

Should We Worry About Problematic Response Behaviour in Social Media Surveys? Understanding the Impact of Social Group Cues in Recruitment

Online Appendix

Table A1. Facebook ad set campaign setup.

#	Ad set	No. of ads	Targeting parameters	Ad text*	Daily budget (€)	Included in analysis
1	Muslim women	15	Germany, women, 18-65+	Are you a female Muslim? Then take part in our survey on the topic of 'Working life and job search' now!	220.00	Yes
2	Muslim men	10	Germany, men, 18-65+	Are you a male Muslim? Then take part in our survey on the topic of 'Working life and job search' now!	90.00	Yes
3	General population, women	5	Germany, women, 18-65+	Click here to take part in a short survey on the topic of 'Working life and job search' and become part of a nationwide study.	10.00	Yes
4	General population, men	5	Germany, men, 18-65+	Click here to take part in a short survey on the topic of 'Working life and job search' and become part of a nationwide study.	10.00	Yes
5	Unclassified framing (excluded from analysis)	5	Germany, 18-65+	Click here to take part in a short survey on the topic of 'Working life and job search' and become part of a nationwide study.	10.00	No
6	Unclassified framing (excluded from analysis)	5	Germany, 18-65+	Click here to take part in a short survey on the topic of 'Working life and job search' and become part of a nationwide study.	10.00	No
Total		45	-		350.00	

Note: *All ad texts are translated into English for illustrative purposes; see Figure 2 for original configurations. In the last week of recruitment, ad set #1 was deactivated by Meta due to the direct address "Are you ...", as this implies personal information that could possibly be perceived negatively (Meta, n.d.). Following the deactivation, the ad text was reworded to maintain social group cues while complying with Meta's guidelines: "Take part in our survey on the situation of Muslim women on the German labour market now!"

Table A2. Facebook ad set campaign performance metrics and costs incl. #5 and #6 adset.

#	Ad set	Impression	Link clicks	CTR (%)	SI (% of LC)	CI (% of SI)	Total cost (€)	Avg. cost per LC (€)	Avg. cost per CI (€)
1	Muslim women	507,990	8,767	1.7	2,555 (29.1)	911 (35.7)	2,277.46	0.26	2.50
2	Muslim men	256,508	3,861	1.5	1,828 (47.4)	807 (44.2)	1,026.49	0.27	1.27
3	General population, women	54,805	720	1.3	321 (44.6)	148 (46.1)	240.94	0.34	1.63
4	General population, men	80,044	673	0.8	216 (32.1)	89 (41.2)	244.92	0.36	2.75
5	Unclassified framing (excluded from analysis)	42,023	1151	2.7	617 (53.6)	328 (53.2)	235.76	0.20	0.72
6	Unclassified framing (excluded from analysis)	43,829	1860	4.2	1,467 (78.9)	739 (50.4)	233.56	0.13	0.32
	Total	985,199	17,032	1.7	7,054 (41.4)	3,022 (42.8)	4,259.13	0.25	1.41

Note: CTR = Click-Through Rate; LC = Link clicks; SI = started interviews; CI = completed interviews. n.a. = not applicable.

Table A3. Index items: tolerance toward Muslim practices.

Source	Own development.
Question	To what extent do you agree with the following statements?
Sub-questions	1. Islam fits into German society. 2. The practice of the Islamic faith in Germany should be restricted. 3. Muslim women should be allowed to wear headscarves at work. 4. Muslim men should be allowed to attend Friday prayers during working hours.
Answer options	1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree

Table A4. Index items: perception of anti-Muslim discrimination.

Source	Own development based on Breyer and Danner (2015).
Question	We are now interested in your assessment of the experiences of Muslims in Germany. To what extent do the following statements apply?
Sub-questions	1. In Germany, Muslims are repeatedly treated with less respect than others. 2. Muslims are praised less often than others at school or in training, regardless of how good they are. 3. Muslims are rejected more often than others when looking for work, even if they have equally good references. 4. Muslims are paid less than others for the same work. 5. Muslims can only achieve something if they work harder than others.
Answer options	1 = Does not apply at all 2 = Does somewhat not apply 3 = Somewhat applies 4 = Fully applies

Table A5. Index items: concerns about religious and racial intolerance.

Source	Own creation.
Question	How about the following areas – are you concerned about them?
Sub-questions	1. Islamophobia in Germany 2. Xenophobia and hatred of foreigners in Germany 3. Anti-Muslim racism in Germany 4. Anti-Black racism in Germany
Answer options	1 = Very concerned 2 = Somewhat concerned 3 = Not concerned

Table A6. Three-class model fit regressions for each response quality indicator.

	Class 1	Class 2	Class 3	Wald
Speeding	-3.87	-2.82	0.82	9.44**
Non-differentiation	-2.84	-2.37	-2.40	2.57
Item non-response	-2.97	-2.78	-1.24	17.33***
Duplicate enrolments	-4.29	-2.71	-1.82	17.39***
Referral source	-4.94	-2.44	-3.12	8.69*
Implausible information	-9.79	1.73	-2.77	0.85
Content quality	-2.57	-1.22	-2.62	16.85***

Note: N = 1,955. * p <.05, ** p < .01, ***<.001.

Table A7. Linear regression models on concerns regarding religious and racial intolerance in Germany.

	(1) Full	(2) Class 1 only	(3) Class 1&2	(4) Class 1&3
Ad sets (ref. Muslim, women #1)				
#2 Muslim, men	-0.358*** (0.057)	-0.332*** (0.061)	-0.357*** (0.059)	-0.337*** (0.059)
#3 General population, women	0.084 (0.221)	0.094 (0.255)	0.09 (0.252)	0.089 (0.223)
#4 General population, men	-0.156 (0.289)	-0.064 (0.322)	-0.069 (0.321)	-0.15 (0.289)
Religiousness - Prayer (ref. daily)				
weekly	-0.228* (0.115)	-0.22 (0.117)	-0.252* (0.117)	-0.196 (0.115)
monthly	-0.102 (0.151)	-0.027 (0.134)	-0.025 (0.134)	-0.102 (0.151)
rare	0.002 (0.079)	-0.005 (0.083)	-0.01 (0.08)	0.008 (0.082)
never	-0.178* (0.074)	-0.127 (0.079)	-0.156* (0.077)	-0.151* (0.076)

Interaction: Ad set x prayer				
<i>Muslim, men # weekly</i>	0.252 (0.164)	0.245 (0.17)	0.266 (0.168)	0.233 (0.165)
<i>Muslim, men # monthly</i>	0.102 (0.208)	-0.043 (0.2)	-0.02 (0.199)	0.083 (0.208)
<i>Muslim, men # rare</i>	0.052 (0.129)	0.067 (0.135)	0.059 (0.133)	0.06 (0.131)
<i>Muslim, men # never</i>	0.001 (0.094)	-0.037 (0.1)	-0.002 (0.096)	-0.032 (0.097)
<i>General population, women # weekly</i>	0.707** (0.27)	0.690* (0.297)	0.726* (0.295)	0.670* (0.271)
<i>General population, women # monthly</i>	0.46 (0.275)	0.381 (0.294)	0.381 (0.293)	0.457 (0.276)
<i>General population, women # rare</i>	0.124 (0.263)	0.169 (0.291)	0.169 (0.288)	0.121 (0.265)
<i>General population, women # never</i>	0.414 (0.237)	0.387 (0.271)	0.388 (0.268)	0.411 (0.239)
<i>General population, men # weekly</i>	-0.12 (0.356)	-0.222 (0.384)	-0.188 (0.383)	-0.153 (0.357)
<i>General population, men # monthly</i>	0.005 (0.481)	-0.166 (0.498)	-0.164 (0.496)	0.002 (0.482)
<i>General population, men # rare</i>	0.301 (0.346)	0.173 (0.377)	0.173 (0.376)	0.299 (0.346)
<i>General population, men # never</i>	0.387 (0.308)	0.251 (0.339)	0.274 (0.338)	0.365 (0.308)
Religious affiliation (ref. Christian)				
<i>Muslim</i>	0.886*** (0.064)	0.888*** (0.066)	0.908*** (0.065)	0.868*** (0.065)
<i>other or none</i>	0.249*** (0.064)	0.239*** (0.068)	0.251*** (0.067)	0.237*** (0.065)
Age	0.000 (0.002)	0.000 (0.002)	0.001 (0.002)	0.000 (0.002)
Employment (ref. unemployed)				
<i>employed</i>	0.088* (0.04)	0.111** (0.043)	0.118** (0.041)	0.081 (0.042)
region (ref. new federal states)				
<i>old federal states</i>	0.223*** (0.048)	0.218*** (0.053)	0.224*** (0.05)	0.218*** (0.05)
Country of origin (ref. Germany)				
<i>predominantly Muslim</i>	-0.183*** (0.048)	-0.147** (0.05)	-0.172*** (0.049)	-0.161** (0.049)
<i>Another country</i>	-0.144 (0.081)	-0.135 (0.092)	-0.148 (0.086)	-0.133 (0.085)
Intercept	1.422*** (0.109)	1.434*** (0.118)	1.391*** (0.113)	1.459*** (0.113)
N	1577	1373	1451	1499
Adjusted R ²	0.198	0.196	0.205	0.189
Root Mean Squared Error	0.718	0.708	0.709	0.718

Note: Coefficients from linear regression models with robust standard errors. * p < .05, ** p < .01, *** < .001. Parentheses report standard errors.

Table A8. Linear regression models on attitude that Muslim individuals face more discrimination than other people in Germany.

	(1) Full	(2) Class 1 only	(3) Class 1&2	(4) Class 1&3
Ad sets (ref. Muslim, women #1)				
#2 Muslim, men	-0.306*** (0.076)	-0.308*** (0.08)	-0.307*** (0.077)	-0.307*** (0.078)
#3 General population, women	0.243 (0.29)	0.254 (0.333)	0.254 (0.331)	0.245 (0.292)
#4 General population, men	-0.695* (0.294)	-0.835** (0.298)	-0.832** (0.297)	-0.695* (0.295)
Religiousness - Prayer (ref. daily)				
weekly	-0.274 (0.141)	-0.286* (0.143)	-0.316* (0.142)	-0.243 (0.142)
monthly	-0.233 (0.17)	-0.143 (0.151)	-0.143 (0.15)	-0.232 (0.17)
rare	-0.046 (0.086)	-0.064 (0.088)	-0.048 (0.085)	-0.06 (0.088)
never	-0.173 (0.092)	-0.113 (0.096)	-0.14 (0.094)	-0.146 (0.094)
Interaction: Ad set x prayer				
Muslim, men # weekly	0.192 (0.211)	0.201 (0.217)	0.241 (0.214)	0.151 (0.214)
Muslim, men # monthly	0.312 (0.253)	0.201 (0.247)	0.189 (0.247)	0.322 (0.253)
Muslim, men # rare	-0.079 (0.157)	-0.008 (0.162)	-0.066 (0.159)	-0.028 (0.16)
Muslim, men # never	-0.139 (0.121)	-0.163 (0.13)	-0.151 (0.126)	-0.152 (0.125)
General population, women # weekly	0.257 (0.334)	0.262 (0.37)	0.299 (0.368)	0.219 (0.335)
General population, women # monthly	0.535 (0.407)	0.458 (0.432)	0.458 (0.433)	0.533 (0.406)
General population, women # rare	0.199 (0.319)	0.219 (0.359)	0.201 (0.358)	0.214 (0.32)
General population, women # never	0.322 (0.307)	0.293 (0.351)	0.3 (0.349)	0.312 (0.309)
General population, men # weekly	0.323 (0.352)	0.488 (0.357)	0.512 (0.355)	0.296 (0.353)
General population, men # monthly	0.975** (0.342)	1.037** (0.337)	1.031** (0.336)	0.977** (0.343)
General population, men # rare	0.642 (0.378)	0.687 (0.369)	0.664 (0.367)	0.661 (0.38)
General population, men # never	0.934** (0.315)	1.041** (0.319)	1.070*** (0.318)	0.905** (0.316)
Religious affiliation (ref. Christian)				
Muslim	0.886*** (0.076)	0.906*** (0.08)	0.924*** (0.078)	0.870*** (0.078)
other or none	0.326*** (0.073)	0.336*** (0.078)	0.334*** (0.076)	0.326*** (0.075)
Age	-0.002 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)
Employment (ref. unemployed)				
employed	-0.031 (0.052)	-0.007 (0.054)	0.008 (0.053)	-0.047 (0.053)
region (ref. New federal states)				
old federal states	0.190** (0.064)	0.166* (0.068)	0.179** (0.067)	0.179** (0.066)
Country of origin (ref. Germany)				
predominantly Muslim	-0.157* (0.092)	-0.136* (0.096)	-0.139* (0.094)	-0.154* (0.094)

	(0.063)	(0.066)	(0.064)	(0.064)
<i>Another country</i>	-0.177	-0.185	-0.158	-0.204
	(0.108)	(0.12)	(0.113)	(0.115)
Intercept	1.992***	2.021***	1.968***	2.036***
	(0.14)	(0.151)	(0.145)	(0.145)
N	1571	1368	1445	1494
Adjusted R ²	0.14	0.148	0.151	0.137
Root Mean Squared Error	0.912	0.885	0.895	0.904

Note: Coefficients from linear regression models with robust standard errors. * p <.05, ** p < .01, *** <.001. Parentheses report standard errors.

Table A9. Linear regression models on tolerance for Muslim religious practice.

	1 Full	2 Class 1 only	3 Class 1&2	4 Class 1&3
Ad sets (ref. Muslim, women #1)				
#2 Muslim, men	-0.079 (0.067)	-0.037 (0.07)	-0.067 (0.068)	-0.052 (0.069)
#3 General population, women	0.083 (0.34)	0.175 (0.374)	0.184 (0.369)	0.077 (0.344)
#4 General population, men	-0.609* (0.287)	-0.59 (0.329)	-0.593 (0.33)	-0.607* (0.286)
Religiousness - Prayer (ref. daily)				
weekly	-0.464** (0.147)	-0.470** (0.153)	-0.492** (0.15)	-0.441** (0.15)
monthly	-0.261 (0.195)	-0.184 (0.183)	-0.18 (0.182)	-0.261 (0.196)
rare	-0.316*** (0.094)	-0.300** (0.098)	-0.317*** (0.095)	-0.299** (0.097)
never	-0.625*** (0.096)	-0.601*** (0.102)	-0.634*** (0.1)	-0.592*** (0.098)
Interaction: Ad set x prayer				
Muslim, men # weekly	-0.056 (0.203)	-0.039 (0.209)	-0.055 (0.209)	-0.038 (0.204)
Muslim, men # monthly	-0.144 (0.26)	-0.289 (0.259)	-0.26 (0.257)	-0.17 (0.261)
Muslim, men # rare	-0.14 (0.157)	-0.15 (0.16)	-0.136 (0.158)	-0.154 (0.159)
Muslim, men # never	-0.199 (0.115)	-0.228 (0.125)	-0.184 (0.12)	-0.242* (0.119)
General population, women # weekly	1.122** (0.405)	1.029* (0.434)	1.053* (0.429)	1.097** (0.408)
General population, women # monthly	0.495 (0.538)	0.332 (0.552)	0.33 (0.551)	0.491 (0.538)
General population, women # rare	0.628 (0.377)	0.554 (0.409)	0.563 (0.404)	0.615 (0.381)
General population, women # never	0.878* (0.357)	0.800* (0.392)	0.771* (0.388)	0.900* (0.36)
General population, men # weekly	1.045** (0.368)	1.022* (0.406)	1.063** (0.405)	1.004** (0.369)
General population, men # monthly	0.816 (0.655)	0.706 (0.676)	0.724 (0.674)	0.796 (0.657)
General population, men # rare	0.848* (0.33)	0.811* (0.375)	0.821* (0.376)	0.836* (0.329)
General population, men # never	1.237*** (0.314)	1.156** (0.355)	1.181*** (0.356)	1.213*** (0.313)
Religious affiliation (ref. Christian)				
Muslim	1.097*** (0.085)	1.080*** (0.091)	1.126*** (0.087)	1.053*** (0.088)
other or none	0.287*** (0.314)	0.301*** (0.355)	0.324*** (0.356)	0.263** (0.313)

Age	(0.084)	(0.09)	(0.088)	(0.085)
	-0.009*** (0.002)	-0.010*** (0.002)	-0.009*** (0.002)	-0.010*** (0.002)
Employment (ref. unemployed) <i>employed</i>	0.012 (0.047)	0.056 (0.05)	0.043 (0.049)	0.025 (0.049)
region (ref. New federal states) <i>old federal states</i>	0.262*** (0.06)	0.263*** (0.064)	0.250*** (0.062)	0.275*** (0.062)
Country of origin (ref. Germany) <i>predominantly Muslim</i>	-0.181** (0.056)	-0.139* (0.059)	-0.179** (0.058)	-0.145* (0.057)
	-0.193 (0.103)	-0.188 (0.114)	-0.152 (0.106)	-0.232* (0.11)
Intercept	2.413*** (0.142)	2.435*** (0.154)	2.399*** (0.148)	2.441*** (0.148)

N	1578	1374	1452	1500
Adjusted R ²	0.355	0.361	0.363	0.353
Root Mean Squared Error	0.865	0.851	0.858	0.859

Note: Coefficients from linear regression models with robust standard errors. * p <.05, ** p < .01, *** <.001. Parentheses report standard errors.

Appendix - References

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