

APPENDIX

Smartphone Bans and Workplace Performance

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Appendix A Supplementary Figures and Tables – Field Experiment



Interviewer wanted!

We are looking for support with a representative telephone survey on the television habits of the German people. The interviews are starting now. For your support during an approximately four hour long shift at the *Institute for Labour Law and Industrial Relations in the European Union* at the University of Trier, Campus II, you will receive a compensation of **30 Euros!**

Interested candidates should apply as soon as possible with our online form which can be found at <http://www.iaaeu.de/de/tvstudie>. The more flexible you are with the shifts you can work, the greater the possibility is that we will be able to accept your application. The only prerequisite for the position is an acceptable German language competence.

For answers to any questions concerning the job, feel free to contact the leader of the study Dr. Adrian Chadi (tvstudie@iaaeu.de).

Scan the QR-Code to go directly to the online application form!



Figure A.1: Job offer poster.



Figure A.2: Example photograph of employees' office.



Figure A.3: Example photograph of employees' workplace: Control Treatment (left) and Ban Treatments (right).

1200

		Telefonnummer	Inexistent	Niemand da	AB	Besetzt	Später	Ablehnung	Interview
53051	0	0176 34373873	X						
53052	0	09721 [redacted]		X					
53053	0	06708 6417972	X						
53054	0	06532 [redacted]			X				
53055	0	0163 3792785	X						
53056	0	0152 31415322	X						
53057	0	0160 92497144	X						
53058	0	0175 [redacted]			X				
53059	0	02137 9299438	X						
53060	0	08191 [redacted]		X					
53061	0	0175 [redacted]			X				
53062	0	0176 [redacted]			X				
53063	0	0361 [redacted]						X	
53064	0	02631 4003125	X						
53065	0	0921 61449	X						
53066	0	06071 8298074	X						
53067	0	0451 6092499	X						
53068	0	02662 2136	X						
53069	0	0176 45020146	X						
53070	0	09086 9209112	X						
53071	0	02066 3937037	X						
53072	0	0176 31899286	X						
53073	0	09562 [redacted]		X					
53074	0	02302 [redacted]			X				
53075	0	0172 [redacted]		X					
53076	0	089 95470665	X						
53077	0	0162 1267707	X						
53078	0	0176 38935576	X						
53079	0	0221 [redacted]		X					
53080	0	089 [redacted]		X					
53081	0	0561 [redacted]				X			
53082	0	02924 858808	X						
53083	0	0173 [redacted]		X					
53084	0	07271 [redacted]						X	
53085	0	089 92306099	X						
53086	0	09401 [redacted]			X				
53087	0	06083 414043	X						
53088	0	0152 [redacted]			X				
53089	0	0821 [redacted]						X	
53090	0	0152 [redacted]				X			
53091	0	0761 4002768	X						
53092	0	06142 [redacted]		X					
53093	0	06477 [redacted]							X
53094	0	06232 1207301	X						
53095	0	0175 [redacted]					X		
53096	0	04761 7208300	X						
53097	0	02224 972161	X						
53098	0	02362 9996387	X						
53099	0	0351 [redacted]						X	
53100	0	03581 [redacted]			X				

Figure A.4: Record sheet. *Note: For the sake of data protection, numbers of actual households are blacked out, while numbers that were not leading to existing households (at the time of the telephone survey) are visible.*

Telefonnummer: [REDACTED]
 Uhrzeit Anruf: 10 37 : 10 46 Geschlecht: weiblich ☐ männlich ☒

Guten Tag, mein Name ist _____. Ich rufe an von der Universität Trier und würde mich sehr über Ihre Unterstützung bei einem Forschungsprojekt zum Thema Freizeit und Fernsehkonsum freuen. Ich möchte Ihnen hierzu ein paar Fragen stellen und brauche dazu die volljährige Person in Ihrem Haushalt, die als letztes Geburtstag hatte. Sind Sie diese Person und hätten ca. fünf Minuten Zeit?

Einstiegsfragen	Ja	Mehr oder weniger	Nein	Weiß nicht/ keine Antwort
1. Sind Sie zufrieden mit der Qualität des deutschen Fernsehprogramms?		X		
2. Ist die Programmqualität bei den Privatsendern in Ihren Augen ähnlich zu der bei den öffentlich-rechtlichen?			X	
3. Würden Sie sagen, dass das öffentlich-rechtliche Fernsehprogramm einen Bildungsauftrag erfüllt?	X			
4. Fühlen Sie sich durch die politische Berichterstattung bei den öffentlich-rechtlichen Sendern umfassend informiert?	X			

5. Wie viel Euro GEZ-Gebühr halten Sie im Monat für gerechtfertigt?	20 (in Euro)
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(Zahl eintragen, ggf. '0' oder bei Aussageverweigerung rechts im grauen Feld ein Kreuz eintragen.)

	Information	Unterhaltung	Sowohl als auch	Weder noch	Weiß nicht/ keine Antwort
6. Schauen Sie eher fern, um sich zu informieren oder eher zur Unterhaltung?			X		

(Wenn die befragte Person nicht fernschaut, dann 'weder noch' ankreuzen)

	Ja	Mehr oder weniger	Nein	Weiß nicht/ keine Antwort
7. Stimmen Sie zu, dass Fernsehen schlecht für eine Gesellschaft ist, da Fernsehkonsum die Gesundheit negativ beeinträchtigt?			X	

8. Wie viel Zeit (in Std. bzw. Min.) entfällt bei Ihnen pro Tag im Durchschnitt auf Hobbies und sonstige Freizeitaktivitäten?	2 Std.	
9. Wie viel Zeit (in Std. bzw. Min.) entfällt bei Ihnen pro Tag im Durchschnitt auf Fernsehschauen?	1 Std.	

! Wenn die befragte Person nicht fernschaut, dann '0' eintragen und → zur Frage 11 springen. !

	Ja	Nein	Weiß nicht/ keine Antwort
10. Werden Sie Ihren Fernsehkonsum in nächster Zeit reduzieren?		X	

Nun benötige ich noch ein paar allgemeine Informationen.

Demographische Fragen	Antworten eintragen:	Weiß nicht/ keine Antwort
11. Wie viele Erwachsene leben in Ihrem Haushalt, Sie selbst mit eingeschlossen?	1	
12. Nennen Sie bitte Ihr Geburtsjahr und das der anderen Haushaltsmitglieder?*	1969	
13. Wie viele Festnetznummern stehen in Ihrem Haushalt zur Verfügung?	1	
14. Über wie viele Handynummern sind Sie persönlich zu erreichen?	2	
15. Nennen Sie bitte Ihre Postleitzahl und Ihren Wohnort:	81673, München	

(*Jahreszahlen mit Kommata getrennt auflisten)

	Ja	Nein	Weiß nicht/ keine Antwort
16. Haben Sie Ende der 1980er Jahre in Westdeutschland gelebt?	X		

! Falls die Antwort 'Nein' lautet, dann → zur Frage 24 springen. !

Bitte wenden Sie den Bogen!

Figure A.5: Survey questionnaire.

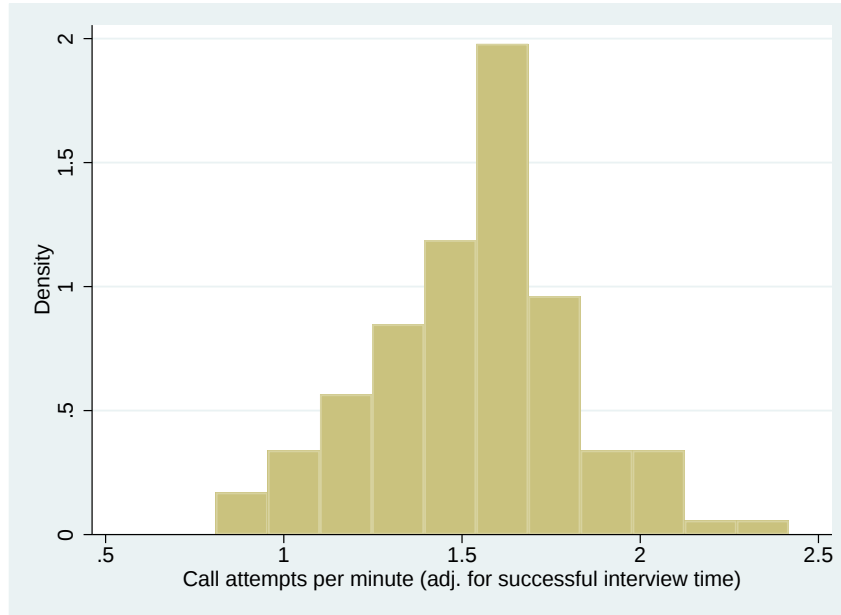


Figure A.6: Histogram of call attempts per minute pooled over all treatments. Shapiro-Wilk test for normality does not reject the hypothesis of a normally distributed variable ($p = 0.525$).

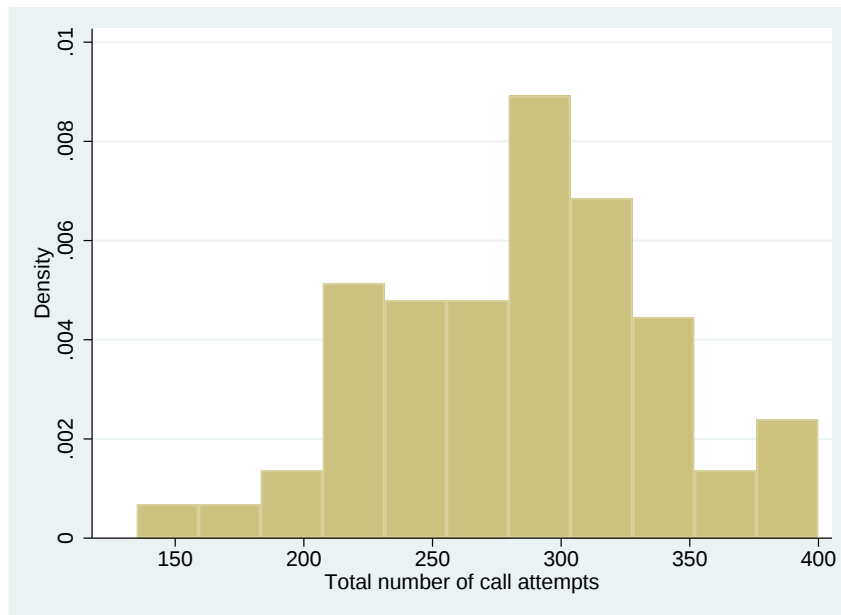


Figure A.7: Histogram of the number of call attempts pooled over all treatments. Shapiro-Wilk test for normality does not reject the hypothesis of a normally distributed variable ($p = 0.629$).

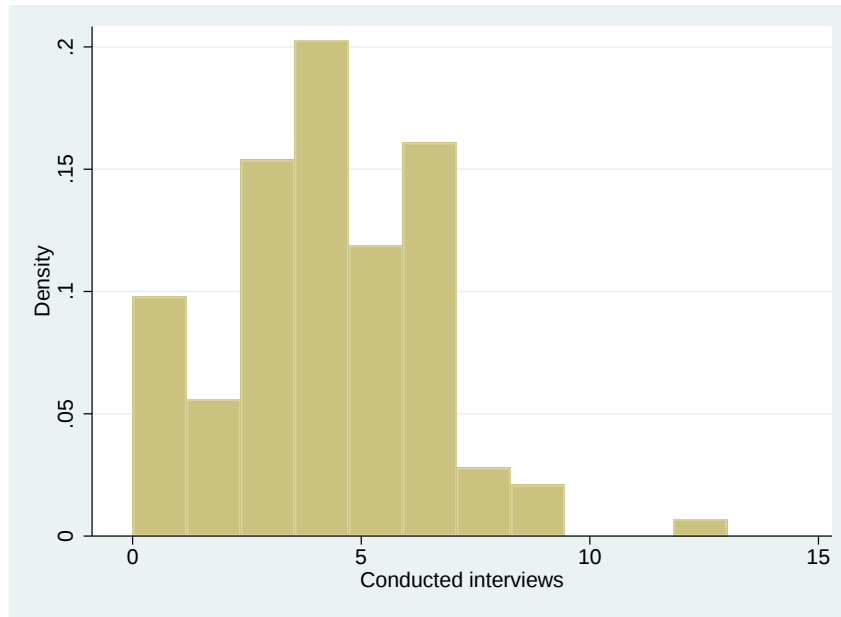


Figure A.8: Histogram of conducted interviews pooled over all treatments. Shapiro-Wilk test for normality rejects the hypothesis of a normally distributed variable ($p = 0.041$).

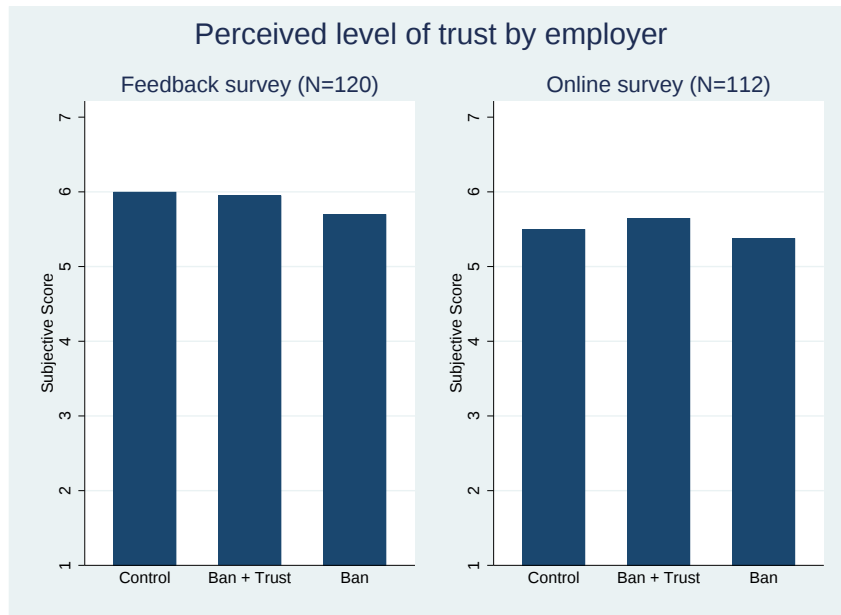


Figure A.9: Left panel: Feedback data (“I felt that the head of the TV study put a large amount of trust in me.”). Right panel: Online survey data (“I felt a large amount of trust by the leadership of the TV study.”). Scores are reported on a Likert scale from 1 (“completely disagree”) to 7 (“completely agree”).

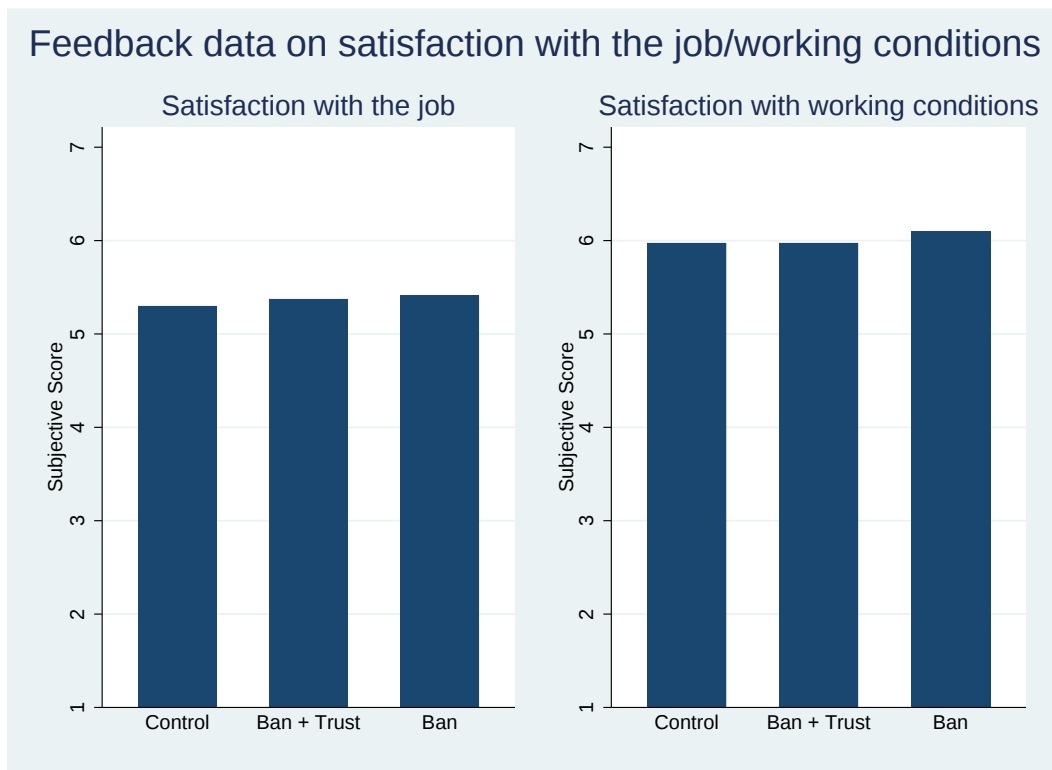


Figure A.10: Left panel: Feedback data (“I was very satisfied with the job.”). Right panel: Feedback data (“I was very satisfied with the working conditions.”). Scores are reported on a Likert scale from 1 (“completely disagree”) to 7 (“completely agree”), $N = 121$.

	Full sample	Control (C)	Ban + Trust ($B+T$)	Ban (B)	Kruskal-Wallis test
Feedback survey data					
Female	0.661	0.700	0.650	0.634	$p = 0.868$
Afternoon	0.372	0.375	0.425	0.317	$p = 0.704$
Age	0.488	0.375	0.475	0.610	$p = 0.188$
Bachelor	0.248	0.150	0.250	0.341	$p = 0.331$
Freshman	0.240	0.275	0.225	0.220	$p = 0.894$
Frequent smartphone use	0.603	0.625	0.650	0.537	$p = 0.651$
Cell phone use during waiting time	0.686	0.675	0.750	0.634	$p = 0.660$
N	121	40	40	41	
Online survey data					
Frequent cell phone use	0.815	0.750	0.861	0.833	$p = 0.699$
Frequent Whatsapp use	0.704	0.778	0.722	0.611	$p = 0.463$
Extraversion	5.025	4.833	5.222	5.019	$p = 0.267$
Agreeableness	5.410	5.556	5.157	5.519	$p = 0.203$
Openness	5.077	4.787	5.231	5.213	$p = 0.131$
Neuroticism	4.321	4.259	4.417	4.287	$p = 0.798$
Conscientiousness	5.154	5.241	5.111	5.111	$p = 0.931$
N	108	36	36	36	

Notes: Category values of the variables are: *Female*: [1] if employee is female, [0] if male; *Afternoon*: [1] if working time started later than 12 p.m., [0] otherwise; *Age*: [1] above average, [0] below average; *Bachelor*: employee already holds a bachelor’s degree [1] yes, [0] no; *Freshman*: employee is a college freshman [1] yes, [0] no; *Cell phone use during waiting time*: [1] yes, [0] no; *Frequent smartphone use*: based on feedback survey item “I spend much time using my smartphone” with categories from [1] Disagree completely to [7] Agree completely, the dummy variable is equal to 1 if smartphone use is equal or above median, and 0 otherwise; *Frequent cell phone use* (during regular days): based on survey question with categories: [1] Exceptional use, [2] Occasional use, [3] Use daily multiple times, [4] Use with only few breaks, [5] Junkie, the dummy variable is equal to 1 for answers [3], [4], and [5], and 0 otherwise; *Frequent Whatsapp use*: based on online survey item “Which apps do you use frequently? – Whatsapp”, categories from [1] Never to [7] Several times per day, with the variable being equal to 1 for answer [7], and 0 otherwise; *Big Five personality traits* measured on a Likert scale from 1 (lowest) to 7 (highest).

Table A.1: Descriptive statistics: means.

	(1) Number of call attempts	(2) Number of call attempts	(3) Number of call attempts	(4) Number of call attempts	(5) Number of call attempts	(6) Number of call attempts
Ban + Trust ($B+T$)	24.523** (10.526)		24.107** (11.094)		25.957** (11.083)	
Ban (B)	41.203*** (12.255)		41.836*** (13.361)		45.474*** (14.294)	
Ban treatments ($B+T$ & B)		31.346*** (9.334)		30.445*** (9.963)		34.072*** (10.156)
Controls	yes	yes	yes	yes	yes	yes
Big Five	no	no	no	no	yes	yes
N	121	121	108	108	108	108
R ²	0.293	0.280	0.311	0.297	0.332	0.316

Notes: * significant at 10%; ** sign. at 5%; *** sign. at 1%. Coefficient estimates from ordinary least squares estimations. The dependent variable is *Number of call attempts*: dialed numbers per employee. *Ban + Trust* ($B+T$) is a dummy variable that takes the value of 1 whenever an employee participated in the Ban + Trust treatment. The dummy variable *Ban* (B) takes the value of 1 whenever an employee participated in the Ban treatment. *Ban treatments* ($B+T$ & B) is a dummy variable which equals 1 whenever an employee participated in either the Ban + Trust or Ban treatment. Additional variables (Controls, Big Five) are the same as in Table 2. The first two columns report regression results based on our full sample of employees. Columns (3)–(6) only include those employees for whom we have survey responses for all control variables plus Big Five. Heteroskedasticity-robust Huber-White standard errors are in brackets.

Table A.2: OLS regression results. Dependent variable: employees' number of call attempts.

	(1) Conducted interviews	(2) Conducted interviews	(3) Conducted interviews	(4) Conducted interviews	(5) Conducted interviews	(6) Conducted interviews
Ban + Trust ($B+T$)	0.340 (0.246)		0.393 (0.264)		0.508** (0.248)	
Ban (B)	-0.070 (0.250)		-0.021 (0.265)		-0.063 (0.267)	
Ban treatments ($B+T$ & B)		0.171 (0.217)		0.243 (0.241)		0.266 (0.230)
Controls	yes	yes	yes	yes	yes	yes
Big Five	no	no	no	no	yes	yes
N	121	121	108	108	108	108
Pseudo-R ²	0.078	0.073	0.107	0.102	0.121	0.113

Notes: * significant at 10%; ** sign. at 5%; *** sign. at 1%. Coefficient estimates from ordered probit regressions. The dependent variable is *Conducted interviews*: number of interviews per employee. *Ban + Trust* ($B+T$) is a dummy variable that takes the value of 1 whenever an employee participated in the Ban + Trust treatment. The dummy variable *Ban* (B) takes the value of 1 whenever an employee participated in the Ban treatment. *Ban treatments* ($B+T$ & B) is a dummy variable which equals 1 whenever an employee participated in either the Ban + Trust or Ban treatment. Additional variables (Controls, Big Five) are the same as in Table 2. The first two columns report regression results based on our full sample of employees. Columns (3)–(6) only include those employees for whom we have survey responses for all control variables plus Big Five. Heteroskedasticity-robust Huber-White standard errors are in brackets.

Table A.3: Ordered probit regression results. Dependent variable: employees' conducted interviews.

	(1) Number of breaks	(2) Number of breaks	(3) Number of breaks	(4) Number of breaks	(5) Number of breaks	(6) Number of breaks
Ban + Trust ($B+T$)	-0.895*** (0.290)		-0.845*** (0.306)		-0.918*** (0.346)	
Ban (B)	-0.884*** (0.292)		-0.926*** (0.326)		-0.969*** (0.346)	
Ban treatments ($B+T$ & B)		-0.890*** (0.245)		-0.877*** (0.271)		-0.940*** (0.308)
Controls	yes	yes	yes	yes	yes	yes
Big Five	no	no	no	no	yes	yes
N	121	121	108	108	108	108
Pseudo-R ²	0.142	0.142	0.141	0.141	0.147	0.147

Notes: * significant at 10%; ** sign. at 5%; *** sign. at 1%. Coefficient estimates from ordered probit estimations. The dependent variable is the number of breaks. *Ban + Trust* ($B+T$) is a dummy variable that takes the value of 1 whenever an employee participated in the Ban + Trust treatment. The dummy variable *Ban* (B) takes the value of 1 whenever an employee participated in the Ban treatment. *Ban treatments* ($B+T$ & B) is a dummy variable which equals 1 whenever an employee participated in either the Ban + Trust or Ban treatment. Additional variables (Controls, Big Five) are the same as in Table 2. The first two columns report regression results based on our full sample of employees. Columns (3)–(6) only include those employees for whom we have survey responses for all control variables plus Big Five. Heteroskedasticity-robust Huber-White standard errors are in brackets.

Table A.4: Ordered probit estimation results. Dependent variable: number of breaks per interviewer.

Appendix B Recruitment Field Experiment

All applicants who responded to the job posting were considered as potential interviewers for the TV study. As described in Section 2, this research project on television consumption in the German public serves as the framework for the field experiment, but it had its own purpose and objectives. One goal that both projects shared was to avoid exposure of the secret experimental conduct. A necessary result of that was that some interviewers participated in the TV study but not in the experiment: To ensure that interviewers in our experiment felt and behaved as employees in a natural workplace context, it was ex-ante clear that individuals on whom there was information about participation in experimental research at the same location had to be treated differently. In such a case, we abstained from any randomized treatment and accepted the fact that the observation was not part of the experimental data underlying our study. However, the same individual did in fact participate in the TV study, given that there was no reason for the leadership of the TV study to reject such a person’s offer to work as an interviewer.

A similar procedure applied in cases of interviewers’ simultaneous appearances. Despite all efforts being made to prevent this incident (e.g., individual time slots and having at least 20-minute time intervals between slots), some interviewers met prior to their jobs and had the chance to chat. In these cases, it was not unlikely that the two interviewers would meet again afterwards, when leaving the university building, and discuss their recent experiences. To avoid exposure of our experiment, in such cases, the second person was routinely given the same treatment as the first person. In consequence, this observation could not be used as part of our experimental data. As soon as our research assistants noted in the protocol that there was any indication of two persons arriving together not by accident but because of personal familiarity, we excluded both individuals from our main analysis. The idea is to ensure that all individuals felt and behaved as employees doing their job in single work and to avoid any peer effects (see, e.g., Mas and Moretti 2009), which could play a role when interaction takes place via smartphone.

This procedure leads to the exclusion of two individuals who arrived in couples but received their scheduled treatment. Note that robustness checks confirm our main findings based on an extended data set ($N = 123$) for which we also consider data from those individuals. Also note that our deeper analysis of available data from employee surveys shows a significant relationship between expected performance of others and own performance, suggesting that peer effects could play a role in such a workplace context.

Appendix C Employer Survey

In the following, we describe the survey module on smartphones, which we conceived in cooperation with the Chamber of Commerce and Industry of Berlin (Industrie- und Handelskammer, IHK). All firms (with the exception of craft enterprises and the agricultural sector) are obliged to be a member of this chamber. Therefore, the IHK roughly represents 300,000 firms in the German capital city. The survey module was added to the regular employer survey of the association in fall of 2018. It included four questions. Question 1 deals with smartphones’ potential for distraction at work. Question 2 allows managers to compare the problem of distraction via private smartphone use to the more common phenomenon of cyberloafing at a personal computer. Question 3 deals with the possibility of a strict ban, as an alternative to the soft ban implemented in our field experiment. Question 4 allows managers to report on their experiences regarding the performance implications of soft smartphone bans. The questions and the distributions of responses can be found in Table C.1. The survey was distributed to a representative sample of the IHK member firms. In total, we have information on 547 firms. The IHK survey routinely makes use of survey weights to ensure representativeness for the larger population of firms in their district.

The findings of the employer survey are as follows. First, many of the managers perceive the problem of distraction via smartphones as severe. We asked them whether smartphones can distract their employees from their work (on a scale from 1 to 5 with 1 “I do not agree at all” to 5 “I absolutely agree”). Only 29.5% tend to disagree (i.e., they choose a value of 1 or 2), 43.5% agree (values of 4 or 5). In particular, the comparison between shirking via private smartphone and cyberloafing using the personal computer provides evidence that the former is seen as a new and unique phenomenon, posing a threat to workplace productivity. 47.1% of the managers perceive the distraction by smartphones to be larger than that of desktop computers (additional 20.4% report the same level of distraction). Second, strict bans on smartphone use that rely on monitoring and sanctions are usually no option for companies. 84% of the managers report that they cannot imagine a strict ban on private smartphone use with enforcement. Soft bans on smartphone use are a realistic option for almost half of the companies. About a fifth of the managers report on viewing a soft ban as a future option, while 23.5% have already implemented one. Interestingly, managers’ views on the performance implications of the ban are strongly divided. 12.4% of the managers report that work performance did not increase due to a soft ban, whereas 11.1% believe that this intervention was successful in improving performance.

We find some heterogeneity in the survey data. For instance, managers of larger firms (≥ 10 employees) see smartphones significantly more often as distraction factor than managers of firms with fewer than 10 employees ($p = 0.001$, two-sided ranksum test). The same holds for

the relative distraction potential of smartphones compared to personal computers ($p = 0.003$). Finally, the survey allows us to focus on sector differences. Private smartphone use during working time appears to be a particular problem in retail and manufacturing, but not that much in the IT service sector. The shares of managers who agree strongly (values of 4 or 5) on smartphones being a distraction factor are 58.9% in retail, 52.6% in manufacturing and 38.1% in the IT service sector. While more than 90% of the managers report that a hard ban would not be possible in the IT service and service sectors, this share is the smallest (63.8%) in the hospitality industry.

Are smartphones a possible distraction factor in your firm?	
1 – Do not agree at all	11.7%
2	17.8%
3	27.0%
4	24.7%
5 – Absolutely agree	18.9%
Is distraction via private smartphones more relevant than distraction via private use of personal computers in your firm?	
1 – Do not agree at all	13.6%
2	18.8%
3	20.4%
4	24.7%
5 – Absolutely agree	22.4%
Can you imagine a “hard” smartphone ban including monitoring in your firm?	
Yes, we could do that in the future	8.7%
Yes, we already have that	7.2%
No, our employees would not understand that	41.0%
No, a ban is impossible for organizational reasons	33.3%
No, for some other reason	9.7%
Is a “soft” ban (a request without monitoring) a promising alternative?	
Yes, we could do that in the future	19.5%
Yes, we did that and work performance increased	11.1%
No, we did that but work performance did not increase	12.4%
No, our employees would not understand that	45.2%
No, for some other reason	11.7%
<i>Notes:</i> Table reports the distributions of responses in the employer survey ($n = 547$ firms).	

Table C.1: Employer survey: Results.

Appendix D Supplementary Experiment

Instructions

Workplace scenario: The employees of a call-center have the task of conducting as many calls as possible using lists of randomly generated telephone numbers for the sake of attracting survey participants. Employees sit in separate offices behind closed doors and independently go through lists of telephone numbers. Opportunities to talk with other employees and other forms of distraction do hardly exist. As it is common in this industry, the call center records the number of calls per hour and can thus estimate how productive the employees are. In addition, there is no monitoring of employees or performance control.

[*Treatment: Short-term work relationship / No ban*] The employees have been working in the call-center for a short time. Some people use their private smartphone for their own entertainment during working hours.

[*Treatment: Long-term work relationship / No ban*] The employees have been working in the call-center for several years. Some people use their private smartphone for their own entertainment during working hours.

[*Treatment: Short-term work relationship / Ban*] The employees have been working in the call-center for a short time. Some use their private smartphone for their own entertainment during working hours. To minimize distraction from work, call-center managers ask workers to stop using their smartphones during working hours. The management of the call center refrains from checking compliance with this rule.

[*Treatment: Long-term work relationship / Ban*] The employees have been working in the call-center for several years. Some use their private smartphone for their own entertainment during working hours. To minimize distraction from work, call-center managers ask workers to stop using their smartphones during working hours. The management of the call-center refrains from checking compliance with this rule.

We ask you to assess a specific behavior in the described scenario. If your assessment conforms to the relative majority (modal response) of all participants, you will receive 5 euros.

A call-center employee uses the private smartphone more than once a day during working time.

- The behavior is very socially inappropriate.
- The behavior is rather socially inappropriate.
- The behavior is more socially appropriate.
- The behavior is very socially appropriate.

Case numbers of appropriateness ratings and perceived legitimacy of smartphone ban									
	No Ban				Ban				Ranksum test (Ban vs. No Ban)
	-1	-1/3	+1/3	1	-1	-1/3	+1/3	1	
Panel A									
All	7 4 %	75 39%	99 52%	11 6%	4 2%	62 29%	124 58%	22 10%	*** ($p = 0.007$)
Panel B									
Short	3 3%	31 36%	48 55%	5 6%	3 3%	37 35%	59 55%	8 7%	n.s. ($p = 0.701$)
Long	4 4%	44 42%	51 49%	6 6%	1 1%	25 24%	65 62%	14 13%	*** ($p < 0.001$)
Panel C									
Legitimacy of a ban	5.14	5.35	5.86	6.45	4.75	5.65	5.96	6.64	

Notes: Table reports observation numbers of each answer category (4-item scale) regarding social norms for the full sample (panel A) as well as for responses in a short-term respectively long-term employer-employee context (panel B). The table also reports on average responses on a 7-item scale regarding the perceived legitimacy of a smartphone ban across reported levels of social norms (panel C). The question wording was: “I can understand if companies want to limit the use of private smartphones in the workplace”.

Table D.1: Supplementary experiment: Results.