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Status Characteristics and Ability Attributions in Hungarian School Classes: An Exponential Random Graph Approach

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Abstract

We study how the status characteristics gender and ethnicity affect the abilities that adolescents attribute to each other in the Hungarian school context. For this, we derive predictions from status characteristics theory that we test by applying exponential random graph models to data collected among students in 27 school classes. By that, we contribute to the few existing studies of status characteristics in a school context, and we propose a novel approach to handle structural dependencies between individual ability attributions. Our results suggest that across classes, gender does not consistently affect ability attributions, while ethnicity does affect ability attributions. Roma students are on average perceived as less able than their Hungarian peers, even after controlling for the structural embeddedness of these perceptions.

Keywords

status characteristics, ability attributions, schools, exponential random graph models

Social characteristics that have status value in society—such as gender, race, and ethnicity—can shape people's expectations about each other. In the United States, for example, men and whites still have status advantages compared to women and blacks. Male and white job applicants are therefore often viewed as more able and competent than female and black applicants with similar credentials (Frazer and Wiersma 2001; Moss-Racusin et al. 2012).

If such stereotypes enter the school context, they can negatively affect student performance and reinforce social inequality. If low-status students experience that others perceive their abilities as low, they are likely to internalize these perceptions, which can reduce the motivation and asserted effort necessary to be successful students (Cohen 1982; Correll 2001). As Rosenholtz and Simpson (1984:41)

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highlighted, peer perceptions play a crucial role in determining how students evaluate their own abilities because "peers are the major source of self-definitions other than the teacher's" (cf. also Rosenholtz and Rosenholtz 1981). It is therefore important to understand whether and how status differences in society at large affect the abilities that students attribute to each other.

In the extant status literature, status characteristics theory (SCT) has frequently been used to predict how status valued characteristics—also status characteristics, for short—affect the perceptions, attributions, and interactions among individuals in small group contexts. Only a few studies have applied SCT to the school setting (e.g., Cohen and Lotan 1995). It therefore remains largely unexplored how status characteristics affect ability attributions in the educational context. In this article, we aim to narrow this gap by studying the effects that gender and ethnicity have on the ability attributions among adolescents in Hungary. For this, we use attribution data from a sample of 27 school classes.

Studying ability attributions in school classes is complicated by the fact that they are interdependent. For example, students can often observe the attributions that occur in the class (Rosenholtz and Rosenholtz 1981; Rosenholtz and Simpson 1984), and this might lead to a self-reinforcing accumulation of attributions. To illustrate why this can be problematic, imagine a mixed-gender class in which one male pupil—say, Péter—has managed to build a reputation as being particularly intelligent among some of his classmates. The observation that Péter is perceived as intelligent by some might lead others to attribute intelligence to him regardless of his actual abilities or gender. Even if the remaining class members do not differ much in the nominations they receive, we might still find that male pupils are on average more often nominated than female pupils if we ignore that the many nominations that Péter receives all share the same target and are partly based on a tendency among the "rich" to get "richer" (van de Rijt et al. 2014).

To date, status researchers lack a coherent framework to deal with the fact that in group settings, ability attributions cannot be treated as statistically independent observations. In this article, we propose that the use of exponential random graph (ERG) models (Lusher, Koskinen, and Robins 2013) resolves this problem. With this approach, we treat ability attributions among class members as directed network ties and study the presence or absence of such ties between dyads of students contingent on characteristics of the students themselves (e.g., their gender or ethnicity) and the attributions that target students receive from other peers. Given that, we can obtain correct estimates of the effect that status characteristics have on ability attributions.

Taken together, we contribute to the existing research literature in two ways. First, we contribute to SCT research by applying the theory for studying ability attributions in a school setting outside the United States. Second, we propose a novel statistical approach to deal with the problem of statistical interdependence that exists in the ability attributions in school classes.

THEORY

SCT is part of the expectation states framework (Berger, Wagner, and Webster 2014). The development of this framework has been prompted by the observation that small task groups tend to quickly develop inequalities in patterns of participation and influence among their members. Within the framework, SCT seeks to explain the process by which

specific and diffuse status characteristics come to affect these patterns. A status characteristic is any characteristic that separates individuals into at least two categories that are related to different expectations and evaluations. Specific status characteristics are related to assumptions about individuals' abilities regarding a small set of specific tasks, such as mathematical understanding that enables individuals to perform well in mathematical tasks. Diffuse status characteristics, by contrast, are related to widely shared beliefs about social worth and beliefs about the possession of specific and general abilities—such as intelligence—that enable people to perform well in a wide range of tasks. Gender and ethnicity are primary examples of such characteristics in many societies (cf. Correll and Ridgeway 2003).

According to SCT, diffuse status characteristics affect interactions in task-focused groups through a process of status generalization (Webster and Driskell 1985). In this process, people apply their beliefs about the abilities and skills of different status groups to specific members of these groups. Once these beliefs have been activated, they tend to combine with possible other sources of ability-relevant information (e.g., with the information provided by specific status characteristics; cf. Zelditch, Lauderdale, and Stublarec 1980) and lead to the formation of performance expectations that affect the way group members coordinate their work on the task. Those who are expected to perform better than others are more likely to receive performance opportunities (e.g., they are more often asked for their opinion), and their task inputs are evaluated better, even if they are similar to the input of members for whom performance expectations are lower.

Although SCT has been developed in the context of task-focused groups, Correll and Ridgeway (2003) highlighted that the basic principles of status generalization are not bound to this context. Instead, status generalization should occur whenever individuals feel pressured to engage in comparative ability evaluations. The reason is that such comparisons create "pressure for actors to assess their task competence relative to others who they imagine are also being or have been evaluated" (Correll and Ridgeway 2003:47). Evidence from the United States suggests that diffuse status characteristics are salient and that status generalization occurs in the school setting. For example, it has been shown that white and Anglo students tend to be more active and influential than black and Mexican American students when they have to collaborate on joint learning tasks (cf. Cohen 1982). This suggests that the status differences that exist between these groups in the larger U.S. society are salient and tend to affect the ability conceptions that students have of each other. This in turn leads to differentiated performance expectations when they have to work on a common task.

Based on previous research, we expect that diffuse characteristics might affect the abilities that class members attribute to each other (cf. also Ridgeway and Correll 2004). In Hungary, as in many other countries, gender is typically assumed to be a source of status that favors men over women. These status differences show in many dimensions of social life, such as political empowerment and economic participation (cf. Fodor and Balogh 2010; Nagy 2006). We therefore assume that gender is a diffuse status characteristic and expect that male students will be more likely to be attributed abilities than female students (Hypothesis 1).

Similarly, ethnicity also is an important source of status differentiation in Hungary. Roma are the largest ethnic minority and are disadvantaged compared to the Hungarian majority in terms

of employment, education and school performance, living and health conditions, and life expectancy (Messing, Neményi, and Zolnay 2011). Roma people are often discriminated by negative judgments, and Roma adolescents often conceive themselves as members of a stigmatized group (Neményi 2007). We therefore assume that ethnicity is a diffuse status characteristic that favors Hungarians over Roma. Accordingly, we expect that Hungarian students will be more likely to be attributed abilities than Roma students (Hypothesis 2).

METHODS

Sample and Procedure

Data were collected through a paper-and-pencil survey in November 2010 and comprise information from pupils of 44 classes (in grade nine) from seven public schools distributed across Hungary. The sample purposively overrepresented school classes with high Roma proportions (for more details about the sampling of classes, see Pál et al. forthcoming). The average class size was about 33 (SD = 3.71), ranging from 17 to 38. Of the initially listed N = 1,425 pupils, n = 1,214 participated in the study, leading to an overall response rate of about 85 percent. The average age of participants was 16.73 years (SD = 1.46), ranging from 14 to 22 years.

Participation ranged from about 58 percent to 100 percent across classes. A large share of missing cases per class might lead to biased results, but excluding classes based on any instance of survey nonresponse might reduce the sample severely and thereby undermine the generalizability of results. To trade off these concerns, we selected only classes with at most 20 percent missing cases (27 classes with 812 respondents). Among these classes, we focused on those in which at least 20 percent of the pupils belonged either to status advantaged or status disadvantaged categories, to be able to estimate the effects that status characteristics have on ability attributions. In some classes, this criterion was satisfied for gender but not for ethnicity and vice versa. We therefore conducted two analyses. In Analysis 1, we focused on classes that had between 20 and 80 percent female pupils and included information about ethnicity in control variables. For this, 21 classes with a total of 648 pupils were eligible (53 percent of the initial 1,214 pupils) with an average of 63 percent females. In Analysis 2, we focused on classes that had between 20 and 80 percent of Roma and Hungarian pupils and included information about gender in control variables. For this, 11 classes with a total of 306 pupils were eligible (25 percent of the initial 1,214 pupils), with an average of 42 percent Roma.

Analytical Approach

In an ERG framework, ability attributions are modeled as directed binary ties between two individuals i and j that can either be present (1 = i attributes abilities to j) or absent (0 = i does not attribute abilities to j). The resulting parameter estimates can roughly be interpreted like parameters in logistic regression analysis. This means that a positive (negative) parameter estimate for a given variable in the model implies that higher values on this variable make it more (less) likely that pupil i attributes abilities to another pupil j. ERG models enable us to estimate this likelihood contingent on properties of i and j (i.e., actor characteristics, such as i's and j's gender and ethnicity), other relations that i and j share (i.e., dyad characteristics, such as when i considers j to be a friend, which might affect i's ability attribution to j), and on other ties that surround i's evaluation of j (i.e., structural variables). In our study,

structural variables are particularly relevant because they allow us to control for the possibility that ability attributions might be interdependent within a given class (e.g., because of a self-reinforcing accumulation of attributions). In the following, we describe the structural variables that we included in the analysis.[1]

In ERG analyses, each class is treated as a separate, complete network for which a different set of parameter estimates is obtained. To assess whether a given variable is associated with ability attributions across classes, we need to aggregate these estimates. Snijders and Baerveldt (2003) suggested that results from different classes can be treated as separate case studies that can be aggregated with standard meta-analytical procedures. Using their approach, we calculated the following measures:

1. T_p^2 enables us to assess whether all estimates θ for a given parameter p are 0 in the population of classes. The statistic follows a chi-square distribution with C (i.e., the number of classes) degrees of freedom.
2. $\hat{\mu}_{\theta,p}^{WLS}$ and s.e.$\left(\hat{\mu}_{\theta,p}^{WLS}\right)$ enable us to assess whether a given variable has a significant effect on ability attributions across the sample of classes. These statistics refer to the weighted least square estimates of the average parameter estimates and their standard errors in the population of classes, respectively. They can be used to calculate a t-ratio that approximately follows a standard normal distribution that can be used to assess the statistical significance of a parameter estimate across classes.
3. $\hat{\sigma}_{\theta,p}^2$ enables us to assess whether the estimate of a given parameter varies across classes. The associated Q_p statistic, which has a chi-square distribution with $C-1$ degrees of freedom, makes it possible to assess the significance of $\hat{\sigma}_{\theta,p}^2$.

[1]Appendix A (available at spq.sagepub.com/supplemental) provides a more detailed description of the way in which parameters are estimated in ERG models and a discussion of how we assessed model fit.

Measures

Ability attributions. The survey contained social network modules in which pupils were given a roster with the names of their classmates and were asked to indicate those whom they perceived to possess various traits. We focused on pupils' attributions of the trait "is clever/smart" as the dependent variable (i.e., 1 = i attributes abilities to j, 0 = i does not attribute abilities to j). Such attributions are often assumed to represent assumptions about general abilities that are relevant for good performance in a wide range of academic and nonacademic tasks and are particularly central in the school context (cf. Rashotte and Webster 2005).

Actor characteristics. Pupils were asked to indicate whether they were male or female. We used this information for the variable *receiver female*, which enabled us to test Hypothesis 1. The associated parameter estimate indicates whether an attribution from i to j was more likely when j was female (coded as 1) than when j was male (coded as 0). Next to this, we included information about gender also in the variables *both female* and *both male*. The parameter estimate for the first variable indicates whether an attribution from i to j was more likely when both were female (coded as 1) compared to when they were both male or differed in gender (coded as 0); the parameter estimate for *both male* indicates whether an attribution from i to j was more likely when both were male (coded as 1)

compared to when they were both female or differed in gender (coded as 0). These variables enabled us to control for the possibility that members of different status groups might be inclined to attribute abilities to the members of their own group, in an attempt to enhance their own self-image (Turner and Reynolds 2001).

Pupils were also asked to indicate whether they considered themselves Hungarian, Roma/Gypsy, Roma/Gypsy and Hungarian at the same time, or to belong to another ethnic group. We defined pupils who considered themselves Roma/Gypsy and Hungarian at the same time to belong to the category Roma/Gypsy (for simplicity called Roma). Pupils who indicated that they belong to another ethnic group were excluded from the analysis. For 101 students, we needed to impute this information.[2] Analogous to gender, we used information about pupils' ethnicity for three variables in the analysis: *receiver Roma, both Roma*, and *both Hungarian*; the variable *receiver Roma* enabled us to test Hypothesis 2.

Dyad characteristics. Cohen and Lotan (1995) highlighted that in the school context, the status characteristics physical attractiveness and academic achievement might also affect ability attributions, next to gender and ethnicity. We therefore controlled for pupils' perceptions of each other's physical attractiveness and their perceptions of each other's academic achievement in terms of having good grades. Similar to ability attributions, these characteristics were measured on network items on which pupils could nominate those class members whom they thought to possess these attributes. In the analyses, we labeled these dyad variables *dyad attractive* and *dyad good grades*.

We also controlled for friendship relations between pupils because earlier research suggests that adolescents are more likely to attribute abilities to friends than to others (Tesser, Campbell, and Smith 1984). Friendship relations were measured with a five-point network item converted into a dummy variable to indicate whether *i* considered *j* to be a friend (coded as 1, comprising the original scale points like and good friend) or not (coded as 0, comprising the original scale points hate, dislike, and neutral). In the analysis, we labeled this dyad variable *dyad friend*.

Structural variables. We included four structural variables in the model. First, we controlled for the possibility that some class members might have a reputation for being especially intelligent, which might lead to an increase in the number of attributions they receive independently from their gender or ethnicity, with the structural variable *popularity*.

Second, there are often no clear-cut standards for assessing the abilities of others (Correll and Ridgeway 2003). Some pupils might thus apply less strict standards than their peers and therefore might be more inclined to attribute abilities to others. The presence of such pupils might blur the effect that status characteristics have among the other class members. We controlled for this possibility with the structural variable *activity*, which enables us to assess the effect of status characteristics net of differences among students in their propensity to make attributions.

Third, displays of respect and admiration to others have the potential to lower one's rank in a given group if they are not reciprocated. Individuals therefore tend to avoid unreciprocated displays (Gould 2002). If ability attributions are

[2]See Appendix A (available at spq.sagepub.com/supplemental) for details.

Table 1. Average Number of Received Nominations across Pupils per Analysis

	Total (n = 648)		Male (n = 238)		Female (n = 410)	
Analysis 1	M (SD)	Range	M (SD)	Range	M (SD)	Range
Ability	7.86 (6.36)	0–31	6.04 (5.48)	0–25	8.92 (6.59)*	0–31
Attractive	5.53 (5.91)	0–29	2.74 (3.47)	0–20	7.15 (6.41)*	0–29
Good grades	6.57 (6.49)	0–31	4.81 (5.79)	0–28	7.59 (6.66)*	0–31
Friend	6.46 (3.45)	0–21	6.07 (3.44)	0–18	6.69 (3.44)*	0–21
	Total (n = 306)		Hungarian (n = 177)		Roma (n = 129)	
Analysis 2	M (SD)	Range	M (SD)	Range	M (SD)	Range
Ability	3.00 (2.71)	0–13	3.89 (2.91)	0–13	1.78 (1.79)*	0–9
Attractive	3.64 (3.70)	0–18	3.34 (3.67)	0–18	4.05 (3.73)	0–16
Good grades	2.18 (2.42)	0–16	2.80 (2.79)	0–16	1.33 (1.40)*	0–6
Friend	5.48 (2.52)	0–15	5.39 (2.48)	0–15	5.60 (2.57)	0–12

*$p < .05$ (based on two-tailed t-tests for differences in means between groups).

to some extent public, we might expect that concerns for reciprocity partly shape the likelihood that two class members will attribute abilities to each other. We controlled for this possibility with the structural variable *reciprocity*.

Finally, we also included the structural variable *arc*, which captures the baseline probability of ability attributions to occur in a given class and operates like an intercept in logistic regression models.

RESULTS

Table 1 shows the average number of nominations that pupils received for the classes included in Analysis 1 and Analysis 2. Compared to male pupils, female pupils were nominated more often as clever/smart, attractive, having good grades, and as a friend. Compared to Hungarian pupils, Roma pupils were nominated less often as clever/smart and having good grades but were nominated more often as attractive and as a friend, albeit the last two differences were not significant.

Table 2 shows the parameter estimates of our ERG models focusing on gender (Analysis 1) and ethnicity (Analysis 2). Concerning the structural variables, after controlling for all other variables in the models, attributions were more likely to not occur than they were to occur. They also tended to be equally distributed across pupils both in terms of attributions made and attributions received and tended to be reciprocal. This is indicated by the negative and significant parameter estimates (i.e., $\hat{\mu}_{\theta,p}^{WLS}$ and s.e.$\left(\hat{\mu}_{\theta,p}^{WLS}\right)$) for *arc, activity*, and *popularity* and the positive estimate for *reciprocity*. Yet, the estimates of $\hat{\sigma}_{\theta,p}^2$ in combination with the Q_p statistic, which assess variation of parameter estimates across classes, indicate that the magnitude of these effects often varied significantly across classes.

Concerning the dyad characteristics, in general a given pupil i was more likely to attribute abilities to another pupil j when i perceived j to be attractive, have good grades, and be a friend. This is indicated by the positive and significant parameter estimates for *dyad attractive, dyad good grades*, and *dyad friend*. Again, the estimates of $\hat{\sigma}_{\theta,p}^2$ in combination with the Q_p statistic indicate that the magnitude of these effects often varied significantly across classes.

Table 2. Results of Main Analyses

	T^2	$\hat{\mu}_\theta^{WLS}$	s.e.$(\hat{\mu}_\theta^{WLS})$	$\hat{\sigma}_\theta^2$	Q
Analysis 1					
Structural variables					
Arc	994.921*	–1.905	.150*	.338	94.695*
Reciprocity	52.042*	.227	.095*	.083	39.013*
Activity	638.714*	–4.901	.512*	3.378	92.803*
Popularity	78.003*	–1.303	.256*	.398	29.774*
Dyad characteristics					
Dyad attractive	280.962*	.790	.095*	.118	49.700*
Dyad good grades	1,500.414*	1.803	.081*	.074	44.889*
Dyad friend	242.936*	.702	.107*	.165	60.844*
Actor characteristics					
Receiver Roma	25.489*	–.495	.245*	.280	15.060*
Both Hungarian	9.592	.195	.219	.215	8.164
Both Roma	24.158*	.219	.546	1.411	18.434*
Receiver female	53.818*	.092	.109	.137	52.922*
Both male	40.854*	.128	.130	.181	37.296*
Both female	51.831*	.164	.088	.091	42.209*
Analysis 2					
Structural variables					
Arc	296.210*	–2.026	.233*	.399	37.315*
Reciprocity	21.068*	.445	.144*	.001	11.414
Activity	315.560*	–3.543	.497*	2.220	51.261*
Popularity	28.664*	–.890	.217*	.005	11.571
Dyad characteristics					
Dyad attractive	87.566*	.682	.211*	.340	28.182*
Dyad good grades	327.400*	1.769	.094*	–.010	12.013
Dyad friend	90.881*	.709	.188*	.288	35.698*
Actor characteristics					
Receiver female	13.527	.070	.166	.074	13.271
Both male	8.402	.019	.263	.212	8.060
Both female	18.538*	.311	.171	.105	13.675*
Receiver Roma	51.806*	–.887	.255*	.411	23.952*
Both Hungarian	17.591	.229	.156	.152	14.466
Both Roma	36.088*	.537	.362	.905	23.344*

Note: In Analysis 1, each estimate is based on 20 classes, except for *activity* (16), *popularity* (16), *receiver Roma* (8), *both Hungarian* (7), and *both Roma* (6). In Analysis 2, each estimate is based on 11 classes, except for *reciprocity* (10), *dyad attractive* (10), *receiver female* (8), *both male* (7), *both female* (7), and *both Roma* (10). See online Appendix A for details.

*$p < .05$ (one-tailed chi-square tests for all T_p^2 and Q_p; two-tailed t-tests for all $\hat{\mu}_{\theta,p}^{WLS}$, excepted $\hat{\mu}_{\theta,\,receiver\,female}^{WLS}$ and $\hat{\mu}_{\theta,\,receiver\,Roma}^{WLS}$, which are based on one-tailed t-tests due to the directionality of the underlying hypotheses).

When it comes to our hypotheses, the results suggest that gender was not associated with ability attributions given that neither the parameter estimates of *receiver female* nor the estimates for *both male* and *both female* were significantly different from 0 in Analysis 1 (focus on gender) and Analysis 2 (focus on ethnicity). Thus, our results do not support Hypothesis 1. In the case of ethnicity, our results show that Roma pupils were less likely to receive ability attributions than

Hungarian pupils in both analyses, regardless of whether the attributions were made by Hungarian or Roma pupils; the effect was stronger in Analysis 2 than in Analysis 1. Our results therefore support Hypothesis 2.

DISCUSSION

Drawing on status characteristics theory, in this article we studied the effects that gender and ethnicity have on ability attributions among students in Hungarian school classes with exponential random graph models.

In the case of ethnicity, our results were in line with our hypothesis. Roma pupils were less likely than Hungarian pupils to receive ability attributions. We found that this effect was stronger in the analysis that explicitly focused on ethnicity than in the analysis that focused on gender and included ethnicity just as a control variable. The stronger effect in the former case might be explained by the differences in the composition of the classrooms included. The analysis that focused on ethnicity had a relatively larger number of classes in which the Roma minority accounted for a large share of pupils, which might make ethnic differences more salient.

If we reject the notion that Roma pupils are systematically less intelligent than Hungarian pupils, these results suggest that the abilities that others attribute to them are affected by the status differences that exist between Hungarians and Roma in the larger Hungarian society. An alternative explanation might be that Roma pupils on average tend to perform less well at school than Hungarian students, possibly because they are aware of existing stereotypes and therefore experience cognitive strain that negatively affects their performance. Given that school performance is often assumed to reflect cognitive abilities, this difference might contribute to the relation between ethnicity and ability attributions. In our analysis, however, ethnicity affected ability attributions even after controlling for subjective evaluations of school performance among pupils. Evidently, subjective evaluations of academic performance might themselves to some extent be affected by status generalization processes. Yet, in the Hungarian school context, grades are communicated often openly (e.g., they are announced in class) and tend to be common knowledge among pupils. This fact is likely to reduce a possible confounding effect of differences in school performance. Nevertheless, future research might benefit from including more objective information on school performance (e.g., grades or test scores) and studying how it affects the relation between status characteristics and ability attributions.

In the case of gender, our results did not support our hypothesis. That is, although women are typically status disadvantaged in the larger Hungarian society, female pupils were not less likely to receive ability attributions than male pupils, as status characteristics theory would predict. This lack of effect might be explained by changing contents of gender stereotypes, especially in the school context. That is, given that today women tend to outperform men in terms of educational attainment in many member countries of the Organisation for Economic Cooperation and Development (OECD), including Hungary (Balázsi et al. 2013), status differences based on gender might be less related to assumptions about intelligence and more related to assumptions about leadership skills (Ridgeway 2011).

There was significant variation in some parameter estimates across classes, particularly among those related to gender and ethnicity. Future research could try to study the sources of such variation and thereby uncover contextual conditions

that make status generalization more or less likely to occur. In some classes, for example, differences in gender and ethnicity might have been more salient than in others because of differential treatment by teachers. Cohen and Lota (1995) have shown that teachers can reduce the effects that status characteristics have on interactions in small learning groups by highlighting that task completion requires multiple skills that are distributed across group members. This generates a mixed set of expectations that tends to undermine the dominance of any single status characteristic. Such treatments have the potential to create lasting effects that can spill over into contexts other than those in which they were applied (cf. Markovsky, Smith, and Berger 1984). If some teachers of the classes in our sample have applied such treatments (intentionally or unintentionally), they might have weakened generalization processes based on gender and ethnicity, and this might account for some of the variation observed across classes.

SUPPLEMENTAL MATERIAL

Additional supporting information may be found at spq.sagepub.com/supplemental.

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