



LUND UNIVERSITY

The (ir)relevance of geography for school choice: evidence from a Swedish choice experiment

Thelin, Mikael; Niedomysl, Thomas

Published in:
Geoforum

DOI:
[10.1016/j.geoforum.2015.11.003](https://doi.org/10.1016/j.geoforum.2015.11.003)

2015

[Link to publication](#)

Citation for published version (APA):

Thelin, M., & Niedomysl, T. (2015). The (ir)relevance of geography for school choice: evidence from a Swedish choice experiment. *Geoforum*, 67(7), 110-120. <https://doi.org/10.1016/j.geoforum.2015.11.003>

Total number of authors:
2

General rights

Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

This manuscript is a post-print (ie final draft post-refereeing) that has been published. Please cite: Thelin, M. & Niedomysl, T. (2015) The (ir)relevance of geography for school choice: evidence from a Swedish choice experiment. Geoforum 67 (8) 110-120.

The (ir)relevance of geography for school choice: evidence from a Swedish choice experiment

ABSTRACT

The increased opportunity to choose one's school of preference has been raised as a key factor in many countries to promote equal opportunities and a higher quality of education. This has been endorsed by policymakers who assume that students make well-informed rational choices and that students stress only academic quality when deciding which school to attend. If this is true, it will benefit schools of high academic quality, rendering improved school quality overall. To date, little research has examined the validity of these assumptions despite the profound effects they have had for changing the school systems in many countries. This article describes an experiment to investigate the relative importance of factors in school choice. The aim is to test the validity of the theoretical assumptions that guided the school choice reforms in Sweden. Specifically, we draw on experimental data from prospective upper secondary school students in Sweden to contrast the principal school quality attributes behind the policy change (knowledge reputation and program feasibility), with the presence of friends and geographical attributes such as distance, location and accessibility, while controlling for individual characteristics. The results have important policy implications as they show that geographical factors are highly relevant for school choice preferences. In contrast to the reforms' intentions, geography appears to have become more important than ever before. The findings thus reveal significant flaws in the assumptions that motivated the school choice policy reform.

Keywords: geographies of education, school choice, rational choice, policy reform, upper secondary school, Sweden

Introduction

In countries where knowledge is increasingly regarded as the key factor of production, the quality of education is of utmost importance to maintain competitiveness (Gennaioli et al., 2013; Rindermann and Thompson, 2011). This notion has spurred policymakers in many countries to seek new ways to further improve their education systems (Ladd and Fiske, 2003; Plank and Sykes, 2003; Ravitch, 2013). For some, the formula was found in the philosophy of the Chicago school of economics and its political companion, liberalism: rational economic individuals will, given a free choice of which school to attend, select schools where they can maximize their knowledge utility as this will provide optimal future returns. To succeed in such competition, schools will have to improve their academic quality or go out of business. For policymakers then, the solution was simple and seemingly brilliant: free school choice in a free market will generate a competitive system where schools constantly have to improve their quality. While intuitively appealing, it is remarkable how little research has examined the validity of these assumptions despite the profound effects they have had for changing the school system in many countries.

This article focuses on students' preferences for upper secondary school choice. *The aim of our study is to test the validity of the theoretical assumptions that guided the school choice reform in Sweden.* Specifically, we draw on experimental data to investigate the importance of key academic, geographical, and social school attributes for school choice and the influence of students' individual background characteristics. This enables us to make a controlled test of the attributes that students should be decisively influenced by, in comparison with attributes that should play a negligible role according to the theoretical

assumptions, in school choice. The research is set in Sweden, which is a particularly interesting case, because the Swedish school reforms have been the most far-reaching in Western countries (Miron, 1996; OECD, 1998). For example, Lindbom (2010) argues that in contrast with their American counterparts, the Swedish school system stands out because independent schools may not charge any fees and local governments are required to furnish independent schools with economic support on the same terms as those enjoyed by municipal schools, without the right of veto. In short, the Swedish government nowadays allocates the same amount of funding per student regardless of whether the student has chosen a public or independent school. These reforms were decisively based on rational choice theory and the assumption that students *only* make their choices based on the quality of schools. Interestingly, the geographical dimension, which prior to the reforms had been a key factor in the structure of the Swedish school system, is marginalized when students, supposedly, solely base their choice on the academic quality of schools.

Whether students also take other factors than school quality into account is essentially an empirical question, but if they do, the theory on which the reforms were based falls in the context of school choice. This would potentially have significant policy implications, because even if falling academic results have been a key concern for Swedish policymakers ever since the reforms were launched, the validity of the theoretical assumptions that paved the way for the reforms have yet to be tested. Importantly, the theoretical assumptions remain largely unchallenged. So far, however, research has paid little attention to students' school choice preferences. This lack of knowledge may be most unfortunate, because if the theoretical assumptions behind the reforms are proven invalid, it suggests that the reforms should have been implemented differently, or possibly, not at all. It would presumably also provide key information for resolving the unfortunate current state of the Swedish school system as indicated by significantly lowered performance in international

comparisons (OECD, 2015), widening differences between schools in terms of low- and high performing students (Swedish National Board for Education, 2012a) and increasing ethnic school segregation (Andersson et al., 2010), to give a few examples.

This article seeks to advance the literature on school choice and the emerging literature on geographies of education (e.g. Burgess et al., 2015; Cook and Hemming, 2011; Holloway and Jöns, 2012) in five ways. First, and foremost, prior research and debate has mainly focused on the outcomes of school choice reforms; instead, we test the theory that paved the way for the reforms. Second, existing studies on motivations for school choice have mainly relied on traditional surveys and interviews to probe the factors of influence in school choice; we employ an experimental approach as an alternative to investigating school choice preferences. Third, students' choice of schools has mostly been explored after choices have been made; to avoid the risk of post-hoc rationalization, we investigate the preferences of students who have yet to make their choice of school. Fourth, previous research on school choice has mainly focused on younger children where parents essentially make the choice; we focus on the choice of upper secondary school where the young adults have more to say. Fifth, previous research has had quite a narrow focus on metropolitan regions, neglecting the fact that only a minority of students live in such regions; we focus instead on a medium-sized city which is more representative because a larger share of students live in such cities compared to metropolitan municipalities.

The article is structured accordingly. The next section provides a review of theory and previous research. It explains how and why an orthodox interpretation of rational choice theory came to be so influential for the Swedish school reforms and what the implications of the theoretical assumptions were. It also points towards the remarkable lack of attention to geographical dimensions of the reforms and presents a summary of previous empirical research on school choice. The article then discusses research design, more specifically the

experimental approach and the data collected, before presenting the empirical results. In the concluding section, we discuss the findings and their implications for school choice reforms, arguing that the Swedish school reforms, in contrast to their intentions, have made geography more important than ever before.

Theory and Previous Research

Ideological Change and the Swedish Welfare State

It may seem like a puzzle. Why did Sweden, a country acclaimed for decades as having been highly successful in educating its population (Björklund et al., 2005), decide to make the most far-reaching school reforms in the Western world? Part of the explanation lies paradoxically in the importance ascribed to knowledge in modern societies. Having a well-educated workforce is seen as crucial to maintain, or improve, the competitiveness of a country (e.g., Gennaioli et al., 2013; Lucas, 1988; Rindermann and Thompson, 2011; Romer, 1986; Schultz, 1961). Since this is a widespread view, where most countries endeavor to upgrade the skills of their workforce, it follows that policymakers will constantly seek to improve the quality of education through various reforms (Ladd and Fiske, 2003; Plank and Sykes, 2003; Ravitch, 2013).

But to fully comprehend the extensive Swedish school reforms and the ways in which they were executed, it is necessary to place Sweden in a broader geopolitical context. During the ideological battle of the Cold War, the Swedish social-democratic welfare state was seeking its way between the two dominant ideological regimes at the time. When the Cold War was brought to an end in 1989–1991 and the shortcomings of the Soviet system stood clear to all, a liberal democracy with a capitalist, free-market economic governance and high degree of freedom to choose clearly suggested the way forward (Fukuyama, 1992).

Sweden, having been somewhere in the middle of the ideological battle, and increasingly burdened by financial debts, turned to what was perceived to have been the winner's strategy.

This strategy entailed adopting a few dominant strands of thinking, to which a political consensus had now emerged in the absence of competing alternatives, which became known as the "paradigm of free choice" (Dahlstedt, 2007). In short, a better and more efficient society demanded individualistic liberalism and a free market built on the concept of "New Public Management" (Fukuyama, 1992). According to the liberal and individualistic view, human freedom and the right to achieve self-determination through choice are fundamental and necessitate traditional public bodies to be adapted to the free market (Chubb and Moe, 1990; Friedman, 1962). To some extent, this view represents a departure from the traditional notion of the Swedish welfare model (Esping-Andersen, 1990). Importantly, the free-market, liberal and individualistic view is strongly linked to the perception of what motivates and controls human choice behavior.

Choice Theory and the Swedish School Reforms

The theory that has become the dominant explanation of how people make their choices has its modern origin in the neoclassical economics developed by the Chicago School (Olssen and Peters, 2005; Simon, 1979). Rationality and human choice has become the foundation of rational choice theory (Buchanan, 2003; Hindmoor, 2006). Robbins (1937), for example, argued that human choice is a product of a rational position based on complete knowledge, self-interest, and the quest for satisfaction of preferences. When derived mathematically through various game and choice experiments during the 1940s and 1950s (Savage, 1972; von Neumann and Morgenstern, 2007), the concept of rationality became the starting point of reasoning based on the seemingly logical assumption that people make

choices based on what is expected to give them maximum future benefits (Kahneman, 1994; Loomes and Sugden, 1982; Tversky et al., 1988).

Over the years, rational choice theory has evolved (Hindmoor, 2006; Hogarth and Reder, 1986) but is still rooted in similar assumptions (Eriksson, 2011; Lichbach, 2003). These include the assumption of individuals as having consistent preferences, maximizing future benefits, being instrumentally rational, and making decisions on the basis of cost–benefit calculations (Eriksson, 2011). Taken together, these assumptions, commonly known as “the economic man,” has become the dominant theory of human choice behavior and is widely held as providing the ultimate answer to human choice behavior (Eriksson, 2011; Hindmoor, 2006; Lichbach, 2003). Although these assumptions have long been criticized as quite unrealistic (see e.g., Bettman et al., 1998; Grether and Plott, 1979; Kahneman and Trevsky, 1979; Simon, 1955), this orthodox interpretation of rational choice theory appears to have become an axiomatic truth; omnipresent in the Swedish political debate and the foundation of the Swedish school reforms.

While possibly naïve, it is now less puzzling to see why Swedish policymakers consensually recognized the potential of rational choice theory to be employed in a school reform. Even if there are no explicit references to rational choice theory in official policy documents, the arguments and assumptions that preceded the Swedish school reforms are in agreement with an orthodox interpretation of rational choice theory (Thelin, 2014). Under the assumption that rational choice theory is valid, a rational, utility-maximizing student will choose the school with the best academic quality as this will provide optimal future returns (Bell, 2009; Björklund et al., 2005; Friedman and Friedman, 1980; Jacob and Lefgren, 2007; Rothstein, 2006; Thieme and Triviño, 2013). It may be noted that the same student, according to rational choice theory, will pay no attention, for instance, to commuting time to school because, however cumbersome the commute may be for a couple of years, it has little or no

relevance for optimizing future returns. If students only focus on academic quality, it will not only reward schools with high quality, it will add a strong element of competition among schools, where the best schools will become more efficient and the bad schools will be forced to improve or disappear from the market (Chubb and Moe, 1990; Hoxby, 2000; Schneider et al., 2002).

The reforms were swift and far-reaching: the school system was decentralized (from state to local authorities) and competition between schools was allowed. Education for Swedish students is free of charge, and the independent (and public) schools get paid for each student. This strongly encouraged formation of independent schools, which have grown dramatically during a short period of time. In 1995, less than 2% of all upper secondary school students attended an independent school. In 2012, this share had increased to 26%. The greater supply of choice turned the focus away from geography. Before the reforms, geography was a given basis for school choice, and students were assigned to schools based on where they lived. In short, the reforms marginalized geography, at the expense of free choice; the students are now supposed to choose the best knowledge school (under whatever other circumstances).

Previous Research

A wealth of research has focused on exploring the effects of school reforms. Two partly different approaches of this research may be identified. A first strand of research has looked at observed student behavior regarding the schools they go to. This research has primarily shown that free school choice correlates with, for example, increased ethnical and sociocultural school segregation (e.g., Allen, 2007; Andersson et al., 2010, 2012; Burgess and Briggs, 2010; Rangvid, 2007; Renzulli and Evans, 2005; Saporito, 2003) and increased knowledge differences between schools (e.g., Andersson et al., 2012; Gibbons et al., 2008;

Söderström and Uusitalo, 2010; Östh et al., 2013). Moreover, research in this strand has focused on individual characteristics as determinants for understanding the factors that are correlated with attending different schools, showing the importance of students' ethnic and socioeconomic background (e.g., Bridge and Wilson, forthcoming; Burgess and Briggs, 2010; Butler et al., 2008; Butler et al., 2007; Hamnett et al., 2007; Müller et al., 2008; Noreisch, 2007; Poupeau et al., 2007).

Nonetheless, this approach only looks at observed behavior, and even though observed choices are often assumed to reflect individual *preferences* (Kahneman, 1994; Tversky et al., 1988), this is not necessarily the case (e.g., Bettman et al., 1998; Tversky et al., 1988, 1990). We emphasize the importance of making this distinction between observed behavior and preferences, due to the risk of otherwise interpreting all choices as positive choices. But if there are no feasible alternatives, some students may face a choice “between Scylla and Charybdis” that policymakers need to become aware of.

A second strand of research has more explicitly sought to investigate the factors that are important in the choice of school, which is of more direct relevance to this article's focus on preferences. For example, Denessen et al. (2005), drawing on survey data from the Netherlands, investigated parental reasons for school choice and found support for a variety of factors but that the general quality of education was decisive. In the United States, Goldring and Hausman (1999) also focused on parental reasons for school choice and found that different reasons were of importance, but that parents assigned more weight to academic criteria. Again, parental characteristics played an important role. Malmberg et al. (2014) surveyed Swedish parents, finding that the school's reputation was one of the main factors. They also found that parental motives were strongly influenced by the ethnic and social context in their neighborhood. For other studies drawing on interviews and surveys, see for example Bell, 2007; Bosetti, 2004; Bunar, 2010; Burgess et al., 2015; Echols and Douglas,

1995; Seppänen, 2003. In summary, this research strand points to the importance of school quality, but also suggests that many other school attributes play a role. Moreover, individual characteristics have also been found to be of importance in explaining motivations for school choice.

However, the findings of previous research in the second research strand, which draws on interviews and surveys, are somewhat difficult to interpret. Most are based on the parents' views, which is natural when it comes to small children, but are of less interest when it comes to choice of upper secondary school, which is the focus of the present study. Moreover, research has focused on those that have already made their choices (overwhelmingly with those that did not actively choose the nearest school) raising the obvious risk of parents having rationalized their choices. In addition, parents are more likely to emphasize socially desirable motivations, e.g., emphasizing the quality rather than the ethnic composition of schools. Finally, research has mainly been carried out in metropolitan regions, even though the geographical settings are quite different for a majority of students. What if, for example, there are no schools with a high academic quality from which to choose?

Only three studies have used a methodology explicitly to overcome some of these problems (Hooley and Lynch, 1981; Soutar and Turner, 2002; Thieme and Treviño, 2013). Although very useful from a methodological point of view (see section on experimental design), in other respects they are less useful to the present research. Hooley and Lynch (1981) and Soutar and Turner (2002) carried out choice experiments to understand preferences for university, while Thieme and Treviño (2013) used a similar approach but focused on parents' preferences for the choice of their young children's primary schools.

Hypotheses

This literature review has shown the centrality of rational choice theory in motivating the Swedish school reforms. Most of the empirical literature, however, has focused on the outcomes of the reforms, but paid little attention to what motivated the design of these reforms in the first place. This article will test the following two hypotheses:

H₁ Prospective upper secondary school students are economically rational and solely decide upon choice of school based on academic quality.

H₂ There is no difference in regard to economic rationality when it comes to prospective upper secondary school students' characteristics.

Unless these two hypotheses hold, the validity of the theoretical assumptions that guided the school reforms falls. These hypotheses are obviously strong in the sense that students are supposed to solely base their decisions on academic quality and that no individual characteristics have an influence in that regard. However, official policy documents preceding the reforms suggest nothing that speaks against the strong hypotheses. If the theory is valid, it appears as a brilliant reform that constantly improves the school system, but only if the theory is valid.

Research Design

Experimental Design

Two factors determined the methodological approach employed in this paper. First, and foremost, aiming to test the validity of the theoretical assumptions that guided the school choice reforms suggested a deductive approach. Second, the risk that students have

preconceptions about schools or other factors that could potentially influence their judgment underscores the importance of avoiding “real-world data”, because such factors may prevent accurate testing of the theoretical assumptions (Falk and Heckman, 2009; Webster and Sell, 2007). Combined, these two factors motivated an experimental design.

We employed an experimental methodology called conjoint analysis, which is a multivariate technique to determine preferences in decision making (Cattin and Wittink, 1982; Green and Rao, 1971; Green and Srinivasan, 1978; Johnson, 1974). The principal idea of conjoint analysis is to let experimental subjects (e.g., students) consider *hypothetical* products (e.g., schools) that are composed of different key attributes (e.g., knowledge reputation) where the levels of the attributes vary (e.g., good or bad knowledge reputation).

Instead of presenting attributes one by one and letting respondents rate the importance of the attributes separately, which is the standard in traditional surveys, experimental subjects are presented with *profiles* for different hypothetical products composed of the attributes and asked to rate their preference for each profile (see Appendix for examples). This creates a more realistic decision-making context, because the experimental subjects have to take more than one attribute into account and make trade-offs as to their relative importance. By systematically manipulating the levels of the attributes in each profile, the utility for each attribute and their respective levels can be calculated.

In the experiments, six different attributes were included (three attributes had two levels and three had three levels) as described in the next section. Since it is not feasible to test all possible combinations (it would require 216 profile presentations), a fractional factorial design was employed where an orthogonal plan was used to reduce the number of profiles while still avoiding significant information loss (Green et al., 1988; Gustafsson et al., 2007; Louviere et al., 2000).

Pre-study to Identify Attributes and Levels

A crucial step in conjoint choice experiments is to identify relevant attributes and their levels (Green et al., 2001; Louviere, 1988; Orme, 2010). Since there is little previous research to rely on, focus group interviews with second-year upper secondary school students (N=48) were carried out in two schools, one centrally located and the other in a peripheral location.

The interviews lasted for about an hour each and took the shape of group discussions where the students were asked to freely express their opinions about which attributes they had perceived to be of importance in their choice of upper secondary school. To avoid bias, no attributes were raised by the interviewer, but when students raised attributes as important, the interviewer asked the group to further discuss and define the attribute (this also facilitated how the attributes and their levels should be expressed to make them distinct and easily understandable in the experiment). The most prominent attributes originating from the focus group interviews, taking into account previous research, are shown in Table 1.

--- TABLE 1 ABOUT HERE ---

The attributes and their respective levels are self-explanatory but it may be noted that they were adapted to the local context in which the experiments were carried out, e.g., the time-distances to schools had to be reasonable within the context of the students. Two attributes refer to *academic factors* (knowledge reputation and program). These two attributes constitute the principal school quality attributes behind the policy change. One attribute refers to *social factors* (friends) and three attributes refer to *geographical factors* (distance, localization, and accessibility).

Data Collection and Descriptive Statistics

The experiments were carried out during October–November 2012 in 11 schools in the municipality of Halmstad, a medium-sized city on the Swedish west coast with approximately 96 000 inhabitants (see Figure 1). Halmstad is the largest city in the county of Halland and therefore has a central role in the region. In total, 587 final year secondary school students (15–16 years old), who were to choose upper-secondary school in February 2013, participated. Non-participation was negligible (14.3% of the total sample) and was likely random. Most of the students who did not participate had been prevented from coming to school, for example, due to sickness on the day when the experiment was carried out.

--- FIGURE 1 ABOUT HERE ---

The experiments were carried out in the following way. A total of 33 classes were visited and after informing the students about the research (purpose, voluntary participation, anonymity, etc.), the attributes were clarified and the 22 profiles (hypothetical schools) were presented visually (using PowerPoint) and read out verbally by the test instructor. Each profile was visible to students for approximately 40 seconds, and the students estimated the attractiveness of each school on a 10-point rating scale (ranging from 1 = very unattractive to 10 = very attractive) on a printed form. The profiles were presented in a random order for each class visited to minimize potential consistency problems. The rating of each school is used as the dependent variable in the analyses presented later.

After the profiles had been presented, the students were asked to complete a separate form with their individual characteristics (shown in Table 2). This included reporting their sex, the language they usually spoke at home, whether any of their parents had any form of higher education, personal identification number (which was later used to obtain their grades

from official registers), which neighborhood they lived in (a separate map was shown, see Figure 1) and, finally, their usual means of transportation to school. In total, completing the experiment took about 45 minutes for each class and internal non-responses were very low.

--- TABLE 2 ABOUT HERE ---

Two clarifications regarding the sample characteristics are necessary. First, the parents' educational levels are very high, which is explained by having asked the students if *either* of their parents had a higher education (additionally, if the students were unsure about their parents' education, some may have given the more attractive alternative). Second, since the students had reported in which neighborhood they lived, we were able to collect information on neighborhood characteristics from Statistics Sweden. The sample characteristics will be used as independent variables in the analyses presented later.

Empirical Results

The main results from the experiment and the conjoint analysis are presented in Table 3, showing the part-worth utilities for each level of the attributes, the average attribute utility, and the relative importance for the attributes, for all students. Table 3 also presents values for Pearson's R and Kendall's tau, i.e. the correlations between observed and estimated preferences, which suggest that the model has a high validity. The analysis tests the first hypothesis, i.e., whether students solely decide upon choice of school based on academic quality.

--- TABLE 3 ABOUT HERE ---

The results on aggregated level show that all included attributes, to varying degrees, are of importance for students' school choice preferences. Obviously, academic quality plays a dominant role, where the two attributes *knowledge reputation* (i.e., schools' knowledge reputation) and *program* (i.e., whether desirable programs are available) combined account for 62.8% of the overall relative importance. Of these two, program is clearly the more important, with an importance value of 40.9% compared with knowledge reputation at 21.9%. Even though it could be debated how high the share of academic quality should stand at to support the first hypothesis, 62.8% is far from 100%, clearly rejecting the first hypothesis. Albeit important, these results show that academic quality is but one factor among others that students relate to when estimating the attractiveness of schools.

Geographical attributes also affect students' preferences; when combined, *distance* (11.9%), *localization* (7.1%), and *accessibility* (8.7%) account for 27.7% of the overall attribute importance. Because these attributes have no direct relevance for optimizing future returns, it invalidates the claim that students are rational in the orthodox interpretation of rational choice theory that guided the Swedish school reforms. In fact, the geographical attributes constitute a larger share of the attribute importance than knowledge reputation.

Lastly, the presence of *friends* at a school is of importance, with a relative importance attribute value at 9.5%. However, it is questionable whether friends can explain much of the observed increasing school segregation after the school reforms (compare Swedish National Board for Education, 2012b; Östh et al., 2013) and it seems more likely that such observations are more related to academic quality and geographical attributes.

To test the second hypothesis, which posited that there should not be any differences in regard to students' preferences and their characteristics, all students were categorized into different groups according to their characteristics, and separate conjoint analyses were

performed for each group. The main results on the relative importance assigned by each group to the six different attributes in the experiment are shown in Figure 2 (the top chart in Figure 2 contains the total sample and corresponds to Table 3).

The charts in Figure 2 suggest that for some characteristics, i.e., sex, parents' education, and transportation, there are no differences between the groups, which is in agreement with the theoretical assumptions. However, the other characteristics investigated, i.e., neighborhood, language, and grades, suggest that differences may exist. For example, the chart comparing students with low and high grades shows that students who have high grades attached greater importance to program (44.9%) whereas students with low grades attached less importance (33.4%) to the same attribute. Language also stands out, where students who speak Swedish at home appear to attach less importance to knowledge reputation (21.5), but notably higher importance to program (41.7%) compared to students who speak a different language at home (24.3% to knowledge reputation and 36.3% to program).

--- FIGURE 2 ABOUT HERE ---

To further probe how different student characteristics may influence the importance assigned to the different attributes and their respective levels in the experiment, while controlling for possible correlations between different characteristics, linear regression analyses were performed using the overall attribute values as dependent variables and student characteristics as independent variables. The results are shown in Table 4.

--- TABLE 4 ABOUT HERE ---

To reiterate, for the second hypothesis to be accepted, no significant differences should arise in Table 4. However, the results reject the hypothesis. Comparing *sex*, boys have significantly higher odds of preferring a school even if it does not have any program they would have preferred. This finding could be interpreted as boys' paying more attention to the school characteristics in general, although equally plausible is the interpretation that girls strongly reject schools that lack a preferred program.

Regarding the *language* students speak at home, there are no strongly significant differences between the two groups. Nonetheless, there is weak support that Swedish-speaking students have higher preferences for the program of their main preference, or alternatively, students who speak another language at home do not care that much about obtaining their first or second choice. It is interesting to note, however, that Swedish speaking students appear somewhat less discouraged by a school with a bad knowledge reputation.

Although previous research has emphasized the importance of *parents' education* as a determinant for school choice (see e.g., Andersson et al., 2012; Burgess and Briggs, 2010; Noreisch, 2007), there is no experimental evidence to support such claims when it comes to preferences. Whatever the reason for the findings of previous research may be, they are not related to preferences. The characteristic that most strongly rejects the second hypothesis is students' *grades*. The results show that students with high grades have much stronger preferences for the program of their first choice compared to students with low grades. Furthermore, students with high grades refute schools with a bad knowledge reputation and pay considerably less attention to the time-distance to school. Clearly, this suggests that grades play a key role in the self-selection of students into specific schools. There is a significant link between preferences and ability/motivation (grades). However interesting this finding may be, and it could surely be debated whether this is desirable or not, the evidence of differences in terms of preferences is clearly in opposition against theory.

The *neighborhood* in which the students live is found to influence their school choice preferences to some extent. For some reason, those who live in a rural neighborhood place greater weight on attaining a program of their first choice. Moreover, students living in the urban center have greater preferences for a school reachable within twenty minutes.

There are no strongly significant differences in terms of preferences that relate to the current means of *transportation* to school and the same is true for *neighborhood* character. The latter, however, is clearly interesting as it stands at odds with expectations from previous research, where a wealth of research suggests that neighborhood effects are important determinants of the school students attend (see e.g., Andersson et al., 2012; Burgess and Briggs, 2010; Malmberg et al., 2014). In fact, the only neighborhood characteristic that is even weakly significant is the share of poor living in the neighborhood, having different preferences when it comes to the second choice of program. Even though previous research may have found correlations between neighborhood characteristics and students attending certain schools, the experimental evidence suggests that such observations are not related to school choice preferences.

Concluding Discussion

Rational choice theory, which the Swedish school reforms were based upon, presupposes that students are economically rational and behave according to the “economic man” theorem. This liberal view became axiomatized, and the theoretical assumptions remain largely unchallenged in the Swedish political debate. Perhaps this is not surprising because if the assumptions are true, the theory seems very promising. Simply allow schools to compete for students, and students, when given the opportunity to choose, will select schools on the basis of quality only as this will provide them optimal future returns. In a stroke, the bad

schools will be forced to improve or disappear from the market and the best schools will have to become more efficient to stay ahead. Extant research has investigated the outcomes of the reforms, but found nothing to suggest improvements of the Swedish school after the reforms were launched. Instead, falling school results have brought about a blame-game where few school actors have been spared. Yet, the validity of the theoretical assumptions that paved the way for the reforms have not been seriously challenged, nor empirically tested, until now.

This article has provided the first empirical investigation to test the validity of the theoretical assumptions that guided the school choice reforms in Sweden. It has been empirically shown that the theoretical assumptions are invalid. Students do not solely base their choices on academic quality when deciding which schools to attend. To be sure, academic criteria are important and account for about 63% of the overall relative importance, but the remaining share is explained by other factors; factors not supported by rational choice theory, nor accounted for in the implementation of the Swedish school reforms. The evidence shows that geographical factors constitute a significant share (about 28%) of the overall relative importance in school choice decision making. This is perhaps particularly noteworthy because one of the expectations of the theory was that the importance of geography should become marginalized by the reforms (i.e., students would no longer be obligated to attend a school in their vicinity). Instead, the opposite may have occurred. Prior to the reforms, Swedish schools had more or less the same quality across the country. Today, quality is increasingly driven by the geography of the school market in that the demand for high quality schools varies and so will the supply. It has also been shown that not all students are economically rational to the same extent. Students with low grades seem more prone to make choices that are unlikely to benefit them, or society, in the long run.

What are the implications of these findings, i.e., what role does it play that the theory on which the Swedish school reforms were based has been proven invalid? We argue that

unless policymakers come to realize that their fundamental assumptions are flawed, they will never fully understand how school choices are made. But the implications go beyond simply school choice. Most interpretations of school outcomes are at risk of becoming skewed if they are based on erroneous assumptions. For example, if students in a specific school achieve good results, policymakers may interpret this as an outcome of the school's quality. However, the quality of the school may not necessarily be good; it may simply be a result of the school's ability to attract high achieving students. Moreover, if a school goes out of business, there is a risk that policymakers may interpret this as an outcome of low quality which resulted in too few students applying to that specific school. However, it could be the outcome of another school having entered the market, one that has a better location. It may not necessarily have anything to do with either school's academic quality. Additionally, there is a danger in assuming that students make positive choices, when some may face a choice where no alternative is especially appealing. In sum, the ability to steer the development of Swedish schools in a positive direction will be much more difficult unless the roadmap (i.e., the map of assumptions) is correct. This paper has shown significant flaws in the assumptions that motivated the Swedish school choice policy reforms.

We also argue that this paper has important implications to move research in the field forward by way of cross-fertilizing existing strands of research on school choice. Combining results from studies looking at how students theoretically value factors of importance with e.g. studies of observed choices, increases the possibility of obtaining a more complete picture of a reality which unlikely will be captured by either approach alone.

References

- Allen, R., 2007. Allocating Pupils to Their Nearest Secondary School: The Consequences for Social and Ability Stratification. *Urban Studies* 44 (4), 751–770.
- Andersson, E., Malmberg, B., Östh, J., 2012. Travel-to-school distances in Sweden 2000-2006: Changing school geography with equality implications. *Journal of Transport Geography* 23 (1), 35–43.
- Andersson, E., Östh, J., Malmberg, B., 2010. Ethnic segregation and performance inequality in the Swedish school system: a regional perspective. *Environment and Planning A* 42 (11), 2674–2686.
- Bell, C. A., 2007. Space and Place: Urban Parents' Geographical Preferences for Schools. *The Urban Review* 39 (4), 375–404.
- Bell, C. A., 2009. All Choices Created Equal? The Role of Choice Sets in the Selection of Schools. *Peabody Journal of Education* 84 (2), 191–208.
- Bettman, J. R., Luce, M. F., Payne, J. W., 1998. Constructive Consumer Choice Processes. *Journal of Consumer Research* 25 (3), 187–217.
- Björklund, A., Clark, M. A., Edin, P-A., Fredriksson, P., Krueger, A. B., 2005. *The Market Comes to Education in Sweden: An Evaluation of Sweden's Surprising School Reforms*. Russell Sage Foundation, New York.
- Bosetti, L., 2004. Determinants of school choice: understanding how parents choose elementary schools in Alberta. *Journal of Education Policy* 19 (4), 387–405.
- Bridge, G., Wilson, D., forthcoming. Towards an interactive sociological rational choice approach to theorizing class dimensions of school choice. *Forthcoming in Policy and Politics*.
- Buchanan, J. M., 2003. Public choice: politics without romance. *Policy* 19 (3), 13–18.
- Bunar, N., 2010. *The Geographies of Education and Relationships in a Multicultural City: Enrolling in High-Poverty, Low-Performing Urban Schools and Choosing to Stay*

- There. *Acta Sociologica* 53 (2), 141–159.
- Burgess, S., Briggs, A., 2010. School assignment, school choice and social mobility. *Economics of Education Review* 29 (4), 639–649.
- Burgess, S., Greaves, E., Vignoles, A., Wilson, D., 2015. What Parents Want: School Preferences and School Choice. *The Economic Journal* 125 (587), 1262–1289.
- Butler, T., Hamnett, C., Ramsden, M., Webber, R., 2007. The best, the worst and the average: secondary school choice and education performance in East London. *Journal of Education Policy* 22 (1), 7–29.
- Butler, T., Hamnett, C., Ramsden, M., 2008. Inward and Upward: Marking Out Social Class Change in London, 1981-2001. *Urban Studies* 45 (1), 67–88.
- Cattin, P., Wittink, D. R., 1982. Commercial Use of Conjoint Analysis: A Survey. *Journal of Marketing* 46 (3), 44–53.
- Chubb, J. E., Moe, T. M., 1990. *Politics, Markets, and America's Schools*. The Brookings Institution, Washington DC.
- Cook, V.A., Hemming, P.J., 2011. Education spaces: embodied dimensions and dynamics. *Social and Cultural Geography* 12 (1), 1–8.
- Dahlstedt, M., 2007. I val(o)frihetens spår: Segregation, differentiering och två decennier av skolreformer. *Pedagogisk Forskning i Sverige* 12 (1), 20–38.
- Echols, F. H., Douglas, J., 1995. Reasons for school choice in Scotland. *Journal of Education Policy* 10 (2), 143–156.
- Eriksson, L., 2011. *Rational Choice Theory: Potential and Limits*. Palgrave Macmillan, New York.
- Esping-Anderson, G., 1990. *Three Worlds of Welfare Capitalism*. Princeton University Press, New York.
- Falk, A., Heckman, J. J., 2009. Lab Experiments Are a Major Source of Knowledge in the

- Social Sciences. *Science* 326 (5952), 535–538.
- Friedman, M., 1962. *Capitalism and Freedom*. The University of Chicago Press, Chicago.
- Friedman, M., Friedman, R. D., 1980. *Free to Choose: A Personal Statement*. Harcourt Inc., New York.
- Fukuyama, F., 1992. *The End of History and the Last Man* Simon and Schuster Inc., New York.
- Gennaioli, N., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2013. Human capital and Regional Development. *Quarterly Journal of Economics* 128 (1), 105–164.
- Gibbons, S., Machin, S., Silva, O., 2008. Choice, Competition, and Pupil Achievement. *Journal of the European Economic Association* 6 (4), 912–947.
- Goldring, E. B., Hausman, C. S., 1999. Reasons for parental choice of urban schools. *Journal of Education Policy* 14 (5), 469–490.
- Gustafsson, A., Herrmann, A., Huber, F., 2007. *Conjoint Measurement: Methods and Applications (Fourth Edition)*. Springer, New York.
- Green, P. E., Krieger, A. M., Wind, Y. J., 2001. Thirty Years of Conjoint Analysis: Reflections and Prospects. *Interfaces* 31 (3), 56–73.
- Green, P. E., Rao, V. R., 1971. Conjoint Measurement for Quantifying Judgmental Data. *Journal of Marketing Research* 8 (3), 355–363.
- Green, P. E., Srinivasan, V., 1978. Conjoint Analysis in Consumer Research: Issues and Outlook. *Journal of Consumer Research* 5 (2), 103–123.
- Green, P. E., Helsen, K., Shandler, B., 1988. Conjoint Internal Validity under alternative Profile Presentations. *Journal of Consumer Research* 15 (3), 392–397.
- Grether, D. M., Plott, C. R., 1979. Economic Theory of Choice and the Preference Reversal Phenomenon. *American Economic Association* 69 (4), 623–638.
- Hamnett, C., Ramsden, M., Butler, T., 2007. *Social Background, Ethnicity, School*

- Composition and Educational Attainment in East London. *Urban Studies* 44 (7), 1255–1280.
- Hindmoor, A., 2006. *Rational choice*. Palgrave Macmillan, New York.
- Hogarth, R. M., Reder, M. W., 1986. Editors' Comments: Perspectives from Economics and Psychology. *The Journal of Business* 59 (4), 185–207.
- Holloway, S., Jöns, H., 2012. Geographies of education and learning. *Transactions of the Institute of British Geographers* 37 (4), 482–488.
- Hooley, G. J., Lynch, J. E., 1981. Modelling the student university choice process through the use of conjoint measurement techniques. *European Research* 9 (4), 158–170.
- Hoxby, C. M., 2000. Does Competition among Public Schools Benefit Students and Taxpayers? *The American Economic Review* 90 (5), 1209–1238.
- Jacob, B. A., Lefgren, L., 2007. What Do Parents Value in Education? An Empirical Investigation of Parents' Revealed Preferences for Teachers. *The Quarterly Journal of Economics* 122 (4), 1603–1637.
- Johnson, R. M., 1974. Trade-off Analysis of Consumer Values. *Journal of Marketing Research* 11 (2), 121–27.
- Kahneman, D., Tversky, A., 1979. Prospect Theory: An analysis of Decision under Risk. *Econometrica* 47 (2), 263–292.
- Kahneman, D., 1994. New Challenges to the Rationality Assumption. *Journal of Institutional and Theoretical Economics* 150 (1), 18–36.
- Ladd, H. F., Fiske, E. B., 2003. Does Competition Improve Teaching and Learning? Evidence from New Zealand. *Educational Evaluation and Policy Analysis* 25 (1), 97–112.
- Lichbach, M., I 2003. *Is rational choice theory all of social science?* The University of Michigan Press, Michigan.
- Lindbom, A., 2010. *School Choice in Sweden: Effects on Student Performance, School Costs,*

- and Segregation. *Scandinavian Journal of Educational Research* 54 (6), 615–630.
- Loomes, G., Sugden, R., 1982. Regret Theory: An Alternative Theory of Rational Choice Under Uncertainty. *The Economic Journal* 92 (368), 805–24.
- Louviere, J. J., 1988. *Analyzing decision making: metric conjoint analysis*. Sage Publications Inc., Newbury Park.
- Louviere, J. J., Hensher, D. A., Swait, J. D., 2000. *Stated Choice Methods: Analysis and Application*. Cambridge University Press, Cambridge.
- Lucas Jr, R. E., 1988. On the Mechanics of Economic Development. *Journal of Monetary Economics* 22, 3–42.
- Malmberg, B., Andersson, E. K., Bergsten, Z., 2014. Composite Geographical Context and School Choice Attitudes in Sweden: A Study Based on Individually Defined, Scalable Neighborhoods. *Annals of Association of American Geographers* 104 (4), 869–888.
- Miron, G., 1996. Free Choice and Vouchers Transform Schools. *Educational Leadership* 54 (2), 77–80.
- Müller, S., Tscharaktschiew, S., Haase, K., 2008. Travel-to-school mode choice modelling and patterns of school choice in urban areas. *Journal of Transport Geography* 16 (5), 342–357.
- Noreisch, K., 2007. School catchment area evasion: the case of Berlin, Germany. *Journal of Education Policy* 22 (1), 69–90.
- OECD, 2015. *Improving Schools in Sweden: An OECD Perspective*. OECD, Paris.
- OECD, 1998. *Education at a Glance*. OECD, Paris.
- Olssen, M., Peters, M. A., 2005. Neoliberalism, higher education and the knowledge economy: from the free market to knowledge capitalism. *Journal of Education Policy* 20 (3), 313–345.
- Orme, B. K., 2010. *Getting Started with Conjoint Analysis: Strategies for Product Design and*

- Pricing Research (Second Edition). Research Publishers LLC, Madison.
- Plank, D. N., Sykes, G., 2003. *Choosing choice: School choice in international perspective*. Teachers College Press, New York.
- Poupeau, F., François, J-C., Couratier, E., 2007. Making the right move: how families are using transfers to adapt to socio-spatial differentiation of schools in the greater Paris region. *Journal of Education Policy* 22 (1), 31–47.
- Rangvid, B. S., 2007. Living and Learning Separately? Ethnic Segregation of School Children in Copenhagen. *Urban Studies* 44 (7), 1329–1354.
- Ravitch, D., 2013. *Reign of Error: The Hoax of the Privatization Movement and the Danger to America's Public Schools*. Random House Inc., New York.
- Renzulli, L. A., Evans, L., 2005. School Choice, Charter Schools, and White Flight. *Social Problems* 52 (3), 398–418.
- Rindermann, H., Thompson, J., 2011. Cognitive Capitalism: The Effect of Cognitive Ability on Wealth, as Mediated Through Scientific Achievement and Economic Freedom. *Psychological Science* 22 (6), 754–763.
- Robbins, L., 1937. *An essay on the nature and significance of economic science*. Macmillan and Company, London.
- Romer, P. M., 1986. Increasing Returns and Long—Run Growth. *Journal of Political Economy* 94 (5), 1002–1037.
- Rothstein, J. M., 2006. Good Principals or Good Peers? Parental Valuation of School Characteristics, Tiebout Equilibrium, and the Incentive Effects of Competition among Jurisdictions. *American Economic Review* 96 (4), 1333–1350.
- Saporito, S., 2003. Private Choices, Public Consequences: Magnet School Choice and Segregation by Race and Poverty. *Social Problems* 50 (2), 181–203.
- Savage, L. J., 1972. *The Foundations of Statistics* (Dover edition). Dover Publications Inc.,

New York.

Schneider, M., Teske, P., Marschall, M., 2002. *Choosing Schools: Consumer Choice and the Quality of American Schools*. Princeton University Press, New Jersey.

Schultz, T. W., 1961. Investment in Human Capital. *The American Economic Review* 51 (1), 1–17.

Simon, H. A., 1955. A Behavioral Model of Rational Choice. *The Quarterly Journal of Economics* 69 (1), 99–118.

Simon, H. A., 1979. Rational Decision Making in Business Organizations. *American Economic Association* 69 (4), 493–513.

Soutar, G. N., Turner, J. P., 2002. Student's preferences for university: a conjoint analysis. *International Journal of Educational Management* 16 (1), 40–45.

Seppänen, P., 2003. Patterns of 'public-school markets' in the Finnish comprehensive school from a comparative perspective. *Journal of Education Policy* 18 (5), 513–531.

Swedish National Board for Education (Skolverket), 2012a. *Likvärdig utbildning i svensk grundskola? En kvantitativ analys över likvärdigheten över tid*. Rapport 374, Skolverket, Stockholm.

Swedish National Board for Education (Skolverket), 2012 b. *Ungdomars uppfattningar om gymnasievalet*. AB Typoform, Stockholm.

Söderström, M., Uusitalo, R., 2010. School Choice and Segregation: Evidence from an Admission Reform. *The Scandinavian Journal of Economics* 112 (1), 55–76.

Thelin, M., 2014. *Elevers val av gymnasieskola: En experimentell studie om elevers geografiska, akademiska och sociala preferenser*. Elanders Sverige AB, Uppsala.

Thieme, C., Treviño, E., 2013. School Choice and Market Imperfections: Evidence From Chile. *Education and Urban Society* 45 (6), 635–657.

Tversky, A., Sattath, S., Slovic, P., 1988. Contingent Weighting in Judgment and Choice.

Psychological Review 95 (3), 371–384.

Tversky, A., Slovic, P., Kahneman, D., 1990. The Causes of Preference Reversal. The American Economic Review 80 (1), 204–217.

von Neumann, J., Morgenstern, O., 2007. Theory of Games and Economic Behavior (Sixtieth Anniversary Edition). Princeton University Press, New Jersey.

Webster Jr, M., Sell, J., 2007. Laboratory Experiments in the Social Sciences. Elsevier Inc., San Diego.

Östh, J., Andersson, E., Malmberg, B., 2013. School Choice and Increasing Performance Difference: A Counterfactual Approach. Urban Studies 50 (2), 407–425.

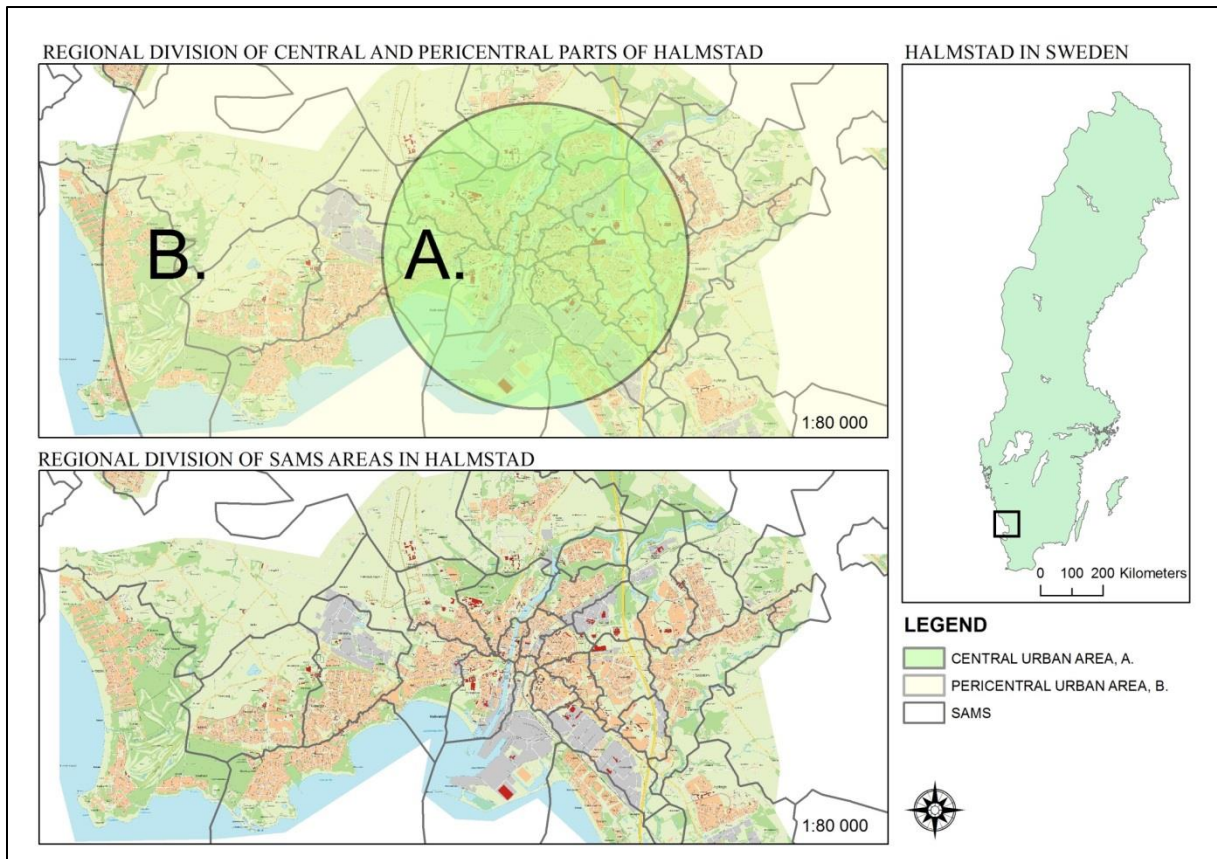


Fig. 1. Location of Halmstad in Sweden (right map), urban (A) and rural (B) areas (top left map) and SAMS-neighborhoods (low left map))

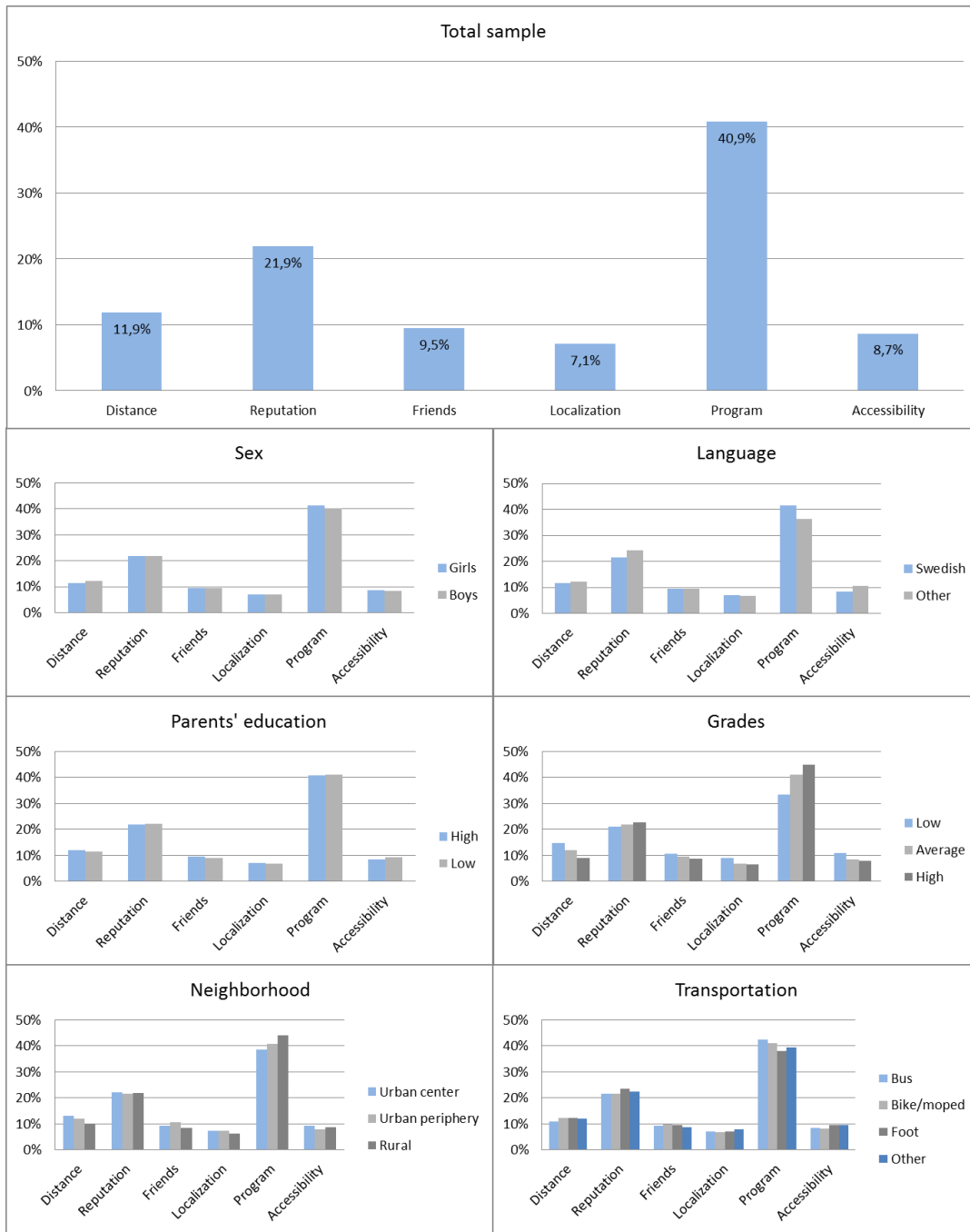


Fig. 2. Estimated Relative Importance for Each Attribute (total sample and for different sample characteristics)

Appendix

SCHOOL 1		
DISTANCE	KNOWLEDGE REPUTATION	FRIENDS
MORE THAN 40 MINUTES TO SCHOOL	SCHOOL HAS A GOOD KNOWLEDGE REPUTATION	SOME OF YOUR FRIENDS WILL ATTEND THIS SCHOOL
LOCALIZATION	PROGRAM	ACCESSIBILITY
SCHOOL IS LOCATED IN THE CITY CENTER	SCHOOL HAS PROGRAM THAT IS YOUR SECOND PREFERRED CHOICE	YOU DO NOT HAVE TO CHANGE MEANS OF TRANSPORTATION TO GET TO SCHOOL

Fig. A1. Example A of Profiles Used in the Experiments

SCHOOL 12		
DISTANCE	KNOWLEDGE REPUTATION	FRIENDS
21-40 MINUTES TO SCHOOL	SCHOOL HAS A GOOD KNOWLEDGE REPUTATION	SOME OF YOUR FRIENDS WILL ATTEND THIS SCHOOL
LOCALIZATION	PROGRAM	ACCESSIBILITY
SCHOOL IS LOCATED IN THE CITY CENTER	SCHOOL HAS THE PROGRAM YOU WOULD PREFER MOST	YOU HAVE TO CHANGE MEANS OF TRANSPORTATION TO GET TO SCHOOL

Fig. A2. Example B of Profiles Used in the Experiments

Table 1
Conjoint Attributes and Attribute Levels

Attribute	Level
Distance	1. 1-20 minutes to school 2. 21-40 minutes to school 3. More than 40 minutes to school
Knowledge reputation	1. School has a good knowledge reputation 2. School has neither good nor bad knowledge reputation 3. School has a bad knowledge reputation
Friends	1. Some of your friends will attend this school 2. None of your friends will attend this school
Localization	1. School is located in the city center 2. School is located outside of city center
Program	1. School has the program you would prefer most 2. School has a program that is your second preferred choice 3. School does not have a program that you would have preferred
Accessibility	1. You do not have to change means of transportation to get to school 2. You have to change means of transportation to get to school

Table 2
Sample Characteristics

Characteristics	N=587	%
Sex		
Boys	286	48.7
Girls	301	51.3
Language		
Swedish	499	85.0
Other	87	14.8
Missing	1	0.2
Parents' education		
High	444	75.6
Low	133	22.7
Missing	10	1.7
Grades		
Low	66	11.2
Average	429	73.1
High	92	15.7
Neighborhood		
Urban center	234	39.9
Urban periphery	178	30.3
Rural	171	29.1
Missing	4	0.7
Transportation		
Bike/moped	245	41.7
Bus	195	33.2
On foot	109	18.6
Other	30	5.1
Missing	8	1.4
Neighborhood characteristics	Mean	Std.Dev.
Disposable income*	1812	312
Share poor	0.155	0.074
Share highly educated	0.325	0.082

*Median disposable income in 100 SEK (1 SEK = 0.11 Euro, 2015-03-27).

Table 4

Regression Results For Student Characteristics On Average Preference Ratings From Conjoint Analysis

	Program			Knowledge reputation		
	First choice	Second choice	No choice	Good	Average	Bad
Sex (reference=girls)						
Boys	-0.110	-0.105*	0.215***	-0.024	-0.061	0.086
Language (reference=other)						
Swedish	0.274*	-0.208*	-0.067	-0.148	-0.036	0.184*
Parents' education (reference=low)						
High	-0.053	0.071	-0.017	-0.004	0.002	0.002
Grades (reference=high)						
Average	-0.293**	0.159*	0.134	-0.077	-0.028	0.106
Low	-0.773***	0.290**	0.483***	-0.081	-0.189*	0.270**
Neighborhood (reference=rural)						
Urban periphery	-0.234*	0.020	0.254*	-0.088	0.070	0.018
Urban center	-0.178	-0.113	0.291**	-0.041	-0.033	0.073
Transportation (reference=bus)						
Bike/moped	-0.010	0.068	-0.058	0.071	-0.089	0.018
On foot	-0.135	0.171*	-0.036	0.197**	-0.113*	-0.084
Other	-0.214	0.113	0.101	0.051	0.059	-0.110
Neighborhood character						
Disposable income (median)	0.001	0.000	0.000	0.000	0.000	0.000
Share poor	0.638	0.865	-1.503	-0.152	-0.769	0.920
Share highly educated	-0.990	0.471	0.519	-0.306	0.174	0.132
Constant	1.726	-0.096	-1.631	1.379	0.867	-2.246
R-square	0.118	0.073	0.084	0.038	0.048	0.045
F-value	5.853	3.463	3.995	1.739	2.196	2.047

*p<0.05, **p<0.01, ***p<0.001.

Table 4 continued

Regression Results For Student Characteristics On Average Preference Ratings From Conjoint Analysis

	1-20 min	Distance 21-40 min	>40 min	Accessibility Change	Localization Urban center	Friends None
Sex (reference=girls)						
Boys	0.054	-0.005	-0.048	0.043	-0.035	0.030
Language (reference=other)						
Swedish	-0.023	0.033	-0.009	-0.002	0.041	-0.081
Parents' education (reference=low)						
High	0.046	-0.042	-0.004	-0.004	0.039	-0.045
Grades (reference=high)						
Average	0.142*	-0.005	-0.136*	0.034	-0.034	0.010
Low	0.229**	-0.056	-0.173*	-0.023	0.003	-0.027
Neighborhood (reference=rural)						
Urban periphery	0.192**	-0.178**	-0.015	0.053	0.121*	-0.114*
Urban center	0.250***	-0.144*	-0.106	-0.028	0.108*	0.021
Transportation (reference=bus)						
Bike/moped	0.017	-0.018	0.002	-0.006	-0.039	0.008
On foot	0.003	0.052	-0.054	-0.076	-0.041	-0.010
Other	0.084	-0.081	-0.003	-0.051	-0.003	0.028
Neighborhood character						
Disposable income (median)	-0.001	0.000	0.000	0.000	0.000	0.000
Share poor	-1.135	0.338	0.797	-0.357	-0.384	-0.649
Share highly educated	0.243	0.410	-0.652	0.206	-0.718	-0.287
Constant	0.955	-0.172	-0.783	-0.601	0.629	-0.389
R-square	0.068	0.031	0.038	0.064	0.023	0.032
F-value	3.194	1.419	1.720	3.001	1.053	1.462

*p<0.05, **p<0.01, ***p<0.001.