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Where do web surveys work?

A multilevel meta-analytical approach to determine country-level impact on response modes

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Background & Research Gap

- Web surveys still on the rise (generated more than 60% of global turnover in 2016) (Esomar 2016)
- Large international surveys do still stick on traditional survey modes but panel alliance makes first attempts to gain cross cultural survey data online
- Do web surveys offer sufficient data quality performance compared to traditional survey modes?
- Several indicators of survey data quality -> limit our discussion to response rates -> indicator for non-response error (Groves 1989)
- Three meta-analyses calculated mean response rate differences between web and other survey modes & which survey features effect this response rate difference (Manfreda et al., 2008; Shih & Fan, 2008; Wengrzik et al., 2017)
- Nobody so far focused on response rate differences between countries in which countries do web surveys work and why?





Hypotheses

 Appreciable differences in cross-cultural nonresponse across different survey modes due to differences in law, study design or survey climate (Smith 2007)

H1: The mean response rate differences between countries are significantly different. The response rate differences within a country are more similar than between countries.

 Older people have higher burden in web (surveys) (Chadwick-Dias 2003) and younger people have higher acceptance for web (surveys) (Correa 2010)

H2a: The older the population the larger the response rate difference H2b: The larger the population growth the smaller the response rate difference









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Literature Search

Supplemented by:

"response rate*" OR "return rate*" OR "participation rate*" "web survey" OR "internet survey" OR "online survey" OR "webbased survey" OR "internet-based survey" OR "electronic survey

Web of Science, Scopus, Proquest (ERIC, PsycInfo, Sociological Abstracts), ipl.org, reference search of collected papers, WebSM, Springerlink, Google Scholar, AAPOR, GOR, EconBiz, Snowballing, AAPOR & GOR Abstracts...

110 studies from 64 manuscripts





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Inclusion & Exclusion Criteria

Web-based Survey • Questionnaire on the web	Other Survey Mode Comparison • email, mail, telephone, fax, face to face, other	Response rates • should be available or calculable • survey country must be reported
A split sample random experimental designrespondents from the same population	No mode switching remain in the mode they were randomly assigned 	 The survey environment should be the same for the compared modes (e.g. same questions)



Data Generation Model

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Random Effects by Hedges and Olkin (1985) -> inference goal: generalizing beyond the studies included – Three level Meta-Analysis Model (metafor – Viechtbauer 2010)

Effect Size (Dependent variable) and Metric

Response Rate Difference Web and other Mode

 $d = \frac{number \, of \, invited \, and \, eligible \, subjects \, web \, mode}{d}$

number of respondents web mode

number of invited and eligible subjects other mode

 $number \ of \ respondents \ other \ mode$

Independent Variables (Moderators)

- Percentage of population aged 65 and older
- Annual population growth rate (%) 2004



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Methods

Results

Conclusion

Methods





Conclusion

Results:

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Background & Research Gap

Response Rate Difference Development over Time

Results



- Sampling error weighted mean response rate difference under a random effects assumption: -0.12 (95% CI -0.16/0.09)
- On average web surveys are being inferior with 12%

Results

Conc<u>lusion</u>

Results:

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H1: The mean response rate differences between countries are significantly different. The response rate differences within a country are more similar than between countries.



differences vary significantly between countries

rate

Response

Results

Conclusion



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H2a. The older the population the larger the response rate difference



Not significant

Per percentage point a countries' population ages 65 years and over the response rate difference enlarges by - 0.02 (95% CI: -0.05/ 0.01)

Results:



H2b. The larger the population growth the smaller the response rate difference





population growth rate the response rate difference decreases by 0.20 (95% CI: 0.06/ 0.34)



Take Home Messages

There is only little variance on the country level.

The response rate differences within a country are more similar than between countries and the response rate differences between countries are significantly different.

The percentage of people 65 years and older in a country has no significant impact on the response rate difference.

The larger a country's population growth the significantly smaller is the response rate difference.



Limitations & Implication:

Limitations & Implications

- More than 72% of all studies were conducted in the US -> we need further evidence from the other countries for achieving more statistical power and better understanding which factors influencing the response rate difference between countries
- We had only effect sizes from ten different countries (Australia, Canada, England, Germany, Slovenia, South Corea, Sweden, the Netherlands, UAE, USA) and strongly recommend in doing primary research in other countries than this to empower analysis
- We only searched in English speaking literature -> could face a problem of language bias in cross cultural research -> evidence from other countries welcome

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Extension

- Considering absolute web response level and its moderators
- Splitting of response rate difference analysis in interviewer and self-administered comparisons
- Moderator Analyses e.g. Hofstede's cultural dimensions

Questions

- Which country-level factors do you expect influencing the web response rate level or the response rate difference of web and an other mode?
- What do you expect from Hofstede's dimensions and their linkage to web response rates / response rate difference?
- As most of our studies are based in the US, can we expect a homogenous value structure e.g. Hofstede values across the US or would it be better to cluster? How to cluster?





Chadwick-Dias, A., McNulty, M., & Tullis, T. (2003). *Web usability and age: how design changes can improve performance*. Paper presented at the ACM SIGCAPH Computers and the Physically Handicapped. Correa, T., Hinsley, A. W., & De Zuniga, H. G. (2010). Who interacts on the Web?: The intersection of users'

personality and social media use. Computers in Human Behavior, 26(2), 247-253.

ESOMAR. (2016). Global market research 2016.

Groves, R. M. (1989). Response effects of the mode of data collection. *Survey errors and survey costs*, 501-552.

Johnson, T. P., Lee, G., & Cho, Y. I. (2010). Examining the association between cultural environments and survey nonresponse. *Survey Practice*, *3*(3).

Manfreda, K. L., Bosnjak, M., Berzelak, J., Haas, I., Vehovar, V., & Berzelak, N. (2008). Web surveys versus other survey modes: A meta-analysis comparing response rates. *Journal of the Market Research Society, 50*(1), 79.

Sánchez-Franco, M. J., Martínez-López, F. J., & Martín-Velicia, F. A. (2009). Exploring the impact of individualism and uncertainty avoidance in Web-based electronic learning: An empirical analysis in European higher education. *Computers & Education*, *52*(3), 588-598.

Shih, T.-H., & Fan, X. (2008). Comparing response rates from web and mail surveys: A meta-analysis. *Field Methods*, 20(3), 249-271.

Smith, T. W. (2007). *Survey non-response procedures in cross-national perspective: The 2005 ISSP non-response survey.* Paper presented at the Survey Research Methods.

Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *J Stat Softw, 36*(3), 1-48. Wengrzik, J., Bosnjak, M., Lozar Manfreda, K., & Čehovin, G. (2017). Web versus Other Survey Modes: An Updated and Extended Meta-Analysis Comparing Response Rates. *forthcoming*.



Thank you for your attention.

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Research Gap	Methods	Results	Conclusion
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From: Moher D₁ Liberati A₁ Tetzlaff J₁ Altman DG₁ The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097. For more information, visit www.prisma-statement.org.



List of studies per country

Author(s)	Year	Web Mode: Response Rate in % (No. of eligible units contacted, No. of responses)	Other Mode: Response Rate in % (No. of eligible units contacted, No. of responses)	Country
Sinclair et al.	2012	1,4; (7000/101)	6,65; (4000/266)	Australia
Sinclair et al.	2012	2,9; (10000/289)	9,3; (5500/511)	Australia
Sinclair et al.	2012	2,9; (10000/289)	27,3; (1000/273)	Australia
Allum et. al.	2014	85,4; (945/807)	97,1; (509/494)	England
Auspurg et. al.	2013	58,5; (1072/627)	64,7; (543/351)	England
Baghal & Lynn	2015	56,3; (1432/807)	92,6; (716/663)	England
Blom et al.	2015	64,6; (1126/727)	95,3; (554/528)	England
de Leeuw et al.	2012	47; (349/164)	73; (282/206)	England
de Leeuw et al.	2012	47; (349/164)	96,1; (314/217)	England
Denscobe	2009	60; (460/276)	60; (460/276)	England
Jones & Pitt	1997	18,5; (200/37)	34; (200/68)	England
Park & Humphrey	2014	55; (1000/550)	55; (1000/550)	England



List of studies per country cntnd.

Jones & Pitt	1997	18,5; (200/37)	72; (100/72)	England
Kirchner & Felderer	2016	19.4: (12400/2400)	19.4: (12400/2400)	Germany
	2010	70 5. (000 (422)	70 5. (600 (400)	Company
Roberts et. al.	2016	70,5; (600/423)	70,5; (600/423)	Germany
Roberts et. al.	2016	65,4; (500/327)	65,4; (500/327)	Germany
Pötschke	2002	37,1; (380/141)	50,7; (402/204)	Germany
Boschmann et al.	2012	44,7; (293/131)	44,7; (293/131)	Slovenia
Lozar Manfreda et al.	2000	77; (200/154)	89; (200/178)	Slovenia
Vehovar et al.	1999	26; (300/78)	51,9; (747/388)	Slovenia
Vehovar et al.	1999	26; (300/78)	39,2; (222/87)	Slovenia
Vehovar et. al	1999	26; (300/78)	21,6; (76/24)	Slovenia
Woo et al.	2015	26,4; (500/132)	85,6; (500/428)	South Corea
Bech & Kristensen	2009	16,9; (4900/829)	42,5; (5000/2123)	Sweden
de Leeuw et al.	2012	19,7; (6134/1207)	60,4; (2000/1207)	The Netherlands
Klausch et al.	2012	28.7: (2200/631)	49.8: (2199/1095)	리. The Netherlands

List of studies per country cntnd.

	Klausch et al.	2012	28,7; (2200/631)	64,8; (2182/1413)	The Netherlands
	Klausch et al.	2012	28,7; (2200/631)	67,5; (2200/1485)	The Netherlands
	Zuidgeest, M. et. al.	2011	60,5; (400/242)	64; (400/256)	The Netherlands
	Al-Subaihi. AA	2008	34.6: (26/9)	100: (26/26)	UAE
	Andrew et al.	2015	64.3: (2345/1509)	63.1: (2366/1494)	USA
	Bason	2000	15.5: (742/115)	23.9: (674/161)	USA
	Bason	2000	15.5; (742/115)	27,8; (735/204)	USA
	Bason	2000	15,5; (742/115)	17,4; (736/128)	USA
	Bates	2000	55,7; (1571/875)	44,2; (1569/694)	USA
	Beach & Musa	2012	67,9; (627/426)	63,9; (627/401)	USA
	Beach & Musa	2012	52,9; (627/332)	41,9; (627/263)	USA
	Beach et al.	2008	60,4; (1966/1188)	55,4; (1967/1090)	USA
	Borkan	2009	21; (1000/210)	44,2; (500/221)	USA
	Boyle etr. Al.	2016	23,49; (2179/512)	17,1; (2755/472)	USA
Member of U	Burnett	2016	87,1; (225/196)	76; (225/171)	USA

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Chat et al.	2002	82,1; (3627/2979)	62,9; (477/300)	USA
Chisolm	1997	24; (300/72)	30; (300/90)	USA
Clark et al.	2011	43,5; (104/45)	51,9; (101/52)	USA
Clark et al.	2011	47,2; (104/49)	49,2; (101/48)	USA
Cobanoglu et al.	2000	44,2; (95/42)	26,3; (99/26)	USA
Cobanoglu et al.	2000	44,2; (95/42)	17; (100/17)	USA
Converse et. al.	2008	41,7; (750/313)	41,7; (750/313)	USA
Crawford et al.	2001	63; (3500/2205)	52; (3500/1820)	USA
Croteau et al.	2010	26,2; (359/94)	39,2; (338/134)	USA
Eckford & Barnett	2016	55,5; (1225/680)	10,9; (1225/133)	USA
Edwards et al.	2014	33,2; (559/185)	53,1; (557/296)	USA
Edwards et al.	2014	27,5; (573/157)	47,1; (552/259,9)	USA
Edwards et al.	2014	23,3; (553/129)	45,5; (561/255)	USA
Edwards et al.	2014	38.7; (574/222)	57.9; (565/327)	E3 USA



Elder & Incalcatera	1999	37,4; (690/258)	54,3; (693/376)	USA
Ellic & Poyrodo	2012	14 5. (2601/277)	25. (9679/2170)	115.4
EIIIS & REXIDUE	2012	14,5, (2001/577)	25, (8078/2170)	USA
Fisher & Herrick	2013	11,5; (1649/189)	31,9; (1834/585)	USA
Foster & Gaugham	2008	46; (100/46)	46; (100/46)	USA
Fraze et. al.	2002	43,2; (95/41)	60; (95/57)	USA
Fraze et. al.	2002	43,2; (95/41)	27,4; (95/26)	USA
Fricker et al.	2003	51,6; (1058/546)	97,4; (544/530)	USA
Grandjean et al.	2009	9,5; (1126/107)	10,8; (1273/138)	USA
Grandjean et al.	2009	9,5; (1126/107)	17,1; (904/155)	USA
Greene et al.	2008	75,2; (501/377)	67,2; (250/168)	USA
Greenlaw & Brown-Welty	2009	52,4; (1281/672)	42; (1280/538)	USA
Hardigan et al.	2012	11; (2000/220)	24,8; (2000/495)	USA
Hayslett & Wildemuth	1999	28; (100/28)	51; (100/51)	USA
Hayslett & Wildemuth	1999	39; (100/39)	51; (100/51)	24 USA



Hsu & McFall	2015	87,2; (624/544)	77,2; (189/146)	USA
Israel	2009	64,5; (200/129)	64,5; (200/129)	USA
Israel	2012	39,8; (646/257)	67; (646/432,82)	USA
Isreal & Lamm	2012	48,1; (310/149)	58,4; (344/201)	USA
Jacob	2011	40,2; (532/214)	59,6; (339/202)	USA
Jacob & Jacob	2012	53,5; (288/154)	53,5; (288/154)	USA
Kaplowitz et al.	2001	29,7; (4327/1285)	31,5; (2594/817)	USA
Kaplowitz et al.	2001	28,6; (4178/1195)	31,5; (2594/817)	USA
Kennedy	2012	42,2; (2609/1102)	23,8; (390/93)	USA
Kerwin et al.	2004	37,6; (359/135)	27,7; (195/54)	USA
Kiernan	2005	70,1; (137/96)	61,3; (137/84)	USA
Knapp & Kirk	1999	15,9; (359/57)	48,5; (359/174)	USA
Knapp & Kirk	1999	15,9; (359/57)	33,7; (359/121)	USA
Kongsved et.al.	2007	76.4: (276/211)	76.4: (276/211)	25 USA



Kwak & Radler	1999	27,4; (987/270)	41,9; (990/415)	USA
Lesser & Newton	1999	18,9; (159/30)	59,4; (389/231)	USA
Lesser & Newton	1999	21,9; (233/51)	59,4; (389/231)	USA
Lesser & Newton	1999	18,9; (159/30)	39,3; (163/64)	USA
Lesser & Newton	1999	21,9; (233/51)	39,3; (163/64)	USA
Lesser & Newton	1999	18,9; (159/30)	53; (151/80)	USA
Lesser & Newton	1999	21,9; (233/51)	53; (151/80)	USA
McMorris & Petrie	2009	82,5; (189/156)	82,5; (189/156)	USA
Messer	2012	32,7; (700/228)	58,5; (600/351)	USA
Messer	2012	32,7; (920/346)	37,6; (920/346)	USA
Messer	2012	12,6; (470/59)	46,2; (600/277)	USA
Messer	2012	28; (510/142)	50; (510/255)	USA
Messer et al.	2012	38,5; (600/231)	59,375; (800/475)	USA
Messer et al.	2012	23.3: (3200/747)	46.2: (2200/1017)	2L USA



Messer et al.	2012	30; (2100/630)	57,8; (1800/1040)	USA
Millar et al.	2011	42,3; (676/285)	51,2; (681/349)	USA
Murphy et al.	2012	30: (400/120)	38: (400/152)	USA
Newsome et. al.	2009	75: (10000/7500)	75: (10000/7500)	USA
Redline & Zukerberg	2015	24: (4477/1075)	24. (4477/1075)	USA
Rodriguez H et al	2006	18 4. (250/46)	50.4. (115/58)	LISA
Rodriguez H et al	2006	18.4: (250/46)	34 5: (200/69)	LISA
Say et al	2001	11 1. (737/82)	10: (1478/152)	LISA
Shannon & Bradshaw	2002	22 2: (189/42)	22 2: (189/42)	LISA
Smyth et al	2010	11: (566/232)	70.6: (367/259)	LISA
Szoc et al	2013	64: (25123/16079)	64: (25123/16079)	LISA
Turner et al	2010	8: (5000/400)	16: (10000/1600)	LISA
Weible & Wallace	1997	31 A. (151/52)	35.7. (196/70)	LISA
Weible & Wallace	1997	34,4; (151/52)	30,8; (162/50)	USA 27



Weible & Wallace	1997	34,4; (151/52)	29,8; (161/48)	USA
Wolfe et al	2008	44; (375/165)	81; (375/303,75)	USA
Wygant & Lindorf	1998	49,5; (1270/629)	31,5; (1299/410)	USA



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```
126
127 # Model calculates 2nd and 3rd level variance (sigma)
128 res2 <- rma.mv(yi, vi, random = \sim 1 | country2/id.author, data=dat)
129 res2
130
131 confint(res2, digits=5) # confidence intervals of sigma^2.1 (country) and sigma^2.2 paper.id
132
133 round(res2$sigma2[1]/sum(res2$sigma2),4)
134 # Variance on country level .004 and variance on study level .03 (sig.)
136
137
138 # Model calculates rho (ICC)
139 res2 <- rma.mv(yi, vi, random = ~ factor(id.author) | country2, data=dat)
140
    ■ 1
137:1 📴 Metafor 🗘
```

 $|uac \rangle = cocarc(incasurc = RD), ar=n, web, parcicipateu, niren, web, niviteu, ci=n, other, parcicipateu, niren, other, niviteu, uaca-uac_woou, orab$

R

```
Console C:/Users/wengrzja/Dropbox/Meta-Analyse Response Rates und kultureller Spin/Finaler Code und Daten/ 🖄
```

```
> # Model calculates 2nd and 3rd level variance (sigma)
> res2 <- rma.mv(yi, vi, random = ~ 1 | country2/id.author, data=dat)
> res2
```

```
Multivariate Meta-Analysis Model (k = 110; method: REML)
```

Variance Components:

160

```
estim
                    sort nlvls fixed
                                                   factor
sigma^2.1 0.0040 0.0636
                             7
                                    no
                                                 country2
sigma^2.2 0.0311 0.1764
                             76
                                   no country2/id.author
Test for Heterogeneity:
Q(df = 109) = 14238.5823, p-val < .0001
Model Results:
estimate
                                      ci.lb
                                              ci.ub
              se
                     zval
                              pval
 -0.1284 0.0389 -3.2989 0.0010 -0.2047 -0.0521
                                                         ***
signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> confint(res2, digits=5) # confidence in
[[1]]
          estimate ci.lb ci.ub
sigma^2.1 0.00405 0.00000 0.03153
sigma.1
          0.06360 0.00000 0.17757
[[2]]
          estimate ci.lb ci.ub
sigma^2.2 0.03111 0.02264 0.04418
sigma.2
          0.17639 0.15046 0.21020
```

```
> round(res2$sigma2[1]/sum(res2$sigma2),4)
[1] 0 1151
```