Is it the school of fish or the size of the pond that matters? An experimental examination of reference group effects in secondary school

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Abstract

It has often been suggested that reference group effects in education work through the self-concept of pupils. At the same time, it has been shown that teachers compare students with their peers when making evaluations. This observation gives rise to an alternative explanation of reference group effects on educational attainment: When deciding whether or not to recommend a student for grammar school, teachers consider not only the individual student's performance and abilities but use the wider group of motivated students as a frame of reference. Thus, given the limited number of places available in grammar school, a student's chances of being recommended also depend on his or her standing in the performance distribution as well as on the number of competitors. Using choice experiments presenting groups of three to five students to secondary school teachers in Switzerland, we show how the individual probability for a grammar school recommendation depends on the size of the reference group. Furthermore, individual chances are especially affected by the number of other students in the group that the teacher perceives as fit for grammar school. Our findings point towards a competition effect: The more and the better the competitors, the smaller the individual chances. In this respect, it seems better to be a big fish in a small pond.

Keywords: Reference Group Effects, Teacher Recommendation, Choice Experiment, Group Size, Compositional Effects

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1. Introduction

There is general agreement on the importance of educational transitions for explaining persistent inequalities in education. In this regard, many have advocated for explanations in terms of intended and unintended consequences of purposive social actions made by relevant agents, such as students, their parents and teachers (e.g., Becker, 2003; Boone and Van Houtte, 2013; Breen and Goldthorpe, 1997; Erikson and Jonsson, 1996; Stocké, 2007). A second line of research suggests that one's educational performance and attainment is also affected by the academic behavior and achievement of others, particularly by one's peers (e.g., Alexander and Campbell, 1964; Hanushek et al., 2003; Imberman et al., 2012; Sacerdote, 2001, 2011; Zimmerman, 2003). While the former line of research points to a social (and ethnic as well as a gender) gradient in students' educational opportunities, the latter stresses reference-group effects caused by the social and academic composition of the student body (e.g., Alexander and Eckland, 1975; Marsh and Parker, 1984; Thrupp et al., 2002). Surprisingly, a key actor who links these two dimensions of educational inequalities has yet received relatively little attention: the teacher and his or her role in the allocation process. This paper tries to close this gap. More specifically, we elaborate an alternative explanation for the finding that being surrounded by high-achieving peers can be detrimental to students' educational chances. This has predominantly been discussed as Big-Fish-Little-Pond (BFLP) effects in the literature (Alicke et al., 2010; Davis, 1966; Marsh and Parker, 1984; Marsh, 1987; Marsh and Hau, 2003). Instead of focusing on students' self-concept or social learning from peers, we ask how reference group effects and relative comparison processes shape teachers' decisions regarding the recommendation of students for grammar school in Switzerland. This approach comes with the advantage that individual actions of teachers are directly observable. Moreover, the literature on reference group effects mainly focuses on different compositional aspects such as the achievement of peers (e.g., Gröhlich and Guill, 2009; Huguet et al., 2009; Trautwein et al., 2006) and has largely neglected the second aspect of the BFLP effect: the size of the pond (Alicke et al., 2010; Zell and Alicke, 2009). Against the background of an ever increasing literature discussing the influence of class size on individual educa-

31 tional outcomes (e.g., Krueger, 1999; Wyse et al., 2008), this comes as an even bigger
32 surprise. We therefore also examine whether being part of a larger group of competi-
33 tors also has a detrimental effect on one’s educational chances. To investigate whether
34 teachers are affected by reference group effects in their judgements of the fitness of
35 pupils for grammar school, we collected data from (prospective) teachers using choice
36 experiments in the city of Bern, Switzerland (Street and Burgess, 2007). In this set-
37 ting, recommendations for grammar school are of special interest, since they enable a
38 direct access to the most advantageous school track in the Swiss school system without
39 further examination.¹

40 The results indicate that teachers base their recommendation decisions not only on
41 students’ individual characteristics but also on the wider group context. Independent of
42 individual academic performance and effort, being part of a larger group reduces one’s
43 chances for a grammar school recommendation. Moreover, this effect seems to work
44 primarily through the share of recommended classmates: The higher the share of peers
45 with a recommendation, the lower a pupil’s chances for being likewise recommended.

46 The remainder of this paper is organized as follows: The next section briefly out-
47 lines the theoretical arguments and reviews the state of the art. The third section
48 presents the data and (experimental) methods used to test the hypotheses. The results
49 are presented in the fourth section. The paper concludes by placing the main findings
50 in context with the literature and by discussing the implications in terms of educational
51 opportunities in tracked education systems.

52 **2. Background**

53 Ever since Davis’ (1966) Frog-Pond, Marsh and Parker’s (1984) Big-Fish-Little-
54 Pond (BFLP) effects and the Wisconsin model of status attainment (Sewell et al., 1969;
55 Haller and Portes, 1973), sociologists and other social scientists have extensively stud-
56 ied the effects of classroom composition on individual educational attainment (for a
57 compact summary see Sacerdote, 2011). In the following, we first briefly summa-

¹Those who are not recommended for grammar school can take additional exams and be granted admis-
sion if they pass.

58 rize existing literature on compositional influences before then focusing on the role of
59 teachers in the explanation of such effects. We particularly focus on the role of the size
60 of the reference group for individual educational chances.

61 Regarding compositional effects, there is considerable agreement that facing high-
62 achieving peers has a negative effect on a pupil's academic self-concept and thus on
63 individual achievement (e.g., Gröhlich and Guill, 2009; Huguet et al., 2009; Marsh
64 and Hau, 2003; Sacerdote, 2001; Trautwein et al., 2006). However, effects vary not
65 only with the methods used (e.g., experimental vs. observational studies) but also with
66 different measures of academic performance (e.g., Zimmerman, 2003; Dockx et al.,
67 2019). At the same time, and although social status and educational attainment are
68 closely related (Becker, 2003; Breen and Goldthorpe, 1997), the average social status
69 of the student body is reported to have an independent, additional positive effect on
70 individual attainment (e.g., Maaz et al., 2008; Palardy, 2008; Rumberger and Palardy,
71 2005; Palardy, 2008). However, this evidence largely refers to theories in which the
72 social composition of peers as well as their performance levels and behaviour influence
73 individual achievement and attainment e.g., through social learning processes. In the
74 present study, however, we are especially interested in the moderating effect of a shared
75 teacher.

76 In addition to the documented effects of students' social and ethnic background
77 on teachers' evaluations (e.g., Boone and Van Houtte, 2013; Jussim and Harber, 2005;
78 Rist, 1970), it has been suggested that, like their pupils, teachers could be affected
79 by comparison processes (Trautwein et al., 2006; Boone et al., 2018). Comparing
80 grades with more objective measures, such as test scores, it becomes apparent that the
81 classroom context clearly structures teachers' evaluations of their students (Hoge and
82 Coladarci, 1989; Maaz et al., 2008). Thus, students' grades can be seen as a reflection
83 of a reference group effect in which teachers evaluate a particular student's academic
84 performance according to how it fares in comparison with the achievement of others.
85 With data from Flanders, Boone and colleagues (2018) show that teachers do use a
86 classroom's composition as a frame of reference. However, while the ethnic and social
87 composition have no effect, the ability composition of students significantly influences
88 teachers' transition recommendations. In line with a relative advantage or social com-

petition explanation, the authors find a larger likelihood for low-ability students to be recommended for an academically orientated track when facing a group of low-ability compared to high-ability peers (Boone et al., 2018). However, since this result is based on cross-sectional data, we don't know whether this effect of the class composition on teacher recommendations is causal. To uncover the underlying social mechanisms, we need to examine this further using methods that allow for causal inference.

Acknowledging that the reference group can have an effect on teachers' decisions, gives us a competing explanation for the direct compositional effects of the achievement and status of peers on individual academic outcome. Rather than through the adjustment of a pupil's self-concept to the observed academic performance of peers, classroom composition could alternatively work through the teacher. With the classroom as a point of reference, teachers might make context-dependent evaluations of the individual peers. If teachers are to recommend the best pupils for grammar school, they must automatically consider a student's position in the performance distribution of the wider group of competitors. We therefore hypothesize that teacher recommendations for grammar school depend on the composition of the student body. More precisely, we expect the presence of high-achieving peers to have a negative effect on individual chances of receiving a grammar school recommendation (i.e., through invidious comparison effects; Sacerdote, 2011). Furthermore, since each classroom acts as an individual frame of reference and thus shapes teachers' perceptions of their students, we expect recommendation decisions to vary between teachers.

Finally, the probability for a recommendation might also depend on the number of competitors, i.e., the size of the group of students who would also like to attend grammar school. Although not directly applicable for the present purpose, existing studies suggest (small) negative effects of large class sizes on individual educational attainment (Krueger, 1999; Wyse et al., 2008). More relevant for this study, however, Zell and Alicke (2009) as well as Alicke et al. (2010) demonstrate that reference group effects are particularly relevant in small groups. One's standing in the immediate context of a smaller comparison group is more weighty for self-evaluations than comparisons with larger groups. If reference group effects on teacher decisions follow a similar logic, we would also expect them to be stronger in smaller groups. However, since there has

120 been a more or less fixed number of available places in grammar schools throughout
121 the last 30 years in Switzerland (Federal Statistical Office, 2017), it is probable that
122 teachers take the ‘demand side’ of grammar schools into account and fill up places
123 accordingly. Because of this, we hypothesize that the individual propensity for a rec-
124 ommendation diminishes with an increasing number of peers who also have grammar
125 school ambitions. We would expect this effect to be especially strong when teachers
126 evaluate the potential of these peers highly and recommend them for grammar school.
127 That is, we assume the negative effect of a larger number of ambitious peers to be more
128 pronounced if the teacher recommends them for grammar school.

129 Summing up, we argued that teachers act as mediators for the effects of classroom
130 composition on a student’s probability of getting a grammar school recommendation.
131 More specifically, because of the comparisons a teacher is bound to make, we expect
132 that a student’s chances decrease when his or her peers are high-performing. Addi-
133 tionally, because there is a more or less fixed number of places in grammar school,
134 we expect the size of the group of students in each class who want to attend grammar
135 school to affect individual chances. As in any competitive situation, we would thus
136 assume that being part of a larger, stronger group decreases the individual probability
137 of being on top and, in this context, of securing a place in grammar school. Finally,
138 since teachers have their individual sets of beliefs and attitudes, we expect significant
139 differences between teachers in their recommendation decisions.

140 **3. Data and Methods**

141 The data used to examine reference group effects on teacher recommendations for
142 grammar school were collected in a small survey of (prospective) secondary school
143 teachers in Bern, Switzerland. In this survey, respondents were confronted with three
144 different groups of students belonging to different hypothetical classes and all of whom
145 want to attend grammar school in 9th grade. In total, 70 teachers participated in the
146 study, and evaluated a total of 840 hypothetical students². The different sets of students

²This number reduces to 68 teachers and 816 hypothetical students after deleting cases with missing values.

	Tom	Sarah	Lisa	Marc
Grade last semester (math)	5	5.5	4.5	5.5
Development of educational performance (compared with previous term)	Better than before	Same as before	Worse than before	Same as before
Participation during class	Actively contributes during class	Contributes only rarely during class	Contributes only rarely during class	Actively contributes during class
Pace of learning	Sometimes takes more time to learn new things	Learns new things easily	Sometimes takes more time to learn new things	Learns new things easily
Learning habits	Has trouble focusing and often needs assistance	Has no trouble focusing and can figure things out for herself/himself	Has trouble focusing and often needs assistance	Has no trouble focusing and can figure things out for herself/himself
Parental educational background	Attended grammar school	Did not attend grammar school	Did not attend grammar school	Attended grammar school
His/her parents would like their child to...	...complete grammar school	...complete a vocational degree	...complete grammar school	...complete a vocational degree
Grammar school recommendation	☐	☐	☐	☐

Figure 1: Sample vignette of hypothetical students wishing to attend grammar school

147 were constructed as D-efficient fractional factorials which were then used to construct
148 different choice-sets of three different group sizes (3 vs. 4 vs. 5 students; relative D-
149 efficiency 95.71; Street and Burgess, 2007). Table 1 depicts all characteristics of the
150 experimental setting. A sample vignette of four students is depicted in Figure 1. Each
151 teacher was presented with three such vignettes, one of each group size. To circumvent
152 potential learning effects, the order of the vignettes was also randomly altered: Some
153 teachers were first confronted with the small group of three students and others first
154 evaluated the larger group of five students.

155 Since a recommendation for grammar school should reflect an assessment of a stu-
156 dent's future potential rather than prior performance (Erziehungsdirektion des Kantons
157 Bern, 2017), grades and especially their development in the course of the year before
158 are key information for teachers' decisions (in the same vein, Klapproth and Fischer
159 (2018) recently used a similar methodological approach to demonstrate that the teach-
160 ers' recommendation decisions are shaped by the development of students' GPAs). In
161 the Swiss education system, grades range from 1, the worst, to 6, the best. The grade
162 4 equals a 'pass', 5 is considered a 'good' mark and 5.5 is given for a 'very good'
163 achievement. Grades range from 4.5 to 5.5 in the experimental design. The highest
164 grade is overrepresented since only students with a good to excellent performance are

165 expected to attend the most demanding track of the Swiss education system, the gram-
166 mar school. The highest mark was not used in the design, since it would probably have
167 been an overriding argument for grammar school. Characteristics that are so potent are
168 a threat to survey experiments since respondents might fail to even register the values
169 of the other treatments in their evaluations and this could lead to biased results.

170 Moreover, apart from cognitive ability, teachers are also asked to take students'
171 learning habits, as well as their general classroom behaviour into consideration. To
172 account for this, the choice experiment provides the respondents with information on
173 students' participation during class, the pace with which they learn new things and their
174 study habits. While the students themselves are all characterized as highly motivated
175 to attend grammar school, we randomly altered parental aspirations as well as their ed-
176 ucational background as part of the experimental setup. Finally, we also accounted for
177 twoway interactions in the design of the fractional factorial, such that our experimental
178 design also allows us to estimate interaction effects between the included dimensions.

179 Furthermore, additional data on respondents, in particular their teaching experi-
180 ence (Figure A1 in the appendix), knowledge about the recommendation process, and
181 individual social and migration background were also collected as a part of the paper
182 and pencil survey. Although almost all of the respondents have at least some teaching
183 experience, it should be noted that they have not yet finished their teacher education
184 for secondary school. This can certainly be regarded as a challenge for a straight-
185 forward generalization of the results beyond the collected sample. However, since a
186 critical debate on selectivity in education and on how contextual factors, such as so-
187 cial origin, influence the educational opportunities of students are part of the teacher
188 education curriculum, respondents might have an idea of how the reference group of a
189 student affects his or her outcomes. One could thus argue that such effects would be
190 even more pronounced in real-world classrooms in which this theoretical knowledge is
191 slowly replaced by everyday practices and routines. However, as with any experiment,
192 one should nevertheless be careful when interpreting and generalizing the results.

193 To create a more lifelike situation, which is important for the validity of an exper-
194 iment, we made a slight adjustment to the traditional choice experiment. Instead of
195 picking one student, respondents were asked to make an individual recommendation

Characteristics	Values
Students' characteristics	
Gender	0 Male, 1 Female
Grade last semester	4.5, 5.0, 5.5
Performance	0 better, 1 about the same, 2 worse than before
Participation during class	0 active, 1 not active
Learning and study habits	0 learns new things easily, 1 needs some time
Methods and learning style	0 independent & concentrated, 1 not very ind. & c.
Parental education	0 attended grammar school, 1 didn't attend it
Parental aspirations	0 grammar school, 1 vocational training
Further classroom context	
Group size	3, 4, 5
Subject	0 math, 1 German

Table 1: Characteristics in the experimental setting

for each pupil. This slight adaptation was made to accommodate for the fact that the real-life problem is that of a choice but not necessarily of just one pupil. Teachers are expected to recommend all students they think have the potential to successfully complete grammar school. As previously mentioned, the experiment was set up as a D-efficient choice experiment. This yielded a fractional factorial design with optimally balanced and orthogonal arrays, which allows us to estimate the causal effect of the randomly altered characteristics on the outcome of interest (Street and Burgess, 2007). A consequence of this design is that each vignette (student) can be treated as an individual observation. This allows us to analyze the binary outcome (recommendation: yes/no) using multilevel logistic regression models with the share of other recommended students and further compositional characteristics as right-hand side variables (Allison, 2009; Hox, 2010). Thus, we consider the model

$$Y = \alpha + X\beta + \eta_j + \varepsilon_{ij}, \quad i = 1, \dots, n_j, \quad j = 1, \dots, J, \quad (1)$$

where i denotes the hypothetical student portrayed in the vignette and j is the index of the teacher making a recommendation. On the one hand, the matrix X depicts observed characteristics of both the hypothetical students seeking a recommendation (i.e., the characteristics in Table 1) and observed teacher background characteristics

(e.g., their experience, gender, social and ethnic background). The vector of the corresponding effects is denoted by β . On the other hand, η_j captures the variance at the teacher level, that is, the extent to which teachers differ in their decision making (e.g., due to unobserved attitudes and beliefs about a particular student). Since the outcome (recommendation for grammar school) is a binary variable, one might consider a binary logistic or probit model with clustered standard errors to account for multiple observations (hypothetical students) per teacher (Wooldridge, 2003). However, from a theoretical as well as an econometric point of view, we are interested in the extent to which teachers differ in their recommendation decisions. Since the respondents in our sample can be regarded as a random sample from the wider population of (prospective) secondary school teachers, we could treat η_j in equation (1) as random and thus opt for a random effects model (Allison, 2009; Clarke et al., 2015). The first row of Table 2 reports the result of a likelihood ratio test comparing our baseline random effect model (without controlling for additional teacher characteristics; model 1 in Table 3) to the corresponding ordinary binary logistic regression model (model 1 in Table A2 in the appendix). The corresponding χ^2 value significantly exceeds the expected value of 1

Test	Test statistic (df)	p-value
Logit vs. random effects (LR)	28.43(1)	0.000
Random vs. fixed effects (Hausman)	1.35(5)	0.930

Table 2: Testing different model specifications

for no difference between the two models. Thus, the random effect model fits the data considerably better than a common binary logistic regression model. While a random effect model seems to be the better choice in the present case, it is only adequate if the random effect is uncorrelated with the individual error term (Wooldridge, 2010; Clarke et al., 2015). To test this assumption that η_j is independent of ϵ_{ij} , we use the well-known Hausman test that allows us to assess whether the random and the fixed effects estimates both target the same values of β (i.e., we test the null hypothesis that $E[\hat{\beta}_{RE}] = E[\hat{\beta}_{FE}] = \beta$; Clarke et al., 2015). If the null hypothesis is rejected, we conclude in favour of a fixed effect model that removes the bias resulting from teacher selection effects (but which does not allow for the estimation of the effects of teacher

Figure 2: Recommendation for grammar school by group size and share with recommendation

characteristics as a consequence). The second row of Table 2 reports the corresponding overall test statistic. The null hypothesis of this test states that the fixed effects model (which would result in unbiased estimates even if η_j and ϵ_{ij} were correlated) and the random effects model both target the same values of β . With a value of 1.35 of the test statistic and an empirical p -value of 0.930, we clearly fail to reject this null hypothesis. Consequently, we can use a random effect model. Descriptive statistics for all the variables included in the subsequent models can be found in the appendix (Table A1).

4. Results

We begin by looking at Figure 2 that shows the shares of recommended pupils by group size and share of other pupils with a recommendation. While group size does not seem to make such a difference, an individual student's likelihood of being recommended drastically sinks with the number of peers with a recommendation (Figure 2b). Together, the two bivariate associations are a first indication that teachers not only consider individual ability and traits of students but also form their decisions within the wider context of the reference group.

Moving on to the multivariate analyses, Table 3 depicts the results from binary logistic regression models with a teacher random effect. Effects are reported as average marginal effects (AME; Cameron and Trivedi, 2005).³ Starting at the bottom of

³As an additional robustness check, we present the results of the corresponding fixed effect models in

	(1)	(2)	(3)	(4)
	Baseline	Controls	Mediator	Interaction
Grade last semester	0.543*** (0.011)	0.544*** (0.011)	0.479*** (0.023)	0.469*** (0.024)
Participation (<i>Reference: active</i>)				
not active	-0.085*** (0.023)	-0.085*** (0.023)	-0.079*** (0.022)	-0.078*** (0.022)
Learning & study habits (<i>Reference: learns new things easily</i>)				
needs some time	-0.071** (0.023)	-0.071** (0.023)	-0.064** (0.022)	-0.061** (0.022)
Methods and learning style (<i>Reference: independent & concentrated</i>)				
not very independent & rather not concentrated	-0.185*** (0.023)	-0.185*** (0.023)	-0.173*** (0.023)	-0.171*** (0.023)
Group size	-0.025+ (0.014)	-0.026+ (0.014)	-0.017 (0.014)	-0.019 (0.013)
Share classmates with recommendation			-0.400*** (0.094)	-0.462*** (0.095)
Teacher: experience & knowledge		✓	✓	✓
Teacher: background characteristics		✓	✓	✓
η_j	1.122** (0.392)	0.999** (0.365)	2.567*** (0.839)	2.948*** (0.944)
N			816	

Marginal effects; Standard errors in parentheses

(d) for discrete change of dummy variable from 0 to 1

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: Random effect models (being recommended for grammar school)

Table 3, the significant random effect η_j suggests that teachers differ in their respective judgements of a pupil's potential. Although the magnitude of the random effect is somewhat reduced when controls for observed teacher characteristics such as their experience, knowledge about the recommendation process or their social and ethnic background are added, the teachers seem to be additionally influenced by unobserved characteristics (comparing model 1 with model 2 in Table 3).

Regarding the influence of the randomly altered dimensions in the choice set, we

Table A3 in the appendix. The corresponding effects in Table A3 (reported as odds ratios) are in line with the results of the random effect models. So are the effects of the logit model with clustered standard errors in Table A2 in the appendix.

first note that not all of the characteristics in the experimental design are significant predictors for a recommendation for grammar school.⁴ While this isn't surprising in the case of the subject (math or German), the missing influence of parental educational background, which in our case served as an indicator of social origin, and of their aspirations needs explaining. First, the absence of an influence of parental education and aspirations could be explained by the fact that students' own aspirations are held constant (they all want to attend grammar school). Second, since we included students' grades, primary effects of social origin are already captured in all models (Becker, 2003; Breen and Goldthorpe, 1997). A third explanation for the insignificant effects could be that the teachers-in-training are mindful of the processes leading to educational inequalities. Due to the information we have on the curriculum of our prospective teachers, we can expect them to know how social origin affects educational chances. Also, the operationalisation of parents' educational background as a binary variable indicating whether or not they have attended grammar school might be insufficient and the intention too evident for the participants. Another variable that surprisingly fails to have the expected effect is the development of students' educational performance (compared to the prior semester). The interaction of a student's grades with the development thereof is not significant either.

All the other characteristics in the experimental design are highly significant predictors for a grammar school recommendation. Moreover, the models fit the data well (the pseudo- R^2 of model 1 is 0.405—see Table A2 in the appendix). As expected, we see that a student's performance, measured in grades, is a very important predictor for a teacher's decision. A unit change in a student's grade leads, on average, to an increase of 54 percentage points (p.p.) for the likelihood of receiving a recommendation for grammar school (model 1 and 2 in Table 3). By contrast, students who don't participate actively in class as well as those who take longer to learn new things have reduced chances of getting recommended for grammar school (9 and 7 p.p. respectively). Sim-

⁴The corresponding likelihood-ratio test comparing a model with all experimentally altered covariates to model 1 in Table 3 yields a p -value of 0.986. The two models can be considered equivalent and we therefore only present the result of models that do not include these additional, insignificant covariates of the experimental design.

Figure 3: Share with a recommendation by grades

ilarly, teachers will be much less likely (19 p.p.) to recommend students who are not very independent and have trouble concentrating. However, what interests us most in the present context is how the number of students who also have grammar school ambitions affects individual chances. We see that there is indeed a slight marginally significant negative effect of 2.5 p.p. for each additional pupil in the baseline model. Comparing models 1 and 2 in Table 3, this effect, as well as all of the above mentioned, remains unchanged when we include the respondent-level control variables (e.g., respondents' experience as secondary school teachers or their social background).

However, if we go one step further and introduce the share of students with a recommendation, the effect sizes are generally reduced (model 3 in Table 3). Most importantly, the group size variable, reflecting the 'size of the pond', is no longer significant. Instead, the share of students with a recommendation has a strong negative effect on the individual chances of being recommended for grammar school. As indicated in Figure 3, this effect is strongest for students with grades around 5.0. This is worth highlighting since grades higher than 5.0 are often regarded as a necessary condition for a recommendation—although teachers are explicitly reminded not to base their rec-

Figure 4: Interaction group size × share with recommendation

ommendation solely on such criteria as grades (Erziehungsdirektion des Kantons Bern, 2017). Unsurprisingly, for students who are characterized either with low or very high grades, the share of others with a recommendation does not matter that much. Nevertheless, there seems to be a tendency towards ‘filling up empty places’ even with students who do not perform that well if others are not recommended (indicated by the significant differences for students with grades lower than 5.0. in Figure 3).

The last random effect model in Table 3 includes an additional interaction term of the number of students seeking a recommendation (group size) with the share of students’ with a recommendation. While the underlying coefficient (odds) is significant and negative, the corresponding average marginal effect is not reported in model 4 of Table 3 since the value of the interaction term cannot change independently of the values of its two component terms (Williams, 2012). To nevertheless assess the effect of this interaction, Figure 4 depicts the predicted probability of being recommended for grammar school for different group sizes by share of others with a recommendation. In this regard, we note that the negative effect of an increasing share of peers with a recommendation for grammar school is strongest in larger groups. On the other hand,

322 if only a small number of students wish to attend grammar school, the share of those
323 with a recommendation has a much smaller impact.

324 Summing up the presented evidence, it has been shown that teachers' decisions
325 for or against a recommendation for grammar school are not only influenced by a stu-
326 dent's effort and educational achievement but also by his or her peers. Such relative
327 comparison processes influencing the evaluative decisions of teachers can be viewed
328 as an alternative explanation for the often documented peer effects on educational at-
329 tainment in general (Sacerdote, 2011) and the Big-Fish-Little-Pond effect in particular
330 (Marsh and Parker, 1984). Our findings show that the number of ambitious peers re-
331 duces individual chances of a grammar school recommendation. We have further seen
332 that this effect is mediated by the share of pupils the teacher deems fit for grammar
333 school. Figuratively speaking, it is not only the size of the pond that matters but also
334 how good the other fish are. Individual chances are lowest for a student in a big group
335 with strong peers. As in any competition, the more competitors one has and the better
336 they are, the harder it is for an individual to win the race. In our example securing a
337 scarce and coveted spot in grammar school is harder for pupils in academically strong
338 classrooms.

339 **5. Discussion and Conclusion**

340 This paper proposed an alternative mechanism for peer group effects (e.g., Sacer-
341 dote, 2011; Zimmerman, 2003), such as the Big-Fish-Little pond effect (Huguet et al.,
342 2009; Marsh and Parker, 1984). These reference group effects are normally thought
343 to influence students indirectly through their self-evaluation, which correlates with
344 achievement. Alternatively, and as was examined in this paper, an individual's propen-
345 sity for receiving a grammar school recommendation could be affected more directly.
346 If, when deciding which recommendation to make for a given pupil, a teacher com-
347 pares this pupil with his or her peers, then the pupil's chances are directly dependent
348 of the classroom context. Given a more or less limited number of places in grammar
349 school and since a recommendation results in a direct transfer to this advantageous
350 school track, we argued that the likelihood of receiving a recommendation is affected
351 by the number of other students with grammar school ambitions.

352 To test our assumption, we analysed data from a modified choice experiment and
353 additional data collected in a survey of 70 (prospective) secondary school teachers in
354 Bern, Switzerland. Using logistic regression models with a teacher random effect, we
355 find that the more students plan to attend grammar school, the lower the individual
356 chances of obtaining a recommendation. We also show how this effect is mediated by
357 the share of classmates the teacher deems fit for grammar school, so that the individ-
358 ual propensity for a recommendation decreases with a higher share of classmates the
359 teacher recommends for this highest track. This effect, which is particularly relevant
360 in larger groups of ambitious students, confirms the assumed competition mechanism.
361 Against the background of a more or less fixed number of available places in gram-
362 mar schools in the short run (an argument that is backed by a constant distribution of
363 students among the different tracks of secondary school in Switzerland over the last
364 30 years—Federal Statistical Office, 2017), this result suggests that teachers take into
365 account the (perceived) ‘demand side’ needs and fill up places accordingly.

366 However, the results are based on a small sample and although almost all respon-
367 dents have teaching experience in either primary or secondary school, they are all still
368 in education. A straightforward generalization to the wider population of secondary
369 school teachers is therefore not possible. However, we also argued that, if anything,
370 this should lead to an underestimation of the documented effects since teachers in train-
371 ing have a fresh knowledge of the mechanisms behind educational inequalities. They
372 can thus be expected to be particularly aware and might become less so the more time
373 passes and the more they settle into their routines. Moreover, the outlined processes
374 are caused both by the structure of the education system (the static nature of a tracked
375 system) and the comparisons teachers make when deciding whether or not to recom-
376 mend a student. It is also worthwhile stressing that the teachers in our sample differ
377 considerably in their recommendation decisions (indicated by the significant random
378 effect). This means that aside from individual abilities and that of one’s peers, a stu-
379 dent’s educational chances also depend on the teacher making the decision.

380 On the whole, we find strong evidence for reference group effects that work by
381 affecting teachers’ decisions. By comparing a student with his or her immediate peer
382 group, teachers have a more or less favourable frame of reference. This finding not only

383 offers an alternative explanation for the often reported compositional effects on stu-
 384 dents' educational achievement and attainment, but it also points to an additional mech-
 385 anism of educational inequalities in tracked education systems (Breen and Goldthorpe,
 386 1997). Our findings imply that next to the often documented primary effects of so-
 387 cial origin on students' educational achievement (Becker, 2003; Stocké, 2007) students
 388 of lower social origin will additionally be disadvantaged when they face many high-
 389 performing peers—especially in larger groups. Irrespective of social origin, however,
 390 such reference group effects on teachers' decision making can be regarded as problem-
 391 atic since they affect educational chances beyond the individual effort, motivation and
 392 even performance levels of students and are thus out of line with the meritocratic ideal.

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523 Appendix A.

Figure A1: Respondents' teaching experience

	Mean	SD	Min	Max
Experiment				
Grade last semester	5.123	0.416	4.5	5.5
Performance	1.015	0.814	0	2
Participation during class	0.484	0.500	0	1
Learning and study habits	0.521	0.500	0	1
Methods and ways of working	0.498	0.500	0	1
Parental education	0.515	0.500	0	1
Parental aspirations	0.412	0.492	0	1
Student's gender	0.496	0.500	0	1
Subject	0.412	0.492	0	1
Group size	4.167	0.800	3	5
Teacher Characteristics				
Experience as secondary teacher	2.000	0.569	1	4
Knowledge recommendation	2.882	1.132	0	4
Gender (<i>Reference: man</i>)	0.515	0.500	0	1
Migration background (<i>Reference: none</i>)	0.235	0.424	0	1
Subjective social status	1.574	0.626	1	3
N (Teacher)*	816 (68)			

* After listwise deletion of 24 vignettes (2 respondents) with item-nonresponse.

Table A1: Descriptive Statistics

	(1)	(2)	(3)	(4)
	Baseline	Controls	Mediator	Interaction
Grade last semester	0.538*** (0.009)	0.540*** (0.009)	0.553*** (0.014)	0.553*** (0.014)
Participation (<i>Reference: active</i>)				
not active	-0.091*** (0.024)	-0.092*** (0.024)	-0.092*** (0.024)	-0.092*** (0.024)
Learning & study habits (<i>Reference: learns new things easily</i>)				
needs some time	-0.071** (0.025)	-0.070** (0.024)	-0.072** (0.024)	-0.072** (0.024)
Methods and learning style (<i>Reference: independent & concentrated</i>)				
not very independent & rather not concentrated	-0.189*** (0.024)	-0.188*** (0.024)	-0.189*** (0.024)	-0.189*** (0.024)
Group size	-0.024 (0.015)	-0.025+ (0.015)	-0.028+ (0.015)	-0.028+ (0.015)
Share classmates with recommendation			0.094 (0.077)	0.091 (0.079)
Teacher: experience & knowledge		✓	✓	✓
Teacher: background characteristics		✓	✓	✓
Pseudo R ²	0.405	0.413	0.415	0.415
N			816	

Marginal effects; Standard errors in parentheses

(d) for discrete change of dummy variable from 0 to 1

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2: Logit with clustered SE (being recommended for grammar school)

	(1)	(2)	(3)
	Baseline	Mediator	Interaction
Grade last semester	192.779*** (75.342)	102.060*** (41.477)	105.313*** (43.925)
Participation (<i>Reference: active</i>)			
not active	0.459*** (0.108)	0.465** (0.119)	0.465** (0.122)
Learning & study habits (<i>Reference: learns new things easily</i>)			
needs some time	0.496** (0.117)	0.519** (0.131)	0.538* (0.137)
Methods and learning style (<i>Reference: independent & concentrated</i>)			
not very independent & rather not concentrated	0.169*** (0.044)	0.177*** (0.050)	0.171*** (0.050)
Group size	0.788+ (0.110)	0.829 (0.121)	2.915* (1.309)
Share classmates with recommendation		0.001*** (0.001)	17.018 (57.524)
Share transition * group size			0.077** (0.068)
N		816	

Odds ratios; Standard errors in parentheses

(d) for discrete change of dummy variable from 0 to 1

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3: Fixed effect models (being recommended for grammar school)