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Online Surveys:
How to Know Who Is Most Likely to Cheat and When Is It Important to Know It

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ABSTRACT

This experimental study investigated factors that influence cheating in health literacy surveys. The objective was to predict who is most likely to cheat using Google in online knowledge surveys. The experiment randomly assigned 265 participants into three research conditions. The first group completed a pen-and-paper version of the health literacy questionnaire. The second group and the third group completed an online version of the same questionnaire, while the participants of the latter group were explicitly asked to be honest. The number of correct answers was higher in the online groups, indicating that respondents to online surveys were more likely to 'cheat' by using search engines to answer questions. A positive correlation was found between the ability to seek health information on the web, and the probability that a participant would cheat without the request to avoid using the internet. In the online group with a request to be honest, no correlation was found. The conclusion is that people who have high ability to seek information online are most likely to cheat.

KEYWORDS

Cheating, Health Literacy, Knowledge, Online Surveys

INTRODUCTION

Coronavirus crisis drove school education, university classrooms, job interviews, medical surveys and many other essential practices online. Thus, it becomes more and more important to assess the authentically of online responses. For example, how do we keep students from cheating in online exams? To what extent people tend to cheat while going online? May signing the honor code be helpful, and to what extent? This paper targets to investigate these questions.

Until recently, the traditional standard approach for administering questionnaires has been to use hard copy questionnaires, i.e. paper-and-pencil questionnaires (Oppenheim 1992). However, technological changes have enabled people to complete questionnaires, surveys and online exams quickly and with a high-quality level (Strabac and Aalberg, 2011). The literature discusses the advantages and disadvantages of online questionnaires (Solomon, 2001; Denscombe, 2003; Kaplowitz *et al.*, 2004). However, only a few researchers have focused on cheating in online questionnaires testing knowledge because it is challenging to measure cheating, even though transmitting questionnaires to online settings may significantly skew the results.

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There are two main problems in measuring the knowledge level of respondents. The first problem is a known problem in knowledge surveys, which is the tendency of respondents to guess the correct answer, depending on their personality (whether they tend to guess or not) (Mondak and Davis, 2001; Mondak and Anderson, 2003; Sturgis *et al*., 2008). Because this problem exists for all types of questionnaires (online, hard copy etc.), it is not important when choosing how to deliver a questionnaire (i.e. an online questionnaire or a hard copy questionnaire). The second problem, which is what this article focuses on, is related to online surveys designed to measure knowledge: it is the possibility that respondents will use their Web browser to search for answers, and thus will 'cheat' in questions relating to their knowledge (Strabac and Aalberg, 2011; Jensen *et al*., 2014). This problem affects online questionnaires relating to knowledge. Given that the use of such questionnaires is relatively novel, the literature on this subject remains limited.

Previous studies have found that the average level of knowledge observed in Web surveys tends to be higher than the average level observed in telephone or face to face surveys. Most of these studies measure political knowledge (Ansolabehere and Schaffner, 2011; Berrens *et al*., 2003; Elo, 2009; Strabac and Aalberg, 2011; Jensen *et al*., 2014) and a few measure scholarly knowledge (Fricker, 2005). However, when they measure knowledge, some researchers do not see the action of using search engines as a source of measurement error (Fricker, 2005; Ansolabehere and Schaffner, 2011). Instead, they suggest that the high evaluation of political knowledge observed in Web surveys is due to an ongoing sampling of people with more knowledge (Ansolabehere and Schaffner, 2011). It is believed that online questionnaires have a sampling problem, and thus they do not constitute a representative cross-section of the population (Denscombe, 2003). Another belief is that the main reason that, on average, online respondents (compared to phone respondents) answer a higher percentage of questions correctly is because questions about knowledge are easier to answer when they are presented visually and when the respondents can answer them at their own pace – and indeed, online respondents take longer to answer information items (Fricker, 2005).

Other researchers acknowledge that access to a Web browser can lead to 'fraud', thereby causing a measurement error (Elo, 2009). Some of them lay a limit of 30 second response time per item (Strabac & Aalberg, 2011) because they think that unlimited response time associated with cheating. Other researchers, however, do not believe there is such a connection (Fricker, 2005). Some researchers have even gone a step further and have attempted to estimate the prevalence of cheating among responders in online surveys of knowledge (Jensen *et al*., 2014). In their study, Jensen *et al*. (2014) found that the number of respondents who used the Internet while answering online knowledge questionnaire was 22.3%, and they noted that, because the study was based on self-reporting, this evaluation can be considered as conservative.

In the authors' view, these results are not unexpected, since they fit previous researchers' findings that the phenomenon of cheating in a society is not characterised by a minority that cheats a lot, but rather by a majority that cheats a little (Mazar *et al*., 2008; Mazar and Ariely, 2006). Indeed, while those researchers study the impact of the cheating phenomenon in financial terms, this article explores the effect on the accuracy and reliability of information collected in surveys. The accuracy of the data collected through such instruments is of utmost importance if researchers seek to present an argument based on the data collected. For this reason, it is proposed that accuracy, as a characteristic of the quality of survey data, is perhaps the most crucial characteristic of all (Singh, 2011). As noted, the possibility of respondents in online questionnaires relating to knowledge cheating affects the accuracy and reliability of data collected through surveys, and, consequently, it strongly influences the survey validity. This strong influence suggests that it is vital to study this phenomenon.

METHOD

The ethics committee of the University reviewed and approved the research described in the manuscript. The method of conducting the questionnaire is an independent variable, which is divided into three categories: 1) *a paper-and-pencil questionnaire*; 2) *an online questionnaire without an explicit request that the participant does not search for information using search engines,* and 3) *an online questionnaire with a direct request that the participant does not search for information using search engines*. The dependent variables were: 1) the answers to knowledge questions testing health literacy, and 2) answers to questions testing personal assessment of a person's ability to search for health information.

The study had two research questions: 1) how does the method of conducting the survey (online survey with/without request for the participant not to use search engines or a hard copy survey) affect the answers to the knowledge questionnaire regarding health literacy? 2) How does the method of conducting the survey (online survey with/without request for the participant not to use search engines or a hard copy survey) affect the answers to the questionnaire regarding the personal assessment of a person's ability to search for health information?

To examine the questions presented in this study, participants received a questionnaire containing two sub-questionnaires, as follows:

Sub-questionnaire 1: This questionnaire measures actual knowledge of health literacy. It examines knowledge of terms used in the health sector, such as bronchus, radiologist, barium and Streptococcus. It is based on the Short Assessment of Health Literacy-English, or SAHL-E questionnaire, as presented in the study by Lee *et al*. (2010) and provides a quick assessment of health literacy. Much like SAHL-S&E, which tests 18 terms, the participants in the current study were given 12 terms (items). Each test item was associated with three answers: a) a word associated with its meaning; b) a distracting word unrelated in meaning; and c) a 'don't know' option. The subject was asked to select one of these three answers.

Sub-questionnaire 2: It evaluates a person's ability to search for health information based on their self-assessment of that ability. The participants were asked to rate how easy or difficult it is for him/her in a variety of situations, such as finding information about his health situation, understanding the information given him/her by his/her doctor, etc. Because it is based on self-assessment, this questionnaire can measure self-efficacy – and in the current case, whether a person believes that they can find and understand health information. This questionnaire is named Health Literacy Scale – Israel (HLS-ISR) and was used in a national health literacy survey carried out in Israel in 2012 (the 2nd European Health Literacy Conference, 2014). HLS-ISR is based on a questionnaire named HLS-EU-Q that is designed to measure health literacy in Europe, and its development is presented in the work of Sorensen *et al*. (2013).

The questionnaire was given to three groups. In Group 1, participants completed a paper-and-pencil questionnaire. In Group 2, participants filled out an online questionnaire. In the last group, participants finished an online questionnaire and were asked at the beginning of the questionnaire not to seek information on the Internet during the response.

The questionnaire was transferred to 265 participants in Israel (average age 29.3 years; 106 males; 158 females), randomly distributed across the three conditions: Group 1 (paper-and-pencil questionnaire); Group 2 (online questionnaire); Group 3 (online questionnaire without using search engines).

The study had three hypotheses:

Hypothesis 1: The authors anticipate that access to the Internet in Groups 2 and 3 would cause (entice) the responders to use the Internet while answering the knowledge questions. However, the authors expect that the instruction given in Group 3 not to use search engines will have some effect, reducing the participants' use of the Internet while answering the questionnaire. Therefore, there will be an 'answer bias' in the health literacy knowledge questionnaire, so that the participants in Groups 2 and 3 will score higher because they are cheating, which will be reflected in answering more questions correctly on average compared to Group 1 (Part One). In regard to Groups 2 and 3, the authors expect that the answer bias will mean that a higher level of health literacy will be detected in Group 2 compared to Group 3 (Part Two).

Hypothesis 2: The authors expect that they will not find significant differences among the three groups in regard to the questionnaire that evaluates the participants' ability to search for health information based on personal assessment. Since this is a self-assessment and attitude-based questionnaire, searching for information online will not be helpful, and therefore the accessibility of Groups 2 and 3 to the Internet is not relevant and is not expected to affect their answers.

Hypothesis 3: Nowadays, in an information society, a considerable amount of health information is available online. However, finding and understanding relevant online health information and determining whether its contents are reliable must present a real challenge for many health consumers (Lee *et al*., 2014). Therefore, the authors assume that only those who have a high level of ability to search online for health information and also have access to the Internet (Groups 2 and 3) will really make effective use of this capability to search for information on the questions they do not know the answers to, and therefore the number of 'don't know' answers will be lower. Therefore, in Groups 2 and 3, the authors expect to find a negative correlation between the number of 'don't know' answers in the health literacy knowledge questionnaire and the score in the self-assessment questionnaire that measures the ability to search for health information. By contrast, in Group 1, the authors will not find any correlation between the above variables.

RESULTS

Tables 1-4 reveal several important trends. There is no correlation between the age of participants in all three groups taken together and the number of 'don't know' answers in Questionnaire 1 (the knowledge

Table 1. Correlations among dimensions for all respondents (the three groups taken together)

	Age	Correct	Incorrect	Don't know	Perceived literacy
Age	---	**0.393****	**-0.399****	-0.080	0.090
Correct	**0.393****	---	**-0.530****	**-0.467****	-0.030
Incorrect	**-0.399****	**-0.530****	---	**-0.203****	0.003
Don't know	-0.080	**-0.467****	**-0.203****	**---**	0.023
Perceived literacy	0.090	-0.030	0.003	0.023	**---**

Note. N = *265* respondents.
** correlations that were statistically significant at the $p < 0.01$ level.

Table 2. Correlations among dimensions for the pencil-and-paper group (Group 1)

	Age	Correct	Incorrect	Don't know	Perceived literacy
Age	---	0.007	-0.141	0.156	**0.484****
Correct	0.007	---	**-0.639****	**-0.445****	-0.195
Incorrect	-0.141	**-0.639****	---	**-0.405****	0.033
Don't know	0.156	**-0.445****	**-0.405****	**---**	0.196
Perceived literacy	**0.484****	-0.195	0.033	0.196	**---**

Note. N = 78 respondents.
All correlations were statistically significant at the $p < 0.01$ level.

Table 3. Correlations among dimensions for online group without a warning not to use search engines (Group 2)

	Age	Correct	Incorrect	Don't know	Perceived literacy
Age	---	0.214	-0.069	-0.202	**0.253***
Correct	0.214	---	**-0.529****	**-0.717****	0.091
Incorrect	-0.069	**-0.529****	---	-0.200	0.141
Don't know	-0.202	**-0.717****	-0.200	**---**	**-0.234***
Perceived literacy	**0.253***	0.091	0.141	**-0.234***	**---**

Note. N = 119 respondents.
*correlations were statistically significant at the $p < 0.05$ level.
**correlations were statistically significant at the $p < 0.01$ level.

Table 4. Correlations among dimensions for online group with the warning not to use search engines (Group 3)

	Age	Correct	Incorrect	Don't know	Perceived literacy
Age	---	**0.392****	**-0.231***	**-0.317****	-0.124
Correct	**0.392****	---	**-0.338****	**-0.462****	-0.098
Incorrect	**-0.231***	**-0.338****	---	0.081	0.022
Don't know	**-0.317****	**-0.462****	0.081	---	0.081
Perceived literacy	-0.124	-0.098	0.022	0.081	---

Note. N = 68 respondents.
*correlations were statistically significant at the $p < 0.05$ level.
**correlations were statistically significant at the $p < 0.01$ level.

questionnaire). There is a significantly positive correlation between the age of participants in all three groups taken together and the number of correct answers in the knowledge questionnaire ($r = 0.393$; $p <0.01$). This is in addition to a significant negative correlation between the age of participants in all groups taken together and the number of incorrect answers in the knowledge questionnaire ($r = -0.399$; $p <0.01$). Group 3 (the online group that was asked not to use search engines) showed a significantly positive correlation between the age of subjects and the number of correct answers in the knowledge questionnaire ($r = 0.392$; $p <0.01$). A significant negative correlation was found between the age of participants and the number of incorrect answers in the knowledge questionnaire ($r = -0.231$; $p <0.05$). However, similar significant correlations were not found in the other groups, presumably because the age variance in the groups was too low to create a significant result.

A significant positive correlation was found between the subject's age and the score in the personal assessment questionnaire relating to the ability to seek health information for both the paper-and-pencil group (Group 1) and the online group without instructions not to use search engines (Group 2). However, the same correlation was not found in the online group with instructions not to use search engines (Group 3). The explanation of this pattern is that, as people get older, they learn better how to seek information, so the authors would have expected to see a significant positive correlation also in Group 3 (the online group with instructions not to use search engines). However, the authors speculate that the ability to search for information acts like a convex parabola – it first increases with age until a certain age at which it reaches a maximum and then decreases with age. The authors suggest that it is possible that the ability to seek health information for some participants in Group

3 (which has the highest average age among all groups) began to decrease, which explains the lack of a correlation in this group.

A significant correlation was also found between the form of survey implementation (paper-and-pencil or online with/without instructions not to use search engines) and the number of correct and incorrect answers in the knowledge questionnaire (Questionnaire 1). No correlation was found between the form of survey implementation and the self-evaluation questionnaire relating to the ability to search for health information (Questionnaire 2). No correlation was found between the transfer form and gender.

No significant differences were found between gender and the answers to the knowledge questionnaire (Questionnaire 1) or the score in the self-evaluation questionnaire relating to the ability to search for health information (Questionnaire 2). These findings, which appear to indicate that the volume of cheating in online questionnaires remains the same regardless of gender, is consistent with the results of Jensen *et al*. (2014), who found no significant difference between gender and self-reported cheating when answering the online questionnaire in their study. However, it should be noted that a difference between the genders was found that might be significant if there were more participants: in the 'don't know' answer in the knowledge questionnaire ($F = 4.711$, $p = 0.165$), males answered more answers with 'don't know' than females. A possible explanation for these findings is that more males had participated in Group 1.

The analysis of responses to Questionnaire 1, the questionnaire that measures actual health literacy, required calculating the number of correct, incorrect, and 'don't know' answers for each subject. The results are presented in Table 5.

Being a knowledge-based questionnaire, searching information online would help the participants in this questionnaire, so the authors expect that anyone with access to the Internet (i.e. the online participants) would use this feature and 'cheat'. It is likely that people who have cheated in the online questionnaire and have searched the Internet for answers will consequently achieve a higher number of correct answers. Therefore, in groups with access to the Internet (Groups 2 and 3), there were more correct answers and less incorrect answers than in the paper-and-pencil group (Group 1).

Therefore, the first part of Hypothesis 1 was supported. Indeed, in the online groups (Groups 2 and 3), there was higher health literacy, which was reflected in answering more questions correctly on average than in Group 1: $t(263) = 5.52$, $p < 0.01$ (comparison of the number of correct answers between Group 1 and the other two groups). There was no difference between the groups ($t < 1$) for the number of 'don't know' answers and scores in the personal assessment of a person's ability to search for health information.

The finding that the online groups have higher health literacy is consistent with the study of Strabac and Aalberg (2011), which found that online knowledge surveys produce estimates that are biased slightly upwards as regards assessing the level of knowledge in the general population. It is also in line with another study that showed that online surveys contain a source of measurement error because respondents can look up the correct answers (Jensen *et al*., 2014).

Table 5. The relationship between method of conducting questionnaire and mean number of correct/incorrect/don't know answers per person

Method	Correct	Don't know	Incorrect
Paper-and-pencil group	5.86 (1.49)	1.52 (1.26)	4.61 (1.46)
Online group without the warning not to use search engines	7.73 (2.33)	1.99 (1.98)	2.23 (1.66)
Online group with the warning to use search engines	7.25 (2.35)	2.17 (1.52)	2.14 (1.32)

Note. N = 265 respondents. The SD is given in parentheses.

As for the second part of Hypothesis 1, Group 2 (online without instructions not to use search engines) had more correct answers than Group 3 (online with instructions not to use search engines). However, this difference is not significant ($t(184) = 1.41$ $p > 0.05$). Hence, the second part of Hypothesis 1 is not supported. The authors consider the explicit instruction not to use search engines that was given to Group 3 to have acted as an 'honour code', and there is evidence that reminders of morality (for example, in the form of an honour code) inhibit oriented motivation thinking, thus hindering dishonest acts and acts lacking in integrity. Apparently, the honour code of the current study (i.e. asking the participants of Group 3 not to use the Internet when answering the questionnaire) worked in a minor way, and therefore the result was not significant. It seems that, even though the authors placed the 'honour code' at the beginning of the questionnaire in order to increase its influence (Shu *et al*., 2012), the effect was not strong enough.

Questionnaire 2 evaluated the ability to search for health information based on personal assessment. In this questionnaire, an online information search is not helpful since it is an attitude-based self-assessment questionnaire. The questionnaire's internal reliability Cronbach's alpha type is 0.90. Hence, the authors joined the questionnaire items to establish an index of a participant's assessment of their ability to search for health information based on a simple average between items, and as a result, their assessment of their health literacy. The index was calculated for the three groups, and the results show that participants from all groups reported similar self-efficacy in the health sector, $F(2, 264) < 1$, $p =$ ns. In other words, in accordance with the expectations of the authors in Hypothesis 2, no difference was observed between the groups in terms of self-assessment of the ability to search for health information (meaning in their self-efficacy in that sector).

However, in Group 2, there was a significant negative correlation between the number of 'don't know' answers and the self-evaluation of the ability to search for health information, $r = -0.234$; $p <0.05$. This means that respondents to the online questionnaire (who showed a high level of confidence in their ability to seek health information, indicating high self-esteem in respect of the ability to search for health information online) chose 'don't know' answers less frequently. This is compared to respondents to the online questionnaire who showed low self-esteem in respect of the ability to search for health information online and who chose more 'don't know' answers. In Group 1, no connection was found between the number of 'don't know' answers and the personal evaluation of the ability to search for health information. This further strengthens the conclusion that the Internet allows 'cheating' $r = 0.196$; $p =$ ns.

In fact, those who reported a high ability to seek health information according to the self-efficacy questionnaire (Questionnaire 2) found the answers to the items they did not know in the knowledge questionnaire (Questionnaire 1) using the Internet. Therefore, they had less 'don't know' answers in the knowledge questionnaire (1) – meaning that those participants were more likely to cheat and to look up the correct answer. This behaviour requires available access to the Internet, which could be seen in Group 2, who had access to the Internet when replying to the questionnaire (and who did not receive an explicit instruction not to search using a search engine).

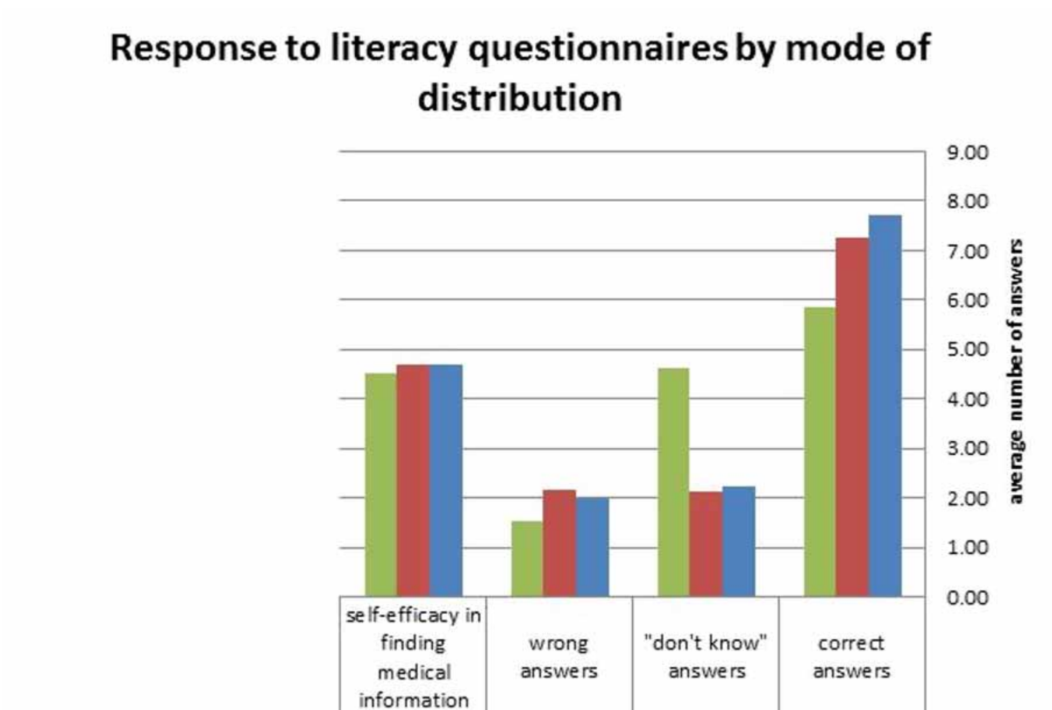
As previously noted, these results were significant concerning Group 2. However, it is notable that, in contrast to Hypothesis 3, in Group 3 no correlation was found between the number of 'don't know' answers and the personal evaluation of the ability to search for health information. Hence, Hypothesis 3 was only partially supported.

Apparently, the instruction not to use search engines that was added to Group 3 led respondents to reduce their use of the Internet. However, it seems that this group nevertheless made some use of the Internet, because according to the findings that were presented in Table 5, the number of correct answers in Group 3 was 7.25 (2.35). This is, however, slightly lower than Group 2 (7.73, 2.33) but still higher than Group 1 (5.86, 1.49). As the table reveals, Group 3 scored lower in the health literacy knowledge questionnaire compared to Group 2, $t(185) = 1.41$, $p = 0.16$, although the difference is not statistically significant. However, Group 3 scored higher in the health literacy knowledge questionnaire compared to Group 1, which was reflected in the higher number of correct answers on average than in Group 1, $t(144) = -4.69$, $p < 0.01$. The difference found is statistically significant. This means that, according to the findings, the authors can say that the participants in the online Group 3 still ‘cheated’ and searched for answers on the Internet, despite the instruction that the authors added to the questionnaire in this group.

It might be suggested that the lack of an Internet search among the online Group 3 is not likely to be a reasonable explanation for the fact that no correlation was found between the number of ‘don’t know’ answers and the self-evaluation of the ability to search for health information in this group. The authors suggest that it is possible that the explicit request among this group not to use search engines caused interfering factors, such as the participant’s morality, integrity and motivation, to have an impact. The authors think that similar to the findings in Group 2 (also among Group 3), personal ability to search for health information online does affect the possibility that the participant will ‘cheat’, but other variables (e.g. the interfering factors mentioned above) produce noise. Thus, the authors cannot see the original effect, and therefore no correlation was found, as discussed above.

Figure 1 summarises the results of this study. It is evident that participants in the online groups answered more questions correctly on average compared to the participants in the offline (pen and paper) group; while participants who were asked at the beginning of the questionnaire not to seek information on the Internet answered correctly less questions than those participants who were not asked anything.

Figure 1. The differences between the knowledge questionnaire (Questionnaire 1) and the personal assessment questionnaire in respect of the ability to search for health information (Questionnaire 2) between three groups of participants: An online group, an online group that was asked not to use search engines and a paper-and-pencil group



	self-efficacy in finding medical information	wrong answers	"don't know" answers	correct answers
internet	4.71	1.99	2.23	7.73
internet +asked not to google	4.71	2.17	2.14	7.26
pen and paper	4.54	1.53	4.62	5.86

DISCUSSION

Internet-based surveys are becoming increasingly popular because of their diverse design options and relatively low cost compared to other options. However, the current research has identified a specific source of error in online surveys when measuring knowledge in the health sector: that is, cheating, in terms of looking up the correct answer, seems inevitable when asking knowledge questions.

Hence, if the goal in an online survey is to examine the amount of information retained by an individual, cheating is a potential source of measurement error (Jensen *et al*., 2014) and will lead to biased upward knowledge estimates. Similarly to the results obtained in this study, when the two online groups (with/without instructions not to use search engines) answered correctly on more knowledge items than the paper-and-pencil group, they had fewer incorrect answers than the paper-and-pencil group.

Researchers have discussed and attempted to offer solutions for the cheating phenomenon. Strabac and Aalberg (2011) suggest that the act of limiting the time given for completing a survey is a solution to the problem of cheating. Other researchers have been sceptical of this solution (Jensen *et al*., 2014). Another option, which Strabac and Aalberg (2011) suggest, is to emphasise the use of images in online knowledge surveys rather than text, which would make it harder for respondents to look up the correct answer. This method was used in the study by Munzert (2015), but it is believed that this approach makes it possible to reduce cheating only slightly, and its use is limited to areas of knowledge for which images instead of text can be used.

Jensen and colleagues (2014) suggest that the exact extent of the cheating phenomenon is unknown, so researchers will have to rely on self-reported measures regarding the phenomenon: i.e. to ask respondents whether they have cheated. However, self-reporting is influenced by social desirability, and therefore it is suggested that the extent of cheating be examined using self-reported measures regarding something else: the ability to search for information on the Internet efficiently.

This article presents new insights into cheating. The possibility that a respondent will look up the correct answer (assuming s/he has access to the Internet while answering the questionnaire) seems to be systematically related to his/her ability to search for information on the Internet, based on self-reporting. The authors suggest that using a self-assessment questionnaire in respect of a person's ability to search for information (Questionnaire 2) measures the respondent's self-efficacy, i.e. the respondent's belief in his/her ability to cheat in the knowledge questionnaire (Questionnaire 1). In other words, the score in Questionnaire 2 makes it possible to predict the probability that a person will cheat in Questionnaire 1. This idea is compatible with Bandura's (1997) concept that, when a person perceives a given task as not corresponding to his/her abilities (as s/he estimates it), s/he will usually stop putting effort into the task (and in the current case, s/he will cheat, at a low level of probability). By contrast, when a person perceives his/her task as fitting his/her abilities, s/he will put considerable effort into finishing the task, even when he/she faces difficulties and obstacles (and in the current case, s/he will cheat, with a high level of probability).

In conclusion, given the extent of cheating in online surveys, the authors believe that knowledge measured in the online survey should be treated carefully. It is suggested that, when a researcher considers using an online survey, s/he needs to take into account the survey's disadvantages compared with alternative methods of data collection. If the goal is to measure knowledge, there should be consideration of the possibility that a considerable number of respondents will cheat, causing an upwards bias in knowledge estimates. However, if the purpose is to measure a topic that cannot be searched for using research engines (e.g. self-efficacy questionnaires) the phenomenon of cheating in online questionnaires should not affect the results, because, according to the findings of the current study, no correlation is found between the different forms of survey implementation (paper-and-pencil or online with/without instructions not to use search engines) and the personal evaluation questionnaire in respect of the ability to search. In this case, even if the participants in the online groups (Group 2 and 3) attempted to use search engines, it did not help them, and the authors did not obtain biased estimates of these groups compared to the paper-and-pencil group.

Future research should focus on how to eliminate (or, at least, manage) the possibility of looking up the correct answer in online surveys that aim to measure knowledge levels. The authors believe that there will always be participants who will cheat, so the suggestion is that future research should focus on the development of a statistical model that will allow future researchers to manage this. The model should be informed by the current study and should include such variables as: a reaction time per item; whether the item is presented as text or as an image; whether the subject has reported independently on cheating; whether the subject has reported on having high-level skills regarding searching for information; and any additional factors that are seen to be associated with cheating in online knowledge questionnaires. Besides, it would be interesting to see how the results would change if an online proctoring system were used.

CONCLUDING REMARKS

Researchers are divided into two groups: those who think that respondents cheat in online surveys and those who do not. The current study shows that respondents do 'cheat' in online surveys, meaning that they go online to look up the correct answer. In this study, this problem was found to affect knowledge surveys, in which looking up information can help produce correct answers. Asking the respondents not to use an Internet browser while answering the questionnaire was found not to be effective enough, as it only reduced the phenomenon slightly. The unique contribution of the current article is the understanding that when the respondents have access to the Internet while answering a survey, they will cheat more – especially those who know better how to search for information. This relationship allows us to identify who will probably cheat (regardless of social desirability) and, therefore, to reliably measure cheating based on a self-reporting questionnaire (as opposed to self-reporting on cheating itself, which is exposed to social desirability).

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