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Taste or statistics? A correspondence study of ethnic, racial and religious labour market discrimination in Germany

Ethnic and Racial Studies

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"Taste or Statistics? A Correspondence Study of Ethnic, Racial, and Religious Labour Market Discrimination in Germany"

Ethnic and Racial Studies

2019

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S1. Descriptive statistics

Table S1: *Number of applications and mean callback by occupation and gender*

Occupation	Female	Male	∑	Mean callback by occupation
Cook	408	441	849	59%
Industrial Clerk	287	319	606	21%
Hotel Receptionist	235	274	509	61%
Sales Assistant	280	317	597	41%
Plant mechanic	-	961	961	59%
Mechatronic fitter	-	929	929	56%
Dental Assistant	566	-	566	70%
Medical Assistant	802	-	802	57%
∑	2,578	3,241	5,819	Ø 54%

Note: The differences in mean callback between males and females and across occupations do not affect our results. We found no evidence of significant interactions between the callback rate of particular jobs—which one can interpret as an indicator of labour shortages—and rates of discrimination against immigrants or specific phenotypical or religious groups.

Table S2: *Number of applications across ethnicity, religion, and phenotype treatments*

Ethnic group: n	Phenotypes			Religious affiliation signalled				
	White	Black	Asian	Christian	Muslim	Buddhist	Hindu	No religion
Albanians: 87	69	-	18	40	15	-	-	32
Bosnians: 91	91	-	-	37	25	-	-	29
British: 88	35	25	28	35	-	-	-	53
Bulgarians: 116	116	-	-	49	30	-	-	37
Chinese: 115	-	-	115	41	-	40	-	34
Dominicans: 83	25	58	-	46	-	-	-	37
Dutch: 70	70	-	-	32	-	-	-	38
Egyptians: 95	40	55	-	38	32	-	-	25
Ethiopians: 77	-	77	-	24	24	-	-	29
French: 113	35	42	36	74	-	-	-	39
Germans: 1,706	1,313	214	179	871	-	-	-	835
Greeks: 77	77	-	-	39	-	-	-	38
Indians: 99	58	-	41	-	34	-	33	32
Indonesians: 72	-	-	72	23	22	-	-	27
Iranians: 73	46	-	27	-	40	-	-	33
Iraqi: 67	36	-	31	-	33	-	-	34
Italians: 73	73	-	-	33	-	-	-	40
Japanese: 85	-	-	85	-	-	37	-	48
Macedonians: 96	76	-	20	41	30	-	-	25
Malaysians: 71	-	-	71	-	23	32	-	16
Mexicans: 57	46	-	11	33	-	-	-	24
Moroccans: 45	16	29	-	-	21	-	-	24
Nigerians: 125	-	125	-	46	38	-	-	41
Pakistani: 64	34	-	30	-	32	-	-	32
Poles: 83	83	-	-	39	-	-	-	44
Romanians: 65	43	-	22	38	-	-	-	27
Russians: 105	105	-	-	43	33	-	-	29
South Koreans:	-	-	129	45	-	48	-	36
Spaniards: 78	53	-	25	41	-	-	-	37
Swiss: 66	66	-	-	30	-	-	-	36
Trinidadians: 130	-	130	-	39	-	-	42	49
Turks: 1,213	785	-	428	-	645	-	-	568
Ugandans: 93	-	93	-	33	25	-	-	35
US Americans: 95	36	28	31	56	-	-	-	39
Vietnamese: 117	-	-	117	29	-	39	-	49
∑ 5,819	**3,427**	**876**	**1,516**	**1,895**	**1,102**	**196**	**75**	**2,551**

Table S3: *Mean scores of group level covariates by ethnic, religious and racial group*

	Mean education*	Mean values #
Ethnic group		
Albanians	2.06	.36
Bosnians	1.51	.42
British	2.37	.57
Bulgarians	2.13	.46
Chinese	2.61	.39
Dominicans	2.26	.46
Dutch	2.06	.61
Egyptians	1.87	.29
Ethiopians	1.86	.47
French	2.38	.58
Germans	1.84	.62
Greeks	1.47	.41
Indians	1.92	.40
Indonesians	2.07	.34
Iranians	2.50	.33
Iraqi	1.33	.27
Italians	1.39	.50
Japanese	2.80	.51
Macedonians	1.30	.21
Malaysians	2.07	.36
Mexicans	2.26	.46
Moroccans	1.53	.32
Nigerians	1.63	.28
Pakistani	1.72	.30
Poles	1.90	.30
Romanians	1.94	.42
Russians	1.82	.37
South Koreans	2.80	.45
Spaniards	1.80	.56
Swiss	2.32	.64
Trinidadians	2.26	.39
Turks	1.18	.34
Ugandans	1.8	.31
US Americans	2.48	.54
Vietnamese	1.84	.36
Religious group		
Christian	1.84	.47
Muslim	1.41	.34
Buddhist/Hindu	1.98	.38
Racial group		
White	1.66	.42
Black	1.85	.31
Asian	1.88	.38

*** Mikrozensus**

 # EVS/WVS:

The values scores in this table are absolute scores (instead of distance cores).

S2. Attractiveness

In 2018, we conducted a post-hoc test of the attractiveness of the final selection of photos that we had used in our correspondence study. To this end we conducted an online survey with Clickworker, a private survey company. About 2,300 online respondents (50% males and 50% females) judged three to seven photos on 7-point scales, with high values indicating high levels of attractiveness. Table S4 below provides the results of linear mixed-effects models of attractiveness on phenotype (or photo), gender and source of the pictures with random intercepts by person.

Table S4: *Linear mixed-effects regressions of attractiveness*

	Attractiveness		Attractiveness
Phenotype		**Subcategories**	
white	*reference*	Central European	*reference*
		Northern European	.05 (.05)
		Southern European	.16 (.05)
black	.01 (.03)	East African	.05 (.04)
		West African	.08(.04)
Asian	**-.33 (.03)*****	East Asian	**-.21 (.04)*****
		South-East Asian	**-.34 (.04)*****
Gender			
female	*reference*		*reference*
male	**-.31 (.02)*****		**-.33(.02)*****
Source			
stock photo	*reference*		*reference*
edited photo	**-.20 (.02)*****		**-.19 (.02)*****
Constant	5.08 (.03) ***		5.02 (.04) ***
N_{obs}	9,546		9,546
N_{pers}	2,307		2,307

Note: This table provides the results of linear mixed-effects models of attractiveness with random intercepts by person.
$^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$ (one-tailed)

In consequence of the large sample size (more than 9,000 observations), most differences are statistically significant. The results suggest that photos of females were generally rated to be more attractive than the photos of males. In a similar vein, original photos were rated to be more attractive than photos that had been edited with image software. Most importantly, photos of blacks were rated to be just as attractive as photos of whites. This holds true for the black phenotype category but also for the two black subcategories. Asian photos, by contrast, were rated as less attractive than photos of whites. Again, this finding applies to the Asian phenotype as well as to the two Asian subcategories.

S3. Robustness tests

S3.1 Logistic regression

Table S5: *Mixed-effect models with random intercepts regressions - logit models*

	Model 1: Baseline	**Model 2:** Education	**Model 3:** Value distance	**Model 4:** Education + value distance
Ethnicity (ref.: German)				
Turkish ethnicity	**-.39 (.09)*** **	-.17 (.13)	-.00 (.15)	.02 (.15)
Other non-German ethnicity	**-.21 (.07)** **	**-.23(.07)** **	.03 (.10)	-.02 (.11)
Phenotype (ref.: White)				
Black	**-.30 (.08)*** **	**-.35(.09)*** **	-.13 (.10)	-.18 (.11)$^{+}$
Asian	-.04 (.07)	-.13 (.08)$^{+}$	.05 (.07)	-.01 (.09)
Religion (ref.: Christian)				
No religion	-.06 (.07)	-.04 (.07)	-.01 (.08)	-.01 (.07)
Muslim	**-.29 (.09)** **	-.19 (.10)$^{+}$	-.12 (.11)	-.11 (.11)
Hindu/Buddhist	-.10 (.14)	-.20 (.15)	.01 (.15)	-.06 (.16)
Education level	**-**	**.13 (.05)** **	-	.06 (.06)
Value distance	-	-	**-.18 (.05)** **	**-.15 (.06)***
CONTROLS VARIABLES:	Yes	Yes	Yes	Yes
N (groups)	132	132	132	132
N (applications)	5,819	5,819	5,819	5,819

Note: Table S5 shows the results of random-effects logit regression models with standard errors clustered at the level of ethnicity-religion-race groups.
Standard errors in parentheses
$^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$ (one-tailed)

S3.2 Linear regression with weights

Table S6 shows the result linear regressions models with ethnicity clusters and weights. We weighted all 34 non-German ethnic groups equally in order to remove any potential biases resulting from the larger sample size of the Turkish group, as well as the smaller variations in sample size across the other groups.

Table S6: *Mixed-effect models with random intercepts – weighted by ethnic group*

	Model 1: Baseline	**Model 2:** Education	**Model 3:** Value distance	**Model 4** Education + value distance
Ethnicity (ref.: German)				
Turkish ethnicity	**-.07 (.03)***	-.03 (.03)	.00 (.03)	.01 (.03)
Other non-German ethnicity	**-.04 (.01)****	**-.05 (.01)*****	.01 (.02)	-.00 (.02)
Phenotype (ref.: White)				
Black	**-.07 (.02)*****	**-.08 (.02)*****	-.03 (.02)	-.04 (.02)
Asian	-.00 (.02)	-.02 (.02)	.02 (.02)	.01 (.03)
Religion (ref.: Christian)				
No religion	-.01 (.01)	-.00 (.01)	.00 (.01)	.00 (.01)
Muslim	**-.10 (.02)*****	**-.07 (.02)****	-.04(.03)$^{+}$	-.04 (.03)
Hindu/Buddhist	-.04 (.03)	-.06 (.03)$^{+}$	-.01 (.03)	-.02 (.03)
Education level		**.03 (.01)***		.01 (.01)
Value distance			**-.04 (.01)****	**-.03 (.01)***
CONTROLS VARIABLES:	Yes	Yes	Yes	Yes
N (groups)	132	132	132	132
N (applications)	5,819	5,819	5,819	5,819

Note: Table S6 shows the results of mixed-effects linear regression models with weights to correct for the oversampled group of Turkish job candidates.
Standard errors in parentheses
$^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$ (one-tailed)

S3.3 Subgroups regressions

In Table S7 we split the sample in male versus female applicants (models 1-2); jobs with low (cook, industrial office clerk, plant mechanic, and mechatronic fitter) and high customer contact (models 3-4); and jobs with a lower (cook, salesperson, plant mechanic, and dental assistant) and a higher required level of schooling (models 5-6).

Table S7: *Mixed-effect models with random intercepts regressions - subgroup models*

	Model 1:	**Model 2:**	**Model 3:**	**Model 4:**	**Model 5:**	**Model 6:**
	female	male	Low customer contact	High customer contact	Low skilled jobs	High skilled jobs
Ethnicity (ref.: German)						
Turkish ethnicity	.01 (.08)	.03 (.04)	.01 (.04)	.01 (.09)	.01 (.07)	.02 (.05)
Other non-German ethnicity	.01 (.05)	.00 (.03)	-.01 (.03)	.01 (.06)	-.01 (.05)	.02 (.03)
Education level	.00 (.02)	.02 (.01)	.02 (.01)	.00 (.02)	.02 (.01)	.00 (.01)
Value distance	**-.05 (.02)****	**-.04 (.01)****	**-.04 (.01)*****	**-.05 (.02)****	**-.04 (.02)****	**-.05 (.01)*****
CONTROLS VARIABLES:	Yes	Yes	Yes	Yes	Yes	Yes
N (groups)	131	132	132	131	132	132
N (applications)	2,578	3,241	3,345	2,474	2, 973	2,846
R^2 within/between	.07 / .09	.07 / .24	.09 / .15	.05 / .09	.04 / .07	.10 / .15
R^2 overall	.08	.08	.10	.06	.05	.10

Note: Table S7 shows the results of separate random-effects linear regression models for different subgroups (standard errors are clustered at the ethnicity-religion-race level). To reduce the problem of increased standard errors because of lower sample size, we reduce the models to a simpler form and remove all variables except for ethnicity, gender and occupation and the two group-level covariates of interest: level of education and value distance. Standard errors in parentheses

^{+}p <.10, $^{*}p$ < .05, $^{**}p$ < .01, $^{***}p$ < .001 (one-tailed)

S3.4 Regression with alternative productivity indicators

In Table S8 we rerun Table 1 models 2 and 4 with alternative indicators of group-level productivity. In Table S8 model 1-2 we replace average level of education with group's average occupational status (ISEI - International Socio-Economic Index of Occupational Status) and in models 3-4 we replace average level of education with groups' share of unemployed.

Table S8: *Mixed-effect models with random intercepts – alternative productivity indicators*

	Model 1: Occupational status	**Model 2:** Occupational status + value distance	**Model 3:** Share of unemployed	**Model 4:** Share of unemployed + value distance
Ethnicity (ref.: German)				
Turkish ethnicity	-.01 (.03)	.00 (.03)	-.03 (.03)	-.01 (.03)
Other non-German ethnicity	-.02 (.02)	-.00 (.02)	-.01 (.02)	.00 (.02)
Phenotype (ref.: White)				
Black	-.03 (.02)	-.03 (.02)	.02 (.03)	.00 (.03)
Asian	-.00 (.02)	.00 (.02)	-.01 (.02)	.00 (.02)
Religion (ref.: Christian)				
No religion	-.01 (.02)	-.01 (.02)	-.00 (.02)	-.00 (.02)
Muslim	-.03 (.02)	-.03 (.02)	-.03 (.02)	-.03 (.02)
Hindu/Buddhist	-.03 (.03)	-.02 (.04)	-.03 (.03)	-.01 (.04)
Productivity indicator	**.02 (.01)*** **	.01 (.01)	**-.02 (.01)*** **	-.01 (.01)
Value distance	-	-.02 (.03)	-	-.02 (.02)
CONTROLS VARIABLES:	Yes	Yes	Yes	Yes
N (groups)	132	132	132	132
N (applications)	5,819	5,819	5,819	5,819

Note: Table S8 shows the results of separate random-effects linear regression models for different measures of group-level productivity.
Standard errors in parentheses
$^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$ (one-tailed)

S4. Moderation Analyses

Table S9: *Linear mixed-effects models with interactions between ethnicity, phenotype, and religion*

TREATMENTS	**Model 1:** Ethnicity * Phenotype	**Model 2:** Ethnicity * Religion	**Model 3:** Phenotype * Religion
Ethnicity (ref.: Other non-German)			
German	**.04 (.02)***	**.05 (.02)***	**.05 (.02)****
Turkish	-.03 (.02)	**-.08 (.02)****	**-.04 (.02)***
Phenotype (ref.: White)			
Black	**-.08 (.02)****	**-.07 (.02)*****	**-.07 (.03)****
Asian	.00 (.02)	-.01 (.02)	-.02 (.02)
Religion (ref.: none)			
Christian	-.01 (.02)	.01 (.02)	.00 (.02)
Muslim	**-.05 (.02)****	**-.10 (.03)*****	**-.05 (.02)***
Hindu/Buddhist	-.01 (.03)	-.02 (.03)	.12 (.12)
INTERACTIONS			
German # Black	.05 (.04)		
German # Asian	.00 (.04)		
Turkish # Black	empty		
Turkish # Asian	-.04 (.04)		
German # Christian		-.01 (.03)	
German# Muslim		empty	
German# Buddhist / Hindu		empty	
Turkish# Christian		empty	
Turkish# Muslim		**-.10 (.04)***	
Turkish# Buddhist / Hindu		empty	
Black # Christian			.01 (.04)
Black # Muslim			-.00 (.06)
Black # Buddhist / Hindu			-.09 (.14)
Asian # Christian			.05 (.04)
Asian # Muslim			.01 (.04)
Asian # Buddhist / Hindu			-.13 (.12)
CONTROLS VARIABLES:	Yes	Yes	Yes
N (groups)	132	132	132
N (applications)	5,819	5,819	5,819

Note: Table S9 shows the results of random-intercept linear regression models on interaction terms between the three main explanatory variables (ethnicity, phenotype, and religion) with standard errors clustered at the level of ethnicity-religion-race groups. Note, we changed the reference categories in order to have meaningful reference categories for the interaction terms.

Standard errors in parentheses

$^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$ (one-tailed)

Table S10: *Linear mixed-effects models with interactions between grades and ethnicity, phenotype, and religion*

TREATMENTS	**Model 1:** Grades * ethnicity	**Model 2:** Grade* phenotype	**Model 3:** Grade* religion
Ethnicity (ref.: German)			
Turkish	**-.09 (.03)****	**-.09 (.02)*****	**-.09 (.02)*****
Other non-German	**-.06 (.02)***	**-.05 (.02)****	**-.05 (.02)****
Phenotype (ref.: White)			
Black	**-.07 (.02)*****	**-.07 (.03)***	**-.07 (.02)*****
Asian	-.01 (.02)	-.00 (.02)	-.01 (.02)
Religion (ref.: Christian)			
No	-.01 (.02)	-.01 (.02)	.01 (.02)
Muslim	**-.07 (.02)****	**-.07 (.02)****	**-.06 (.03)***
Hindu/Buddhist	-.02 (.03)	-.02 (.03)	-.02 (.05)
Grades (ref.: satisfactory)			
good	**.04 (.02)+**	**.05 (.02)****	**.07(.02)****
INTERACTIONS	Turkish # Good -.01 (.04) Other non-German # Good .02 (.03)	Black # Good -.01 (.03) Asian # Good -.01 (.03)	No religion # Good -.04 (.03) Muslim # Good -.02 (.04) Buddhist or Hindu # Good -.00 (.06)
CONTROLS VARIABLES:	Yes	Yes	Yes
N (groups)	132	132	132
N (applications)	5,819	5,819	5,819

Note: Table S10 shows the results of random-intercept linear regression models on interaction terms between the three main explanatory variables (ethnicity, phenotype, and religion) and grades with standard errors clustered at the level of ethnicity-religion-race groups.
Standard errors in parentheses
$^{+}p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$ (one-tailed)

S5. Mediation Analyses

To formally test whether value and mean education distance mediate the effects of ethnicity signals, in Table S11 we show the results of Sobel-Goodman mediation tests[1] with bootstrapping for the path from Turkish (model 1), other non-German ethnics (2), black phenotype (3), and Muslim religiosity (model 4), respectively, to employer responses.

Table S11: *Mediation analyses*

	Model 1: Turkish	**Model 2: Other non-German**	**Model 3: Muslim**	**Model 4: Black**
MEDIATOR:	Bootstrapped indirect effect	Bootstrapped indirect effect	Bootstrapped indirect effect	Bootstrapped indirect effect
Level of education	-.03, ns.	.05, p<.05	-.02, p<.05	.02, p<.05
Value distance	-.07, p<.05	-.03, p<.05	-.06, p<.05	-.03, p<.05

Note: Indirect effects (bootstrapped results, 1000 replications, with percentile-based and bias-corrected CI tables) resulting from Sobel Goodman mediation tests (with control variables). All mediator variables are standardized (M=0, SD = 1).

Overall, the mediation tests suggest that the negative relation between ethnicity signals and callback is by far and large explained by value distance. Controlling for all individual-level covariates as well as the respective other signals, we find that the indirect path through value distance is highly significant in each case. Similar mediation tests for mean level of education, however, reveal mixed results. While for Turkish job applicants the path through education was insignificant, for other non-German and black job candidates the indirect effects had positive signs; disqualifying mean education as the explanation for lower response rates. For Muslim job candidates, the indirect effect of mean education was as expected negative and significant, but it was much smaller than the indirect effect of value distance.

[1] We used the *sgmediation* command in STATA and bootstrapping (1000 replications). The *sgmediation* command ignores the clustered nature of our data. However, when instead running multilevel mediation tests with the *mlmediation* command, the pattern of results hardly changes.