Effectiveness of incentives and follow-up on increasing survey response rates and participation in field studies

Supplementary Online Materials

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This supplement provides ancillary methods and results to the main text:

A. Questionnaire instruments

Complete versions of the short, medium and long questionnaires are given on p. 2, pp. 3-4 and pp. 5-8 respectively.

B. Cost estimate calculations

Formulae used to estimate the costs to receive one completed survey and to recruit one participant into the field study are given on p. 9.

C. Field study participation

Results of the regression models for the odds of a mailed individual eventually participating in the field study are given in Table S1 (p. 10). Data are visualized for each predictor variable in Figure S1 (p. 11).

D. Figures

Figure S1 (p. 11) presents the odds ratios of completing the survey, interest in the field study and participating in the field study. Results are given for each independent predictor variable in the fully adjusted regression models: Model 2 for survey completion and Model 3 for interest and participation in the field study. The presented results are from Table 2 and Table 3 in the main article, and Table S1 in this Supplemental Material (p. 10).

Short questionnaire

Q1. During the past month, how would you rate your sleep quality overall?						
Very Good	Fairly Goo	d	Fairly E	Bad	Very Bad	
▼	▼		▼		•	
Q2 . In general, would you say your health is?						
Poor	Fair	Goo	d	Very C	Good	Excellent
▼	▼	▼		•	,	•
]	
03 Rate how strongly you	agree or disa	aree to the s	tatement [.]	l am sen	sitive to noise	
Strongly Disagree			latement.	rum sen		Stronaly Aaree
1	2	3	4		5	6
▼	•	▼	▼		▼	•
sleep disturbed by noise fro	om the followi Not at all	ng sources? Slightly	Mode	rately	Very	Extremely
Q4a. Road Traffic						
Q4b. Trains						
Q4c. Aircraft						
Q4d. Neighbors						
Q5. Are you Hispanic or La	atino?		□ Yes	□ No	Prefer	Not to Answer
Q6. What race do you consider yourself to be? (mark all that apply)						
American Indian or Ala	aska Native	□ Native	Hawaiian	or Other	Pacific Island	≏r
			vvnite			
Black or African American D Other (please specify):						
Prefer Not to Answer						
Q7. Gender: 🔲 Male	□ Fema	le Q8.	Age:			(years)

Medium questionnaire

Q1 . During the past month , how would you rate your sleep quality overall?							
Very Good	Fairly Goo	d	Fairly Bad		Ver	y Bad	
•	▼		▼ 			▼	
]			
Q2. How often have you have month?	e taken medic	ine (prescri	bed or "over	the counter	") to help you sle	ep in the past	
Not during the past month	s than once ▼	a week	Once or twi ▼	ce a week	Three or r W	nore times a eek	
]		▼ □	
Q3. How often in the past mo home?	onth have you	ı done the f	following bec	ause of nois	se when trying to	sleep at	
		Never 1	Rarely 2	Sometim 3	es Often 4	Always 5	
Q3a. Wear earplugs or heads	ohones						
Q3b. Turn on the TV							
Q3c. Turn on music							
Q3d. Close windows							
Q3e. Use a sound machine							
Q3f. Turn on a fan							
Q4. Rate how strongly you ag	ree or disagre	ee to the sta	atement: I ar	n sensitive	to noise		
Strongly Disagree	•	2			S	trongly Agree	
1 ▼	∠ ▼	3 ▼	4 ▼		5 ▼	•	
Q5. Thinking about the last 1	2 months or	so, when yo	ou were here	at home, h	ow much was yo	ur sleep	
disturbed by holse from the id					Marri	E	
	Not at all ▼	Siignt			very ▼	Extremely	
Q5a . Road Traffic							
Q5b. Trains							
Q5c. Aircraft							
Q5d. Neighbors							
Q6. In general, would you say	y your health i	s?					
Poor	Fair	C	Good	Very	Good	Excellent	
	•		•	<u> </u>	7	•	
	Ш					Ш	

Q7 . Have you ever been diagnosed by a he	Q7. Have you ever been diagnosed by a health professional with any of the following sleep disorders?				
□ Sleep Apnea	🗆 Na	ircolepsy		Restless Le	g Syndrome
Periodic Limb Movement Syndrome	🔲 Ins	omnia		None	
Other (please specify):					
Q8 . Do you have any problems or difficultie	es with your	sense of hearing	g?	☐ Yes	🗆 No
Q9 . Have you ever been diagnosed by a he (mark all that apply)?	alth profes	sional with the fo	ollowing	conditions	
□ Hypertension/ □ High blood pressure	Arrhy Irregu	thmia/ ılar heartbeat		None	
Q10. If currently employed, does your job re	eauire over	niaht shift work?)		
(Overnight shift work refers to work for at le midnight to 6 a.m. in the morning)	ast 4 hours	s between 12 a.n	n. [] Yes	🗆 No
	- + : -	_			
Less than 1 year 1-5 years	nt residence	5-10 years	5	More	than 10 years
Q12 . Are there children in this household u	nder the ag	e of 5?		□ Yes	□ No
Q13 . Are you Hispanic or Latino?		□ Yes [] No	Pref	er Not to Answer
Q14 What race do you consider yourself to	be? (mark	all that apply)			
American Indian or Alaska Native	□ Nat	ive Hawaiian or	Other F	acific Islande	r
☐ Asian	□ Wh	ite			
Black or African American Other (please specify):					
Prefer Not to Answer					
Prefer Not to Answer					
Prefer Not to Answer Q15. Gender: Male Femal	e Q	16. Age:			(years)
 Prefer Not to Answer Q15. Gender: Male Femal Q17. What is your height? 	e Q	16. Age:		feet	(years) inches

Long questionnaire

Q1a . During the past month , at what time have you usually gone to bed on weekdays or workdays?	(HH:MM AM/PM)					
Q1b. During the past month, at what time have you usually						
weken un en weekdave er werkdave?						
woken up on weekdays of workdays?						
Q1c. During the past month, how much sleep did you						
(Hours)						
usually get on weekdays or workdays?						
Q2 During the past month how would you rate your sleep guality overall?						

az. Daning the published	man, now would you rate yo	ar bloop quality overall.	
Very Good	Fairly Good	Fairly Bad	Very Bad
•	•	▼	▼

Q3. For the following questions, select the response that best reflects how often the following occurred during the **past month.**

	Not during the past month ▼	Less than once a week ▼	Once or twice a week ▼	Three or more times a week ▼
Q3a . You had trouble sleeping because you cannot get to sleep within 30 minutes ?				
Q3b . You had trouble sleeping because you wake up in the middle of the night or early morning?				
Q3c . You have taken medicine (prescribed or "over the counter") to help you sleep?				
Q3d . You had trouble staying awake while driving, eating meals, or engaging in social activity?				

Q4. How often in the **past month** have you done the following because of noise when trying to sleep at home?

	Never 1	Rarely 2	Sometimes 3	Often 4	Always 5
	•		•	•	
Q4a. Wear earplugs or headphones					
Q4b. Use alcohol					
Q4c. Use medication					
Q4d. Turn on the TV					
Q4e. Turn on music					
Q4f. Close windows					
Q4g. Use a sound machine					
Q4h. Turn on a fan					

Q5. For the following statements respond how strongly you agree or disagree.						
	Strongly				Strongly	
	Disagree					Agree
	1	2	3	4	5	6
	▼	▼	▼	▼	▼	▼
Q5a. I am easily awakened by noise						
Q5b . I get used to most noises without much difficulty						
Q5c . I find it hard to relax in a place that is noisy						
Q5d . I am good at concentrating no matter what is going on around me						
Q5e . I get mad at people who make noise that keeps me from falling asleep or getting work done						
Q5f. I am sensitive to noise						

Q6. Thinking about the **last 12 months** or so, when you were here at home, how much was your sleep disturbed by noise from the following sources?

	Not at all	Slightly	Moderately	Very	Extremely
	▼	▼	▼	•	▼
Q6a. Road Traffic					
Q6b. Trains					
Q6c. Aircraft					
Q6d. Industries/Factories					
Q6e. Construction					
Q6f. Neighbors					
Q6g. Air Conditioner					

Q7. Thinking about the **last 12 months** or so, when you are here at home, how much does noise from each of the following bother, disturb, or annoy you?

	Not at all	Slightly	Moderately	Very	Extremely
	▼	▼	▼	▼	▼
Q7a. Road Traffic					
Q7b. Trains					
Q7c. Aircraft					
Q7d. Industries/Factories					
Q7e. Construction					
Q7f. Neighbors					
Q7g. Air Conditioner					

Q8. In general, would you say your health is…?						
Poor	Fair	Good	Very Good	Excellent		
▼	▼	▼	▼	▼		

Q9. Have you ever been diagnosed by a health professional with any of the following sleep disorders?				
🔲 Sleep Apnea 🔲 N	arcolepsy 🔲 Restless Leg Syndrome			
Periodic Limb Movement Syndrome	nsomnia 🔲 None			
□ Other (nlease specify):	-			
Q10. Do you have any problems or difficulties with yo	our sense of hearing? Yes No			
Q11a. Have you ever been diagnosed by a health professional with the following conditions (mark all	Q11b . If you have been diagnosed with a condition listed under Q11a, have you been treated for the			
that apply)?				
\square None of the above				
	042 W/hat was your total have shald in some last			
Q12. What is your marital status? Single Married Widowed Separated Divorced Domestic Partners	Q13. What was your total household income last year? < \$25,000			
Q14 . What is the highest level of education you have completed?	Q15 . What is your current employment status? □ Working			
Less than High School	Unemployed			
☐ High School Graduate	□ Student			
College Graduate or Higher	Homemaker			
Q16. If currently employed, does your job require overnight shift work? (Overnight shift work refers to work for at least 4 hours between 12 am midnight to 6 am in the morning)				
Q17. Are you Hispanic or Latino?	Yes No Prefer Not to Answer			

Q18. What race do you consider yourself to be? (mark all that apply)											
	American Indian or Alaska Native		Native Hawaiian or Other Pacific Islander								
	Asian		White								
	Black or African American		Other (please specify):								
	Prefer Not to Answer										
Q19. Has your current residence received any sound proofing treatment to reduce noise?											
Q20 resi	0. How long have you lived at your cu idence?	Q21 . Do you have an air conditioner in your bedroom?									
	Less than 1 year										
	1-5 years										
	5-10 years		 Central Air Conditioner Window Unit 								
	More than 10 years										
Q22. How many people (including yourself) reside in this household?											
Q23. How many children in this household are under the age of 5?											
Q24	I. Gender: 🗌 Male 🗌 Fem	ale	Q25. Age:(years)								
Q26. What is your height? feet inches											
Q27	. What is your weight?	lbs									

Cost estimate calculations

 $#nondeliverable \ surveys = \frac{(nondelivery \ rate)}{delivery \ rate} \times #surveys \ delivered$

where *#surveys delivered* is the number of surveys that must be delivered in order to receive one response to the postal survey (Table 6 in main manuscript).

reclaimed cash incentives = #nondelilverable surveys × \$2

cost estimate, 1 response

= (#surveys delivered × cost of single mailing)

+ (#nondeliverable surveys × cost of single mailing)

- reclaimed cash incentives

cost estimate, 1 participant

= cost estimate, 1 response $\times 1/field$ study participation rate

The following example is for short surveys using a \$2 cash incentive and 3 follow-up waves:

Delivery rate = 87.6%; #surveys delivered = 4.61

#nondeliverable surveys =
$$\frac{(1 - 0.876)}{0.876} \times 4.61 = 0.65$$

reclaimed cash incentives = $0.65 \times \$2 = 1.3$

A complete mailing round costs \$5.74:

$$cost estimate, 1 response = (4.61 \times 5.74) + (0.65 \times 5.74) - 1.3 =$$
\$28.89

Field study participation rate = 9.1%;

cost estimate, 1 participant =
$$28.89 \times \frac{1}{0.091} = $317.47$$

The \$0.04 difference between this cost estimate for one participant and the cost estimate in Table 6 is due to rounding of the values in the above calculation. The cost estimates in Table 6 are calculated using non-rounded data.

Model and test relative to	Variable	Fixed effects			Variable	Field study participation		
intercept-only model		df	Wald χ^2	р	level	p-value	OR	95% CI
Model 1	Survey incentive	1	0.174	0.677	Gift card	Ref		
$\chi^2(6, n=407)=4.707,$					\$2	0.677	0.608	0.059-6.305
p=0.582	Survey length	2	0.058	0.971	Short	Ref		
					Medium	0.809	0.855	0.241-3.040
					Long	0.896	0.929	0.307-2.811
	Follow-up waves	2	0.805	0.669	0	Ref		
	-				2	0.698	1.528	0.179-13.022
					3	0.936	0.914	0.100-8.300
	Field study incentive	1	2.828	0.093	150	Ref		
	·				200	0.093	0.376	0.120-1.176
Model 2	Survey incentive	1	0.294	0.588	Gift card	Ref		
$\chi^2(9, n=407)=10.502,$	-				\$2	0.588	0.521	0.049-5.505
p=0.486	Survey length	2	0.065	0.968	Short	Ref		
	, ,				Medium	0.810	0.854	0.236-3.095
					Long	0.843	0.892	0.290-2.748
	Follow-up waves	2	1.012	0.603	0	Ref		
	Ĩ				2	0.628	1.703	0.197-14.691
					3	0.971	0.960	0.104-8.834
	Field study incentive	1	3.254	0.071	150	Ref		
	, ,				200	0.071	0.346	0.109-1.094
	Noise exposure category	4	3.662	0.454	<40	Ref		
	1				40-45	0.258	0.519	0.166-1.619
					45-50	0.906	1.061	0.399-2.818
					50-55	0.605	0.770	0.285-2.079
					>55	0.142	0.427	0.137-1.330
	Direction	1	1.917	0.166	West	Ref		
					East	0.166	0.607	0.299-1.231
Model 3	Survey incentive	1	0.286	0.593	Gift card	Ref		
χ^2 (17, n=364)=13.496,	Survey meeninve		0.200	01070	\$2	0.593	0.520	0.047-5.730
p=0.702	Survey length	2	0.011	0.995	Short	Ref	0.020	01017 01/00
	Survey rengin	-	01011	01770	Medium	0.919	0.933	0 244-3 569
					Long	0.944	0.959	0 303-3 036
	Follow-up waves	2	1.092	0.579	0	Ref	0.959	0.505 5.050
	ronow up waves	-	1.072	01077	2	0.642	1.687	0.187-15.238
					3	0.935	0.910	0.094-8.817
	Field study incentive	1	3 190	0.074	150	Ref	0.910	0.071 0.017
	Tield study meentive	1	5.170	0.071	200	0.074	0 344	0 107-1 110
	Noise exposure category	4	3 4 3 2	0.488	<40	Ref	0.511	0.107 1.110
	rioise enposare eurogory	•	01102	01100	40-45	0.354	0.570	0.173-1.873
					45-50	0.992	0.995	0 360-2 746
					50-55	0.722	0.828	0 293-2 340
					>55	0.119	0.391	0 120-1 274
	Direction	1	1 877	0 171	West	Ref	0.371	0.120 1.271
	Difection		11077	011/1	East	0.171	0.602	0 291-1 245
	Sex	1	0.081	0.776	Female	Ref	0.002	0.271 1.215
	Sen		0.001	0.770	Male	0.776	0.894	0.411-1.942
	Age category	5	3,223	0.666	<30	Ref	0.074	0.111 1.772
	1160 cuto501 y	5	5.225	0.000	30-39	0.906	1,096	0.237-5.064
					40-49	0.696	0.737	0.159-3.410
					50-59	0.624	0.686	0.152-3.093
					60-69	0.727	0.560	0 173-3 368
					>70	0.173	0.763	0.039-1.703
					<u>~</u> /0	0.175	0.203	0.037-1.795

Table S1 Results of the regression models for recipients participating in the field study (including only completed surveys). All analyses excluded surveys that could not be delivered for any reason. df=Degrees of Freedom. OR=Odds Ratio. CI=Confidence Interval. Ref=Reference category.



Figure S1 Odds ratios and 95% confidence intervals for the effect of different survey approaches and situational factors on receiving completed surveys (green), eliciting interest in the study (blue) and recruiting a participant into the study (red). The horizontal dashed line indicates the reference value OR=1.0.