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# Personalized sms, survey participation and data quality – the italian case

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## Résumé

**SMS personnalisés, participation au sondage et qualité des données - Le cas italien.** La personnalisation des enquêtes peut être un moyen rentable de compenser le déclin des taux de réponse et d'améliorer éventuellement la qualité des données d'enquête. Un certain nombre de recherches ont révélé que la personnalisation des salutations dans les communications par courrier électronique peut entraîner des taux de réponse plus élevés. Compte tenu de leur utilisation répandue, les messages courts de texte (SMS) peuvent également être un mode de contact utile dans les enquêtes. Cependant, on sait peu sur les effets de salutations personnalisées par SMS lors de la communication avec des membres de l'échantillon. À l'aide de données expérimentales provenant d'un sondage en ligne sur les diplômés italiens, ce travail a pour but d'évaluer l'impact des salutations SMS personnalisées sur les erreurs de réponse et de mesure. Nous trouvons la preuve que la personnalisation a un impact positif sur les taux de réponse et certains indications qu'il peut conduire à de meilleures données d'enquête; c'est-à-dire, fournissant des réponses plus complètes aux questions ouvertes. Les limites et les implications de l'étude sont également discutées.

## Abstract

The personalization of survey materials may be a cost-effective way to contrast the decline of response rates and possibly improve the quality of survey data. A number of papers have found that personalization of salutations in e-mail communications may lead to higher response rates. Given their widespread use, Short Text Messages (SMS) may also be useful contact modes in surveys; however, little is known on the effects of

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personalized salutations when contacting sample members using SMS. Using experimental data from an online survey on Italian graduates, this work intends to evaluate the impact of personalized SMS salutations on response and measurement error. We find evidence that personalization has a positive impact on response rates and some indication that it may lead to better survey data, i.e. by providing more complete answers to open-ended questions. Limitations and implications of the study are also discussed.

### **Mots clés**

Enquêtes Web, Messages texte courts (SMS), Taux de réponse, Personnalisation, Erreur de mesure

### **Keywords**

web surveys, short text messages (sms), response rates, personalization, measurement error

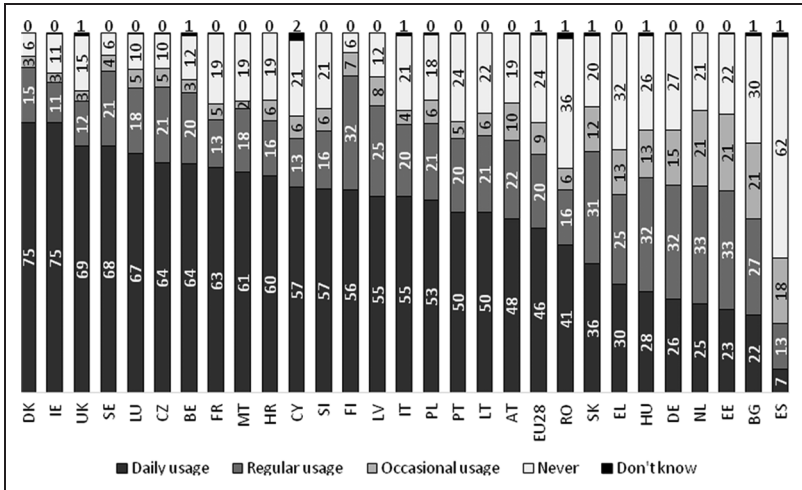
## **Introduction**

Response rates are key indicators of data quality and may have an impact on the research potential of survey data. There are two main reasons why obtaining high levels of survey participation is important: high response rates are likely to reduce the occurrence of response bias (i.e., the bias that may be introduced in survey estimates when respondents differ from non-respondents on the variables of interest) and can enhance the power of the analysis.

However, in a context in which response rates have been constantly declining over time (see, for example, Brick and Williams, 2013; Dillman et al., 2010; National Research Council, 2013), obtaining high levels of response has become a challenge for many researchers. The situation is particularly serious for surveys conducted over the Internet, that are characterised by lower response rates than those usually obtained with other modes of data collection (Lozar Manfreda et al., 2008; Wengrzik et al., 2016). Indeed, in case of online surveys, the absence of interviewers who encourage response constitutes an additional obstacle to survey participation.

To boost response rates, survey designers can adopt different strategies; they can increase the number of contact attempts, use a combination of different contact modes, and introduce a set of monetary and non-monetary incentives. In addition, they can personalize the survey materials, e.g., advance letters or contact e-mails, by “tailoring” survey instruments according to respondent characteristics. Compared with other strategies, personalization of survey materials offers the advantage of being less costly. However, personalization implies the violation of the assumptions on which standardisation is based, i.e. the very idea that survey stimuli should be the same for all sample members (Fowler, 1984, 1991; Fowler and Mangione, 1990) and therefore it may also have an impact on measurement error.

In this paper, we focus on the effects of personalization of SMS salutations in the context of a web survey of university graduates in Italy. The aim of this work is to evaluate the impact of personalized vs. generic SMS invitations on two aspects of non-



**Figure 1.** Frequency of sending or receiving SMS (percentages). Source. Our analysis of the data published in EC (2016b, p. 12). Note. Due to rounding, some percentages do not sum up to 100.

sampling error, i.e. nonresponse and measurement error. Previous research on this topic has focused on personalization of salutations in e-mails; to the best of our knowledge, this is the first study that investigates the effects of personalization of SMS salutations. Dealing with an under-researched topic, results from this work are meant to contribute to expand the knowledge in this research field. The remaining part of the paper is structured as follows: first, we describe the pattern of SMS use in Europe, provide an overview of the theoretical and empirical context in which this paper is set and discuss the research aims, then we describe the characteristics of the study and the experiment, present the analytical strategy and discuss the research findings. The last Section concludes.

## Use of short text messages in europe and implications for survey research

Very little is known on the use of SMS in Europe. We are aware of only one recent publication that allows to draw a detailed picture of the use of SMS in Europe, i.e. the *E-Communications and the Digital Single Market* report, published by the European Commission in 2016 (EC, 2016b). As documented in the publication, Europeans are frequent users of SMS; in 2015, 38 percent sent or received SMS several times a day (p. 11) and 66 percent were daily or regular SMS users (p. 12). It is worth noting that the activities associated to the use of text messages are second only to making or receiving phone calls over a mobile phone, activity reported by 62 percent of Europeans. Although it would be interesting to study change over time in SMS usage within Europe, we cannot perform such an analysis as the Eurobarometers collected data on the use of SMS for the first time in 2015.

Unsurprisingly, there are differences in the pattern of SMS use. As Figure 1 shows, in 2015 there was high variation in the use of SMS within European countries. For example,

75 percent of the Irish and the Danish sent or received SMS daily compared to 22 and 7 percent of the Bulgarian and the Spanish, respectively. Italians are very frequent users of SMS; 55 percent used text messages daily.

Similar to the use of other telephone and Internet services, there are also age-related differences in the use of SMS; in particular, the frequency of using text messages amongst Europeans decreases linearly with age. For example, 71 percent of the youngest respondents sent and received SMS daily, compared to 63 percent of those aged 25-39, 53 percent of those who are 40-54 and 23 percent of respondents who are over 55 (p. 17).

Given the current pattern of SMS use in Europe, short text messages can be considered as a very useful research “tool”, in particular when studying the young population. Indeed, there are studies that documented the wide use of SMS in research carried out in different academic fields and with different aims. In epidemiology, they can improve adherence to specific therapies and attendance at appointments (for a review, see Mbuagbaw et al., 2015). In survey methodology, they can enhance the effectiveness of random digit dialing (RDD) of mobile telephone numbers (Kunz and Fuchs, 2012; Steeh et al., 2007) and, more in general, of the data collection process (Dal Grande et al., 2016; Hoe and Grunwald, 2015; Johnson, 2016), especially when investigating sensitive topics (West et al., 2015). Against this background, it is key to investigate the conditions to maximize the effectiveness of SMS use in survey research.

## The theoretical and empirical context

### *Theoretical Framework - Social Exchange Theory*

To theoretically contextualise our work, we draw on the social exchange theory, originally developed by Blau (1964), Homans (1961), and Thibaut and Kelley (1959) in the early Sixties. In a nutshell, this theory is a general model to understand how people interact with one another and how social norms develop to guide these interactions. Twenty years later, in his first edition of *Mail and Telephone Surveys - The Total Design Method*, Dillman applied the social exchange theory to the survey context (Dillman, 1978). As Dillman, Smyth, and Christian recently put it (Dillman et al., 2014: 24): “the idea that lies behind the social exchange theory is simple: people are more likely to comply with a request from someone else if they believe and trust that the rewards for complying with that request will eventually exceed the costs of complying”. As this statement suggests, the key concepts on which this theory is based are the notions of costs, rewards and trust.

The social exchange theory is a useful framework to explain the (mainly) social mechanisms that lead sample members who receive a personalized salutation to respond to the survey invitation and possibly to provide better survey data. In the context of this work (i.e., a web survey of graduates), costs refer not only to the time respondents spend when filling in a questionnaire but also to the risk of infecting respondents’ electronic devices with viruses or a malware when clicking on the link to the questionnaire (Dillman et al., 2014: 37). Trust, although described as a generic concept, here refers to trust in others and, in particular, in the survey organisation or to the legitimacy of a sponsorship, i.e. the university in our case. The idea of rewards is key; rewards are “as-yet

undelivered benefits (social, psychological, in addition to economic benefits) as well as any immediate ones” (Dillman et al., 2014: 25).

Personalizing salutations may activate the process of social exchange. Respondents may feel valuable, important and “unique”, being addressed using their name rather than using a generic salutation and may feel a moral duty to reciprocate the “reward” that they received, by helping out researchers with their task, i.e. responding to the questionnaire and providing more accurate information (Heerwegh, 2005: 590). It is worth also noting that “social exchange is not a rational behaviour model” (Dillman et al., 2014: 25) based on a careful evaluation of costs and benefits associated to a particular choice individuals may take. Rather, it is a model that relies on the evaluation of only *some* of the multitude of factors that lead people to take a specific decision and personalization may indeed be one amongst the many factors that are effective in driving respondents to participate in surveys.

### *Empirical Context - The Impact of Personalized Salutation in Web Surveys*

In postal surveys, there is consistent evidence that shows that personalization of survey materials and, in particular, advance letters [have](#) a positive impact on response (for a review, see Dillman, 2000). In web surveys, however, the effects of personalization on different sources of error, especially measurement error are less clear (see Appendix 1 for an overview of the studies taken into consideration in this review).

*Impact on Response Error.* The first study that looked at the impact of personalization on survey participation is by Pearson and Levine (2003). Experimenting with a group of Stanford alumni, the authors looked at the impact of four types of e-mail personalization on response rates. Although personalized salutations were associated to higher response rates, the differences between the experimental groups were not statistically significant. However, when exploring differences in the sample composition of the four groups, they did find evidence for significant interactions between response rates and socio-demographic characteristics (e.g., older and younger respondents as well as engineers reacted positively to formal personalized salutations).

Pearson and Levine’s pioneer work inspired a number of scholars who, drawing on their paper, replicated and extended their study. Heerwegh and co-authors conducted three experiments on Belgian university students similar to those that Pearson and Levine carried out a few years earlier. In the first study they found that personalized e-mails have a positive effect on login and response rates and no effect on drop-out rate (Heerwegh et al., 2005). For example, 57.7 percent of respondents who received a personalized e-mail clicked on the “Start” survey button compared with 49.1 percent of those who got a generic e-mail. Although the authors used different indicators to measure response, this finding was consistent with results from other research that they carried out on this topic (Heerwegh, 2005; Heerwegh and Loosveldt, 2006). Similar results were also found in the experimental studies that Joinson and Reips (2007: Study 1) and Muñoz-Leiva, Sánchez-Fernández, Montoro-Ríos, and Ibáñez-Zapata (Muñoz-Leiva et al., 2010) conducted on UK and Spanish students, respectively. The former work documented that response increased from 12.4 percent to 16.6 percent when respondents were addressed using their name (“dear John”) rather than an impersonal

salutation (“dear Student”) whereas the latter study found that 61.0 percent of respondents in the “personalized” condition completed the survey compared with 52.0 percent of those who were assigned to the “anonymous” condition.

Other important contributions in this field are by Sánchez-Fernández, Muñoz-Leiva, and Montoro-Ríos (Sánchez-Fernández et al., 2012), Sinclair, O’Toole, Malawaraarachchi, and Leder (Sinclair et al., 2012), Sauermann and Roach (2013) and Short, Rebar, and Vandelanotte (Short et al., 2015). Experimenting with members of a Spanish Internet Panel representative of the general population, Sánchez-Fernández and colleagues (2012) found a small but significant effect of personalization on response; the number of respondents reaching the end of the questionnaire was higher (9.4 percent) than when anonymous mailings were used (8.6 percent). In the community study that Sinclair et al. (2012) conducted in Melbourne the authors found that 4.7 percent of respondents who received a personalized e-mail responded to the survey compared with 2.2 percent of those addressed using a general salutation. When exploring differences in sample composition, the authors found little evidence for selectivity bias; respondents in the “generic salutation group” were less likely to be homeowners and more likely to be greywater users than the other respondents. Similar results were found in Sauermann and Roach (2013) and Short et al. (2015)’s research. Sauermann and Roach (2013) carried out an experiment with US graduate students and post-doctoral researchers. They documented that 48 percent of the young scientists addressed using their name completed the survey compared with 24 percent of those addressed using their first and last name. Experimenting with a population of Australian breast cancer survivors, Short et al. (2015) found that 69 percent of respondents who were addressed using their name and surname completed the eligibility questionnaire compared with 50 percent of those who were addressed with the more generic salutation “dear member”.

Although most research clearly documented that personalizing e-mail salutations has a positive impact on survey participation, a small number of studies have found that the relationship between personalization and response may be more complex. On the one hand, two papers have shown no effects of personalization on survey participation (Mueller et al., 2014; Porter and Whitcomb, 2003), on the other hand some studies have found that the effects of personalization may depend on other survey design features. Experimenting with a population of UK students, Joinson and Reips (2007: Study 3) found evidence for interactions between type of salutation and nature of the power of the sender. Indeed, the relationship between these two variables is significant only for the respondents in the high power condition: 53.4 percent of respondents in this experimental condition addressed in a personalized manner submitted the first page of the questionnaire compared with 42.1 percent of those addressed with “Dear Student”. Similar results were found in a study that Joinson, Woodley and Reips replicated (Joinson et al., 2007). However, in a later study Muñoz-Leiva et al. (2010) found no evidence for interaction effects between personalization, frequency of reminders, and response rates.

*Impact on Measurement Error.* Investigating the impact of personalized salutations on survey participation is key; however, exploring their effects on measurement error is paramount important. Indeed, a number of papers also extended the empirical analysis to the assessment of personalized e-mail salutations on data quality. As personalization may alter respondents’ perceived anonymity, some of these studies focused on the

evaluation of the effects of personalization on social desirability bias. In their first study, Heerwegh and co-authors (2005) found some evidence that personalized e-mail salutations impacts data quality. As the authors conclude (p. 97): “there are indications that personalization may increase the tendency of respondents to answer questions in a socially desirable way”. In their later research they further investigated the relationship between personalization and data quality, using a larger number of questions on sensitive topics. In both studies, the authors found very little evidence for social desirability bias. In particular, Heerwegh (2005) found no relationship between type of e-mail salutations and the tendency to answer in a social desirable way, whereas Heerwegh and Loosveldt (2006) found no effects on five of the six measures of social desirability considered in the analysis. Other works carried out on this topic have also found very little evidence for social desirability bias. Joinson et al. (2007) found a marginally significant association between personalization and disclosure to sensitive question ( $p = .10$ ), Mueller et al. (2014) documented a small but significant difference in perceived anonymity, whereas Sauermann and Roach (2013) found no evidence for social desirability bias.

Although some studies focused on social desirability bias, other papers assessed the impact of personalization on other indicators of measurement error, e.g. item nonresponse. Findings from these studies are consistent with those from the analysis on social desirability bias. Heerwegh et al. (2005) found no effects of personalized salutation on “don’t know” answer and survey completion time and little evidence for bias in item nonresponse. However, their work also shows that personalization has a positive impact on adherence to survey instructions. Muñoz-Leiva et al. (2010) documented that respondents who received the personalized and generic e-mail salutations did not differ in the number of questionnaire block answered and item nonresponse. Similarly, Mueller et al. (2014) found no difference in response behaviour, item nonresponse, extreme responding, response variability, and answer to open-ended questions.

In conclusion, the review of the main studies in this field has shown that:

- Personalized salutations in e-mails lead to higher response rates or, in the worst-case scenario, have no effects on survey participation.
- There is some evidence that personalization may have a different impact on respondents with different socio-demographic characteristics.
- Although there is mixed evidence on the effects of personalization on measurement error, some studies have shown that it does not hamper data quality.

## Research questions

This paper sits within this empirical context. The aim of this work is to assess the impact of SMS personalized salutations on response and measurement error. As discussed in the previous sessions, we draw on the social exchange theory (Dillman, 2000) and posit that personalization may have an effect on both sources of survey error. Our hypothesis is that personalized salutations may lead to higher response rates and more accurate survey data. This work also aims to test whether personalized



salutations are more effective in boosting participation from respondents with specific socio-demographic characteristics.

## Data

We consider three different datasets: a national web survey on Italian graduates, experimental data from a follow-up study, and administrative data.

*The study on labour market outcomes of Italian graduates in Social Work (main study).* This study is a national web survey on labor market outcomes of Italian students who graduated in Social Work between 2006 and 2012 (N=6,294). Twenty-one of the forty-three university courses on Social Work participated in the study, that is 59 percent of all Italian students who graduated in Social Work between 2006 and 2012. The response rate was 36.2 percent (AAPOR RR2). The questionnaire collected information on three main areas: respondent socio-demographic characteristics, characteristics of the first and current employment, and evaluation of the quality of the university courses. The survey was conducted in 2013-2014 (see Authors, 2015 for more information on the study). An experiment was carried out in the context of this survey; eligible study members were randomly allocated to three experimental groups and non-respondents were reminded to take part in the survey using different modes, by e-mail and SMS (see Authors, 2015). The overview of the study is shown in Appendix 2.

*The follow-up study and the experiment on SMS personalized salutations.* The follow-up study is a web survey that was carried out in 2015 aimed to collect updated employment information on those graduates who were allocated to the SMS experimental group of the main survey (N=708). When controlling for bias, we found no statistically significant differences in the socio-demographic characteristics of the 6,294 eligible participants to the main survey and the 708 graduates belonging to the SMS experimental group. In the context of this follow-up study, we conducted an experiment to assess the impact of SMS personalized salutations on data quality. All 708 graduates were randomly allocated to two experimental groups: the Personalized salutation and the Generic salutation groups. The first group received an invitation with a personalized salutation to take part in the follow-up study. The text of the SMS was: "Dear [First name], we are conducting a follow-up study on graduates in Social Work. Please take part in the study! Here is the link to the 6 questions: [URL]". The second group received an invitation with a generic salutation. In this case the text of the SMS was: "Dear graduate, we are conducting a follow-up study on graduates in Social Work. Please take part in the study! Here is the link to the 6 questions: [URL]". In both cases, the sender was Uni-Bicocca (short for Università di Milano-Bicocca). To send the SMS we used an online service (<https://www.sms hosting.it/it>) that allows personalizing the text of the messages and provides a report on the status of the SMS messages (i.e., delivered or not delivered). Non-respondents received three reminders.

*Administrative data.* Administrative data were provided by the university administrative offices and include an extensive range of information, including graduates' contact information (i.e., telephone numbers and e-mail addresses), their socio-demographic characteristics and key variables on their university performance.

## Methods

### *Methods of Analysis*

To pursue our aims we performed bivariate analysis and computed the Pearson's Chi-Square Test for Independence to test for statistically significant differences in response rates, computed as AAPOR RR2 (AAPOR, 2016), and two indicators of data quality that are discussed in the next Section. To assess the impact of personalization on different respondent characteristics we used a set of socio-demographic variables available from the administrative data (i.e., graduation year and score, and area of residence) and an indicator of saliency computed from the data of the main survey (i.e., response rate). For all analysis, the independent variable is a variable that indicates the two treatment groups (Personalized or Generic groups).

The analysis on nonresponse was carried out on the 575 sample members with a valid mobile number (133 cases were excluded from the analysis because of bouncing SMS); the remaining analyses were carried out on the responding sample only. When checking for selectivity in response, we found very little evidence for bias between sample members with valid and invalid numbers and no bias between respondents and non-respondents.

*Indicators of measurement error.* Estimating the size and the direction of measurement error, i.e. the discrepancy between an estimated and a "true" value, is empirically challenging, being the latter unknown in most of the cases. Therefore, studies that look at the impact of specific survey design features on measurement error often adopt indirect strategies to assess this source of survey error. Lugtig and Toepoel clarify this point in a recent paper (Lugtig and Toepoel, 2016: 81): "indirect methods link measurement error in surveys to the process of answering a survey question. Measurement errors are caused by not conscientiously understanding the question, retrieving and judging information from memory, or giving an answer (Tourangeau et al., 2000)".

Indirect methods of assessing measurement error are based on a number of indicators of quality of survey answers. In our case, to assess differences in data quality between the Personalized and Generic group, we considered two indicators of measurement error, namely response speed and the number of answers provided to an open-ended question. The former is a proxy of respondent willingness to fill in the questionnaire (Malhotra et al., 2014); therefore, we speculate that willing respondents may provide more accurate answers than those who are reluctant. The latter is often considered to be an indicator of satisficing, i.e. respondents' tendency to provide survey answers that are just "good enough", rather than accurate accounts and thorough self-reports (Krosnick, 1991). The variables we used in the analysis are dummy variables that identify respondents who (i) answered before/after the first reminder and (ii) provided an answer to the following open-ended question: "Could you please specify the year in which you started to work as [ . . . ]?"

## Results

### *The Effect of Personalization on Response*

Results from the analysis of the effects of personalization on response are shown in Table 1. We found that sample members who received a personalized invitation were

**Table 1.** Response rate by experimental group

Experimental group	Response rate	Total (N)
Personalized salutation	17.5	285
Generic salutation	12.1	290
Total	14.8	575

Note. = 3.420, df 1,  $p$  0.064

**Table 2.** Response speed and answers provided to an open-ended question by experimental group (%)

Indicators of measurement error	Experimental group		
	Personalized salutation	Generic salutation	Total
Response speed <sup>a</sup>			
RR before 1st reminder	54.0	42.9	49.4
RR after 1st reminder	46.0	57.1	50.6
Total (N)	50	35	85
Specification of the year in which the respondent started to work ("yes") <sup>b</sup>	72.0	60.0	66.7
Total (N)	25	20	45

<sup>a</sup> = 1.023, df 1,  $p$  0.312

<sup>b</sup> = 0.720, df 1,  $p$  0.396

more likely to take part in the survey (17.5 percent) than those receiving a generic invitation (12.1 percent). The level of significance of the differences in percentages (i.e., 5.4 percentage points) between the two groups is borderline ( $p = .064$ ).

*The effect of personalization on measurement error.* As already mentioned, to assess the impact of personalization on data quality we considered two variables: response speed and answers provided to an open-ended question. The analysis on time of response was performed comparing response rates obtained before and after the first reminder was sent. As shown in Table 2, in this study sample members who received a personalized invitation answered faster (54.0 percent) than those receiving a generic invitation (42.9 percent). Similarly, when we focused on the second indicator of measurement error, we found that 72 percent of respondents who received the personalized SMS provided an answer to the open-ended question compared with 60 percent of those belonging to the Generic group. However, as one may expect given the small sample size, the Chi-Square Tests are not significant.

*The effect of personalization on respondents.* To evaluate whether personalization has a differential effect on sample members, we compared the sample composition of the two experimental groups who completed the survey. We focused on three variables regarding their university curriculum (i.e., graduation score and year, and area of residence) and an indicator of the salience of the survey topic. As shown in Table 3, with the

**Table 3.** Respondent characteristics by experimental group (%)

	Experimental group		Total
	Personalized salutation	Generic salutation	
Response rate to the main survey <sup>a</sup>	46.0	40.0	43.5
Graduation year <sup>b</sup>			
2006-2008	36.0	42.9	38.8
2009-2012	64.0	57.1	61.2
Graduation score <sup>c</sup>			
up to 100	38.8	40.0	39.3
more than 100	61.2	60.0	60.7
Geographic area of residence <sup>d</sup>			
North	54.0	62.9	57.7
other area	46.0	37.1	42.3
Total (N)	50	35	85

<sup>a</sup> = 0.301, df 1, *p* 0.583

<sup>b</sup> = 0.408, df 1, *p* 0.523

<sup>c</sup> = 0.013, df 1, *p* 0.910

<sup>d</sup> = 0.661, df 1, *p* 0.416

exception of the variable graduation score, in our study we found that personalization attracts different types of respondents, i.e. those who participated to the main survey, who graduated recently, and were living in the Centre or the South of Italy when attending the university courses. For example, 64 percent of those who received a personalized salutation graduated between 2009 and 2012 compared with 57.1 percent of respondents belonging to the Generic group. However, also in this case, the Chi-Square Tests are not significant.

## Conclusions

Nonresponse and measurement errors are very serious issues in survey research. The personalization of survey materials may contribute to reduce the impact of nonresponse, as documented in different papers. However, personalization can also affect measurement error. Indeed, with personalization, some of the assumptions of standardization are violated and this may have an impact on data quality. Our paper explores the effects of an unexplored feature of personalization in survey research (i.e., salutations in SMS) on nonresponse and measurement error. We focused on SMS as these are often used in many European countries, including Italy, and may be considered useful means to contact respondents in surveys. Drawing on the social exchange theory we hypothesize that respondents may feel valuable when addressed using their name (rather than receiving a generic salutation) and may reciprocate this “reward” by taking part in the survey and providing accurate information.

Consistently with previous research in this field, we found that personalization may increase response rates; although the level of significance of the differences in percentages between the two groups is borderline ( $p = .064$ ), we believe this finding may be conservative (recall that the result of the Chi-Square Test is dependent on the sample

size). When exploring the impact of personalization on two indicators of measurement error, we did not find any statistically significant differences between the two groups. However, it has to be noted that in our research, study members allocated to the Personalized group seem to react faster to the invitation to fill in the survey and provide more complete answers to open-ended questions. Similarly, when assessing the impact of personalized salutations in SMS on sample composition, we did not find any statistically significant differences. However, in our experiment we found some indication that personalization may have a different impact on respondents with different characteristics; personalization may be more effective on study members who participated to the main survey, graduated recently, and were from the Centre or the South of Italy. We believe these differences in response propensity amongst sample members living in the different part of Italy may be due to the cultural differences that still persist between the different Italian regions (i.e., traditionally, the South of Italy is characterized by a more informal communication style).

The main limitation of this work is constituted by the sample size available for the analysis. Although the size of the study population of this experiment is similar to that of other studies, the statistical power of the analysis was hampered by the low response rate that further reduced the number of cases available for the analysis. Another limitation lies in the characteristics of the study population; as most of the works in this field, we experimented with a population of graduates. However, this specific population may have different response patterns to those of the general population, especially when institutions that are perceived as potentially salient by the sample members contact them. Therefore, it remains unclear the extent to which we can extend the findings from this work to the general population.

Our research has some practical implication. We have shown that in 2015 the majority (i.e., at least 70 percent) of the population living in more than half of all European countries use SMS on a regular basis, i.e. daily or regularly. Under certain condition, i.e. when surveying the young population or in countries with poor Internet connections and where mobile phones are hardly used to access the Internet (EC, 2016a), SMS are important contact means and personalization of salutations may be effective in boosting survey outcomes and, in particular, in increasing response rates. In addition, the use of SMS may lead to significant savings in researcher time (although one also needs to consider the costs associated to the sending of SMS).

As shown in the section devoted to the literature review, research findings on the role of personalization on data quality are mixed. We do believe that further research in this field is needed to provide a deeper understanding of the relationship between personalization of survey features and the quality of the survey answers. Ideally, future studies should be carried out on larger samples and should consider a number of different indicators of measurement error. Research in this field could also assess whether personalized salutations in SMS are a more efficient means to contact sample members than personalized e-mails.

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## Appendix I. Overview of the main studies on personalized salutations in SMS

Study characteristics	Experimental groups	Response error	Measurement error
Heerwegh et al. (2005) -Study population: students -Country: Belgium	Dear student/dear [name and surname]	Positive effect on login rate and response rate (clicking the "Start" survey bottom); no effect on drop-out rate	No effect on don't knows & survey completion time; borderline impact on item nonresponse; positive impact on adherence to survey instructions & social desirability
Heerwegh (2005) -Study population: students -Country: Belgium	Dear student/dear [name and surname]	Positive effect on login rate and response rate (reaching and submitting the final question of the survey), no effect on drop-out rate	No effect on social desirability bias
Heerwegh and Loosveldt (2006) -Study population: students -Country: Belgium	dear [name and surname], dear student	Positive effect on response rate and login (reached and submitted the final page); no effect on drop-out rate	No effects for 5 of the 6 measures of social desirability
Jonson and Reips (2005) -Study population: students -Country: Uk	Dear student, Dear Open University student, dear [name and surname], dear [name]. In study 3, Dear Open University student is dropped Note: Study 3 is a 2x3 factorial design with power/status of the sender	Positive effects of personalization on first page submitted; the highest response rate obtained with the most informal salutation (study 1). No effects of personalization on leaving the panel when considering the 4 groups; negative effect when considering the 2 recorded groups, impersonalized and personalized (study 2). High power condition, positive effect of personalization on response to the first page of questions (study 3)	n/a
Jonson, Woodley and Reips (2007) - Study population: students -Country: Uk	Dear PRESTO panel member; Dear surname Note: Study 1 is 2x2 factorial design with power/status of the sender. Study 2 experiments with personalization of URL	No effect. High power conditions: positive effect of personalization on final survey page submitted; neutral power condition: no effect of personalization (study 1)	Marginally significance association between personalization and disclosure to sensitive questions (p. 0.10). Personalized condition: higher levels of use of the "I prefer not to answer" option; non-personalized condition: higher levels of non-selection of any option (study 1)

(continued)

## Appendix 1. (continued)

Study characteristics	Experimental groups	Response error	Measurement error
Muñoz-Leiva et al. (2010) -Study population: students -Country: Spain	Dear student/Dear [name and surname] Note: It is a 2x2 experimental design (personalization and frequency of reminders)	Positive effect on login rates, retention rates; no effect on drop-out rate. No evidence for interaction effects with frequency of reminders	No effect on number of blocks answered and number of missing data
Mueller et al. (2014) -Study population: employees of a financial service company -Country: Germany	Personalized/generic form of address (no details provided) & login procedures (in the personalized condition, login codes)	No effect on response rate (not responding to any survey item)	With the generic-impersonalized group, small but significant difference in perceived anonymity; no differences in response behaviour, item nonresponse, extreme responding, response variability, answer to open-ended questions
Pearson & Levine (2003) -Study population: university alumni -Country: US	Dear Stanford Alum/Dear Mr. Bond/Dear James/James.	No effects on response rates; positive effect on specific socio-demographic groups	n/a
Porter and Whitcomb (2003) -Study population: High school students -Country: Unspecified	Dear [name]/dear student Note: Experiment 1 is a 2x2x2x2 design (e-mail address of the sender; power/status of the sender; authority of the e-mail signatory; type of sponsor). Experiment 2: 2x4 design (selectivity statement, deadline)	No interaction effects on click-through (percent of respondents viewing the first page of the survey but not submitting any results) and response rate	n/a
Sánchez-Fernández, Muñoz-Leiva, Montoro-Ríos (2012) -Study population: members of an Internet panel -Country: Spain	Dear Sir or Madam, Dear [name and surname] Note: The experiment is a 2x2x2 design (personalization, number of reminders, post-incentives)	Positive effect of personalization on retention rate (number of persons reaching the end of the questionnaire). Significant interaction between personalization and number of reminders	No effects on the number of missing data

(continued)

### Appendix I. (continued)

Study characteristics	Experimental groups	Response error	Measurement error
Sauermaann, Roach (2013) -Study population: graduate students and postdoctoral researchers -Country: US	“Dear Researcher”, dear [name and surname], dear [name] Note: 25 experimental groups (personalization, incentives, day of the week, hour of the day, and a set of dynamic features including number of contacts)	Positive effect on login (click on the survey link) and survey completion rates (clicked “next” on the final page of the survey)	No effects on social desirability bias (self-reported preferences for making a contribution to society)
Short et al. (2015) -Study population: breast cancer survivors -Country: Australia	[name and surname], dear member	Positive effect on completing the eligibility questionnaire	n/a
Sinclair et al. (2012) -Study population: general population living in Melbourne -Country: Australia	Details of the personalization are not provided, to the householder Note: the experiment also included a postal and a telephone component	Positive effect on responding to the survey; little evidence of selectivity in the sample composition when survey modes or personalized/generic samples are obtained. No info on how response rates are computed. Comparisons of costs	little n/a

## Appendix 2. Overview of the study

Study name	Sample size	Experiments
-The Study on Labour Market Outcomes of Italian Graduates in Social Work (main study) -2013-2014 -Web survey	N = 6,294	Random allocation to three experimental groups: the e-mail, no reminder and SMS group.
-The Follow-up Study -2015 -Web survey	N = 708 (members of the SMS group)	Random allocation to two experimental groups: the Personalized the Generic salutation groups

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