TO CATCH A SURVEY CHEATER

When Online Survey Respondents Cheat on Fact-based Questions

GREY MATTER RESEARCH & CONSULTING
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INTRODUCTION

Would you be concerned if surveys overstated your organization's brand awareness by 50%? Or your slogan awareness by 33%?

Dateline NBC has received a lot of attention for their "To Catch a Predator" and "To Catch an Identity Thief" series. In the growing world of online market research, there has been much attention given to catching survey cheaters. Cheaters of various types rob researchers of accuracy and validity.

Most of the attention given to online survey cheaters relates to those who cheat on an entire survey experience. This includes "satisficing" (attempting to provide "correct" answers in order to qualify for a survey), straight-lining (selecting the same response over and over on a series of questions in order to move through it more quickly), and haphazardly selecting response options, among other cheating behaviors.

Cheating behavior usually has to do with "bad" respondents who really should not be participating in the study at all. But even "good" respondents can fall into cheating behavior on certain types of questions.

In your online surveys, do you ever ask respondents fact-based questions such as:

- What company uses the slogan "You can do it. We can help."?
- Which one of the following automotive companies manufactures the Maxima?
- What well-known football player is currently a spokesperson for MasterCard?
- Which political party currently has the most members in the U.S. Senate?

Fact-based questions are relatively common in quantitative surveys. These questions have a correct answer; they are not based on a respondent's individual opinions or behaviors. For example, the answer to the first question above is Home Depot. These types of questions can be used to assess brand awareness, advertising awareness/effectiveness, political awareness, or general organizational/company awareness. When used appropriately, fact-based questions are an effective means of measuring respondent awareness on various issues.

When someone is asked a question like this in a telephone survey, the respondent generally has to answer the question immediately, based on whatever knowledge he or she already possesses. If the respondent already recognizes the slogan for Home Depot, that's the answer that will be given. But with an online survey, it's very easy for the respondent to ask another person in the room, grab a nearby reference book, or move to another window on their computer and do a quick online search for the right answer. It takes about ten seconds to type "Maxima" into the Yahoo! search box and find that on the second question above, the correct answer is Nissan.

This raises a major question for researchers using online methods for surveying: are the results you get from fact-based questions accurate?

The focal point for this brief report is simple: what is the likelihood that online survey respondents engage in cheating behavior to answer a fact-based question?

I DON'T WANT TO APPEAR IGNORANT...

With an online research methodology, respondents face competing motivations. More often than not, respondents are incentivized through points, raffles, or cash to complete a survey. The completely rational choice for the respondent is to complete a survey in the shortest time possible. Any other strategy would be suboptimal, as the respondent's incentive does not typically increase or decrease with how much time he or she spends on the survey.

In competing fashion, respondents also face social desirability pressures. Namely, people do not want to feel or appear ignorant or unaware on questions that measure their knowledge. Aside from the social desirability issue, some respondents may also exhibit an honest curiosity to know the correct answer. Since the answer will not be provided in the survey, they may search for it while taking the survey.

Fact-based questions present the perfect scenario for testing these competing motivations. If a respondent looks up the answer while completing an online survey, doing so will undoubtedly cost time and effort and is therefore a suboptimal strategy. However, such options alleviate the social desirability pressure some might feel when responding and also address the curiosity factor others might exhibit when they do not know the answer.

TO CATCH A CHEATER

Grey Matter Research & Consulting decided to measure just how much impact cheating may have on the responses to fact-based questions.

We conducted an online survey of 2,000 adults through a well-known national panel. Seven questions appearing in the middle of the questionnaire were fact-based, meaning they had one correct answer. Every question in the survey contained an internal timer (recorded in seconds) to measure how long each question took each respondent to complete.

Ideally, a "cheater" is defined as someone who searches for the correct answer to a fact-based question. This definition will have to remain ideal, as it impossible to watch a respondent open a new screen and search for answers, or cheat in some other fashion.

As a proxy, question response times were used to detect suspect respondents. Someone who goes to the trouble of searching for an answer will logically take longer to answer a fact-based question than will the respondent who knows the answer to the question or who guesses the answer. Timed responses serve as an arguable proxy for detecting this type of cheating.

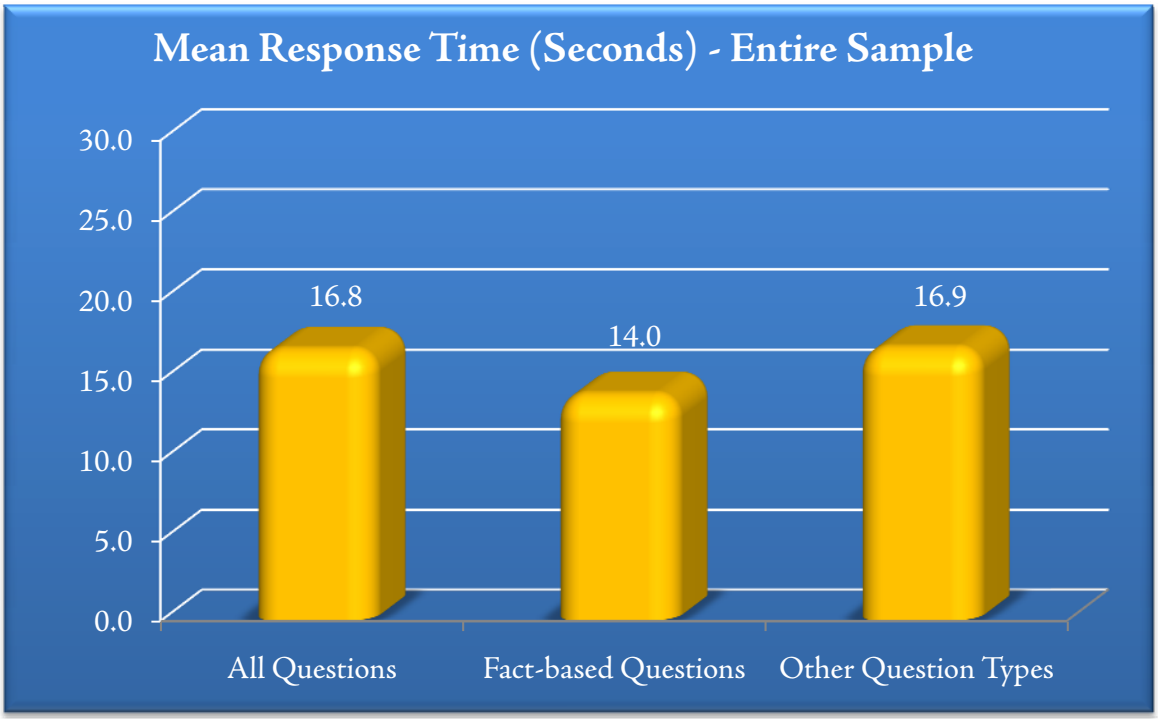
If you are familiar with statistical testing approaches, you'll want to examine the last section of this report (Testing Methodology) for the exact statistical methods used. If not, suffice it to say at this point that we accounted for the following:

- The fact that some questions naturally take longer to read/answer than others
- The fact that some respondents simply take longer in general to answer questionnaires
- The fact that some people may become distracted or pause during a study (e.g. to answer the phone), causing misleading time measurements on the question where they paused

While log seconds and standardized scores were used in all the analytics (again, see the Testing Methodology section for details), for the ease of presenting figures and results, actual response times are reported here.

The following figure highlights the average response time for all questions in the survey, including fact-based questions and non-fact-based questions. As the figure indicates, there is not a large difference in response time between the fact-based questions and the non-fact-based questions. In other words, the fact-based questions did not take the average respondent longer to answer than non-fact-based questions.

The cheater algorithm Grey Matter Research developed detects unique patterns in the standardized response time compared against the actual responses. In looking at these unique patterns, the algorithm identified respondents who took longer than normal to answer a fact-based question, but not so long as to suggest they were distracted. It also examined response patterns to fact-based questions in the context of response times to these questions and other questions in the survey, and differentiated between those who answered a fact-based question correctly or incorrectly.

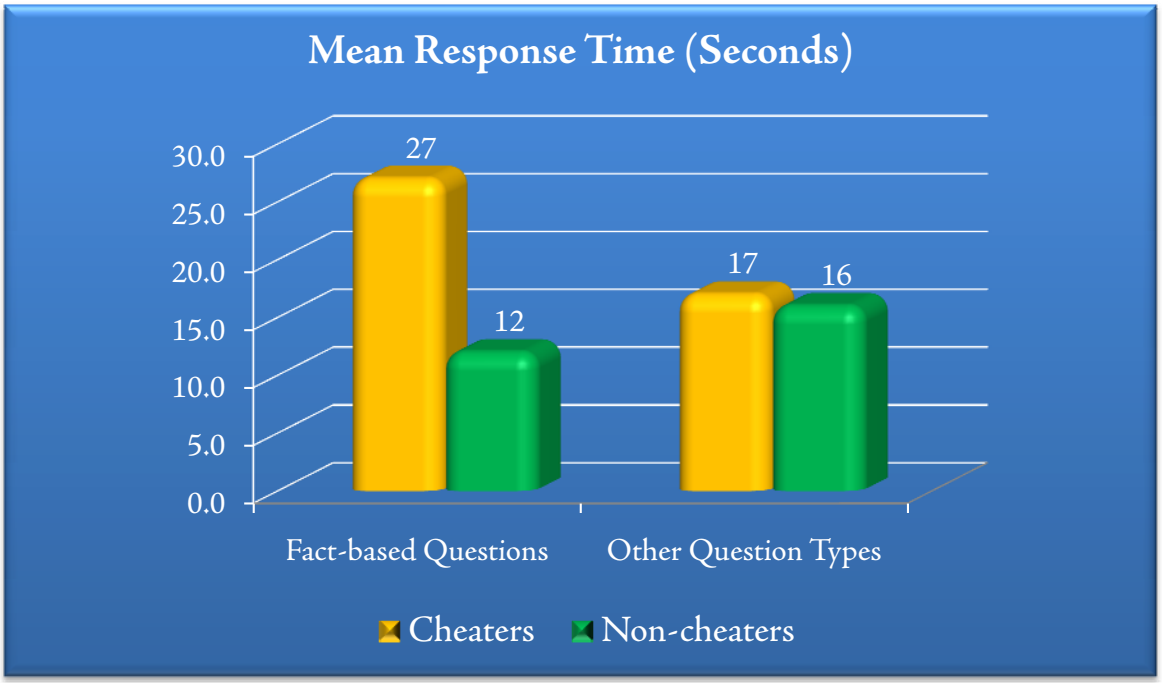


In all, 189 of the 2,000 respondents (9.5%) were detected as possessing a high probability of having cheated on one or more fact-based questions. The response time profiles of the cheater and non-cheater are displayed in the following figure. It shows the response time differences between identified "cheaters" on both the fact-based questions and the non-fact-based questions, compared against the remaining respondents.

On the non-fact-based questions, identified "cheaters" had a mean response time of about 17 seconds, while non-cheaters registered a mean response time of about 16 seconds. This one-second difference underscores the similarities between these two groups of respondents on non-fact-based questions.

A different story surfaces when mean response times are compared on the fact-based questions. As the figure suggests, the identified "cheater" took an average of 15 seconds longer – more than double the time – to answer a fact-based question than the non-cheater. This represents a strong and significant difference between cheaters and non-cheaters ($P<.000$) and their mean response times on the two different types of questions.

As an extension to the above point, a regression model was used to predict what kind of respondents were more likely or less likely to cheat. The dependent variable (or outcome variable) in this case was created as a 1 if the respondent cheated on any of the seven questions and a 0 otherwise. A logit model was used to predict the outcome of the dependent variable given the range of independent variables in the model.



The independent variables (or the variables used to predict whether someone cheated) included demographic factors such as gender and race; socioeconomic factors such as education, household income, and home ownership; and other potentially related items, such as the number of nights per week someone watches the evening news and where he or she lives (regional location). This type of regression analysis allows for the prediction of probabilities, or the chances of someone cheating, based on the independent variables in the model.

Of all the independent variables, four were found to be statistically significant. They were the respondent's age, gender, educational attainment, and household income:

- As the age of the respondent increases, so does the probability that he or she will cheat.
- Women are slightly more likely to cheat than men.
- Individuals with lower levels of education are more likely to cheat than are those with higher levels of education.
- Respondents with higher household incomes are more likely to cheat than are those with lower household incomes.

The following table shows the chances that a respondent will cheat, when all other independent variables are held constant at their respective means or medians.

CHANCES OF CHEATING

Variable			Net Difference
Age	Youngest Respondent 4%	Oldest Respondent 12%	**8%**
Gender	Female 10%	Male 6%	**4%**
Education	Less than High School Degree 11%	Grad or Professional Degree 6%	**5%**
Household Income	Under $20,000 6%	$150,000 or Higher 14%	**8%**

*Table is to be read horizontally and compares statistics within categories, not across categories.

HOW THIS IMPACTS YOU

Respondent cheating is something to take very seriously, particularly in an online environment in which researchers do not get to observe behavior, confirm respondent claims, or interact directly with the respondent. While many studies have examined "cheating" in a traditional sense, it's also important to understand the impact of using certain types of questions in an online environment.

In our study, close to 10% of online respondents cheated in order to find the "correct" answer to a fact-based question. For example, if your online research finds that 20% of your target market recognizes your slogan or can identify your company spokesperson, this level of cheating means your figure would be *double* the actual proportion that's out in the marketplace. It may be even higher if your specific survey target is one or more of the populations we found are more likely to cheat.

This has potentially enormous implications for various measurements of the knowledge and/or awareness of brands, logos, advertising, candidates for office, political issues, etc. when measured in online surveys.

What can you do about this? In one sense, not a lot. You can't actually stop respondents from cheating on fact-based questions.

In another sense, there are a number of steps that can mitigate the impact of cheating:

- Consider whether your questions can be designed to minimize cheating by making it more difficult or undesirable to search for the correct answer.
- Use an internal timer on each question to help identify the "cheating factor" and adjust for that in the analysis.
- When you discover the "cheating factor" on a particular set of questions, consider adjusting your findings accordingly (either by adjusting for the amount of cheating you find, or removing cheaters from the sample for those questions).

Understand the advantages and disadvantages of different methodologies. If fact-based questions represent a major part of your information objectives, considering using a telephone methodology instead of an online approach.

ABOUT GREY MATTER RESEARCH

Grey Matter Research & Consulting has been operating since 1996, for many years under the name Ellison Research. Although the name has changed, the grey matter behind the company remains the same as when it opened.

Our clients are highly diverse and our work is very broad-based, with experience in retail, financial services, non-profit, publishing, automotive, health services, and other sectors. We assist them through both qualitative and quantitative research services.

CLIENTS WE HAVE SERVED INCLUDE:

- Coca-Cola
- General Motors
- American Red Cross
- PetSmart
- Pulte Homes
- Macy's Department Stores
- Electronic Retailing Association
- BMW
- Fairmont Hotels & Resorts
- The Alzheimer's Association
- Goodwill Industries
- LifeWay Christian Stores
- Hancock Bank
- Chrysler Corporation
- Design Forum/Interbrand
- Herman Miller
- Caremark
- Suzuki
- World Vision
- Mazda Motors
- Dove Chocolates

We have also conducted numerous studies at our own expense to understand the American consumer mindset more thoroughly (including this one).

Results from these studies have been covered in the international media, such as *USA Today*, *The Financial Times of London*, Associated Press, MSNBC, *Los Angeles Times*, USA Radio Network, *Dallas Morning News*, Salem Radio Network, *Manila Times*, and many other outlets in the USA, China, England, Canada, Russia, New Zealand, Norway, Korea, Sweden, Hungary, the Philippines, Australia, and other parts of the world.

Grey Matter Research is available to serve clients through privately commissioned research studies such as brand awareness, customer satisfaction, concept testing, and customer loyalty.

More information on the company is available on our website: www.greymatterresearch.com.

Please contact Ron Sellers at 602-684-6294 for additional information.

TESTING METHODOLOGY

Slight data weights were used to correct for response rate imbalances across gender, race/ethnicity, age, income, and geography. The study carries a ±2.1% margin of error. The fact-based questions appeared on the screen individually, in a multiple-choice format containing four response options for each question. The order of these seven questions was randomized, as were the response options within each question. All respondents received the fact-based questions at the same point in the survey.

Two specific tasks were preformed in preparing the time data. First, time data are inherently skewed, as some respondents become "distracted" when completing survey questions (e.g. they answer the phone or go get a drink in the middle of completing a questionnaire online). Following in the footsteps of other studies that use time data, all times were normalized on a natural log scale, which minimizes extreme times.

Second, because this study examines "cheating" and not "distractions," response times in the 99th percentile were removed. Arguably, a respondent who takes five minutes to indicate their gender or ethnicity is distracted. This serves as examples of a 99th percentile time. The removal of these times constituted a minimal proportion of the approximate 250,000 recorded times.

Response times were subsequently standardized to a standard normal (z-score) distribution. This distribution highlights how many standard deviations an individual *respondent's* response time is above or below the question's *average* response time. An advantage of this approach is that it allows for direct comparisons of a person's response times across the entire survey.

Grey Matte Research created an algorithm that highlights suspect response patterns and times. There are primarily two factors used to detect suspect response patterns:

- Standardized response times
- Actual responses

The standardized response time looks for anomalies in response times to fact-based questions and non-fact-based questions. Through standardized response times, the algorithm also looks at the cumulative nature of a respondent's response times throughout the survey. This latter point differentiates between respondents who are simply "slower" (or more thoughtful) and those who are answering questions through a different method. This process highlights response times and actual responses that are highly questionable.