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EXPLORING DETERMINANTS OF ‘MENTAL DISTANCE’ IN CROSS-BORDER CONTEXTS

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ABSTRACT

State-of-the-art research has identified mental distance, which is the limited perception of occurrences beyond one’s country’s border, as the main determinant of moderate cross-border interactions in Europe. While it is well understood that mental distance is an upstream process that occurs prior to (bounded) rational decision-making, it is not clear whether and, if so, which determinants affect the degree of mental distance. Standardised interviews with inhabitants of the Euregio Meuse–Rhine cross-border region were conducted in 2019 to detect the potential effects of language (areas), sociodemographic characteristics and centre–periphery relations. The results demonstrate that knowledge of regionally spoken languages (German, French and Dutch) leads to a lower mental distance in four out of five cases, whereas English abilities surprisingly have the opposite effect. In addition, the outcomes indicate that centre–periphery relations can outweigh the fact that two cross-border sub-regions share the same official language.

Key words: Mental distance; Euregio Meuse–Rhine; cross-border interactions; knowledge of foreign languages; centre–periphery relations; inferential statistics

INTRODUCTION

Cross-border regions are of particular importance for the European integration, especially since official funding by Interreg programmes launched in 1990 (Perkmann 2003; Knippenberg 2004; Nilsson *et al.* 2010; Durand 2014; European Commission (n.d.-a)). Considerable legal integration processes – in particular, Directive 2004/38/EC, Regulation No 492/2011 and the enforcement of the Schengen Agreement from 1995 onwards – have been undertaken to enhance the free movement of workers and cross-border mobility in the European Union (European Commission n.d.; European Parliament 2020). In fact, although labour mobility within the European Union and European Free Trade Area has been growing in recent years, it still occurs at moderate levels overall (Heinz & Ward-Warmedinger 2006; Fries-Tersch & Mabilia 2015; Fries-Tersch *et*

al. 2018). Assuming an identical share (63%) of at least weekly cross-border commuters on total cross-border commuting in 2010 (EU-27) and 2016 (EU-28), there were approximately 882,000 (at least weekly) cross-border commuters within the EU-28 in 2016 (Fuller & Ward 2011; Fries-Tersch *et al.* 2018). This equates to a less-than-0.4% share of at least weekly cross-border commuters among the total workforce in the EU-28 in 2016 (Eurostat 2021).

Conceptual research explains this phenomenon of comparably low cross-border commuting levels primarily with reference to the prevalent mental distance of individuals. Derived from the literature review in the following chapter, mental distance is defined as the limited perception of occurrences and/or opportunities (e.g. on the labour market, with regard to business relations and with respect to cultural and social participation) beyond one’s state border. According to state-of-the-art

research, mental distance is even prevalent in European cross-border regions and hence occurs despite spatial proximity to a neighbouring country (van Houtum & van der Velde 2004; Szytniewski & Spierings 2014; van der Velde & van Naerssen 2015; Böhm & Opiola 2019).

However, mental distance has, thus far, been treated as an invariable parameter despite the empirically proven importance of language in terms of cross-border (labour) mobility in Europe (van Beck 1996; Nerb *et al.* 2009; Bartz & Fuchs-Schündeln 2012; Fries-Tersch *et al.* 2018). In addition, some European cross-border regions (e.g. the Czech–Slovakian or French–Spanish border regions) share similar historical roots and associated cultures (Boman & Berg 2007; Dumetz & Gáboríková 2016; Markuszewska *et al.* 2016; Ogrodnik 2017). Based on this argumentation, one can strongly assume that institutional features (language and culture) potentially shape the extent to which mental distance unfolds power. Therefore, the association between language, whose operationalisation is comparably unequivocal, and mental distance is at the core of this paper's empirical analysis.

Following classical central place theory, which was first introduced by Walter Christaller in 1933, one might also expect that cities with central functions influence the number of individuals who are dependent on such a central place in a neighbouring country (Getis & Getis 1966; Partridge *et al.* 2009; Mulligan *et al.* 2012; Hsu 2012). Cities' central functions (e.g. the offering of central goods and services, larger labour markets, cultural and educational facilities) might exercise a power of attraction beyond state borders if these cities are the most proximate urban centres for inhabitants of an adjacent country. Put differently, mental distance might be lower in cases of noticeable cross-border centre–periphery relations.

Therefore, the aim of this paper is to enrich the predominantly conceptual state-of-the-art research empirically, namely by investigating whether mental distance varies depending on different regional constellations with regard to official languages and centre–periphery relations, while taking into

account individuals' knowledge of foreign languages and sociodemographic characteristics (age, gender and educational qualifications). The data stem from standardised interviews conducted in the Euregio Meuse–Rhine (EMR) cross-border region in 2019. Before the concrete methodology and empirical results gained from inferential statistics are presented, mental distance is conceptually elaborated on in the next section.

MENTAL DISTANCE

To the best of the author's knowledge, van Houtum (1999, p. 332) first associated mental distance with 'the perception of differences in business conventions'. Van Houtum and van der Velde (2004) and Strüver (2005) have generalised and extended van Houtum's (1999) insights by emphasising that actions and habits beyond people's state border(s) are not only different but also much less often perceived than actions within people's home nation.

The 'threshold of indifference' and 'spaces of absence' conceptual frameworks by van Houtum and van der Velde (2004) and Strüver (2005), respectively, can be considered as further developments of the concept of mental distance. Both frameworks emphasise the dominance of socially constructed, imaginary mental borders being anchored in people's minds. The vast intuitive presence of the home nation in people's minds is the major determinant of the 'threshold of indifference' (mental distance) – that is, the socially constructed, limited perception of cross-border (labour) opportunities. This attitude of indifference towards what occurs beyond the border is driven by the need to belong to one's home nation and internalised by compliance with social norms, rules and values (van Houtum & van der Velde 2004; van der Velde & van Houtum 2004, referring to Anderson 1983; Paasi 1996).

Similarly, the conceptual framework of 'spaces of absence' relates to borders being prevalent in people's minds and everyday practices (Strüver 2005, premised on De Certeau 1984). Complementary to van Houtum and van der Velde (2005), Strüver

(2002, 2005) has attributed the phenomenon of mental borders (distance) specifically to the frequent representation of borders, for example, through symbols (stamps, flags, number plates) and media coverage (especially when maps are shown). This frequent reproduction of borders is illustrated by interpretations of museum visitors' comments and newspaper reports concerning two exhibitions in the Dutch–German borderland dealing with Dutch–German relations following Second World War. Despite some critical comments and reports concerning the strong emphasis on prejudices and stereotypes, Strüver (2002, 2005) has demonstrated and concluded that these two exhibitions contributed to and reflected people's nationally oriented identities and practices on the whole by stressing cultural differences between the two nations. In this context, Gasparini (2014) has distinguished between 'self-centred' and 'hetero-centred' borders. 'Self-centred borders' are characterised by an orientation towards the town, region or nation in which one lives, whereas the feeling of belonging to and identification with the cross-border region is more widespread among inhabitants of 'hetero-centred borders'.

Interestingly, and in line with Strüver (2005), van Houtum and van der Velde (2004) and van der Velde and van Naerssen (2011) have identified individuals' mental distance ('threshold of indifference' and 'mental border threshold') as an upstream process that occurs prior to the (bounded) rational assessment of benefits and opportunities. In other words, mental distance unfolds power before (bounded) rational decision-making (e.g. with regard to monetary border gradients (differences in prices, wages and taxes)) takes effect. Traditional neoclassical approaches relating to rational actors consequently overestimate individuals' willingness to demonstrate mobility and likelihood of doing so (De Gijssel *et al.* 1999; van der Velde & van Naerssen 2011). Van Houtum (1999) has made a similar claim, namely that perceived rather than objective cultural differences are decisive for (economic) cross-border relations.

Different terms are used in the literature to describe a similar, if not identical, phenomenon. Despite the fact that – unlike van Houtum (1999) – Strüver (2002, 2005), van der Velde and van Naerssen (2011) and van Houtum and van der Velde (2004) do not mainly use the term 'mental distance' to explain low levels of cross-border interactions, it is used in this paper because of its general, neutral character. To conclude, in this paper, mental distance is defined as the limited perception of occurrences and/or opportunities (e.g. on the labour market, with regard to business relations and with respect to cultural and social participation) beyond one's state borders despite spatial proximity to a neighbouring country.

METHODOLOGY AND DATA

Given the identified research objective, namely to empirically explore the determinants of the conceptually widely grasped phenomenon of mental distance, the analysis should be executed on the example of multiple spatial settings to ensure robustness. Given its administrative and cultural heterogeneity (three official languages and five subregions), the EMR is a suitable exemplary cross-border region. Furthermore, the EMR has a comparably vivid and heterogeneously shaped cross-border labour market. As of 2018, roughly 43,000 regular commuters were part of the cross-border labour market in the EMR, which equates to a share of approximately 2.6% of the total workforce (EGTC Euregio Meuse–Rhine 2019a; Eurostat 2021). Two facts imply that cross-border commuter streams likely do not follow a homogenous pattern in the EMR.

First, the share of cross-border commuters in the total workforce in South Limburg (the Netherlands) equalled 5% (2016) and hence was nearly twice as high as the mean value (CBS 2019). Second, in 2018, the commuter streams from the German-speaking Community (Belgium) to the city of Aachen (Germany) were at least six times as large as those in the opposite direction (IT.NRW 2020). Figure 1 depicts the EMR and its five

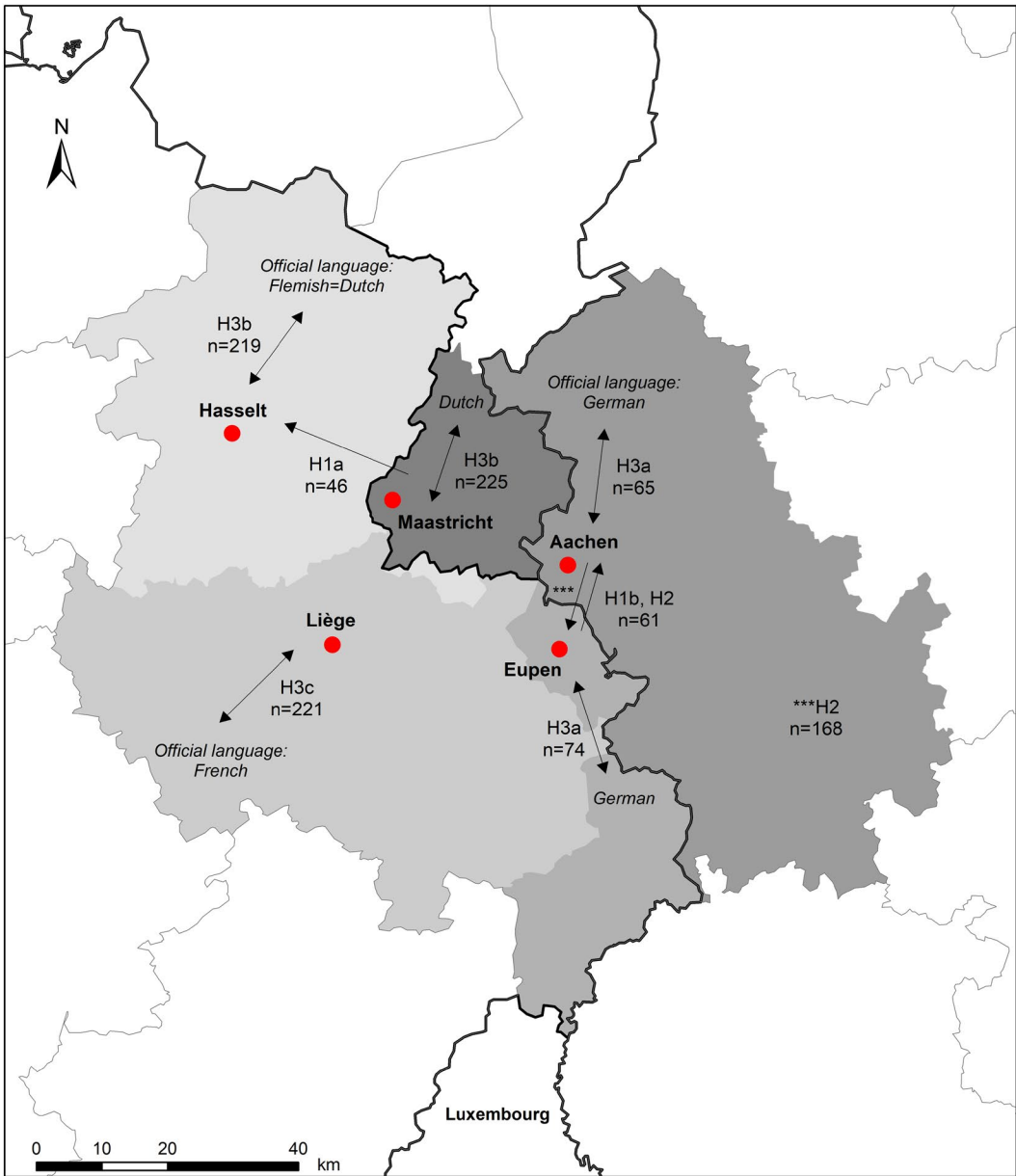


Figure 1. The Euregio Meuse–Rhine cross-border region [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com)]

Author: Henrik Basche
 Projection: ETRS 1989 / LAEA
 Date: 30/03/2021
 References: EGTC Euregio Meuse-Rhine (2019b), Eurostat (2015)

H1a = Hypothesis 1a
 n = number of observations

subregions, including their capitals and most populous cities, the officially spoken languages (in italics) and the subsample sizes according to the tested hypotheses.

Two subregions each share official languages: Dutch/Flemish is the official language in the Province of Limburg (Belgium) and South Limburg (the Netherlands), whereas German is the official language in the Region of Aachen (Germany) and the German-speaking Community of Belgium, which formally belongs to the Province of Liège. In accordance with van Keymeulen (2015), De Vogelaer and Van Der Auwera (2010), Willemyns (2002), Treffers-Daller (1994) and many others, Dutch is used synonymously with Flemish in this paper; therefore, Belgian and Dutch Limburg are treated as one language area.

Data were gathered in two consecutive oral surveys. Passengers on cross-border public transport lines that connect the Dutch and German, the Belgian and German and the Dutch and Belgian parts of the EMR were personally interviewed in English, German or Dutch in April and May 2019. Furthermore, pedestrians in the city of Aachen (Germany) were surveyed. Altogether, 191 interviews were conducted with inhabitants of the EMR who were at least 16 years old and speak at least one of the official languages in the EMR (German, Dutch and/or French) at least fluently. As not all students who supported the elicitation of data spoke fluent Dutch, the oral surveys with Dutch citizens had to be partly conducted in English. This might have distorted the results in the sense that these respondents might be more open-minded and internationally oriented than those who had not been surveyed (in their mother tongue). German native speakers, however, were exclusively interviewed in German.

Moreover, 120 valid interviews (i.e. with inhabitants of the EMR who are at least 16 years old and speak at least one of the official languages in the EMR fluently or as first language) were conducted between August and November 2019 in Aachen, Eupen (in German) and Maastricht (in Dutch). The interviews in Aachen were conducted by one student assistant, whereas those in Eupen and Maastricht were conducted by the author

himself. These respondents were exclusively surveyed in their mother tongue. All interviews of both oral surveys that were deemed valid were held during the day (8 AM to 6 PM) on rain-free weekdays (Monday–Friday) with arbitrarily selected interviewees.

The core (dependent) variable ‘mental distance’ was operationalised as follows: Inhabitants of the EMR were asked to rate how mentally close and attached they feel to the most populous city in each of the five subregions on a Likert scale: close, rather close, rather not close, not close or I do not know the city. The last-mentioned category reveals the strongest expression of mental distance because interviewees who do not feel mentally close to a certain city have at least heard about it. The fact that mental distance was measured by the respondents’ self-appraisal, because it is solely subjectively and individually ascertainable, might have distorted the empirical results.

The obtained empirical results may also depend on the specific operationalisation of the intangible, fuzzy factor mental distance. While distance estimation as applied by van der Velde (1998) and Carbon (2007) was also tested as a proxy for mental distance in the second conducted survey, it has not been included in the analysis for two reasons. First, depending on the subregion where the interviewees were surveyed, the question referred to partly different cities, so that their responses are only comparable to a limited degree. Therefore, answer options ought to relate to identical cities in future survey endeavours. Second, distance estimation values with regard to one individual domestic city each should then serve as a benchmark.

EMPIRICAL RESULTS: DETERMINANTS OF MENTAL DISTANCE IN THE EUREGIO MEUSE–RHINE

Common official language and centre–periphery relations – The positive impact of sharing the same language on cross-border interactions – (labour) mobility in particular – has been verified repeatedly (van Beck 1996; Nerb *et al.* 2009; Bartz & Fuchs-Schündeln 2012; Fries-Tersch *et al.* 2018). As already expounded in the conceptual section on mental distance,

Strüver (2002, 2005) has stressed the importance of media consumption with regard to the creation and shaping of individuals' mental distance. As a consequence, inhabitants of different countries can (potentially) consume the same media distortion-free if they share a common first language. Hence, it was assumed that, depending on whether a common official language is spoken, different degrees of mental distances to cities in adjacent countries exist. Given that Dutch and German are officially spoken in two subregions each, the following Hypotheses 1a and 1b were tested accordingly. To rule out biases, only inhabitants of the German-speaking Community (South Limburg) who speak German (Dutch) fluently or as their mother tongue were relevant for the verification of these hypotheses.

Hypothesis 1a: If individuals who speak Dutch at least fluently live in South Limburg (the Netherlands), they feel mentally more attached to Hasselt, which is the capital and most populous city of the Belgian Province of Limburg and whose official language is also Dutch, than to Aachen, Eupen and Liège.

Hypothesis 1b: If individuals who speak German at least fluently live in the German-speaking Community (Belgium), they feel mentally more attached to Aachen, which is the capital and most populous city of the Region of Aachen (Germany), than to Hasselt, Liège and Maastricht.

Opposing Hypothesis 1a, the descriptive statistics indicate that inhabitants of South

Limburg (the Netherlands) who speak Dutch at least fluently are mentally more attached to the German city of Aachen than to Hasselt (cf. Figure 2).

Given that the same individuals were surveyed regarding their mental closeness to the five cities marked in Figure 1, some of the following inferential statistics refer to dependent and not independent samples. In these cases, the effect of some confounding variables (sociodemographic characteristics) can be excluded. Wilcoxon signed-rank tests were consequently applied to test whether inhabitants of South Limburg (the Netherlands) feel significantly mentally closer and more attached to Aachen (Germany) than to Hasselt (Belgium). Both cities are approximately equidistant from Maastricht, which is South Limburg's most populous city (cf. Figure 1).

The corresponding Wilcoxon signed-rank test indicates that this observed pattern is significant at 0.1% level. Therefore, the hypothesis that inhabitants of South Limburg do not feel more attached to Hasselt than to Aachen, Eupen and Liège cannot be refuted in favour of Hypothesis 1a. Despite the fact that Dutch is spoken both in South Limburg (the Netherlands) and the Belgian Province of Limburg, inhabitants of the former cross-border subregion feel mentally closer to Aachen (Germany) than to Hasselt (the capital of the Belgian Province of Limburg). The appertaining effect size (ES) is 0.60 and hence demonstrates that the mental closeness to

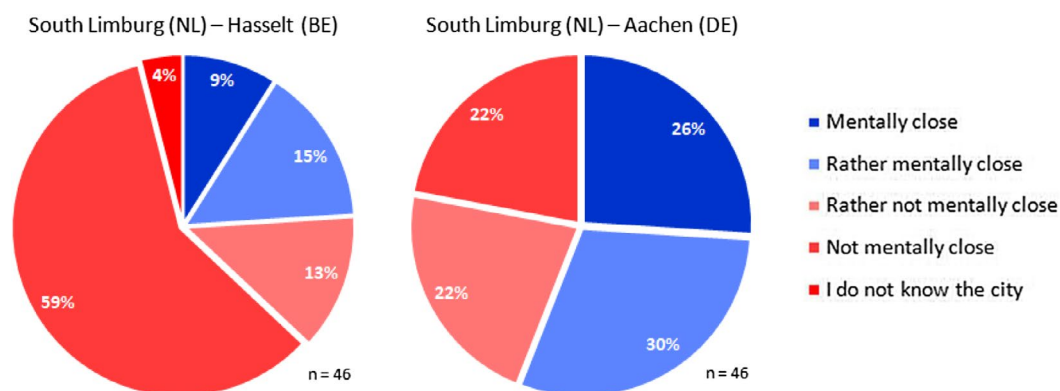


Figure 2. Mental distance of inhabitants of South Limburg (the Netherlands) to the cities of Hasselt (Belgium) and Aachen (Germany) [Colour figure can be viewed at wileyonlinelibrary.com]

Aachen (Germany) is not only significantly but also much higher than to Hasselt (Belgium). The ES is calculated from the Wilcoxon signed-rank or Mann–Whitney *U* test's absolute *z*-score divided by the square root of *n* (number of observations). The higher the ES (range: 0–1), the stronger the significant association between two variables (Cohen 1988; Corder & Foreman 2009).

Aachen has just more than 250,000 inhabitants – more than three times as many as Hasselt – and is the largest city in the EMR. This fact could suggest that sharing the same language (here, Dutch) might not necessarily outstrip centre–periphery relations or the spatial proximity to a considerably more populous city. However, the fact that 45.7% of the respondents who reside in South Limburg (the Netherlands) live in the densely populated area between Maastricht (the Netherlands) and Aachen (Germany) and are hence geographically closer to Aachen than to Hasselt (Belgium) might also partly contribute to this observed pattern. Another explanation points to the empirically detected cultural differences between the Netherlands and Flanders, to which Hasselt and the Province of Limburg belong, in spite of the common official language (Hofstede 2001; Hofstede *et al.* 2010; Gerritsen 2014).

The verification of Hypothesis 1b yielded the following results: Wilcoxon signed-rank tests demonstrate that inhabitants of the German-speaking Community (Belgium) feel mentally closer and attached (0.1% level) to the city of Aachen (Germany) than to Maastricht and the Belgian cities Hasselt and Liège. The belonging ESs equal 0.58 (Maastricht), 0.79 (Hasselt) and 0.54 (Liège), respectively, and indicate that the mental closeness to Aachen (Germany) is not only significantly but much larger. Sharing the same official language can apparently exert a positive effect on mental closeness and a negative influence on mental distance. The hypothesis that inhabitants of the German-speaking Community of Belgium are not more attached to Aachen than to Hasselt, Liège and Maastricht must be rejected in support of Hypothesis 1b. The former feel significantly more mentally close to Aachen than to Hasselt, Liège and Maastricht. However, the fact that approximately 75.4% of the respondents from the

German-speaking Community (Belgium) lived in its capital Eupen, which is spatially closer to Aachen (Germany) than to Maastricht and the two Belgian cities under investigation (cf. Figure 1), might reduce the language effect.

Furthermore, the relevance of centre–periphery relations can be most suitably verified on the basis of the rural German-speaking Community (Belgium) and the Region of Aachen (Germany). Aachen is the most proximate German large city for inhabitants in the German-speaking Community of Belgium, whose nine communities, including its capital Eupen, do not even total 80,000 inhabitants. Roughly 60,000 students were enrolled in the two largest universities (of applied sciences) located in the Region of Aachen (Germany) in the winter term 2019/2020 – RWTH Aachen University and FH Aachen of Applied Sciences – as opposed to around 200 at the sole University of Applied Sciences in the German-speaking Community (Belgium) in the winter term 2018/2019 (RWTH Aachen University 2020; FH Aachen University of Applied Sciences n.d.; Autonome Hochschule Eupen 2019).

Different sources further suggest that the adjacent German borderland serves as an important workplace for persons living in the German-speaking Community. Figures from Information und Technik Nordrhein-Westfalen (IT.NRW 2020) indicate that in 2019, approximately 4000 employees who were subject to social insurance, self-employed, public officials and part-time employees commuted from Belgium to the city of Aachen (Germany). According to figures published by the Ministry of the German-speaking Community (2020), nearly 6000 employees who were subject to social insurance commuted from Belgium to Germany in 2019, and approximately 70% of them stemmed from the German-speaking Community (Belgium). The attraction of the city of Aachen for EMR inhabitants might also be attributed to its retail centrality (121.6 in 2020). This value indicates that the retail turnover in the city of Aachen exceeded the local retail purchasing power in 2019 by 21.6% (MB-Research 2020; GfK GeoMarketing 2020). In fact, unfamiliarity with places across state borders may favour rather than hinder cross-border shopping (as empirically demonstrated

by Spierings & van der Velde 2008; Spierings & van der Velde 2013).

In accordance with the classical yet still academically relevant central place theory (Partridge *et al.* 2009; Mulligan *et al.* 2012; Hsu 2012), namely that Aachen's central functions (dominant labour market, educational and retail facilities) exude a power of attraction for the contiguous, rural German-speaking Community of Belgium and result in centre-periphery relations, the following hypothesis was formulated:

Hypothesis 2: Inhabitants of the German-speaking Community (Belgium) and the Region of Aachen (Germany) differ significantly in terms of their mental distance to the other cross-border subregion's capital (Aachen (Germany), Eupen (Belgium)).

Corroborating Hypothesis 2, the empirical results denote that inhabitants of the Region of Aachen (Germany) feel significantly (0.1% level, Mann-Whitney *U* test) less mentally close to Eupen – the capital and most populous city in the German-speaking Community (Belgium) – than inhabitants of the German-speaking Community feel to Aachen (Germany). The corresponding ES is 0.66; therefore, one can again speak of a large difference in terms of mental distance. Inhabitants of the German-speaking Community (Belgium) and the Region of Aachen (Germany) differ significantly and strongly in terms of their mental distance to the other cross-border subregion's

capital. The concrete distributions can be inferred from Figure 3.

Sociodemographic characteristics – Nevertheless, this evident pattern of inhabitants of the German-speaking Community (Belgium) feeling mentally significantly closer to the city of Aachen (Germany) than inhabitants of the Region of Aachen (Germany) to Eupen (Belgium) must be partly qualified. This is because interviewees from the Region of Aachen are significantly younger than those from the German-speaking Community and because age has a significant negative effect on mental distance (i.e. the younger inhabitants of the EMR are, the higher their mental distance is).

Considering the amount of time spent in one place, it is understandable that one usually builds up knowledge of the region in which one lives. In other words, the older people are, the longer they have been living on average in their current place of residence, and the more opportunities they have had to explore the (cross-border) region in which they reside. The negative correlation between age and mental distance also holds true when controlling for frequency of border crossings and spatial distance from the respondents' places of residence to the five cities under investigation.

Apart from age, the sociodemographic characteristic of a university degree (dummy) influences mental distance significantly. The computed results of the two-tailed

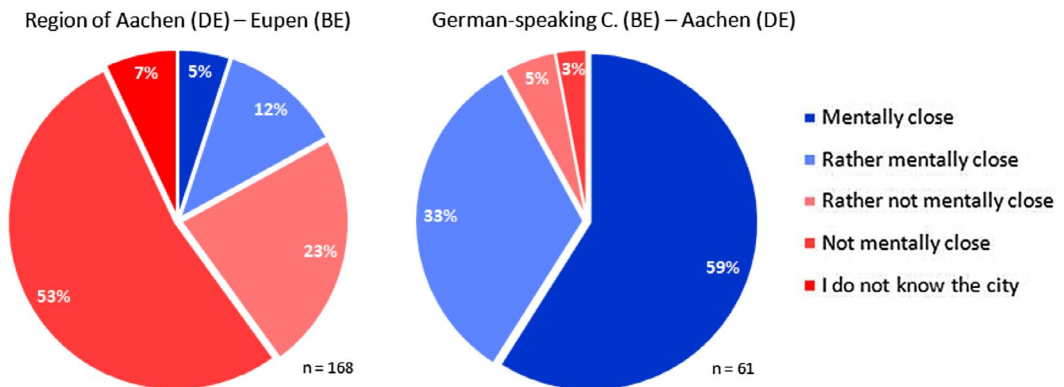


Figure 3. Mental distance of inhabitants of the Region of Aachen (German-speaking Community) to Eupen (Aachen) [Colour figure can be viewed at wileyonlinelibrary.com]

Mann–Whitney *U* test revealed that inhabitants of the EMR who have obtained a university degree have a significantly lower mental distance (5% level) compared with those who have not graduated from a university (of applied sciences), whereas gender does not exert a significant impact on mental distance. Table 1 presents the exact outcomes of the verified effects of sociodemographic characteristics on mental distance.

In Table 1, mental distance was treated as the interviewees' cumulative feeling of closeness to all five cities under investigation. This procedure is useful for (partly) controlling for the circumstance wherein individuals might not feel mentally close to the subregion's capital where they lived. Overall, approximately 83% of the respondents felt mentally close to the most populous city in their region of residence. However, the fact that respondents from the Region of Aachen (Germany) are over-represented with a share of 55.6% might distort the conclusions drawn about the EMR inhabitants in general (Table 1) because these respondents are significantly younger than those from the other subregions (0.1% level, ES: 0.16). Note that neither Pearson's *r* (age) nor the two-sample *t*-test (gender, university) could be computed because of the non-normally distributed data.

Furthermore, given the diversity of the education and school systems of the five subregions in the EMR, the different types of degrees and schools cannot be merged without distortion. Therefore, solely graduates from universities (of applied sciences) were compared with

interviewees who have earned other degrees (e.g. from vocational schools).

Knowledge of foreign languages – Analogously to the rejected hypothesis in favour of Hypothesis 1b (that inhabitants of the German-speaking Community of Belgium feel more attached to Aachen than to Eupen, Hasselt and Liège), it was assumed that foreign language skills are negatively correlated with mental distance, as they also potentially enable the consumption of media published in (adjoining) foreign countries. Conversely, a lower mental distance to (a specific city or region in) one country might also have an impact on one's willingness to learn the respective foreign language or to improve one's skills. Hence, one could speak of a negative influence of language on mental distance in the case of native speakers and a negative correlation between these variables in the case of non-native speakers. Accordingly, the following hypotheses were formulated:

Hypothesis 3a: The better the foreign language skills in German, the lower the mental distance to Aachen (Germany) and Eupen (Belgium), where German is the official language.

Hypothesis 3b: The better the foreign language skills in Dutch, the lower the mental distance to Hasselt (Belgium) and Maastricht (the Netherlands), where Dutch is the official language.

Hypothesis 3c: The better the foreign language skills in French, the lower the mental distance to Liège (Belgium), where French is the official language.

Despite English not being spoken as an official language in the EMR, its potential interrelation with mental distance is worth analysing, as it is the most frequently spoken foreign, non-official language among residents in Belgium, Germany and the Netherlands (European Commission 2012). In addition, it is the most frequently studied foreign language in upper secondary school in these countries (Eurostat 2011). It was hypothesised that this language's correlation with mental distance is also negative, as (advanced) knowledge of the English language is rather associated with a cosmopolitan, open-minded attitude (Park & Abelman 2004; Guilherme 2007; Lidi 2008):

Table 1. *Sociodemographic characteristics and their effects on mental distance*

Variables	Effect on mental distance
Age (<i>n</i> = 296)***	Negative (Spearman's rank correlation: -0.35)
Gender (<i>n</i> = 296)	Insignificant (Mann–Whitney <i>U</i> test)
University (<i>n</i> = 292)**	Negative (Mann–Whitney <i>U</i> test, ES: 0.15)

p* < 0.05; *p* < 0.01.

Table 2. *Partial Spearman's rank correlations between the knowledge of foreign languages and mental distance. Control variables: age, university (dummy), frequency of border crossings and spatial distance*

Mental distance to	Foreign language	Partial correlation coefficient
Aachen ($n = 65$)	German	-0.21*
Eupen ($n = 74$)	German	-0.35***
Hasselt ($n = 219$)	Dutch	-0.16**
Liège ($n = 221$)	French	-0.09*
Maastricht ($n = 225$)	Dutch	Insignificant
All above-mentioned cities cumulative ($n = 119$)	English	0.27***

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Hypothesis 3d: The better the foreign language skills in English, the lower the cumulative mental distance to the five capitals of the EMR's subregions.

To investigate the correlation between mental distance and foreign language skills individually, inhabitants of the corresponding region and native speakers were excluded from the subsamples (i.e. respondents who live in South Limburg (the Netherlands) and/or speak Dutch as their first language were not considered with regard to mental distance to Maastricht (the Netherlands)). Due to their significant influence on mental distance, the sociodemographic characteristics of age and university (dummy) were controlled for in partial Spearman's rank correlations (one-tailed) between mental distance and foreign language skills. Furthermore, the frequency of border crossings to Belgium/Germany/the Netherlands and the spatial distance from the respondents' places of residence to Aachen/Eupen/Hasselt/Liège/Maastricht (by car, from centre to centre, transformed into an ordinal variable) serve as additional control variables. Frequency of border crossings is significantly correlated with mental distance in five, and spatial distance in two out of six cases presented in Table 2.

The results of the six computed partial Spearman's rank correlations are illustrated in Table 2. In four out of five cases, foreign language skills in Dutch, French and German were significantly negatively correlated with mental distance (i.e. the better the foreign language skills in French, the closer inhabitants of the EMR feel to Liège, where French is spoken as the official language). In contrast

to these results, the more advanced English abilities are, the higher inhabitants' cumulative mental distance is to all above-mentioned cities (Aachen (Germany), Eupen (Belgium), Hasselt (Belgium), Liège (Belgium) and Maastricht (the Netherlands)). Thus, the hypotheses that there is no negative correlation between foreign language skills in German (French) and mental distance to Aachen and Eupen (Liège) must be rejected in favour of Hypotheses 3a and 3c. In fact, better foreign language skills in German (French) are significantly negatively correlated with mental distance to Aachen and Eupen (Liège). However, the hypothesis that foreign language skills in Dutch are not negatively correlated with mental distance to Hasselt and Maastricht can only be partly refuted in support of Hypothesis 3b. Finally, the hypothesis that there is no negative relation between foreign language skills in English and the cumulative mental distance to the five capitals of the EMR's subregions cannot be rejected in support of Hypothesis 3d.

Considered in isolation, a moderate, negative and significant partial correlation exists between the mental distance of EMR inhabitants who do not reside in Belgian Limburg and do not speak Dutch as first language to the city of Hasselt (Belgium) and their knowledge of Dutch. In contrast, (slightly) stronger partial correlations can be observed with regard to speaking German as a foreign language and the mental distance to the cities of Eupen (Belgium) and Aachen (Germany).

People living in the German-speaking Community (Belgium) were not included in the sample regarding the correlation between knowledge of the French language and

mental distance to Liège for two reasons. First, the German-speaking Community of Belgium belongs administratively to the Province of Liège. Second, French is taught compulsorily as the first foreign language in primary and secondary schools in the German-speaking Community (Belgium). Second, the German-speaking Community of Belgium belongs administratively to Wallonia, whose second most populous is Liège (Ministry of the German-speaking Community n.d.-a, Ministry of the German-speaking Community n.d.-b). The correlation coefficient suggests a weak, negative, partial correlation between foreign language skills in French and the mental distance to Liège that is significant at the 10% level.

The finding that (more advanced) foreign language skills in Dutch do not significantly lower the mental distance to Maastricht (the Netherlands) could be attributed to the city being recognised as an eminent cultural hub. Put differently, because of its 'wide zone of influence' (Evans 2013, p. 176), persons with no or limited knowledge of the Dutch language are also likely to feel mentally attached to Maastricht (the Netherlands). Overall, 61.8% of the respondents considered in Table 2 ($n = 225$) indicated feeling mentally close or rather close to Maastricht, even though 67.6% claimed not to speak Dutch at all.

Last but not least, the correlation between one's knowledge of English (excluding the sole native speaker who was surveyed) and the cumulative mental distance to all five cities of relevance was verified. All five above-mentioned cities were considered simultaneously to (partly) control for the circumstance wherein inhabitants of one region might not feel mentally close to their region of residence's capital. The sample size of 120 is comparably low because English skills were only collected in the second survey. The result is nevertheless surprising because a moderate, significant, positive, partial correlation was found between knowledge of English and mental distance. This result is all the more interesting because only persons who speak at least one of the three official regional languages (German, Dutch and/or French) fluently or as first language were taken into consideration. Studies conducted by Guilherme (2007), Lidi (2008) and Park

and Abelmann (2004) may indicate that people who speak English (fluently) are not only more open-minded and cosmopolitan but also possibly more strongly oriented towards the international or global than the cross-national regional level.

This orientation towards the global, international scale might also find expression in the higher priority assigned to speaking English fluently than to the official languages of one's adjacent countries. Lidi (2008), for instance, refers to the growing subordinate role of other foreign languages (French, German, Russian and Japanese) at secondary schools in China. Furthermore, in the Netherlands, the share of pupils enrolled in secondary schools who had a final examination in German decreased from 59% in 1980 to 32% in 2014, whereas it is compulsory to take a final examination in English (Voogel 2016). This supposition is corroborated by the fact that no significant correlation exists between the levels at which inhabitants of the Region of Aachen (Germany) and the German-speaking Community (Belgium) speak English and Dutch ($n = 104$) as well as between the levels at which inhabitants of South Limburg (the Netherlands) and the Region of Aachen (Germany) speak English and French ($n = 65$).

CONCLUSION AND DISCUSSION

State-of-the-art research, mainly of a conceptual nature, has identified the mental distance of individuals – the limited perception of occurrences and/or opportunities beyond one's state border – as the main barrier to interactions within European cross-border regions. Van der Velde and van Houtum (2004) state that low cross-border interactions (e.g. with regard to cross-border labour mobility) are not primarily a matter of European harmonisation and integration of, for example, insurance, pension and tax systems, but rather a matter of indifference towards occurrences beyond the border. Therefore, underlying patterns of this so-called mental distance within (European) cross-border regions should be regarded as highly relevant for the European Commission and its endeavours to foster cross-border

interactions (e.g. in terms of social cohesion and labour mobility).

Although mental distance has been clearly highlighted as an upstream process that occurs prior to (bounded) rational decision-making, it has not been regarded as a factor that might depend on regional and sociodemographic characteristics. Because its underlying determinants have, hence, been largely unclear, this research gap has been explicitly addressed, and potential determinants of mental distance have been explored in this paper.

The empirical results of two conducted surveys in the EMR in 2019 strongly point to the relevance of language and centre–periphery relations (e.g. the offering of central goods and services, larger labour markets, cultural and educational facilities). Inhabitants of the German-speaking Community (Belgium) feel significantly mentally closer to Aachen (Germany) than to the Belgian cities of Liège and Hasselt. Furthermore, they feel significantly mentally more attached to the city of Aachen than inhabitants of the Region of Aachen to Eupen, which is the capital of the German-speaking Community of Belgium. As one cannot measure the exact effect of centre–periphery relations on mental closeness (distance) premised on the gathered data, it is not clear which of the two factors – dependency on Aachen as an adjacent, proximate populous city or the fact that German is the first language in both regions – is more influential. In this context, one should bear in mind that the type of cross-border interaction (cultural events, working or living) might be decisive regarding the degree to which a low mental distance to occurrences/opportunities beyond the border is ‘required’.

Furthermore, the result that inhabitants of South Limburg (the Netherlands) feel mentally closer to Aachen (Germany) than to Hasselt (Belgian Limburg) indicates that centre–periphery relations can outweigh the sharing of an official language (here, Dutch). In addition, the older the inhabitants of the EMR are, the more distinctive their cumulative mental closeness or attachment is to the most populous cities in the five subregions. The same applies to university graduates. By controlling for these two sociodemographic characteristics, the frequency of border

crossings and spatial distance, a negative effect of foreign language skills on mental distance was revealed in four out of five cases. For example, the better individuals who do not live in the Region of Aachen (Germany) speak German as a foreign language, the higher their likelihood of feeling mentally close to Aachen. In contrast, and surprisingly, the better their knowledge of the English language is, the higher the cumulative mental distance is. This result may indicate that those who speak English fluently might be more strongly oriented to the global and cosmopolitan than to the cross-national regional level. The fact that knowledge of the English language is not correlated with speaking Dutch and French as a foreign language does not refute this supposition. To conclude, this analysis strongly points to the necessity to actively promote skills in neighbouring languages at both national and European levels to noticeably foster cross-border interactions. Skills in terms of command of neighbouring languages may both encourage familiarity with neighbouring countries’ cultures and sensitise inhabitants in border regions to cross-border relations (as indicated by Olsen 2014, and to a lesser extent, by Fuss *et al.* 2004).

Qualitative in-depth interviews are indispensable to shed light on the rationale that, for example, the inhabitants of South Limburg (the Netherlands) feel mentally closer to the city of Aachen (Germany) than to Hasselt (Belgium) despite different official languages (i.e. to explore the reason and the degree to which this pattern can be attributed to centre–periphery relations in favour of the city of Aachen). Furthermore, qualitative research is apt to explore additional determinants of mental distance that are less tangible and measurable, such as personality-related psychological factors, as elaborated on by Markuszewska *et al.* (2016) and van Houtum (1999), or cultural similarities.

Despite the thorough translation of the questionnaire, potential distortions cannot be excluded, as interviews were held in different languages (Dutch, English and German). This applies especially to the operationalisation of mental distance – the translation of being (mentally) close. Apart from this potential limitation, a bias might arise because

mental closeness (distance) was related exclusively to the five most populous cities in the five subregions of the EMR and not to the rest of the cross-border subregions, or even countries.

To conclude, these delivered empirical results should be understood as initial and not all-encompassing insights into the underlying determinants of mental distance. The revealed and statistically significant patterns should be thoroughly verified in different spatial settings – preferably in European cross-border regions that are characterised by at least three subregions and partial language area overlaps (such as the ‘RegioTriRhena’ encompassing the French–German–Swiss borderland). The paramount objective of this paper, however, has primarily been to raise awareness that mental distance is unlikely to be randomly, ubiquitously or homogeneously spread among the inhabitants of European cross-border (sub) regions.

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