within their household or house or at least in the immediate vicinity such as their neighborhood.

People who migrate within the borders of their country of residence, called internal migrants in our study, are oftentimes looking to improve their job outcomes by either moving related to a career or for education (Bimonte et al., 2020; Dreby & Stutz, 2012). However, the cost associated with moving are of social nature, potentially disconnecting network ties (Hendriks et al., 2016; Kratz, 2020). Assuming that the core family network is not moving with the individual or only to a very limited extent, we hypothesize that the net direction of mobility regarding internal migration is away from family and kin and therefore internal migrants live further away from their kin, but still in the same country.

For transnational families, the decision to migrate is frequently made with the intention of improving children's lives (Abrego, 2009; Dreby & Stutz, 2012), and thus, is a consequence of a strong emotional bond to the origin household (Nobles, 2011). International migrants are not only dealing with assimilation and integration but also with cultural differences in the place of destination. To buffer some of the stress experienced in the new location, they are trying to uphold ties to family in their country of origin (Carella et al., 2022; Nee & Sanders, 2001), hence we are expecting their networks to have a bigger share of people living abroad. However, some of the mobility could also be motivated by kin who has already settled in the country of destination before the move takes place (Boujija et al., 2022; Ortensi & Barbiano di Belgiojoso, 2021; Pacheco et al., 2013), which acts as a pull factor. International migrants could either move towards those family members, or migrate with their respective family, we are therefore expecting them to have a proportion of their ties living close by also in the destination country.

Drevon et al. (2021) find that the composition or ratio between friends and family in social networks does not vary between mobile and non-mobile people. The social network composition does not change because familial ties are considered to be stronger than ties to friends or co-workers and are not subjected to erosion of trust if the individuals are not collocated, they are more often upheld even over larger distances (Wellman, 1992; White & Riedmann, 1992). Scholars have pointed out that family ties, in particular between parents and children, are more likely to overcome spatial dispersion than weaker relationships, such as those between with friends and other acquaintances (Viry, 2012; Viry et al., 2017). This finding can be explained by normative expectations concerning relatives and the density of connection of kinship systems (Wellman & Wortley, 1990). Following this argumentation, the only difference between the mobility groups is the spatial proximity to family and kin.

1.2 Why Residential Mobility may Affect Social Support

The decision to relocate or remain at a certain place is not only a product of the economic opportunities and cultural and place-based resources, but also closely related to interpersonal relations and especially social support (Mulder et al., 2018; Niedomysl & Clark, 2014). Several mechanisms affect the availability of individuals' social support. For example, Wellman and Wortley (1990) argue that residential proximity fosters densely knit connections, mutual awareness of problems, and easy delivery of aid. The authors' rationale stems from the fact that residential mobility affects the proximity to family and kin and thereby the magnitude of interaction (Shi et al., 2016; Wellman & Wortley, 1990; White & Riedmann, 1992). Indeed, co-residence and levels of geographical mobility help to explain the frequency of kinship interactions, and even cross-countries variations thereof (Höllinger & Haller, 1990). As distance increases more than

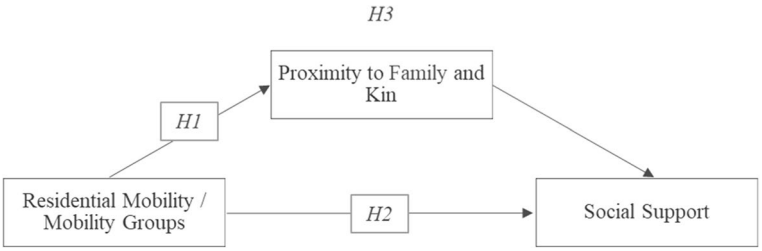

Fig. 1 Theoretical model

5 miles, the frequency of face-to-face and telephone contact decreases steadily, as demonstrated in a study by Mok et al., (2007). Some studies show that social support, to a certain degree, requires face-to-face interactions (White & Riedmann, 1992). International residential relocation, specifically, is often associated with a decrease in the frequency of contact with social networks in the home country (Lubbers et al., 2010). In Germany, residential proximity seems to be related to contact frequency, so that the closer (geographically) parents and children reside, the more frequent they contact one another (Axhausen & Frei, 2007; Ermisch & Mulder, 2019; Steinbach, 2013).

Additionally, the strength of social ties between individuals and their family as well as kin may subside with decreasing residential proximity, which weakens the mutual inclination to support (Shi et al., 2016; Wellman & Wortley, 1990). Long periods of separation, often extending for several years, are associated with weakening relationships, union dissolution, and the formation of new sexual partnerships (Dreby & Adkins, 2010; Lubbers et al., 2010; Magdol, 2000). This occurs mainly because maintaining relations requires time, an active effort, and meeting opportunities (Mollenhorst et al., 2014). Migration duration, for instance, seems to play a prominent role in the disruption of ties with family and kin in the home country (Morosanu, 2013). Furthermore, migration duration can cause the substitution of these ties with ethnic networks in the host country (Nee & Sanders, 2001), while also influencing processes related to family reunification or building in the host country (Boyd, 1989).

Embeddedness, standing for the social relationships increasing integration in a particular local surrounding, is relevant to the mobility decision of non-movers and internal movers (Korinek et al., 2005). Family already living at a distance increases the likelihood to move to the location where family members have settled already (Mulder et al., 2018; Pacheco et al., 2013) and social support in the destination country reduces the desire for returning back to the country of origin (Ortensi & Barbiano di Belgiojoso, 2021; Yahirun, 2014). Embeddedness thus contributes to the effect of proximity, as it is tied to the locally available social support.

To test the hypothesis, we employed a simple mediation model by Hayes (2022). Figure 1 presents the theoretical model of the study. Following previous work, we thus hypothesize that.

1. Proximity systematically varies between groups – the further the residential mobility goes the more dispersed is the family and kin social support network (Hypothesis 1, H1).
2. Residential mobility contributes to variations in individuals' exchange of social support with family and kin (Hypothesis 2, H2).

3. Proximity to family and kin should mediate the variations between mobile and non-mobile individuals in their access to social support (Hypothesis 3, H3).

2 Data

In an optimal dataset to address our research questions, we would be able to draw on data describing the mobility trajectories of all mobility groups assessed before and after their decision to become residentially mobile, which would allow us to conduct a pre-post migration analysis. However, large-scale national panel data with this level of granularity does not exist to our knowledge. Nevertheless, the analysis of the available data contributes to increase the understanding of the impact of residential mobility on social support until better suited data is attainable.

The analytical part of the paper is based on data from the "Socio-Economic Panel (SOEP)". It is a wide-ranging, nationally representative, longitudinal study of private households across Germany that was launched in 1984. Every year, nearly 15,000 households and more than 25,000 individuals are surveyed for the main sample of the SOEP (SOEP Core) study. Data for this investigation come from the SOEP Core and the additional IAB-SOEP Migration samples where the migrant population is targeted (M1-3). The analytical sample contains around 14,000 individuals, who have partaken in at least one of the survey years, when our outcome variable was collected (2006, 2011, and 2016). To arrive at this sample size, we dropped individuals over the age of 65 (4080 observations), as they were filtered over one of the questions that makes up our dependent variable, social support. To achieve comparability with the general population in Germany, we use the person-based weights provided by the SOEP. Using this dataset, we are not able to control for potential selection effects. In other words: if people who relocate select themselves into a distinct group because of observable and unobservable characteristics, we will not be able to account for this potential selection, as the survey questions have not been posed to international migrants before their arrival to Germany. The same is true for internal migrants, as we only have values for when they are part of the survey population.

3 Variables and Method

3.1 Residential Mobility

According to our hypotheses, we define individuals as movers (internal or international) if they relocated at least once before the respective survey interview. For example, if they changed residential location between 2006 and 2011, their migration experience was recorded in 2011. Internal movers are people who changed their place of residence while being part of the SOEP population, or people who indicated that they now live in a federal state that differs from their birthplace. Since individuals may have moved within a federal state, which would not be reflected in the data, we argue that our measure is conservative for internal movers. We define international movers as individuals born outside of Germany or who provided a year of immigration to Germany in the interview. In cases where the person had an international migration experience and

moved within Germany, they were counted as international movers, as their international relocation arguably evoked stronger ruptures in their access to social support than the relocation between different Federal States (Viry et al., 2017).

3.2 Proximity to Family and Kin

We include a measure of proximity to family and kin, constructed similarly to the approach used by Popielarz and Cserpes (2018), as we argue that residential mobility influences the spatial spread of the kin support network.

In the SOEP, respondents are being asked "(1) which of the following family members do you have? For each, indicate how many such relatives you have, (2) whether they live in your household, and if not, how far away they reside. If you have more than one relative in a category, please give only the location of the nearest-residing relative."(Goebel et al., 2018). The proximity item ranges from 0 (in the same household), 1 (in the same house) 2 (in the same neighborhood) 3 (in the same town) 4 (in a different town, less than 1 h by car) 5 (further away, but still in Germany) to 6 (abroad). To construct continuous variables, we assigned relative measures for the seven proximity categories by dividing the number of people reported by the total amount of kin reported to live within a certain proximity. For example, the variable "% in the same household" is calculated by dividing the number of people that live in the same household (e.g. 3) as the respondent by the number of people they reported who could provide social support (e.g. 15), which would yield 0.2. For better interpretability in the analysis, we have scaled the proximity categories by factor 10.

3.3 Social Support

Social support is considered to be a multi-dimensional phenomenon. House (1981), for example, differentiates between emotional, instrumental, informational and appraisal support.[3] In accordance, our outcome variable, based on the SOEP questionnaire, is considering multiple dimensions of social support and constructed according to previous work by Viry (2012). The variable is continuous, ranging from 0 (no support on any dimension) to 12 (support from three individuals in each dimension). It quantifies the number of individuals who are important to the respondents, and who would assist them in the following scenarios, with each scenario corresponding to a particular dimension of social support mentioned in brackets after each sub-question: (a) With whom do you talk about personal thoughts and feelings, or about things you wouldn't tell just anyone? (emotional support) (b) Who supports your advancements in your career or educational training and fosters your progress? (informational support) (c) Now a hypothetical question: If you were to need long-term care (for example, in the case of a bad accident), who would you ask for help? (Instrumental support) and (d) Who can you tell the truth, even when it is unpleasant? (appraisal support) (Goebel et al., 2018).

In the questionnaire, respondents could name immediate family members, extended kin, friends, and co-workers. Since our analysis focusses on the support provided by close and extended family members, our dependent variable captures social support if it was provided by these family members. Furthermore, we have estimated all models using only

[3] While social support is considered to be relationship-based, it is however, distinct from its relational preconditions, such as the availability of ties and social capital (for an introduction see Song et al., 2011).

the first three familial support providers of a possible five. This choice was made because scores exceeding 12 generated issues related to model fit (refer to Sect. 4.3 for robustness checks). The Cronbach's alpha for the adjusted outcome variable is 0.63, 0.62 and 0.65 for 2006, 2011 and 2016 respectively.

The additive index is particularly appropriate for our study because it captures perceived availability of social support, in contrast to the social support actually received. While both constructs are positively correlated (Meadows, 2009), perceived social support is measuring long-term benefits of social support, as well as being neutral as to whether people actually need or use this support (Mazelis & Mykyta, 2011), therefore encompassing a wider range of potential support relationships. In addition, this measure may count a recorded individual multiple times, as the respondent perceives this person to be helping them in various situations. Thus, it captures the quality and accessibility of social support relevant for our analysis and not the quantity of social support providers.

3.4 Controls

Research evidence suggests that the availability of social support is not evenly distributed in the population, but instead, varies according to marital status, age and other social factors (Penning & Wu, 2013; Wellman & Wortley, 1990). Therefore, we control for the gender *(female)* and the marital status *(*dummy variable *married (living together), marrieds (living separately), divorced, widowed,* and *single).* The *age* of an individual is an important demographic covariate as well, and since social support provision and reception changes with age, we also control for a non-linear relationship using the squared value of age, *age2*. Parents of younger children are more likely to be living closer to their family members (Nivalainen, 2004) and therefore rely more on familial social support. Hence, we control for the number of household members below the age of 14 *minorchild*. Other socio-economic factors such as *income* also have an impact on the available social support, as does the level of *education* (dummy variable differentiating between general, middle vocational, vocational and Abitur, higher vocational, and higher education) and whether the person is *employed* or not (Viry et al., 2017). Living in an *urban* area can also have an impact on how much social support an individual can access (Korinek et al., 2005). People who are of ill *health* (approximated by a grip strength test) rely more on their family and kin and are less able to provide social support to their family members, therefore health is also a determining factor when it comes to social support (Hank, 2007). A description of the control variables according to the mobility groups can be found in Table 3.

3.5 Estimation Approach

To answer the first research question, which concerns proximity and mobility and is of a descriptive nature, we were looking at residential proximity distinguished by the mobility trajectory over the study period. Given that we were furthermore interested in the effect of a certain mobility decision on social support and the mediating effect of proximity to family members and kin, we then ran two separate regression models in a stepwise fashion to answer research questions 2 and 3. Model 1 controls for the different mobility groups, testing in a first step for systematic variations in social support between the three groups and thereby indicating whether hypothesis 2, that residential mobility contributes to variations in social support, can be upheld.

Model 2 additionally controls for the proximity to close and extended family, testing for hypothesis 3. The underlying idea behind Model 2 was to account for the potential mediation effect of proximity to family and kin as source of social support. We hypothesize that controlling for proximity to family members diminishes the effect of residential mobility on available social support (more information on the methodological approach of mediation can be found in Hayes, 2022).

The regression analysis is done cross-sectionally, because we would need values for our variables pre-migration, which we only have for people who have stayed or migrated domestically within the study period. Since we therefore lack important information on a third of our sample, we can only draw point-based conclusions.

We ran two robustness checks: First, we ran each of the models for each of the mobility groups separately. Second, we conducted the analysis not only on the composite index (dependent variable) but also on its four individual support dimensions (emotional, instrumental, informational, and appraisal support), each ranging from 0 (no support) to 3 close and extended family members mentioned. The results will be discussed in the following section and detailed tables can be obtained upon request.

4 Results

4.1 Descriptive Results

As an answer to the first research question, we find that internal and international movers differ from the group of non-movers regarding the proximity to family and kin. As depicted in Fig. 2, respondents who had never moved had on average a higher share of family and kin living close by, in the same household, house, in the neighborhood, or in the same town (49–50% of non-movers' family and kin are residing within this distance, the reported range indicating the three different survey years). For international movers, the share of family living in very close proximity is 39–44%, meaning about 40% of their family and kin is living not further than in the same town. Internal movers mentioned a higher share of family members and kin living at a further residential proximity than non-movers. A high share (47–49%) of internal movers' family and kin lived further away but still in Germany.

Another striking difference between the mobility groups is the share of family members living furthest away from the respondent: 32–35% of international migrants' family and kin are residing abroad, however it is not clear from the data whether those people live in their country of origin or other places abroad. Descriptively, we find no variations for the three mobility groups across survey years, thus the, location of where the support providers live remains constant over the study period.

Regarding the second research question, we show in Fig. 3 the differences in the mean of social support between the different mobility groups. Descriptively, social support from family and kin is lower for international movers and higher for internal movers for each group compared to non-movers. On average, international movers perceive the availability of 0.60–1.00 support providers less than non-movers, whereas internal movers have access to 0.08 to 0.24 more support providers than non-movers depending on the survey year (significant to the 5% level). Social support varies across the survey years, respondents in all mobility categories are mentioning a higher number of support providers on average in 2016 than in 2011 (we cannot compare the numbers for 2006, as the question design

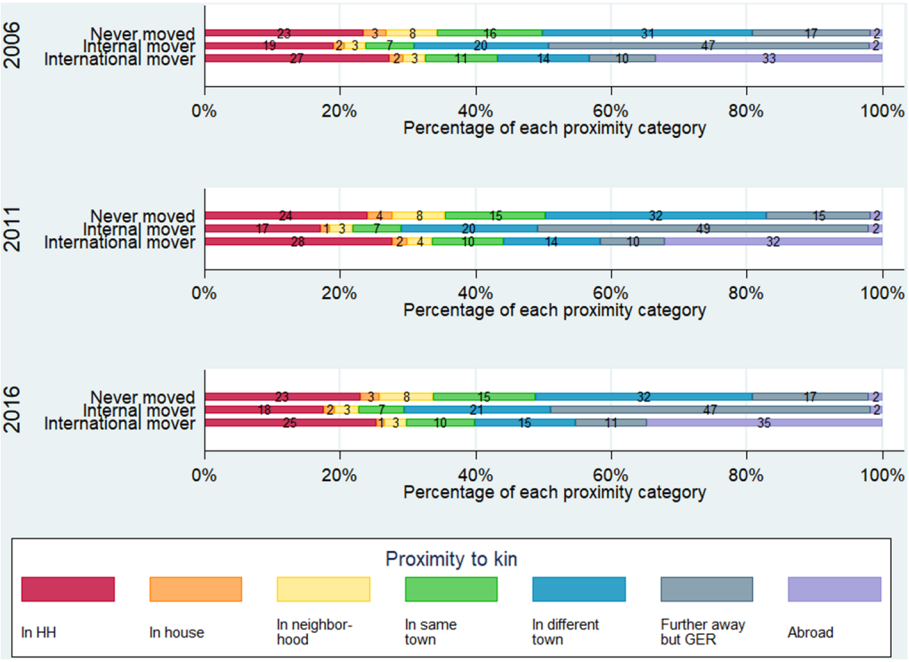

Fig. 2 Percentage of family and kin living at a certain proximity by mobility group and survey year (N = 15,714 (2006), 15,211 (2011), 17,373 (2016)). *Notes*: Percentage of family and kin living within a certain proximity based on the sample of Socio-Economic Panel Study (SOEP) respondents with non-missing information on the dependent and independent variables as well as the covariates in later models. "In HH" = living in the same household, "in house" = living in the same house, but not household, "in neighborhood" = living in the vicinity but not the same building, "in same town" = living in same town, but more than 15 min away by foot, "in different town" = living in another town but within one hour drive, "farther away but GER" = living in Germany, but further away than within 1h drive, "abroad" = living outside of Germany

changed). Furthermore, since we are looking at cross-sectional analyses and the study population between the years are not the same, we can only interpret these differences on a surficial level. Except for international movers, the descriptive summary statistics for social support indicate a slight increase across time. Mean social support for non-movers increased from 6.90 in 2011 to 7.04 in 2016. In 2016, internal movers had on average access to 0.21 support providers more than in 2011 (average increase from 7.07 to 7.28).

Further descriptive statistics on the analyzed sample can be found in the appendix (Table 3).

4.2 Multivariate Results

Figure 4 and Table 1 show the results of the linear regressions. All predictors described in the controls section are included in Model 1 (M1), as well as our independent variable, mobility group. Model 2 (M2) further includes the mediator variable "proximity to family and kin".

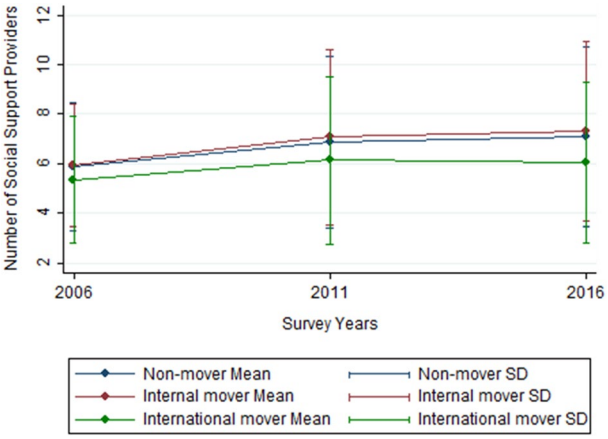

Fig. 3 Mean and standard deviation (SD) of social support providers according to mobility group and survey year N = 15,714 (2006), 15,211 (2011), 17,373 (2016). From top to bottom: Internal mover, non-mover, international mover. *Notes*: The number of support providers is based on the sample of Socio-Economic Panel Study (SOEP) respondents for 2006, 2011, and 2016. Social support is the average number of family members who are important to the respondent and would assist in different scenarios (range 0–20). "International movers" include people who were born outside of Germany, or who provided a year of immigration to Germany in the interview. "Internal movers" are people who changed their place of residence while being part of the SOEP population, or people who indicated that they now live in a federal state that differs from their birthplace

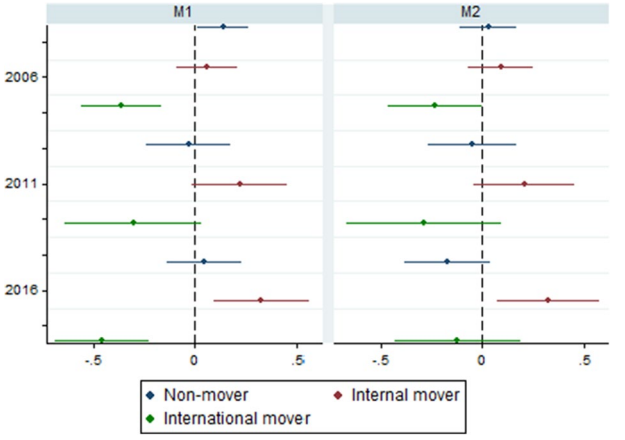

Fig. 4 Effect of mediator "proximity to family and kin" on social support, showing the coefficient for residential mobility (Internal vs. International) for each of the survey years. Non-Mover: First Horizontal Line, Internal Movers: Second Horizontal Line, International Mover: Third Horizontal Line from the top of each survey year. *Notes:* Reference: Non-movers. Results that are significant to the 1% level ($p < 0.01$) are indicated by confidence intervals not touching the dashed line at the bottom. For more details see Table 1

The results suggest that social support differs between mobility groups (hypothesis 2). Internal movers had a higher amount of social support available to them than their non-mobile counterparts. However, the results are only statistically significant in 2016, where internal movers report 0.24 more support providers than non-movers (Fig. 4 and Table 1).

The picture is reversed for internationally mobile respondents: they perceive significantly less available support from family and kin than non-mobile individuals. This result is supporting the descriptive findings presented in Table 2 and Fig. 2, demonstrating

Table 1 Multivariate results estimating the effect of residential mobility and the mediating effect of spatial proximity to family and kin (m1 vs.m2)

	2006				2011				2016			
	M1		M2		M1		M2		M1		M2	
Variable	b	SE	b	SE	b	SE	b	SE	b	SE	b	SE
Internal movers	0.01	(0.08)	0.07	(0.08)	0.19	(0.12)	0.18	(0.13)	0.24**	(0.12)	0.32**	(0.13)
International movers	−0.36***	(0.10)	−0.22*	(0.12)	−0.26	(0.17)	−0.25	(0.19)	−0.40***	(0.12)	−0.06	(0.16)
Reference: non-movers												
% Rel. in house			0.06	(0.04)			−0.02	(0.04)			0.10*	(0.05)
% Rel. in neighborhood			0.02	(0.03)			0.16***	(0.04)			0.08**	(0.04)
% Rel. same town			−0.01	(0.02)			0.08***	(0.03)			0.04	(0.03)
% Rel. different town			−0.03	(0.02)			0.07**	(0.03)			0.05*	(0.03)
% Rel. further away			−0.03*	(0.02)			0.07**	(0.03)			0.01	(0.03)
% Rel. abroad			−0.06**	(0.03)			0.07	(0.05)			−0.06**	(0.03)
Reference: % Rel. in hh												
Constant	4.38***	(0.25)	4.50***	(0.27)	4.83***	(0.41)	4.33***	(0.44)	4.97***	(0.32)	4.67***	(0.37)
N	15,714		15,714		15,211		15,211		17,373		17,373	
Adjusted R2	0.12		0.12		0.15		0.15		0.15		0.15	
F-statistic	44.92		37.39		43.65		36.35		50.14		41.42	
p > F	0.00		0.00		0.00		0.00		0.00		0.00	

The coefficients are based on a sample of Socio-Economic Panel Study (SOEP) respondents for 2006, 2011, and 2016 respectively using listwise deletion in the estimation. Reference category are non-movers. Standard errors (SE) in parentheses. The proximity categories were transformed using factor 10 for better interpretation

international movers having access to a fewer number of familial support providers (the difference is − 0.36, − 0.26, and − 0.40 in 2006, 2011, and 2016 respectively).

The proximity to family and kin is mostly statistically significant, except for family members living in closer proximity in 2006. Including the proximity to family and kin (M2) did not change the significance of the coefficient for internal movers, they still accessed 0.32 more social support providers of their family and kin than their non-mobile counterparts in 2016. Because we do not find statistically significant results for 2006 and 2011, hypothesis 2 is only weakly supported for the internally mobile population. Once controlled for spatial proximity to their family and kin, the significant negative effect for internationally mobile people diminishes (in 2006) or vanishes completely (in 2016), which confirms hypothesis 3. Since the proportion of support providers located within a certain proximity does not change significantly between the survey years and internationally mobile people exhibit the highest share of kin and family abroad (see Fig. 2), we can infer about the importance of residential mobility vs. spatial proximity to family and kin.

Even though the R-squared only marginally increases between the Models 1 and 2, additional Wald-tests indicate that the proximity to family and kin is still an important and significant predictor in explaining the observed variance in social support.

Having family and kin in close proximity is more important than further away, as depicted by the coefficients of the proximity categories. In 2011 for example, having a high share of relatives in the same neighborhood increased social support by 0.16, while having family located further away only led to an increase of 0.07. Compared to relatives in the same household, having familial support providers abroad even diminishes social support by 0.06 in 2006 and 2016. The coefficient for the share of relatives living abroad in 2011 is not statistically significant. In other regressions run as robustness checks described in the next sub-chapter, having relatives abroad was not statistically significant the groups of non-movers and internal movers, but still significant for international movers.

In agreement with the literature, we saw a positive effect of education on social support, with a higher degree of education corresponding to more social support. Older people have less access to social support, but at a decreasing rate (significantly positive coefficient of *age squared*). Women have more access to social support than men. However, if the respondents still had to care for minor children, social support diminished. Having a stable relationship with a partner and cohabitating increased social support. Union dissolution or the death of the partner do not have a significant effect on social support in our sample. As the nuclear family is very important for support provision, especially parent-children ties, having parents (mother and father) who are still alive significantly increases social support. People living in urban areas perceive less support from family and kin in our sample. Respondents of Christian faith have more support available compared to respondents who indicated no connection to religion (*undenominational*), while Muslims indicated less available family support. (The results are available upon request).

4.3 Robustness Checks

To confirm our results, we ran several models to check the robustness of our models. To scrutinize our dependent variable, we ran both Models (M1 and M2) for each of the four social support dimensions (emotional, informational, instrumental, and appraisal support). People who moved within Germany have access to significantly more emotional support as compared to non-mobile individuals (in 2006 and 2011). They furthermore had slightly more appraisal support (in 2016) than non-mobile individuals. International movers have

significantly less access to social support in the dimension of appraisal support (in 2006, 2011 and 2016) compared to non-movers. Even though the coefficients for the other support dimensions do not yield statistically significant results, it has to be noted that the sign of the coefficients points towards less social support for internationally mobile people, and more support for individuals who have moved within Germany. Proximity to family and kin members mediates the impact of mobility group on all dimensions of social support, leading to a decrease in the effect size of the mobility group. Additionally, we have run the models for each of the mobility groups separately, where we have found similar relationships between social support, residential mobility, and spatial proximity of family and kin (results available upon request). Thus, both test confirm the robustness of our results.

5 Discussion

Residential mobility is an important driver of change in social support networks and continues to gain importance as societies become more mobile and more people relocate internally and internationally. Families, who are the main provider of social support, are challenged by fragmentation, spatial spread, and changes in residential proximity to family and kin (Hagan et al., 1996; Koelet et al., 2017; Litwak, 1960). Based on the literature, this study set out to provide a clearer understanding of the connections between access to social support and residential mobility in Germany. In hypothesis 1, we have assessed the proximity to family and kin according to the residential mobility trajectory of the respondent. As we observed stark differences in the proximity to family and kin between the mobility groups (Fig. 2), we were furthermore interested in whether those differences would be reflected in the access of social support within the family network. Hypothesis 2 therefore was tailored to examine if residential mobility caused variations in access to social support. Because those variations could originate from the disrupting effect of distance in social networks, we hypothesized that proximity to family and kin should mediate the variations between mobile and non-mobile individuals in their access to social support (hypothesis 3).

All hypotheses were supported by the data to a large extent, with a few differences between the survey years. Non-mobile individuals have most of their family living nearby. People who change residential location within Germany are most likely to live further apart from their family, but their kin and family members will still live within the national borders. In contrast, international movers have most of their family network at a larger distance (abroad).

For internal movers, the data showed that their amount of accessible social support systematically and significantly varies compared to non-movers (hypothesis 2). This positive effect remained significant even after controlling for proximity to family and kin (hypothesis 3), which points towards the general ability of internally mobile people to maintain social support over a larger distance. International movers have less access to social support compared to non-movers (hypothesis 2), which in this case can be accounted for by the distance to the respondents' family and friends (hypothesis 3). In other words, once controlled for the proximity to their family and kin, international migration does not significantly affect social support anymore. In other words, international movers have less social support provided by family and kin, because their family and kin are living further away from them. Even though there are ways in which distance can be overcome, for example

by using modern forms of communication, some social support relies on face-to-face interaction. Hence, our study proposes that distance is still going to play an important role in modern social networks.

These findings furthermore support the claim of residential mobility being a core cause of variations in access to family social support and international mobility disrupting social ties (Magdol & Bessel, 2003) and contrasts other studies which did not find significant differences in access to social support after internal residential mobility (Viry, 2012). We therefore add to the literature in confirming a formative impact of residential mobility on the access to social support, which we additionally differentiate according to whether the relocation occurred within Germany (internally) or by people immigrating to Germany (internationally). By distinguishing between these mobility groups, we found differences in social support between internal movers and non-movers and international movers and non-movers, respectively, which previous studies have seldom investigated.

At the core of our study was the observation that residential proximity to family and kin varied between mobility groups and thereby their access to social support would be different, hypotheses 1 and 2. We have found variations in the spatial proximity to family and kin that are characteristic for the respective mobility group. Connected to this initial descriptive investigation, access to social support increases the most when a higher share of family and kin lives in the same neighborhood. Having kin and family at a larger residential distance, however, also affects access to social support positively, albeit a little less than having family and kin living close by. With increasing availability of different modes of transportation, individuals are able to overcome larger distances to keep up personal contacts in distant residential locations (Drevon et al., 2021; Viry et al., 2017). But our results suggest that even with these tools for communication and transportation in hand, it remains more complicated to access social support from family and kin living outside of Germany. Having family and kin abroad was not important for the access to social support for internal movers or non-mobile people. Conversely, familial ties abroad still provided access to social support to international movers, even though to a smaller extent. Because internationally mobile people are actively maintaining their networks at a distance, they still obtain value from these distant relationships. In contrast, non-mobile people might not rely on their few distant social ties, as those relatives were the ones who decided to move away and they therefore do not play an important role as providers of social support.

The findings of this study have four limitations that warrant further research. First, this study has explored the relationship between residential mobility and social support, by considering the role of proximity to family and kin as a mediating factor. Future research should delve deeper into other mediating factors of importance for the relationship between kin members, such as the magnitude of interactions and tie strength (for a discussion on how distance impacts parent–child relationships, see Schafer & Sun, 2021). Second, this study highlights the importance of distinguishing between internal and international movers, as these constitute entirely different migration experiences, and are especially decisive for network composition (Magdol & Bessel, 2003). A more nuanced pattern might emerge if we could further differentiate between the motives for migration, such as housing, employment and family-related considerations (Thomas et al., 2019). Third, proximity to family and kin accounts for variations in social support between international movers and non-movers, however, not for internal movers. Further investigations should be carried out

to unveil other causes for these social support variations. Fourth, it is important to observe the long-term temporal variations of social support in connection with residential proximity, as they are both influenced by technological progress in communication and transportation but in different ways and residential mobility is projected to increase even more in the future. We have used three different points in time and have observed two distinct trends: the average social support from family and kin is steadily increasing from 2006 to 2016 (Table 2 in the appendix) while the distance to family and kin is remaining stable (Fig. 2). Future research should uncover how social support dynamics change over extended periods, which would require panel data analysis.

This study provided empirical evidence for the relevance of residential mobility for variations in social support. Spatial proximity is important for support provision within the family network, especially for internationally mobile populations. Moving within Germany does not have a negative effect on the available social support provided by family and kin, which could be attributed to the technological advancements available to families in Germany (better telecommunication, a reliable and fast public transportation system) or the personality of the respondents, who might be better at maintaining support networks over larger distances than people who have never left the place where they grew up. Future research may be directed at uncovering whether and how far these different motivations behind residential mobility are consequential for social support. In order to accurately reflect inequalities in social support between mobility groups, the impact of proximity to family and kin must be compared for populations with differing motivations to migrate. Improving the controls for selection is also important, however, the data availability to conduct analysis testing for selection effects is very limited to this day. Once we overcome the data-gap in the future, we will be able to draw a more detailed picture of who is migrating and why, to further understand how to design optimal policies to support integration and well-being in mobile populations.

Appendix

See Tables 2, 3

Table 2 Mean and median in social support for mobility groups, By survey years

	2006			2011			2016		
	M	Mdn	N	M	Mdn	N	M	Mdn	N
Non-mover	5.88	6	11,417	6.90	6	11,176	7.04	7	10,856
Internal mover	5.96	6	2576	7.07	7	2454	7.28	7	2502
International mover	5.28	5	1721	6.13	5	1581	6.04	5	4015
Total	5.83	6	15,714	6.84	6	15,211	6.85	6	17,373

The number of support providers is based on the sample of Socio-Economic Panel Study (SOEP) respondents for 2006, 2011, and 2016. Social support is the average number of family members who are important to the respondent and would assist in different scenarios (range 0–20). "International movers" include people who were born outside of Germany, or who provided a year of immigration to Germany in the interview. "Internal movers" are people who changed their place of residence while being part of the SOEP population, or people who indicated that they now live in a federal state that differs from their birthplace

Table 3 Descriptive statistics for control variables according to mobility group and survey year

	2006						2011						2016					
	Never moved N = 11,417		Internal mover N = 2576		International mover N = 1721		Never moved N = 11,176		Internal mover N = 2454		International mover N = 1581		Never moved N = 10,856		Internal mover N = 2502		International mover N = 4015	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Gender[a]	0.51	0.50	0.55	0.50	0.53	0.50	0.54	0.50	0.56	0.50	0.57	0.50	0.55	0.50	0.56	0.50	0.56	0.50
Age	43.03	12.81	44.06	12.15	43.71	11.99	42.49	11.74	44.92	12.30	42.23	11.06	44.16	12.25	45.14	12.67	41.42	10.69
Age squared	2015.49	1094.05	2089.11	1061.89	2054.60	1053.18	1943.13	1001.09	2169.09	1077.29	1905.59	978.29	2100.14	1048.37	2197.80	1121.07	1829.63	919.55
Ln of HH income adjusted with modified OECD equivalence scale	9.89	0.54	9.96	0.58	9.64	0.53	9.90	0.52	10.04	0.60	9.68	0.53	9.98	0.54	10.08	0.61	9.72	0.51
Inadequately educated	0.01	0.10	0.00	0.05	0.08	0.26	0.01	0.11	0.00	0.05	0.05	0.23	0.01	0.11	0.01	0.08	0.05	0.22
General elementary	0.10	0.30	0.06	0.24	0.24	0.43	0.08	0.27	0.05	0.22	0.20	0.40	0.08	0.28	0.05	0.22	0.16	0.37
Middle vocational	0.55	0.50	0.43	0.49	0.37	0.48	0.53	0.50	0.42	0.49	0.37	0.48	0.52	0.50	0.40	0.49	0.34	0.47
Vocational + Abitur	0.06	0.23	0.07	0.26	0.09	0.29	0.08	0.27	0.08	0.27	0.12	0.32	0.09	0.28	0.08	0.28	0.16	0.37
Higher vocational	0.08	0.27	0.08	0.27	0.06	0.24	0.08	0.26	0.07	0.26	0.04	0.20	0.07	0.26	0.07	0.25	0.02	0.13
Higher education	0.20	0.40	0.36	0.48	0.16	0.36	0.22	0.41	0.37	0.48	0.22	0.41	0.23	0.42	0.39	0.49	0.27	0.44
Single	0.28	0.45	0.25	0.43	0.12	0.33	0.25	0.44	0.26	0.44	0.11	0.31	0.27	0.45	0.28	0.45	0.18	0.38
Married living together	0.61	0.49	0.62	0.49	0.76	0.43	0.62	0.49	0.58	0.49	0.78	0.41	0.58	0.49	0.57	0.50	0.72	0.45
Married living separately	0.02	0.14	0.03	0.17	0.04	0.21	0.02	0.15	0.03	0.17	0.03	0.17	0.03	0.16	0.03	0.16	0.03	0.16
Divorced	0.08	0.27	0.09	0.29	0.06	0.24	0.09	0.29	0.11	0.31	0.07	0.25	0.11	0.31	0.11	0.32	0.07	0.25

Table 3 (continued)

	2006						2011						2016					
	Never moved N = 11,417		Internal mover N = 2576		International mover N = 1721		Never moved N = 11,176		Internal mover N = 2454		International mover N = 1581		Never moved N = 10,856		Internal mover N = 2502		International mover N = 4015	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Widowed	0.02	0.14	0.02	0.14	0.02	0.13	0.02	0.13	0.02	0.14	0.01	0.12	0.02	0.13	0.02	0.15	0.01	0.11
Employed	0.71	0.45	0.73	0.44	0.64	0.48	0.76	0.43	0.77	0.42	0.64	0.48	0.80	0.40	0.79	0.40	0.72	0.45
Urban	0.63	0.48	0.68	0.47	0.84	0.36	0.62	0.49	0.67	0.47	0.78	0.42	0.62	0.48	0.68	0.47	0.75	0.43
Christian	0.66	0.47	0.54	0.50	0.62	0.49	0.65	0.48	0.52	0.50	0.60	0.49	0.62	0.49	0.49	0.50	0.31	0.46
Muslim	0.00	0.03	0.00	0.00	0.02	0.14	0.01	0.11	0.00	0.06	0.21	0.40	0.02	0.14	0.02	0.13	0.17	0.38
Other religion[b]	0.01	0.11	0.01	0.09	0.24	0.43	0.00	0.04	0.00	0.05	0.02	0.13	0.00	0.05	0.00	0.03	0.03	0.17
Undenominational	0.33	0.47	0.46	0.50	0.13	0.33	0.33	0.47	0.48	0.50	0.18	0.39	0.34	0.47	0.47	0.50	0.24	0.43
Health[c]	50.96	7.55	51.37	7.36	49.92	7.78	51.36	7.53	52.14	6.95	50.42	7.82	51.67	7.61	52.45	7.33	51.37	8.76
Minor children[d]	0.41	0.77	0.42	0.79	0.65	0.97	0.83	1.09	0.39	0.77	1.13	1.20	0.69	1.01	0.47	0.83	0.93	1.07
Mother alive	0.72	0.45	0.74	0.44	0.67	0.47	0.77	0.42	0.74	0.44	0.73	0.44	0.74	0.44	0.74	0.44	0.74	0.44
Father alive	0.54	0.50	0.55	0.50	0.50	0.50	0.59	0.49	0.55	0.50	0.57	0.50	0.56	0.50	0.56	0.50	0.55	0.50

[a]Gender: 0 = male, 1 = female. [b]Other religion: 1 = Jewish, Buddhist, Hindu, and any other religion which is not accounted for as Christian or Muslim. [c]Health: Measured with a grip strength test. [d]Minor children: 0 = no children below the age of 14 living in the household, 1 = at least one child below the age of 14 living in the household

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Knowledge, trust, and environmental labelling

On the importance of trust and the knowledge of eco-labels (Marine Stewardship Council (MSC), USDA Organic, and Non-GMO project) in the sustainable food and beverage consumption in the United States.

Kyra Selina Hagge[1]

Abstract

Today's major environmental issues, whether it is the rise of CO_2 concentration in the Earth's atmosphere, the decline of species diversity or the depletion of natural resources, all environmental issues share a common cause: human behavior. Increasing wealth, capitalism, and technological progress have led to an upward trend in demand for consumer goods and services, which in turn has decreased the Earth's capability to satisfy those needs. Understanding how to use available mechanisms to shift human behavior to a more sustainable path therefore remains crucial. The introduction of environmental labelling - green or eco-labels - has been one possible market-based mechanism to increase consumer awareness about the sustainability of their consumption choices. This paper investigates the importance of the U.S. population's trust in the government, Non-Governmental Organizations (NGOs) and individuals to protect the environment and enforce standards certified by eco-labels as a determinant for sustainable food purchasing behavior. The findings show that recognizing eco-labels and researching a company's environmental responsibility empowers consumers to make more sustainable consumption choices. Knowledge value increases sustainable food consumption and is mediated by trusting the government and other entities to protect the environment for the present and future generations. Analysis for this research applies logit models on data from the 2019 survey by the Natural Marketing Institute (NMI) of a representative sample of 3,000 U.S. citizens. This study addresses important questions about the importance of trust measured as expected behavior towards the environment and knowledge value in eco-labelling efforts.

Keywords: eco-labelling, sustainable consumption, trust, interaction effects

[1] Kyra Hagge – Justus-Liebig University Giessen, Licher Strasse 64, 35394 Giessen, haggek19@students.ecu.edu

Introduction

Increasing human population and the inert human desire for growth puts human existence in a difficult spot. In order to maintain a healthy and sustainable interaction with the planet that allows for human existence, humans will have to shift their behaviors. Global food systems are responsible for a fourth to a third of greenhouse gas emissions (Crippa et al., 2021), and individual dietary preferences are intimately linked to what is being produced. Since the contribution of individual consumption to environmental degradation is significant, an analysis on private consumption choices and behaviors is merited.

The most important human basic needs are met through food consumption and price is an important driver of these consumption decisions. However, as researchers learn more about human behavior and decision-making, consumption has diverged from its primary rational conceptualization to a multi-faceted research topic. Consumption of food not only satisfies primary needs such as hunger and thirst, it is also used for self-enhancement, to increase social esteem or to represent a lifestyle (Heiskanen & Pantzar, 1997). In recent decades, the consumption of food items has obtained a more politically partisan character (Berlin, 2011; Nicholls, 2010), whether to represent a particular lifestyle - vegetarianism/veganism (Micheletti et al., 2015) - or to showcase socio-economic status - luxury food items such as lobster and champagne - but also a higher percentage of meat in the diet (Nungesser & Winter, 2021).

As food systems move away from local production to globalized enterprises, the way consumers are assessing the food they are buying is shifting too. Previously, it was enough to talk to the seller at the farmers market and possible to visit the local food producer, modern consumers have to find heuristics that reinforce their trust in the food source and quality (Oosterveer et al., 2007).

In this paper, eco-labels, green labels and environmental certification labels are used interchangeably to denote International Standard Organization (ISO) type I products, i.e. products certified by a third party, independent certification scheme according to the standard ISO 14024 (International Organization for Standardization, 2018). The emergence of global food chains and especially production happening in the global South led to a sentiment of guilt for unsustainable, unethical or environmentally harmfully produced goods in the global North (Babu, 2020). These factors in turn led to the introduction of environmental certification labels in the 1980s with the goal of signaling the added value of credence goods. Credence goods are goods for which certain attributes cannot be uncovered by the consumer either before or after the purchase. For example, a consumer is unable to know whether their banana was produced under elevated environmental standards by looking at it or even eating it (Daugbjerg et al., 2014). Even though eco-certified foods might arguably be of a higher quality[2], most of the characteristics that consumers expect when buying a sustainably produced good are not directly apparent to them (Carfora et al., 2019). Therefore, the label helps consumers choose a product that not only serves their primary needs but also their social and environmental conscience (Van 'T Veld, 2020). Put into a broader perspective, the certification process that leads to eco-labels being displayed on products can also help to internalize negative externalities such as environmental pollution (land, water, and air), or environmental degradation created in the production of certain goods (Heiskanen & Pantzar, 1997). They allow producers to charge a higher price for their product, so they can follow

[2] They might be produced under lower use of pesticides/other chemicals (Praneetvatakul et al., 2022), and consuming products produced under sustainable farming practices can also lead to health benefits, although not for all products (Garcia & Teixeira, 2017).

more sustainable production processes. By giving the consumer the agency to choose, eco-labels can empower the consumers as political actors[3].

However, there are also issues with eco-certification. First and foremost, certification is voluntary, so producers do not have to follow a certain certification scheme to produce their goods. As certified goods are predominantly sold in Western economies (such as the U.S., Canada, Australia, and Europe) and cost more than conventionally produced items, they do not have a large impact in lower income strata and are therefore considered elitist within those groups (Sønderskov & Daugbjerg, 2011). Yet, if done properly, certification can have positive environmental and social impacts on producing countries, which are mostly located in the Global South (Bellchambers et al., 2016).

For a label to have the aforementioned positive impacts, it has to be widely known and trusted (Thøgersen, 2000). Some findings assert that eco-label knowledge is connected to an increase in the pro-environmental behavior under consideration (e.g. knowledge of the Nordic Swan eco-label to an increase in certified products) (Daugbjerg et al., 2014). Knowledge value, how it is used in this paper, translates the consumers' knowledge about a product and the circumstances under which it has been produced to a monetary value, that also increases with information (Sammer & Wüstenhagen, 2006).

The literature on trust is extensive and the conceptualizations of the term are similarly broad (Bigley & Pearce, 1998). This paper concentrates on a very narrow definition of trust, looking at the trust of consumers in public actors[4] potentially engaged in certification to protect the environment today and in the future. Applying a very narrow focus combined with a representative dataset of U.S. consumers, this research contributes to the literature by analyzing the links between trust, environmental labelling, and sustainable food consumption in Western societies.

As all environmental issues are hybrid problems, "[c]aused by social and economic behavior, they are mediated through technical systems and affect the natural environment, which in turn has social and economic impacts" (Heiskanen & Pantzar, 1997, p. 411), this research unites consumer theory with political science, institutional economics, and behavioral psychology to find linkages between trust in institutions, NGOs, and individuals to protect the environment, different environmental labels (Marine Stewardship Council (MSC), Non-GMO project, and USDA organic) and the purchase of sustainable food and beverage items.

Theoretical Background

Environmental labels are a market-based mechanism that mitigate a host of different market failures related to the nature of credence goods, which are goods for which certain attributes cannot be uncovered by the consumer neither before nor after the purchase. Eco-labels provide information and thereby attempt to close the information gap between the consumer and the producer. Value neutral or positive environmental labels equip consumers with additional knowledge to inform their purchase decision (Leire & Thidell, 2005). Especially in areas where the difference between goods is not apparent, as they objectively look the same, environmental labels provide a simple guide to differentiate between the product that follows stricter environmental guidelines than its competitors (Yokessa & Marette, 2019). In the case of credence goods, an environmental label serves as a translator to turn the credence value into an objectively observable attribute. Regarding energy consumption, for example, labelling the energy efficiency level of appliances as done in the European Union (EU)

[3] Exemplified by the difference in private benefit and public benefit in studies like Baranzini et al. (2010).
[4] The term "public actors" describes people and institutions active in the public domain, such as athletes, celebrities but also non-governmental organizations (NGOs) and corporations.

increases people's ability to compare household appliances according to their energy intensity, even though the labels are unclear about the overall energy use of said appliance (Sammer & Wüstenhagen, 2006). The environmental label can therefore be seen as an additional intangible product characteristic, that speaks to the environmental preferences of the consumer by providing information and value (e.g. prestige) (Sammer & Wüstenhagen, 2006). To be able to connect the environmental label to a more sustainable production process, the consumer has to trust the labelling agency (Torjusen et al., 2004). Especially consumers who consider the environmental impact of their consumption choices because they have a preference for sustainable products and therefore appreciate the existence of environmental labels to guide those decisions (Thøgersen, 2000).

Environmental labels can also act as a political statement. Behaving congruent with one's values is an important driver of human behavior (Steg, 2016). With increasing pressure on the sustaining forces of the Earth, more people have been making a connection between the current state of the planet and human behavior. These eco-centric values are overrepresented especially in younger generations (Funk, 2021; Poortinga et al., 2019), who are using protest and direct action to demand that businesses and governments take actions to protect the climate (e.g. Fridays for Future). Consumers have learned that they possess power over industry and the production process through their consumption choices (Belasco, 2006). Therefore, the decision to buy an environmentally labelled product is not only satisfying the need to align values and behavior, but it also represents a political statement (Sassatelli & Scott, 2001). Phenomena such as boycott and "buycott" (the intentional purchase of a product for its pro-environmental properties) represent the voicing of such partisan attitudes through purchasing decisions (Sassatelli & Scott, 2001).

Environmental labels do not only benefit consumers by providing more information, they also satisfy their desires for environmentally friendly products. If applied by a third party certification agency, the labels provide policy makers and NGOs a means of pushing producers towards a more sustainable production process (Sammer & Wüstenhagen, 2006). Knowing which products are working towards providing a more sustainable future, consumers can demand those products and reject products that harm the environment. Depending on the kind of product, the producers face higher costs of production when designing their production process in a more environmentally friendly manner, e.g. not using pesticides leads to a loss in produce, which in turn leads to lower output and higher prices. This additional cost can be priced by using an environmental label to signal additional product characteristics such as organically grown, fairly traded etc. (Wojnarowska et al., 2021). Furthermore, positive externalities (for example less soil degradation from more sustainable farming practices or less overharvesting of natural resources) can be internalized by the premium paid on certified products, thereby acknowledging the relationship between environmental problems and products of daily consumption (Roheim et al., 2011).

H1: The recognition of the labels under concern (USDA organic, Non-GMO project, and MSC) and the knowledge of their background is positively associated with higher consumption of the items certified under these labels. There is therefore a positive knowledge value for the eco-labels.

Previous literature has identified multiple issues with environmental labels, some of which are particularly relevant for understanding the relationship between the consumer and the eco-label. With an increased awareness of environmental issues globally and in the U.S., producers have found a way to promote the sales of sustainable products by using a variety of third-party certified as well as self-declared environmental labels (Yokessa & Marette, 2019). This increase in available environmental labels, of which some can be considered

"Greenwashing", has led to consumer confusion, rendering the information gain negative (Heiskanen & Pantzar, 1997).

H2a: People who feel overwhelmed with the number of eco-labels and certifications do not recognize the environmental label as often as people who do not feel overwhelmed and are less likely to purchase sustainable food and beverage items.

Furthermore, literature is not unanimous on whether more informed consumers will make more sustainable consumption decisions, pointing to a gap between information, attitude and action (Pedersen & Neergaard, 2006; Taufique et al., 2017). Even though most consumers indicate they benefit from the additional knowledge provided by the environmental label , the increase in information does not necessarily lead to an increase in environmental purchase decisions (Brouhle & Khanna, 2012). A host of factors contribute to the gap between environmental attitude and actual behavior, among them lack of rational behavior of the consumer and the importance of barriers such as budget considerations (Pedersen & Neergaard, 2006). Another finding asserts that general attitude does not result in specific behavior, i.e. people who state they are concerned about the environment do not necessarily engage in behaviors such as recycling or conserving energy (Turaga et al., 2010).

Additionally, environmentally more inclined consumers are benefitting disproportionally from environmental labels and consumers who include their environmental sustainability considerations into their decision-making are not affected by an increase in information (Handgraaf et al., 2017; Yokessa & Marette, 2019). The benefits of the informational content of environmental labels therefore remain contested. Moreover, even though most consumers recognize the label, they have difficulties understanding its implications and they may not care how much environmental benefit they are creating (Van 'T Veld, 2020).

H2b: Researching the company's environmental responsibility is positively correlated with consumption of sustainable food and beverage items and with eco-label knowledge and recognition.

Some environmental labels are mandatory through policy, such as energy ratings on cars and household appliances in the EU. The labels discussed in this research are voluntary, it is therefore on the producer to obtain certification. Outsourcing the environmental strategy is costly, and depends on the type of label and the re-certification frequency (Gruere, 2013). Hence, an important determinant factor for the producer is knowing whether there is an added benefit of certification.

To reap the full benefits from labelling and the implied signaling effect, consumers have to know the label well enough (Sammer & Wüstenhagen, 2006) and have to trust in the labelling entity (Yokessa & Marette, 2019), the labeling process and the overseeing agency (Daugbjerg et al., 2014; Nuttavuthisit & Thøgersen, 2015). Since the interaction between the consumer and the environmental label is not considered personal, this research is also concerned with institutional trust (or system trust) (Torjusen et al., 2004). Institutional trust (or "disembedded trust") denotes the more abstract form of universal reliance on another entity (Sassatelli & Scott, 2001). However, in geographies where face-to-face interactions are important, personal trust (also termed "embedded trust") grounded in local knowledge, can be an important driver of consumption (Sassatelli & Scott, 2001; Torjusen et al., 2004). Similarly, embedded trust plays a role for environmental labels that represent more an individual quality of a product rather than a generalizable token (Torjusen et al., 2004). Another important conceptual clarification has to be made to talk about the presence/absence of trust: relying on survey responses where consumers can indicate if they trust a particular entity to protect the environment, only indicates trust and not distrust. Even though some researchers would use

trust-distrust on a spectrum, in this paper I am only looking at trust and the absence of it (low or no trust), not the more active concept of distrust (Kavanagh et al., 2020).

The labels concerned in this research represent different points on a spectrum in both, regarding their certifying agency (governmental organization vs. NGO) and the qualities they are certifying for. They, however, do not include first party certification schemes, where a company or organization awards the label to its own products in an effort to appear more sustainable, as the standards are lesser known and might represent greenwashing (Ackerstein & Lemon, 1999).

USDA Organic is a label certifying organically produced products and is awarded by the United States Department of Agriculture (USDA), a federal government agency. The label was established 10 years after the U.S. congress had passed the Organic Foods Production Act of 1990, but the certifying agencies are State, non-profits, or private organizations, to which the producers apply to in order to be certified. The seal can be displayed on a wide range of food and livestock, and certified products that adhere to the USDA standards, which vary according to the certified product. In a nutshell, the products are supposed to safeguard natural resources, prohibit the use of artificial chemicals (except for a few who are being tracked on a checklist by the USDA (USDA, 2013)), and protect animal welfare. Producers have to apply an organic systems plan and refrain from using any non-organic practices for at least three years before getting certified. This label does not assess social sustainability or local sourcing, however, and producers are allowed to get certified through additional labels (Greene, 2007).

The Non-GMO project is a U.S. based NGO that certifies products that are produced largely without the use of genetically modified ingredients. Apart from food and beverage items, personal care products are also eligible to obtain the seal. The organization only certifies products that can prove compliance with its standards throughout the chain of custody and testing of major high-risk ingredients[5] (Waddell, 2024). Producers submit their products individually for certification, and have to renew every year. Even though USDA organic's standards also ban genetically modified ingredients/practices, they do not test the products to verify the producers' claims (Bain & Selfa, 2017).

The Marine Stewardship Council (MSC) is concerned with sustainably harvested wild-caught seafood. MSC is an international NGO awarding its logo to companies who comply with harvesting procedures that follow three main pillars: the sustainability of a fish stock, the environmental impact of the harvesting method, and the oversight and management of a fishery (Greenberg, 2010). In its role as a certifier for sustainable seafood, MSC is the biggest player, engaging with 19% of the marine fish that are caught in the wild (MSC, 2025).

Another distinction between the labels is the motivation behind the consumers' choice: while MSC certifies the sustainable harvest of a common resource, and therefore a public good, literature has shown that the consumption of organic and non-GMO food and beverage items is motivated by both, a personal and an altruistic perspective. Organic food, in the public view, has health benefits and a higher quality (Bougherara & Combris, 2009; Guilabert & Wood, 2012), all while protecting the environment and animal welfare (Daugbjerg et al., 2014). Because of these differences in motivation, I expect the results to be slightly different, based on the eco-label in consideration.

Against this theoretical background, I argue that the consumption of sustainable food and beverage items is not only motivated by the consumers' income, their dietary restrictions and

[5] The testing is done by one of four accredited technical administrators, and more expensive for products including corn or soy, which are considered high-risk ingredients.

attitude, but also by how people see the responsibility of public actors in protecting the environment and whether they trust them to do so by posing the following hypotheses:

H3a: A higher institutional trust to protect the environment (currently and in the future) moderates the impact of the environmental label on the consumption of sustainable food and beverage items and is most pronounced for USDA organic as a government-run eco-label.

H3b: Higher trust in NGOs to protect the environment moderates the impact of the environmental label on the consumption of sustainable food and beverage items, which mostly impacts the Non-GMO project and MSC labels.

H3c: Higher embedded trust moderates the impact of the environmental label on the consumption of sustainable food or beverage items, which is higher for localized labels (USDA organic, Non-GMO Project) than for global labels (MSC).

Data, Variables, and Methods

Data

I am answering these hypotheses using a dataset collected by the Natural Marketing Institute (NMI), a marketing institute surveying 3,000 adults under the 2019 U.S. LOHAS Consumer Trends Database™ effort. For the analysis I will be using a binary logit regression after checking the values for compliance with the assumptions imposed by the logit regression.

To answer the questions whether the public actors' intention matters, a relatively narrow concept of trust has been chosen. Trust in this research is mainly referring to the consumers' perception of the public actors' intention to improve the environment today and in the future.

Even though many consumers do not know much about the background of environmental labels, they still understand that it constitutes a distinct product property and associate it with a sustainable food consumption choice (Yokessa & Marette, 2019). Therefore, I am assuming the recognition of the environmental label with some knowledge about its background to be enough for the consumer to make a more informed decision.

Variables

Dependent variable: Consumption of organic food and beverages (*organic*)/ GMO-free foods and beverages (*gmofreefood*)/ sustainably harvested seafood (*sustainableseafood*) within the past 3 months. The three months range has been chosen by the surveying agency (NMI) and relates to the most recent behavior of the consumers, which is important for market research.

Main independent variables:

Labels: Knowledge of label "Marine Stewardship Council (*msc*)"/"Non-GMO Project (*nongmo*)"/"USDA Organic (*usdaorganic*)", measured on a scale from 1 (I don't recognize the label) to 4 (I recognize the label and know what it stands for).

Overwhelm: People who answered the question "thinking about seals and certifications for environmentally-friendly products, please indicate your agreement or disagreement with the following statement: There are too many green seals and certifications" with "agree somewhat" or "agree completely" receive the dummy variable *overwhelmed*.

Initiative: Another part of the same battery as the confusion question is about agreement with the statement "I research a company's environmental/social responsibility before I buy the product." Because I argue that looking into a company's claims requires significant effort, I am coding respondents who answered with "neither agree nor disagree" as not showing

initiative, and therefore only people who somewhat or completely agree receive the dummy *initiative*.

Trust: To arrive at a measure for trust, I followed a distinction into disembedded or institutional trust and embedded, or interpersonal trust (Sassatelli & Scott, 2001). I specifically looked at trust in individuals and volunteer groups (*embeddedtrust*, which includes *trustvolunteergroups* and *trustindividuals*) and government (*institutionaltrust,* comprised of the variables *trustgoverment*, *trustschools* and *trustmedia*). Furthermore, since NGOs are the main entity behind sustainable labeling, I also look at how participants' trust in NGOs affect their consumption of sustainable food items (*trustngos*). Furthermore, I use leadership of public actors (government, NGOs, individual people, volunteer groups) to protect the environment to see if trust can be also described by who people think is a leader in protecting the environment.

Control variables: age, female, race (white, black, Asian, Latinx, Native American, Pacific Islander, Other, more than one), children in household, college degree (1 if respondent at least completed a bachelor's degree, because higher education correlates with higher ecological awareness and trust (Kavanagh et al., 2020)), income (11 steps from < $15,000 to >$250,000 to account for purchasing power (Torjusen et al., 2004)), dietary preferences (vegan, vegetarian, pescetarian, flexitarian, "I think about my meat consumption", "I don't think about my meat consumption").The summary statistics of these variables can be found in Table 1.

Table 1: Summary statistics for control variables and main independent variables.

	N	mean	sd	min	max
Female	3000	0.52	0.50	0	1
Age	3000	48.28	16.69	18	99
Number of children	2840	0.81	1.24	0	12
Income:					
Less than $15,000	2949	0.09	0.29	0	1
$15,000 to $24,999	2949	0.09	0.29	0	1
$25,000 to $34,999	2949	0.10	0.30	0	1
$35,000 to $49,999	2949	0.12	0.33	0	1
$50,000 to $74,999	2949	0.17	0.38	0	1
$75,000 to $99,999	2949	0.12	0.33	0	1
$100,000 to $124,999	2949	0.11	0.31	0	1
$125,000 to $149,999	2949	0.08	0.26	0	1
$150,000 to $199,999	2949	0.07	0.26	0	1
$200,000 to $249,999	2949	0.02	0.15	0	1
$250,000 or more	2949	0.02	0.15	0	1
Race:					
White	2987	0.74	0.44	0	1
Black	2987	0.10	0.29	0	1
Asian	2987	0.05	0.22	0	1
Latinx	2987	0.05	0.21	0	1
Native American	2987	0.00	0.07	0	1
Pacific Islander	2987	0.00	0.04	0	1
Other race	2987	0.01	0.09	0	1
More than one race	2987	0.05	0.22	0	1
Education:					
College degree or higher	3000	0.46	0.50	0	1

Dietary preference:					
Vegan	3000	0.01	0.11	0	1
Vegetarian	3000	0.02	0.13	0	1
Pescetarian	3000	0.02	0.13	0	1
No red meat	3000	0.05	0.22	0	1
Flexitarian	3000	0.04	0.19	0	1
Try to cut down on meat	3000	0.32	0.47	0	1
Not consciously trying to reduce meat	3000	0.55	0.50	0	1
Overwhelm	3000	0.47	0.50	0	1
Initiative	3000	0.25	0.43	0	1
Trust to protect environment:					
Institutional trust	3000	0.35	0.48	0	1
Trust in NGOs	3000	0.40	0.49	0	1
Embedded trust	3000	0.58	0.49	0	1
(Knowledge of) Environmental labels:					
USDA Organic	3000	2.89	1.06	1	4
Non-GMO Project	3000	2.53	1.17	1	4
Marine Stewardship Council	3000	1.44	0.86	1	4

Note: sd=standard deviation.

Methods

Logit regressions allow me to model the binary consumption choice while keeping the model interpretable, especially when transforming the resulting coefficients of the logit estimation into average predictive probabilities and marginal effects. To test the hypotheses, I am running the following models, based on the baseline model, Model 1:

$$greenpurchase_i = logit(socio - demographic\ variables, label_i)$$

Where *greenpurchase* is the dependent variable taking up the value of 1 if the respondent had purchased one of the food or beverage items that are labelled with the respective green seal (e.g. if a consumer had purchased organic meat or poultry and the label under concern is USDA Organic), and i being the subscript denoting the three different green purchase options: 1) organic food and beverages, 2) GMO-free food and 3) sustainably harvested seafood and their correspoding labels: i) USDA organic, ii) Non-GMO project iii) Marine Stewardship Council (MSC).

To understand the connection of confusion ("too many green seals and certifications") I include a dummy variable for people who agree with the statement *overwhelm* (Hypothesis 2a). To see how much personal initiative is impacting the purchase decision, I inlclude the dummy variable *initiative*, that identifies people who are actively researching a company's environmental or social responsibility (Hypothesis 2b). Finally, I am looking at trust and its mediating effect on label impact, analyzed through Model 3:

$$greenpurchase_i = logit(socio - demographic\ variables, overwhelm, initiative, label_i, trust_j, label_i * trust_j)$$

Trust is measured in three different ways, i.e. $j = \{institutional\ trust,\ trust\ in\ NGOs, embedded\ trust\}$. As for control variables, I include the socio-demographic variables that have been mentioned in the previous section.

For better interpretability of the results, I report predicted probabilities and average marginal effects, which I have calculated with the margins command in STATA 19.0. Average marginal effects are assessed with the delta method (Williams, 2012).

To perform a logistic regression, I had to make assumptions that checked for validity. Looking at a plot of the residuals against time, I confirmed the independence assumption (Stoltzfus, 2011). I checked for multicollinearity using variance inflation factor (VIF) (or the "Spearman's rank correlation coefficient" or "the Pearson correlation coefficient"). The influential observations were assessed by looking at the deviance residual and the difference of chi-squares, assumed linearity between the dependent variable and the log-odds have been checked using the Box-Tidwell test. I furthermore gauged if the model fits the data well using Hosmer and Lemeshow's goodness-of-fit test.

Results

Label knowledge/green consumption (Hypothesis 1)

Of all the sustainable food consumption choices analyzed in this paper, organic food is the most prevalent: 31.1% of people in the sample said they had purchased organic food, beverages, meat or poultry or organic store-brand items in the past 3 months, compared to 15.6% of people who indicated they had opted for GMO-free food, and 8.9% who had bought sustainable seafood. The label recognition is similar to the consumption of items with these credence properties (Figure 1): 83.1% of survey respondents recognize the label USDA organic, with 34.8% responding that they do not just recognize it but are also fully aware of the labels' meaning. Additionally, 70.8% of people in the sample recognize the monarch butterfly logo of the Non-GMO Project, and 26.5% say they also know what the label stands for. Sustainable seafood is not only less consumed, but also less recognized: only 24.7% of respondents recognize the MSC logo, with 4.9% saying they fully know what it means.

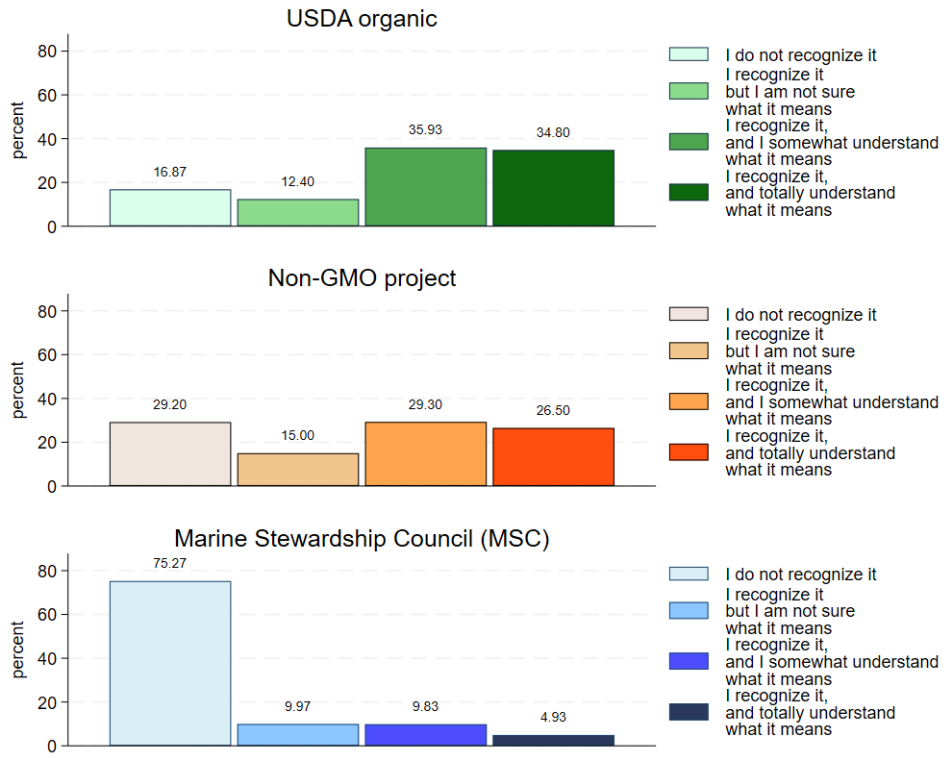

Figure 1: Environmental label knowledge, measured on a scale from 1 (I don't recognize the label) to 4 (I recognize the label and know what it stands for), mean(usdaorganic)=2.89, mean(nongmo)=2.53, mean(msc)=1.44. N=3000.

Moving from descriptive results to testing the hypotheses using the defined framework, I am applying Model 1 to see whether eco-label knowledge leads to a higher purchase probability. As indicated by Figure 2, the predicted probability of purchasing organic food and beverages is increasing with increasing stated knowledge of the label USDA organic. Compared to the baseline category of people who indicated that they do not recognize the label, people who recognize it, but are not sure what it means are 9 percentage points (pp) more likely to purchase organic food and beverage items. People who not recognize it but also know what it means are 18 pp more likely to buy organic, and respondents who indicated they totally understand what the label means have a 38 pp higher probability of purchasing organic food and beverage items, compared to their counterparts who do not recognize the USDA organic label. All these average marginal effects are highly significant to the 1% level.

As fewer people are aware of the label of the Non-GMO Project, the effects of the label are less pronounced than for USDA organic. However, there are still significant differences between people who recognize the label and somewhat know what it stands for and people who do not recognize it: the former are 9 pp more likely to buy non-GMO food items. The effect is even stronger for respondents who are totally aware of what the label stands for: their likelihood of purchasing non-GMO items increases by 28 pp.

Looking at sustainable seafood purchases, the low label knowledge is also indicated in the predictive margins and average marginal effects: there is no significant difference between people who do not recognize the label, and those who recognize it but are not sure what it means. Somewhat knowing what MSC stands for does lead to an increase in purchases of sustainable seafood of 11 pp, and respondents who totally understand what the label means are 15 pp more likely to buy sustainable seafood than their counterparts who do not recognize

the label. There is therefore support for Hypothesis 1, that people who are aware of the label and know more about its origin and what it stands for are more likely to buy products that are labeled.

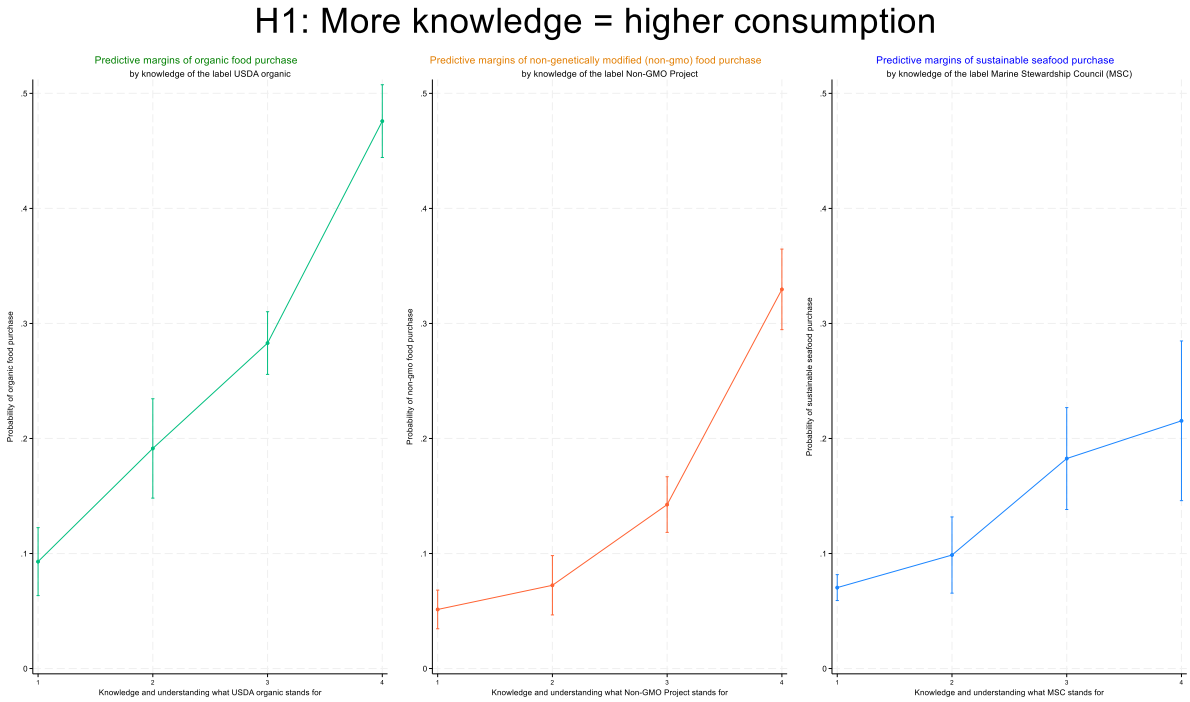

Figure 2: Marginal predicted probability of sustainable purchase depending on the knowledge of the label (Model 1). Notes: N= 2,801 (USDA organic) N= 2,799 (Non-GMO & MSC), predictive margins for different categories of sustainable purchases, organic food, non-genetically modified food, and sustainable seafood. X-axis: 1= I do not recognize it, 2= I recognize it, but I am not sure what it means, 3= I recognize it, and somewhat understand what it means, 4= I recognize it, and totally understand what it means. All other covariates are held at their observed values.

People's feeling of agency/green consumption (Hypotheses 2a and 2b)

H2a: People who feel overwhelmed with the number of eco-labels and certifications do not recognize the environmental label as often as people who do not feel overwhelmed and are less likely to purchase sustainable food and beverage items.

H2b: Researching the company's environmental responsibility is positively correlated with consumption of sustainable food and beverage items and with eco-label knowledge and recognition.

Table 1 shows the prevalence of the feeling that "there are too many green seals and certifications": 46.6% of people feel overwhelmed in the jungle of eco-labels. A potential way to overcome this confusion is to take the matter into their own hands and research "a company's environmental/social responsibility", which 24.6% of the respondents indicated they had. Hypotheses 2a and 2b are asking if these feelings or the reaction to them are making a difference in likelihood of sustainable food purchases and label recognition. The results show that overwhelm is not significantly correlated with organic food and beverage consumption, and looking at the difference of label recognition and knowledge between respondents who feel that there are too many green seals and certifications and those who do not, we can see that they are less likely to recognize the USDA organic label. However, the differences are not significant (Figure 3, Panel a). In contrast, respondents who claim they research the environmental and social responsibility of companies before buying, are 11 pp

more likely to purchase organic food and beverage items. When broken up according to how much they know about the label USDA organic, people who recognize the label and know at least somewhat for what it stands for purchase 12 pp more organic food and beverage items. For people who totally know what the label means the difference is even more pronounced at almost 14 pp (Figure 3, Panel b).

People who recognize the label of the Non-GMO Project and know what it stands for and indicated that they are researching companies' environmental and social responsibilities are 10 pp more likely to buy non-GMO products (Figure 3, Panel d). There are no significant differences between people who are overwhelmed with the number of labels and those who are not dependent on their knowledge of the Non-GMO Project seal (Figure 3, Panel c).

Only about 25% of the people in the sample recognize the MSC label, and therefore the effects of agency are not as stark: there are no significant differences between people who feel overwhelmed and those who do not regarding their purchase of sustainable seafood, even if broken up by label knowledge levels (Figure 3, Panel e). Researching companies' responsibilities does make a difference in purchasing probability of about 4 pp, however, only for people who do not recognize the label (Figure 3, Panel f). This effect might be stronger if more people would recognize the MSC label and know what it stands for.

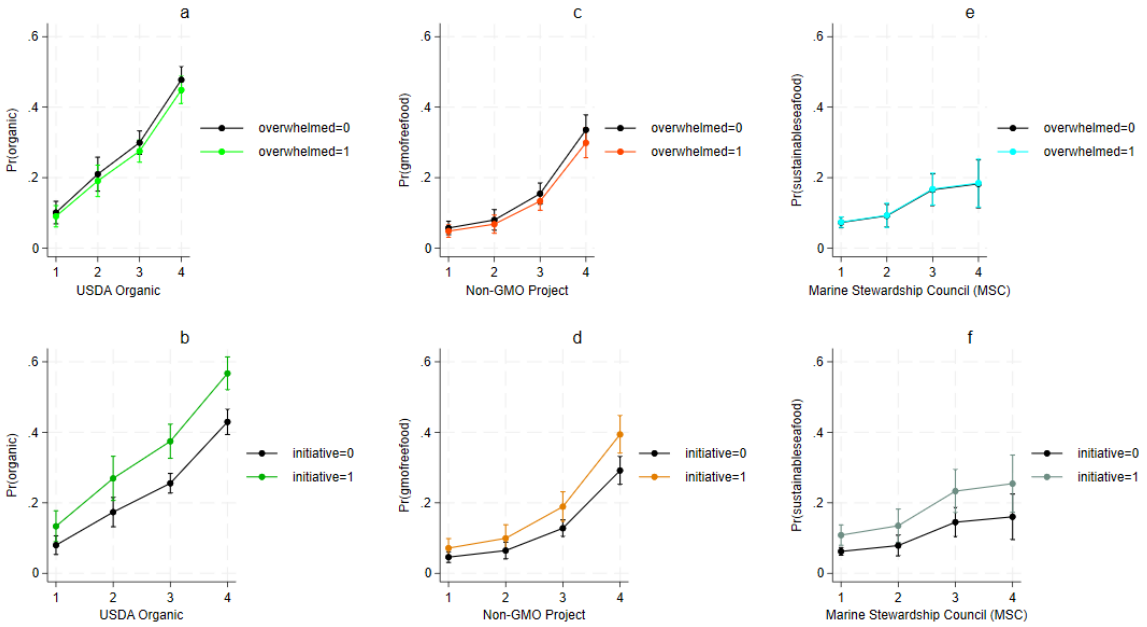

Figure 3: Predictive margins of perceptions of overwhelm and initiative at different levels of eco-label knowledge. N=2,801 (USDA organic) N=2,799 (Non-GMO & MSC).

Trust (Hypotheses 3a-3c)

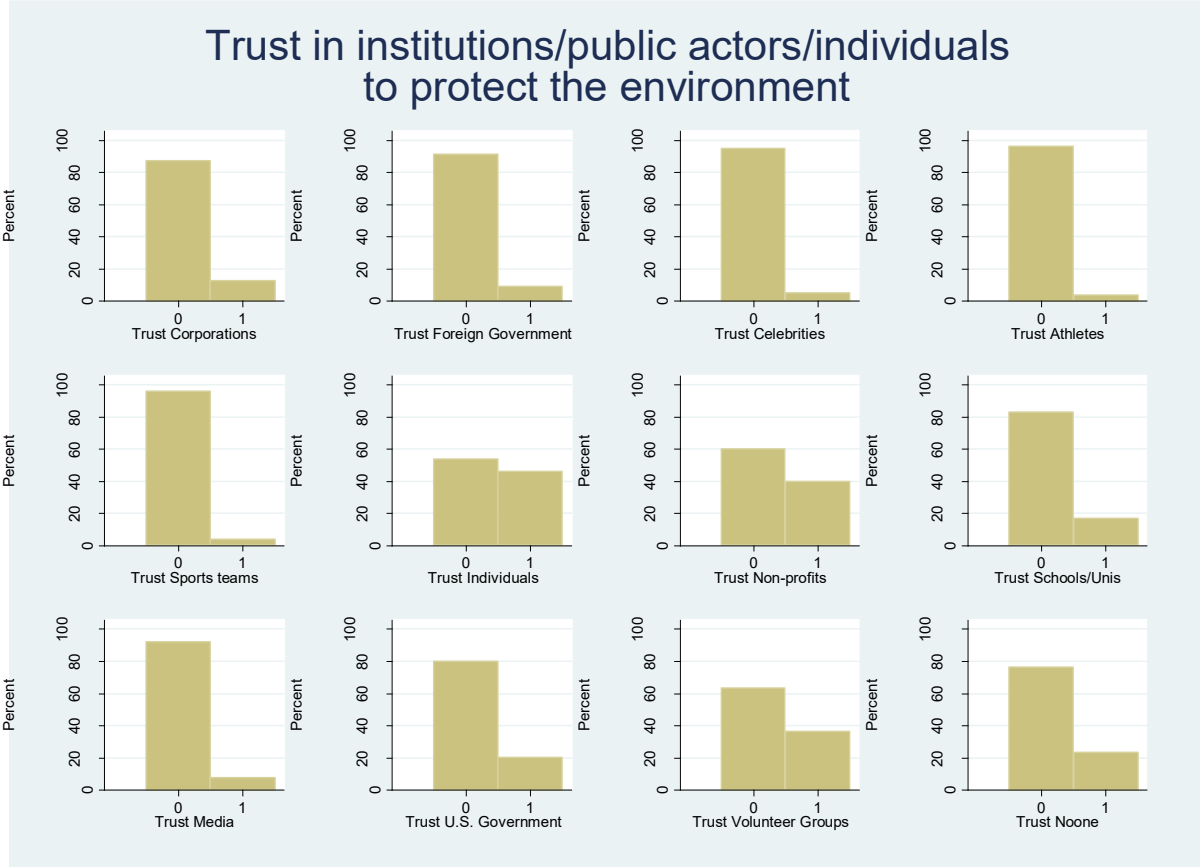

Figure 4: Which of the following are you most likely to trust to protect the environment now and in the future? In percent, N=3000.

According to Figure 4, people in the sample trust individuals most to protect the environment now and in the future (46%), followed by NGOs (40%) and volunteer groups (37%). They have little trust in governments to protect the environment, but, they trust the U.S. government over foreign governments (20% vs. 9%). Institutions funded publicly such as universities are also trusted by 17% of the people in the sample. Private entities such as corporations (13%) and the Media (8%) rank low in being trustworthy regarding environmental protection, as well as celebrities (5%) and athletes (4%). Additionally, 23% of the people surveyed indicate they do not trust anyone to protect the environment.

As mentioned in the methodology section, I am analyzing the effect of people's trust in public actors on their sustainable consumption in the two categories *embedded* and *institutional trust*, as well as people's trust in NGOs to protect the environment, since NGOs are the main entities behind sustainable certification.

Institutional trust

H3a: A higher institutional trust to protect the environment (currently and in the future) moderates the impact of the environmental label on the consumption of sustainable food and beverage items and is most pronounced for USDA organic as a government-run eco-label.

As described in the variables section, institutional trust encompasses trust in these three public actors: government, media and schools. From Table 1 we can see that there are 1,058 respondents who trust one or more of these actors, which is 35.27% of the sample. Table 2 in

the Appendix shows the results in marginal effects, with the left column depicting the model with interaction effects, and the right column the results without interaction effects.

We can see that institutional trust does indeed matter for the purchase of organic food, and it increases the probability to buy organic food by roughly 4 pp. However, Figure 5 lays it out a little more clearly: institutional trust does have a moderating effect on the label knowledge, and thus on the propensity of organic consumption. Comparing the models with and without interaction effects, we can see that institutional trust significantly increases purchases of organic food and beverage items in the model without interaction effects. When we change the model to allow for moderation, institutional trust has only a significant impact for people without knowledge of the label USDA organic. There is no significant difference in propensity to purchase organic items for people who at least recognize the label.

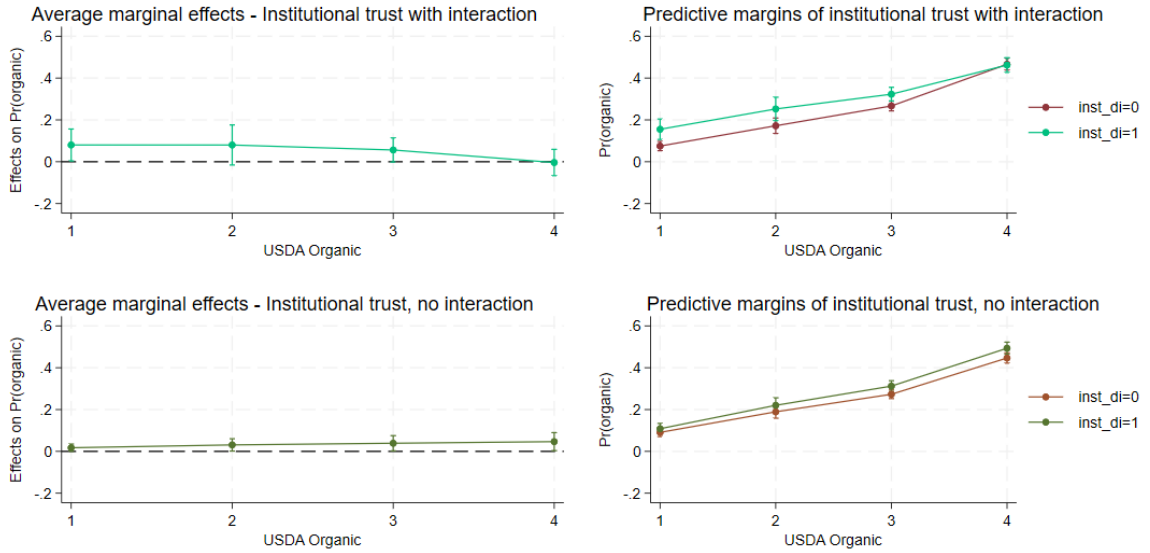

Figure 5: Average predictive margins and predictive marginal effects of institutional trust on organic food and beverage purchases by knowledge of USDA organic - interaction effects vs. no interaction effects. N=2,801.

For people purchasing GMO-free food, institutional trust is not significantly connected to their likelihood of purchase (Table 2 in the Appendix). Albeit, if we are looking at moderating effects (Figure 6), we can see that there is a difference in how institutional trust impacts purchasing probability: for people with no knowledge of the Non-GMO Project label, having institutional trust increases their likelihood of purchase by 5.5 pp.

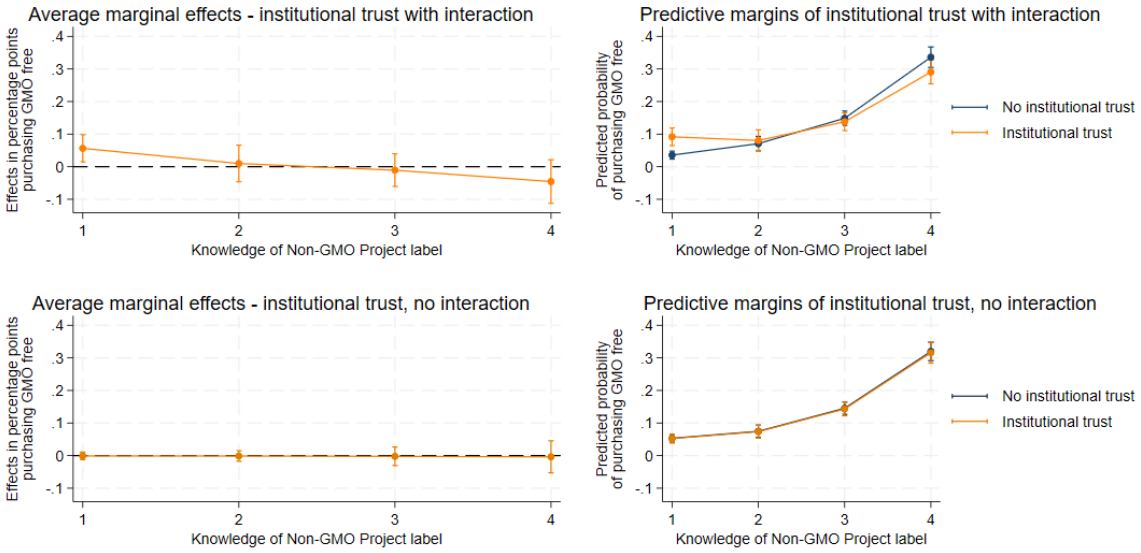

Figure 6: Average predictive margins and predictive marginal effects of institutional trust on GMO-free food by knowledge of the Non-GMO Project label - interaction effects vs. no interaction effects. N=2,799.

There is no significant difference in sustainable seafood purchase between respondents who trust institutions compared to those who do not (Table 2 in Appendix). But looking at the moderating effect, Figure 7 shows that people who do not recognize the MSC label but trust institutions are 2.7 pp more likely to purchase sustainable seafood.

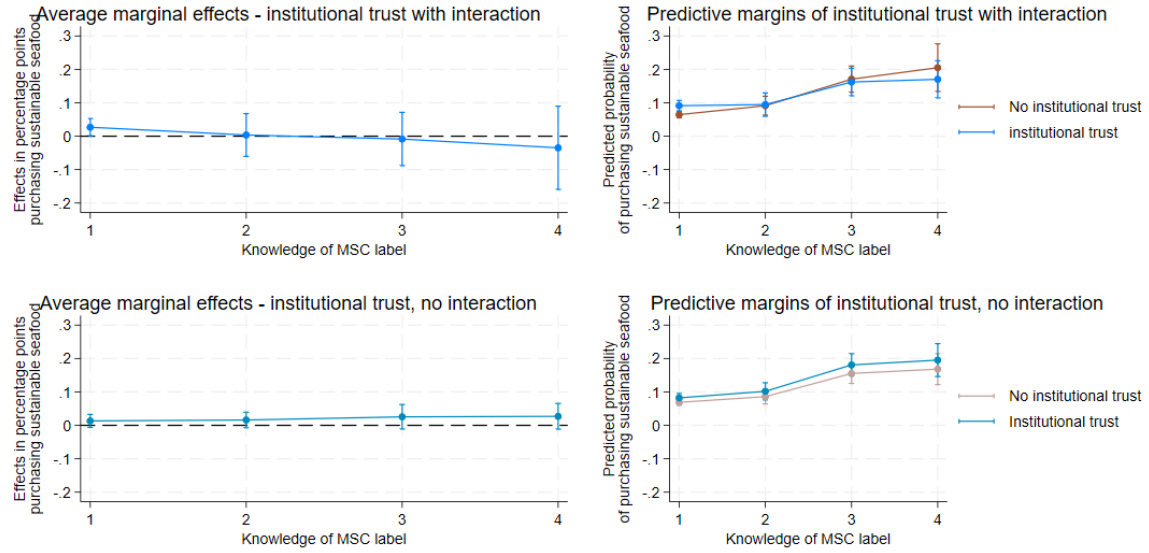

Figure 7: Average predictive margins and predictive marginal effects of institutional trust on sustainable seafood purchases by knowledge of the MSC label - interaction effects vs. no interaction effects. N=2,799.

Trust in NGOs

H3b: Higher trust in NGOs to protect the environment moderates the impact of the environmental label on the consumption of sustainable food and beverage items, which mostly impacts the NGO project and MSC labels.

Trusting NGOs increases the probability of organic food and beverage purchases by 9.6 pp (Table 3 in Appendix). Figure 8 shows that the effect is conditional on the level of knowledge, with trust in NGOs increasing peoples' probability of organic purchases when they either do not recognize the label or somewhat know what the label means. There is no

significant effect of trust in NGOs on people who recognize the USDA organic label but do not know what it stands for. Without the interaction effect, we would assume that trust in NGOs is increasing with increasing levels of knowledge, which is not the complete picture (Figure 8).

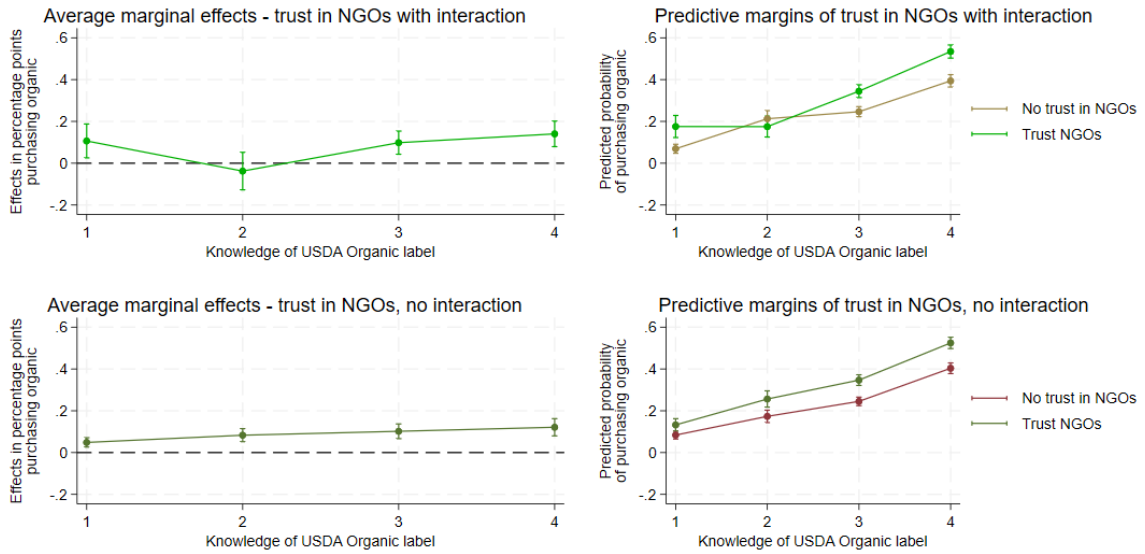

Figure 8: Average predictive margins and predictive marginal effects of trust in NGOs on organic food and beverage purchases by knowledge of USDA organic - interaction effects vs. no interaction effects. N=2,801.

Table 3 in the Appendix shows the importance of trusting NGOs to protect the environment for the Non-GMO project label, which is awarded by an NGO. Modeling the influence of trust in NGOs as conditional on the level of knowledge of the label, and results in a different picture than not accounting for this interaction (Figure 9). People who are fully aware of what the Non-GMO Project stands for and also trust NGOs to protect the environment have a 12.4 pp higher probability to purchase GMO-free food. There is also a significant effect for people who do not recognize the label, trusting NGOs increases their probability of purchasing GMO-free food by 4.8 pp. For people who recognize the label and do not know what it means or people who only somewhat know what it means, trust in NGOs does not significantly change their propensity to purchase GMO-free food. Missing the interaction effect would lead to the conclusion that the probability to purchase GMO-free food increases when people trust NGOs, regardless of the level of knowledge (Figure 9).

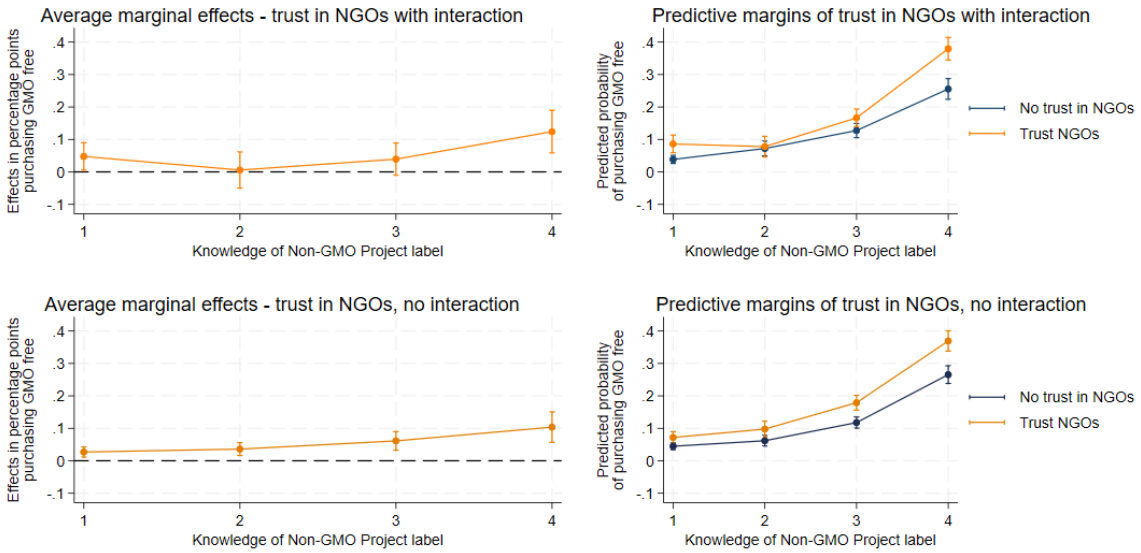

Figure 9: Average predictive margins and predictive marginal effects of trust in NGOs on GMO-free food by knowledge of the Non-GMO Project label - interaction effects vs. no interaction effects. N=2,799.

The effect of trusting NGOs and recognizing the label and totally understanding what it means is even larger when it comes to sustainable seafood: in the model accounting for the moderating effect of trust in NGOs, people who trust NGOs and know what the label MSC stands for have a 21.6 pp higher probability of purchasing sustainable seafood (Figure 10). Not recognizing the label but trusting NGOs also significantly increases the odds of purchasing sustainable seafood: people with trust in NGOs purchase sustainable seafood 2.5 pp more likely. Without the moderating effect, we would assume that sustainable seafood purchase probability is increasing in the knowledge of the MSC label, and even more for people who trust NGOs to protect the environment.

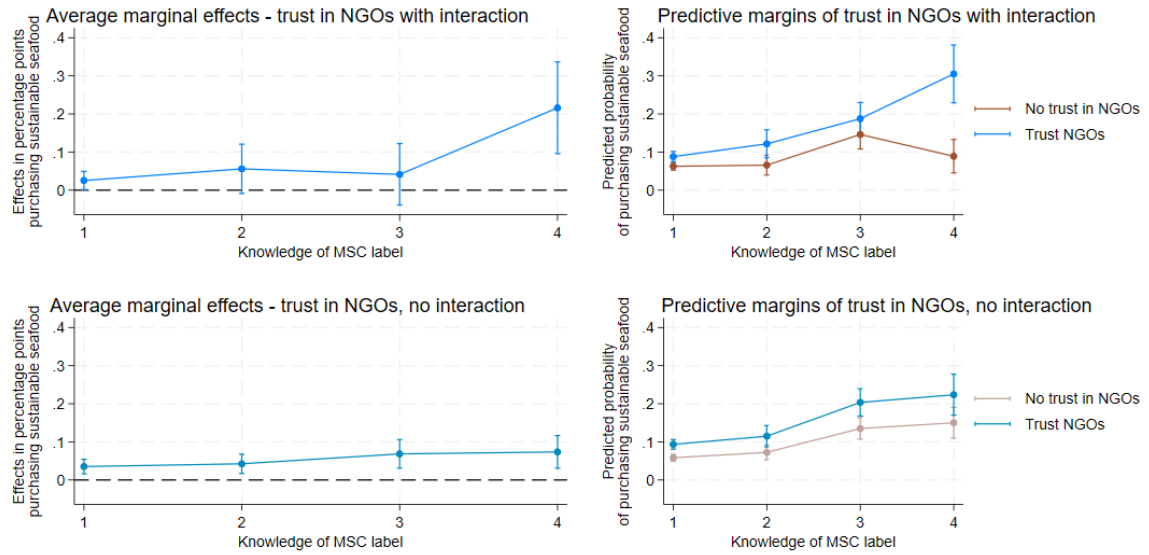

Figure 10: Average predictive margins and predictive marginal effects of trust in NGOs on sustainable seafood purchases by knowledge of the MSC label - interaction effects vs. no interaction effects. N=2,799.

Embedded trust

H3c: Higher embedded trust moderates the impact of the environmental label on the consumption of sustainable food or beverage items.

Trusting people in face-to-face contacts also matters for the sustainable purchase decision. Knowledge and experiences are being transferred between people in close relationships. 57.9% of the people in the sample (or 1,736 people) trust individuals or volunteer groups or both (Table 1).

Conditional on the knowledge of the label USDA organic, having embedded trust translates into a difference of 6.5 pp for people who recognize the label and somewhat know what it means and 10 pp for people who know exactly what the label stands for (Figure 11, Table 4 in the Appendix). Without accounting for the moderating effect of embedded trust, we would assume that embedded trust increases the probability of organic food and beverage items, regardless of label awareness (Figure 11).

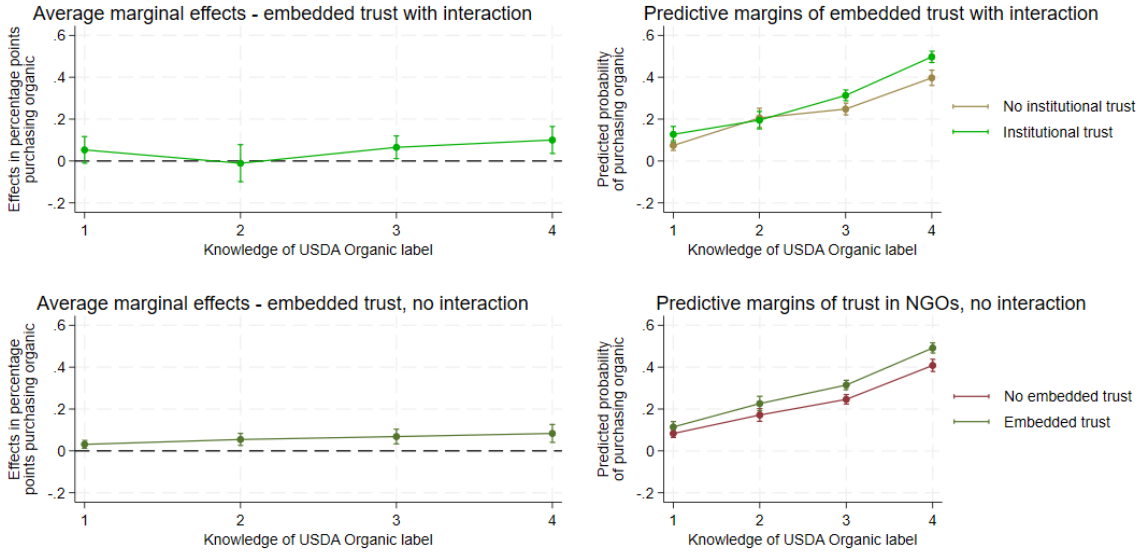

Figure 11: Average predictive margins and predictive marginal effects of embedded trust on organic food and beverage purchases by knowledge of USDA organic - interaction effects vs. no interaction effects. N=2,801.

Embedded trust does influence the purchase of GMO-free products conditional on the level of knowledge of the Non-GMO Project label. In Figure 12 we see that trusting individuals is increasing the probability of purchase for people who either do not recognize the label (increase of 4.0 pp) or people who totally know what it means (16.2 pp higher probability). While if we ignore the interaction, we had assumed that the effect size per knowledge level would vary, but not that some knowledge levels are not significantly influenced by embedded trust.

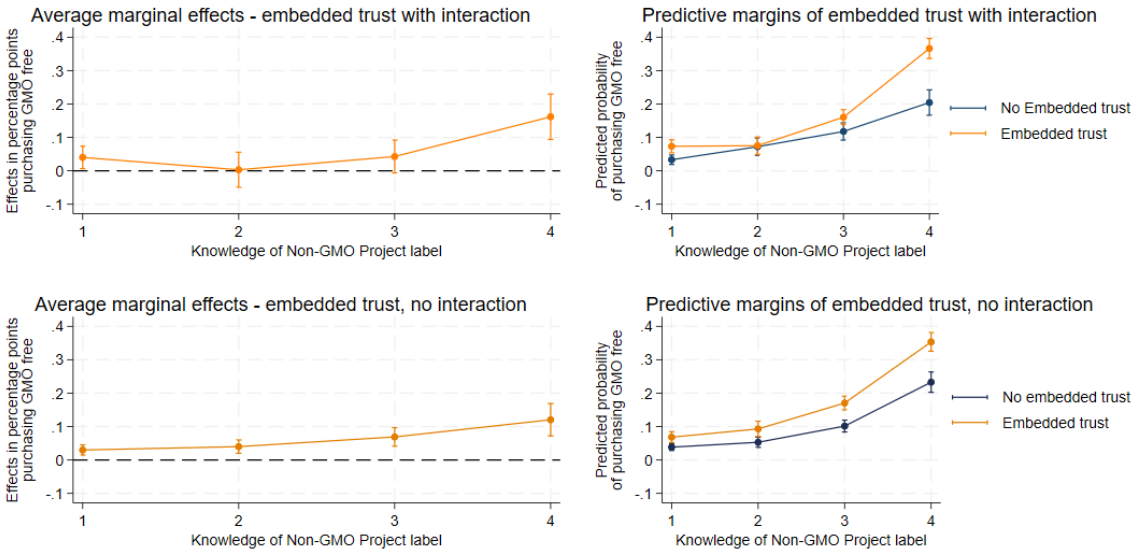

Figure 12: Average predictive margins and predictive marginal effects of embedded trust on GMO-free food by knowledge of the Non-GMO Project label - interaction effects vs. no interaction effects. N=2,799.

Embedded trust does not have the same effect for sustainable seafood as for GMO-free or organic food: For people who know nothing about the label, having embedded trust increases the probability of buying sustainable seafood by 3.4 pp. However, this is a different interpretation from the model that ignores the moderating effect. Here, embedded trust increases the propensity of sustainable seafood purchase by 3.0-6.4 pp, depending on the knowledge level (Figure 13).

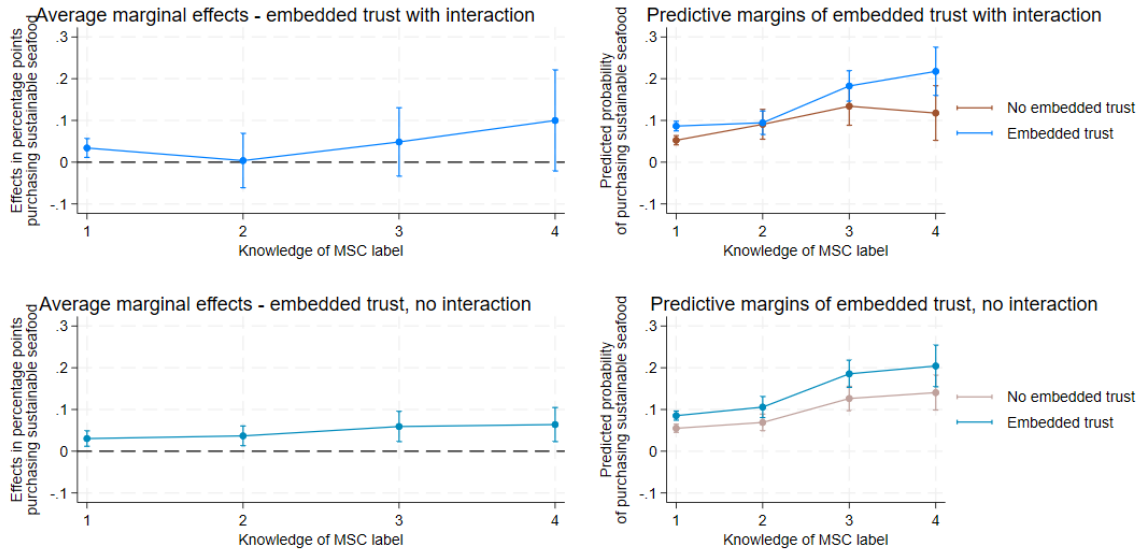

Figure 13: Average predictive margins and predictive marginal effects of embedded trust on sustainable seafood purchases by knowledge of the MSC label - interaction effects vs. no interaction effects. N=2,799.

Limitations

The data used in this study were surveyed in a situation where the consumer was not immediately involved in a purchase decision. This discrepancy might lead to answers that are inconsistent with real observed behavior. Previous studies have found that consumers overstate their purchase of environmentally labelled products (Pearson et al., 2011), which could overestimate the actual behavior reported here. However, as all variables have been

surveyed at the same time, the responses should be internally valid, representing the point in time when the answer has been given.

As the survey consists of self-reported data and does not track revealed preferences for organic, non-GMO or sustainably harvested seafood, there is a high likelihood for consumers to overstate their purchases due to social pressure. Sustainable consumption choices are preferred in societies with a high environmental awareness such as the U.S. Not reporting the purchase of sustainable food items would represent a socially undesirable behavior and therefore is likely to be overstated (Pedersen & Neergaard, 2006).

Not all labels are recognized with the same frequency: USDA organic is by far the most recognized, only 16.9% of respondents in the sample did not recognize it. 29.2% of people in the sample did not recognize the monarch butterfly of the Non-GMO Project and 75.3% did not recognize the MSC label. With a smaller sample size, some of the statistical analyses are becoming more difficult and are less reliable. A main recommendation is therefore for organizations of labels that are less recognized and have a low market penetration to invest in outreach and education, and possibly even team up with other labels to boost their impact on people's purchasing behavior.

Discussion

Understanding the effect of eco-labels on sustainable consumption is valuable, as consumers are not monoliths and market-based instruments for pricing in negative externalities are a simple mechanism to foster environmental awareness. Especially for everyday purchases of necessity goods, such as food and beverage items, consumers can use their purchasing power to support their values. Hypothesis 1 is confirming the positive connection of respondents with higher knowledge about the respective eco-label and their probability to purchase the sustainable food or beverage item. The more people know about eco-labels, the higher their probability of purchase. Which in turn also means that labels that are not yet recognized as often (e.g. MSC) have an opportunity to educate and make their label more recognizable, because just recognizing the label without knowing what it stands for could help shape sustainable purchase decisions.

Several other researchers have found a negative effect of the number of labels and sustainable purchases (Leire & Thidell, 2005; Nuttavuthisit & Thøgersen, 2015; Yokessa & Marette, 2019). Overwhelmed consumers cannot differentiate between eco-labels certifying similar credence values and stop participating. In this study, overwhelm did not significantly alter the probability of sustainable purchases, possibly because two of the three labels are well established and people are not confusing them (Hypothesis 2a). However, this does not invalidate prior findings calling for a reduction in available certifications to lower the mental load of consumers, as 46.6% of respondents agreed with the statement "there are too many green seals and certifications".

Saturation of the eco-label landscape leads to fewer gains for producers, consumers, and mostly the environment, as consumers cannot make fully informed choices. Standardizing and streamlining eco-label certifications could help ease confusion for consumers and give producers a few main eco-certificates to work towards. Having everyone, institutional, NGO- and private actors involved to improve credibility and trust can furthermore boost eco-label success. This has already been recognized in several key markets, such as the European Union, which in 2023 has adopted a proposal to improve credibility of green claims and increase transparency of eco-labeling schemes (Directive of the European Parliament and of

the Council on Substantiation and Communication of Explicit Environmental Claims (Green Claims Directive), 2023).

Further, the results show that respondents who take action against the feeling of overwhelm and research the companies' social and environmental responsibilities are more likely to purchase sustainable food and beverage items (Hypothesis 2b). This finding is in line with research showing disproportionate benefits of eco-labels to already informed consumers (Handgraaf et al., 2017; Yokessa & Marette, 2019). The positive effect of initiative on purchasing probability is strongest for established and more recognized eco-labels, such as USDA organic (Figure 3).

For the label to be successful people also have to trust the certifying entity and the process, which I have also found is dependent on the level of awareness for the eco-label the respondent has. In all three forms of trust analyzed in this research, trust acted as a moderating variable to refine the relationship between the eco-label and the purchase decision. In many cases, the null hypotheses were only partially rejected, as the effect of the trust variable is conditional on the knowledge level. This confirms the Hypotheses 3a-c that trust is acting as a moderator variable, but not always in the direction or effect size I had anticipated.

Institutional trust is moderating the impact of eco-labels, but trusting the government and other public institutions has a significant effect mostly on people who do not recognize the eco-labels of concern. It therefore can be "considered as a strategic determinant to be reinforced in order to promote sustainable food consumption to consumers who are not particularly involved in eco-friendly behavior" (Ricci et al., 2018, p. 63). Institutional trust remains vital for people to determine what is true and where to obtain credible information from (Kavanagh et al., 2020).

The Non-GMO Project and MSC labels are two eco-labels awarded by NGOs, and people who trust NGOs to protect the environment and know what the respective label stands for are exhibiting the highest propensity to purchase sustainable food and beverage products. The effect of trusting NGOs is also spilling over to eco-labels that are certified by governmental organizations, such as USDA organic. A part of this might be that some consumers do not know which entity is responsible for the certification and generally believe that it is mostly NGOs doing so. Especially in times of decaying institutional trust (Kavanagh et al., 2020), it is important for NGOs to maintain the status of trustworthiness by being maximally transparent and clear about the guidelines and rules they are following during certification.

Trusting other individuals on a personal level translates to higher purchasing probabilities for people who do not know anything about the label and acts as another mechanism for engaging people who otherwise are not concerned with environmental qualities. There might also be a mechanism of information exchange: people who have embedded trust and know a lot about a label are more likely to pass on information about these labels in their close-knit groups, creating pockets of people highly engaged in eco-conscious behavior (Torjusen et al., 2004). This pathway should be explored more by less recognized labels such as MSC, to spread information and increase reputation.

Conclusion

Individual goods are embedded in larger systems, and these systems are slow to change (Heiskanen & Pantzar, 1997). Since consumption coincides with resource use and places a

burden on the environment, re-thinking consumption values by introducing sustainable consumption labels can serve as a possible way to make the current economic system more sustainable.

In this paper, I offer a variety of drivers of sustainable consumption, knowledge value of eco-labels, initiative to research companies' responsibilities, institutional trust, embedded trust and trust in NGOs to protect the environment, of which only a few have been researched on a national dataset before. Differentiating between consumers at various knowledge levels helps producers and decision-makers tailor their efforts to specific sub-groups within the consumers, and will improve the uptake of eco-labeling and therefore the environmental footprint. Even though consumption is not the way out of the climate dilemma, the research presented here focuses on goods that can substitute for less environmentally friendly products, and therefore not lead to an increase in consumption but a shift.

For producers who are debating which eco-label strategy to follow, the guidelines generated by this research are as follows. First, choose an eco-label that is already well established even if the cost is higher because recognizing the label on the product leads to an increased purchasing probability. Second, be transparent about the certification process and make this information accessible to consumers who want to research the company's environmental responsibility. Third, look for a certification agency that is trusted by the consumers and is similarly transparent, responsive, and engaged in the topic they are certifying. And last, if your market is characterized by high institutional and embedded trust, just obtaining the label can increase sales, as people do not need additional information to believe in the credence value of your good.

Eco-labels present an alternative investment path for those individuals who want to align their eco-centric values with their actions, especially when purchasing necessity goods. Spreading knowledge to other individuals in personal networks is a way to increase market share of certified goods and services and researching a company's environmental and social responsibility provides relief from a feeling of overwhelm and lack of control. Even though the larger structures surrounding food systems stand on less sustainable pillars such as efficiency and economic growth, consumers can help shape the economy, especially when they are voting with their purses.

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Appendix

Table 2: Logistic regression results for Hypothesis 3a: Moderation of Institutional Trust and Label Knowledge on Sustainable Food and Beverage Purchase

	(1) Organic	(2) Organic no interaction	(3) GMO free	(4) GMO free no interaction	(5) Sustain. seafood	(6) Sustain. seafood no interaction
USDA organic I recognize it - but I am not sure what it means	0.0967***	0.103***				
	(0.03)	(0.03)				
USDA organic I recognize it - and somewhat understand what it means	0.182***	0.190***				
	(0.02)	(0.02)				
USDA organic I recognize it - and totally understand what it means	0.360***	0.366***				
	(0.02)	(0.02)				
Non-GMO Project I recognize it - but I am not sure what it means			0.0178	0.0212		
			(0.02)	(0.02)		
Non-GMO Project I recognize it - and somewhat understand what it means			0.0882***	0.0915***		
			(0.02)	(0.02)		
Non-GMO Project I recognize it - and totally understand what it means			0.263***	0.265***		
			(0.02)	(0.02)		
MSC I recognize it - but I am not sure what it means					0.0179	0.0180
					(0.02)	(0.02)
MSC I recognize it - and somewhat understand what it means					0.0929***	0.0909***
					(0.02)	(0.02)
MSC I recognize it - and totally understand what it means					0.118**	0.104**
					(0.04)	(0.03)
Institutional Trust	0.0385*	0.0363*	-0.000627	-0.00213	0.0164	0.0156
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)

Overwhelm	-0.0234 (0.02)	-0.0238 (0.02)	-0.0204 (0.01)	-0.0205 (0.01)	0.000824 (0.01)	0.000362 (0.01)
Initiative	0.110*** (0.02)	0.108*** (0.02)	0.0597*** (0.02)	0.0584*** (0.02)	0.0539*** (0.02)	0.0536*** (0.02)
Female	0.0243 (0.02)	0.0233 (0.02)	0.0134 (0.01)	0.0125 (0.01)	0.00250 (0.01)	0.00202 (0.01)
Age	-0.00248*** (0.00)	-0.00249*** (0.00)	0.0000277 (0.00)	-0.0000271 (0.00)	0.00147*** (0.00)	0.00149*** (0.00)
Black	-0.0588* (0.03)	-0.0578* (0.03)	0.00565 (0.02)	0.00559 (0.02)	-0.0304 (0.02)	-0.0309 (0.02)
Asian	-0.0536 (0.03)	-0.0549 (0.03)	-0.0643* (0.03)	-0.0659** (0.03)	-0.0544** (0.02)	-0.0540** (0.02)
Latinx	0.0265 (0.04)	0.0278 (0.04)	-0.0441 (0.03)	-0.0442 (0.03)	0.0180 (0.03)	0.0197 (0.03)
Native American	0.0878 (0.13)	0.0834 (0.13)	-0.0722 (0.08)	-0.0730 (0.08)	0.0785 (0.11)	0.0715 (0.11)
Pacific Islander	-0.0802 (0.17)	-0.0876 (0.16)	0 (.)	0 (.)	0 (.)	0 (.)
Other race	-0.165* (0.07)	-0.167* (0.07)	-0.101* (0.05)	-0.102* (0.05)	-0.000377 (0.06)	-0.00100 (0.06)
More than one race	-0.119*** (0.03)	-0.118*** (0.03)	-0.0274 (0.03)	-0.0270 (0.03)	0.0183 (0.03)	0.0190 (0.03)
Number of children	0.00408 (0.01)	0.00418 (0.01)	0.00697 (0.01)	0.00683 (0.01)	-0.00489 (0.01)	-0.00504 (0.01)
College degree or higher=1	0.0445* (0.02)	0.0446* (0.02)	-0.00814 (0.01)	-0.00857 (0.01)	0.0276* (0.01)	0.0280* (0.01)
$15'000 to $24'999	0.0694 (0.04)	0.0700 (0.04)	0.0245 (0.03)	0.0266 (0.03)	0.0128 (0.03)	0.0117 (0.03)
$25'000 to $34'999	0.0510 (0.04)	0.0516 (0.04)	0.0475 (0.03)	0.0502 (0.03)	-0.0103 (0.02)	-0.0110 (0.02)

$35'000 to $49'999	0.0887*	0.0880*	0.0942**	0.0967***	-0.00217	-0.00282
	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)
$50'000 to $74'999	0.0649*	0.0663*	0.0785**	0.0800**	0.0219	0.0222
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
$75'000 to $99'999	0.129***	0.131***	0.0865**	0.0889**	0.0208	0.0198
	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)
$100'000 to $124'999	0.117**	0.120**	0.0453	0.0495	0.0576*	0.0557*
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$125'000 to $149'999	0.110**	0.111**	0.0459	0.0475	0.0368	0.0352
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$150'000 to $199'999	0.207***	0.206***	0.0488	0.0516	0.0762*	0.0737*
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$200'000 to $249'999	0.0191	0.0220	0.0228	0.0273	0.0167	0.0166
	(0.06)	(0.06)	(0.05)	(0.05)	(0.04)	(0.04)
$250'000 or more	0.122*	0.123*	0.00506	0.00765	0.133**	0.131*
	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)
Vegetarian	-0.0321	-0.0233	-0.112	-0.110	-0.0666	-0.0645
	(0.10)	(0.10)	(0.08)	(0.08)	(0.05)	(0.05)
Pescetarian	0.0309	0.0370	0.0197	0.0259	0.0670	0.0712
	(0.10)	(0.10)	(0.08)	(0.08)	(0.07)	(0.07)
No red meat	0.168	0.175*	-0.0119	-0.0104	0.00741	0.00977
	(0.09)	(0.09)	(0.07)	(0.07)	(0.05)	(0.06)
Flexitarian	0.0397	0.0464	-0.0268	-0.0257	0.0726	0.0726
	(0.09)	(0.09)	(0.07)	(0.07)	(0.06)	(0.06)
Conscious carnivore	-0.0362	-0.0288	-0.0578	-0.0552	0.00760	0.0103
	(0.08)	(0.08)	(0.06)	(0.06)	(0.05)	(0.05)
Carnivore	-0.109	-0.102	-0.0984	-0.0968	-0.0406	-0.0381
	(0.08)	(0.08)	(0.06)	(0.06)	(0.05)	(0.05)
Observations	2801	2801	2799	2799	2799	2799

Standard errors in parentheses
* p<0.05 ** p<0.01 *** p<0.001

Table 3: Logit regression results for Hypothesis 3b, moderation effect of Trust in NGOs and Label Knowledge on Sustainable Food and Beverage Purchases.

	(1) Organic	(2) Organic no interaction	(3) GMO free	(4) GMO free no interaction	(5) Sustain. seafood	(6) Sustain. seafood no interaction
USDA organic I recognize it - but I am not sure what it means	0.0831**	0.104***				
	(0.03)	(0.03)				
USDA organic I recognize it - and somewhat understand what it means	0.173***	0.183***				
	(0.02)	(0.02)				
USDA organic I recognize it - and totally understand what it means	0.338***	0.349***				
	(0.02)	(0.02)				
Non-GMO Project I recognize it - but I am not sure what it means			0.0163	0.0206		
			(0.02)	(0.02)		
Non-GMO Project I recognize it - and somewhat understand what it means			0.0853***	0.0869***		
			(0.02)	(0.02)		
Non-GMO Project I recognize it - and totally understand what it means			0.248***	0.252***		
			(0.02)	(0.02)		
MSC I recognize it - but I am not sure what it means					0.0165	0.0174
					(0.02)	(0.02)
MSC I recognize it - and somewhat understand what it means					0.0902***	0.0909***
					(0.02)	(0.02)
MSC I recognize it - and totally understand what it means					0.108***	0.108**
					(0.03)	(0.03)
Trust NGOs	0.0956***	0.0953***	0.0596***	0.0594***	0.0416***	0.0416***
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Overwhelm	-0.0230	-0.0243	-0.0197	-0.0200	0.00291	0.00160
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Initiative	0.109***	0.110***	0.0573***	0.0572***	0.0517**	0.0522***

	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Female	0.0197	0.0199	0.0118	0.0115	-0.00194	-0.000577
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Age	-0.00250***	-0.00253***	-0.0000213	-0.0000434	0.00138***	0.00145***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Black	-0.0508	-0.0513	0.00713	0.00806	-0.0302	-0.0285
	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
Asian	-0.0480	-0.0451	-0.0634*	-0.0632*	-0.0541**	-0.0519**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
Latinx	0.0263	0.0287	-0.0479	-0.0471	0.0169	0.0193
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
Native American	0.0598	0.0542	-0.0844	-0.0832	0.0494	0.0570
	(0.14)	(0.13)	(0.07)	(0.07)	(0.09)	(0.10)
Pacific Islander	-0.104	-0.0991	0	0	0	0
	(0.17)	(0.18)	(.)	(.)	(.)	(.)
Other race	-0.163*	-0.163*	-0.103*	-0.102*	-0.0000103	0.00522
	(0.07)	(0.07)	(0.05)	(0.05)	(0.06)	(0.06)
More than one race	-0.118***	-0.118***	-0.0302	-0.0295	0.0153	0.0184
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)
Number of children	0.00668	0.00665	0.00838	0.00815	-0.00416	-0.00379
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
College degree or higher=1	0.0429*	0.0436*	-0.00873	-0.00887	0.0278*	0.0272*
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
$15'000 to $24'999	0.0656	0.0677	0.0268	0.0273	0.0126	0.0102
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$25'000 to $34'999	0.0496	0.0525	0.0518	0.0517	-0.00950	-0.0117
	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)
$35'000 to $49'999	0.0845*	0.0866*	0.0976***	0.0970***	-0.00177	-0.00441
	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)
$50'000 to $74'999	0.0583	0.0592	0.0794**	0.0781**	0.0184	0.0184
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
$75'000 to $99'999	0.127***	0.129***	0.0882**	0.0891**	0.0186	0.0166

	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)
$100'000 to $124'999	0.116**	0.116**	0.0483	0.0481	0.0553*	0.0526*
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$125'000 to $149'999	0.106**	0.108**	0.0469	0.0462	0.0344	0.0321
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$150'000 to $199'999	0.191***	0.192***	0.0467	0.0462	0.0684*	0.0660*
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$200'000 to $249'999	0.0120	0.0140	0.0270	0.0258	0.0140	0.0133
	(0.06)	(0.06)	(0.05)	(0.05)	(0.04)	(0.04)
$250'000 or more	0.110	0.111	0.00438	0.00289	0.124*	0.122*
	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)
Vegetarian	-0.0109	-0.0169	-0.102	-0.103	-0.0614	-0.0634
	(0.10)	(0.10)	(0.08)	(0.08)	(0.05)	(0.05)
Pescetarian	0.0436	0.0375	0.0263	0.0257	0.0763	0.0693
	(0.10)	(0.10)	(0.08)	(0.08)	(0.06)	(0.06)
No red meat	0.176*	0.176*	-0.00285	-0.00422	0.0136	0.0101
	(0.09)	(0.09)	(0.07)	(0.07)	(0.05)	(0.05)
Flexitarian	0.0659	0.0559	-0.0137	-0.0155	0.0886	0.0830
	(0.09)	(0.09)	(0.07)	(0.07)	(0.06)	(0.06)
Conscious carnivore	-0.0294	-0.0323	-0.0525	-0.0536	0.00867	0.00836
	(0.08)	(0.08)	(0.06)	(0.06)	(0.04)	(0.05)
Carnivore	-0.100	-0.103	-0.0906	-0.0919	-0.0364	-0.0365
	(0.08)	(0.08)	(0.06)	(0.06)	(0.04)	(0.05)
Observations	2801	2801	2799	2799	2799	2799

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 4: Logit regression results for Hypothesis 3c, moderation effect of Embedded Trust and Label Knowledge on Sustainable Food and Beverage Purchases.

	(1) Organic	(2) Organic no interaction	(3) GMO free	(4) GMO free no interaction	(5) Sustain. seafood	(6) Sustain. seafood no interaction
USDA organic I recognize it - but I am not sure what it means	0.0934**	0.102***				
	(0.03)	(0.03)				
USDA organic I recognize it - and somewhat understand what it means	0.181***	0.185***				
	(0.02)	(0.02)				
USDA organic I recognize it - and totally understand what it means	0.350***	0.356***				
	(0.02)	(0.02)				
Non-GMO Project I recognize it - but I am not sure what it means			0.0165	0.0206		
			(0.02)	(0.02)		
Non-GMO Project I recognize it - and somewhat understand what it means			0.0859***	0.0865***		
			(0.02)	(0.02)		
Non-GMO Project I recognize it - and totally understand what it means			0.244***	0.249***		
			(0.02)	(0.02)		
MSC I recognize it - but I am not sure what it means					0.0191	0.0180
					(0.02)	(0.02)
MSC I recognize it - and somewhat understand what it means					0.0902***	0.0890***
					(0.02)	(0.02)
MSC I recognize it - and totally understand what it means					0.106**	0.106**
					(0.03)	(0.03)
Embedded trust	0.0654***	0.0645***	0.0697***	0.0680***	0.0358**	0.0360**
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Overwhelm	-0.0233	-0.0237	-0.0191	-0.0194	0.00104	0.00122
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)

Initiative	0.108***	0.109***	0.0555**	0.0567**	0.0527***	0.0536***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Female	0.0211	0.0211	0.0127	0.0122	0.00102	0.000514
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Age	-0.00262***	-0.00260***	-0.000140	-0.000140	0.00143***	0.00141***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Black	-0.0521	-0.0513	0.00952	0.0102	-0.0273	-0.0273
	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
Asian	-0.0430	-0.0421	-0.0587*	-0.0587*	-0.0498**	-0.0492**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
Latinx	0.0331	0.0341	-0.0428	-0.0422	0.0230	0.0220
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
Native American	0.0724	0.0721	-0.0775	-0.0769	0.0596	0.0589
	(0.13)	(0.13)	(0.08)	(0.08)	(0.10)	(0.10)
Pacific Islander	-0.0846	-0.0843	0	0	0	0
	(0.18)	(0.17)	(.)	(.)	(.)	(.)
Other race	-0.171*	-0.170*	-0.106*	-0.104*	0.000232	-0.00000331
	(0.07)	(0.07)	(0.05)	(0.05)	(0.06)	(0.06)
More than one race	-0.118***	-0.118***	-0.0286	-0.0287	0.0168	0.0166
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Number of children	0.00433	0.00447	0.00743	0.00717	-0.00499	-0.00479
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
College degree or higher=1	0.0429*	0.0437*	-0.0110	-0.0106	0.0266*	0.0268*
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
$15'000 to $24'999	0.0691	0.0696	0.0287	0.0288	0.0134	0.0131
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$25'000 to $34'999	0.0499	0.0504	0.0510	0.0502	-0.0119	-0.0119
	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)
$35'000 to $49'999	0.0841*	0.0850*	0.0949***	0.0941**	-0.00305	-0.00303
	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)
$50'000 to $74'999	0.0596	0.0597	0.0754**	0.0754**	0.0187	0.0189
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)

$75'000 to $99'999	0.132***	0.134***	0.0946**	0.0943**	0.0205	0.0203
	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)
$100'000 to $124'999	0.121**	0.120**	0.0524	0.0511	0.0566*	0.0573*
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$125'000 to $149'999	0.110**	0.109**	0.0503	0.0482	0.0342	0.0346
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
$150'000 to $199'999	0.207***	0.206***	0.0573	0.0561	0.0728*	0.0738*
	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)	(0.03)
$200'000 to $249'999	0.0153	0.0169	0.0259	0.0253	0.0143	0.0152
	(0.06)	(0.06)	(0.05)	(0.05)	(0.04)	(0.04)
$250'000 or more	0.124*	0.124*	0.0103	0.00976	0.130*	0.131*
	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)
Vegetarian	-0.0195	-0.0189	-0.0921	-0.0980	-0.0614	-0.0611
	(0.10)	(0.10)	(0.07)	(0.08)	(0.05)	(0.05)
Pescetarian	0.0474	0.0456	0.0519	0.0436	0.0770	0.0771
	(0.10)	(0.10)	(0.08)	(0.08)	(0.07)	(0.07)
No red meat	0.177*	0.178*	0.0105	0.00378	0.0110	0.0121
	(0.09)	(0.09)	(0.07)	(0.07)	(0.05)	(0.05)
Flexitarian	0.0506	0.0489	-0.00868	-0.0161	0.0767	0.0743
	(0.09)	(0.09)	(0.07)	(0.07)	(0.06)	(0.06)
Conscious carnivore	-0.0299	-0.0294	-0.0425	-0.0486	0.0112	0.0109
	(0.08)	(0.08)	(0.06)	(0.06)	(0.05)	(0.05)
Carnivore	-0.100	-0.100	-0.0798	-0.0858	-0.0342	-0.0346
	(0.08)	(0.08)	(0.06)	(0.06)	(0.05)	(0.05)
Observations	2801	2801	2799	2799	2799	2799

Standard errors in parentheses
* p<0.05, ** p<0.01 ,*** p<0.001