Behavioral Frequency Judgments: An Accessibility-Diagnosticity Framework

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Marketing research surveys often elicit behavioral frequency reports. When estimating the number of times a respondent engages in a behavior, s/he may use information about the behavior stored in memory, information provided by the response context, or both. Based on an accessibility-diagnosticity framework, we theorize that the probability of using context-based information in forming a frequency judgment is inversely proportional to the diagnosticity of the alternate inputs accessible in memory. That is, when memory-based information is accessible and diagnostic, contextual information is not used; when memory-based information is accessible but not diagnostic, the use of contextual information depends on its perceived diagnosticity. Finally, when memory-based information is not accessible, contextual information is used even when its diagnosticity is questionable. The results of three experiments support this model. Theoretical implications and recommendations for questionnaire design are discussed.

Surveys in consumer research often include questions that seek to determine the frequency of engaging in different behaviors. Such behavioral frequency judgments may be elicited about the respondents themselves (self-reports), or about other household members (proxy reports). Judgments of such frequencies are used by marketers in making forecasts. Therefore, the accuracy of these reports is of the utmost importance. To the extent that the cognitive processes underlying such judgments affect their accuracy, we need to understand the different cognitive processes used (see Schwarz and Sudman 1994) and the conditions under which they are employed.

The present research contributes to our understanding of the cognitive processes involved in formulating behavioral frequency judgments and bears on key issues of questionnaire construction. In the context of formulating frequency judgments about oneself, there are two main sources of information that could be tapped by a respondent. *Memory-based* information includes individual episodes or summary rates of occurrence (e.g., "once a day"), and *context-based* information includes information provided by the response situation, such as information inferred from the questionnaire itself. In the case of frequency judgments, a major source of information provided by the questionnaire is the frequency range of the response alternatives used as part of the question (see Schwarz 1990). In this article, we address the importance of these two alternate sources of information in making behavioral frequency judgments for oneself and others.

Feldman and Lynch (1988) developed a framework that predicts that "an earlier response will be used as an input to a subsequent response if the former is accessible and if it is perceived to be more diagnostic than other accessible inputs" (p. 431). While *accessibility* refers to the ease of retrieving an input from memory, *diagnosticity* refers to the sufficiency of the retrieved input to arrive at a solution for the judgment task at hand. Therefore, the likelihood that the response to an earlier question will be used in a response to a later question is (a) a positive function of the accessibility of the earlier question in memory, (b) a positive function of its diagnosticity for the later question, (c) a negative function of the accessibility of alternate inputs, and (d) a negative function of the diagnosticity of these accessible alternate inputs (Simmons, Bickart, and Lynch 1993).

Using this accessibility-diagnosticity framework, we propose a frequency formulation process model. We theorize that the probability of using context-based information in a frequency judgment is inversely proportional to the diagnosticity of the alternate inputs accessible in memory. Therefore, we hypothesize that when memory-based information is accessible and diagnostic, contextual information will not be used. However, when memory-based information is accessible but not diagnostic, the use of contextual information will be a function of its perceived diagnosticity. Further, when memory-based information is not accessible, then contextual information will be used even when its diagnosticity is questionable. Hypotheses derived from this model are tested in a series of three experiments and the results support the predictions of the model. Frequency judgment formulation processes differ for frequent and infrequent behaviors (Blair and Burton 1987; Burton and Blair 1991). Our focus is on very frequent behaviors.

We demonstrate that the regularity of the behavior moderates the relative importance of context-based versus memory-based information for judgments related to oneself. This is because regularity affects the accessibility of diagnostic information in memory, as it is directly related to the existence of fairly accurate, summary rates of occurrence in memory (Menon 1993). While respondents rely on the information provided by the response alternatives in the case of irregular behaviors, they rely more on rates of occurrence retrieved from memory in the case of regular behaviors (experiment 1). We further demonstrate that even when respondents do not use information from the response alternatives in estimating their own behavioral frequency, they do use this context-based information from the self-report question when estimating the "typical" behavioral frequency of an average person in a subsequent open-ended question (experiment 2). We then show that the use of information inferred from response alternatives for frequency judgments of others may be indirect (i.e., through the use of self-reports based on the response alternatives provided) or direct, and whether the use of such information is direct or indirect is a function of the diagnosticity of the different pieces of information for the judgment task at hand (experiment 3). Therefore, the diagnosticity of memory-based information affects the use of context-based information in such judgment tasks.

THEORETICAL FRAMEWORK

The incentive to use the least taxing cognitive strategy that yields a reasonable response in a typical survey situation is fairly high. This prompts the use of judgment heuristics to reduce task complexity and to make the judgment process easier (March and Simon 1958; Tversky and Kahneman 1974). Hence, the diagnosticity

of different pieces of easily accessible information determines the strategy used by respondents to formulate a frequency judgment. In making behavioral frequency judgments, respondents may use information about the behavior stored in memory (see, e.g., Felcher and Calder 1989; Menon 1993), other contextual information (see, e.g., Schwarz et al. 1985), or some combination of these.

Memory-Based Information

When formulating frequency judgments, a respondent could retrieve individual episodes of the behavior. In general, frequent behaviors are not easily accessible in episodic memory (Linton 1978, 1982; Schwarz 1990). In fact, in reporting frequencies of behaviors that are engaged in very often, respondents rarely "recall and count" each instance of the behavior (Blair and Burton 1987). This is because multiple instances of highly similar behaviors blend into a generic representation that renders it difficult to isolate individual episodes (see Schwarz [1990] for a review). Accordingly, respondents rely on estimation strategies, using "any information they have in order to generate a reasonable answer" (Bradburn, Rips, and Shevell 1987, p. 160).

One such estimation strategy is to use a summary representation of frequency per unit of time, such as a *rate of occurrence* (Blair and Burton 1987; Burton and Blair 1991). Rates of occurrence are formulated after extensive experience with a behavior and have been shown to be more accurate than the use of episodic recall for frequent behaviors (Menon 1993). For example, using the verbal protocol technique to ascertain the manner in which respondents formulated frequencies, Menon (1993) demonstrated that when rates of occurrence were used by respondents, reported frequency was more closely correlated to an independent measure of actual frequency recorded in a diary. She also demonstrated that rates of occurrence were more likely to be available for regular behaviors than for irregular behaviors.

Context-Based Information

However, responses to questions are not always memory based. There are a variety of non-memory-based information sources that can be used to formulate judgments (see Sudman and Bradburn 1974). For example, respondents can use information provided by the response context, such as the questionnaire itself (see, e.g., Bickart 1993). One context-based heuristic that has recently received some attention involves the use of information provided by the response alternatives (see, e.g., Schwarz and Scheuring 1988; Schwarz et al. 1985). Specifically, respondents assume that the researcher has constructed a meaningful set of response alternatives that reflects the frequency distribution of the behavior under study. They assume accordingly that the extreme alternatives correspond to the extremes of

the distribution and that alternatives in the middle reflect the average or typical frequency of the behavior (Schwarz 1990; Schwarz and Hippler 1991). On the basis of this assumption, respondents use the range of the response alternatives provided to them as a frame of reference in estimating their own behavioral frequency. This results in reports of higher frequencies along response alternatives that present a high rather than a low range of frequencies. For example, Schwarz et al. (1985, experiment 1) observed that 37.5 percent of a sample reported watching television for more than two and a half hours per day using response alternatives that ranged from "up to two and a half hours" to "more than four and a half hours," whereas only 16.2 percent did so when using response alternatives that ranged from "up to a half hour" to "more than two and a half hours."

Response alternatives are readily accessible to respondents in the survey situation. They represent a source of diagnostic information that respondents can use to simplify a judgment task. As may be expected on theoretical grounds (Feldman and Lynch 1988), reliance on this source of information decreases when diagnostic behavioral information is easily accessible in memory. For example, the impact of response alternatives has been found to be more pronounced for proxy reports than for self-reports (Schwarz and Bienias 1990). This reflects that respondents know more about their own than about another person's behavior. In addition, Bless et al. (1992) observed that the impact of response alternatives decreased with decreasing complexity of the judgment task.

We have summarized two possible information sources that are likely to be used to make judgments pertaining to frequent behaviors: (*a*) rates of occurrence, when accessible in memory, and (*b*) information gathered from response alternatives. While response alternatives have the potential to bias responses (Schwarz et al. 1985), rates of occurrence yield fairly accurate frequency judgments (Menon 1993). Therefore, it is extremely important to understand the conditions that foster the use of one information source over the other.

A Conceptualization of the Frequency Formulation Process

Using the Feldman and Lynch (1988) framework, we theorize that when memory-based information is inaccessible, respondents will resort to whatever context-based information is available, even if its diagnosticity is questionable. However, when memory-based information is accessible, respondents can assess this information for its diagnosticity along with alternate context-based information. When memory-based information is not diagnostic, then respondents will use context-based information. If memory-based information is highly diagnostic, then they will use it. However, if

memory-based information is moderately diagnostic, then a combination of memory-based and context-based information may be used in an attempt to make the best possible judgment in light of the information given.

Given respondents' assumption that the researcher constructed a meaningful scale (Schwarz 1990), information provided by the response alternatives is considered diagnostic of the typical frequency of the behavior. When rates of occurrence are not accessible, we expect that the information provided by the response alternatives will be used as the basis of arriving at a frequency judgment. However, when both rates of occurrence and response alternatives are accessible, then the choice between the two will depend on their perceived diagnosticity. The greater the perceived diagnosticity of memory-based information, the lower the likelihood of the use of context-based information.

We argue that the use of rate-of-occurrence information versus information provided by response alternatives is a function of the regularity of the behavior (which determines the accessibility of memory-based information) and the type of judgment task (which determines the perceived diagnosticity of the memory-based information).

Regularity of the Behavior. Regularity has been defined as deterministic occurrences of an event (Wheat and Morrison 1990), or as the occurrence of a particular event with the same periodicity (Krishna 1991). The greater the regularity of the behavior, the greater the predictability of when the event will next occur. For example, people may wash their hair seven times a week and consume seven cans of soda a week. But while they wash their hair every day, they may consume two cans a day on some days and no cans on others, thereby averaging seven cans a week. The time period between two consecutive hair washes is less variable than the time period between consuming consecutive cans of soda. Hence, these behaviors differ in their regularity, although they occur with the same frequency over the week. Whereas a regular behavior has a fixed periodicity of occurrence, an irregular behavior does not (Menon 1993). This aspect of regular behaviors affects how people store information about the frequency of such behaviors in memory. Research on judgments of behavioral frequencies has suggested that a rate of occurrence may sometimes be stored in memory (Blair and Burton 1987; Burton and Blair 1991), as people have the ability to learn temporal and sequential patterns (Povel 1981; Simon and Kotovsky 1963). This, however, is more likely for regular than for irregular behaviors (Menon 1993). Therefore, for regular behaviors, memory-based information should be accessible, and this should lead to the lower use of context-based information.

Although previous research has demonstrated that the impact of response alternatives is less pronounced when memory-based information is accessible (Schwarz

1990), this research has not addressed the moderating role of behavioral regularity. Rather, respondents in previous studies were given an opportunity to refresh their memory (e.g., by browsing though a television magazine prior to reporting their television viewership during the past week). That such manipulations reduced the impact of response alternatives is consistent with the assumptions underlying the present studies. Further, the present studies extend the exploration of memory-based information by assessing the impact of a variable of considerable applied importance, namely, the behavior's regularity.

Judgment Tasks. We argue that the judgment task determines the perceived diagnosticity of memory-based information, if accessible, and the subsequent use of context-based information. For example, when judgments relate to oneself, we expect respondents to rely on context-based information (e.g., response alternatives provided to elicit a frequency judgment) only when memory-based information is not accessible, as is the case for irregular behaviors.

On the other hand, when the task refers to another person who is not well known (e.g., an average American consumer; see Hoch 1987, 1988), we expect respondents to use information conveyed by the response alternatives presented to elicit frequency judgments about oneself, even under conditions where memory-based estimates of one's own behavioral frequencies have been made and frequency judgments about the other person are elicited in an open-ended format. This has previously been observed by Schwarz et al. (1985). In their study, respondents inferred that an "average German citizen" watches more television when they had previously reported their own television viewership along high- rather than low-frequency response alternatives. It seems likely, however, that the relative impact of response alternatives and information about one's own behavior depends on the other's perceived similarity. The present studies address this issue by exploring the moderating role of the target person's similarity to the respondent, thus extending previous work.

Specifically, when judgments relate to known others, such as a significant other (see, e.g., Davis, Hoch, and Ragsdale 1986), the use of memory-based information about oneself may depend on the perceived similarity of the other. To the extent that the other person is perceived as similar to oneself, one would expect respondents to consider their own self-reports diagnostic. Therefore, the greater the perceived similarity of the other person, the greater should be the impact of self-reports on judgments of others. If the self-report pertains to a regular behavior and is hence based on rate-of-occurrence information, this should decrease the impact of response alternatives. If the self-report pertains to irregular behaviors and is hence based on information provided by the response alternatives, this source of information should also affect reports for similar others.

Finally, if the other person is perceived as dissimilar to the self, respondents should rely on information provided by the response alternatives regardless of the regularity of the behavior under study.

We conducted three experiments, each of which examines related sets of hypotheses pertaining to the impact of response alternatives on different kinds of frequency judgments.

EXPERIMENT 1

The first experiment was designed to examine the moderating effects of accessibility of information in memory on the use of context-based information in self-reports.

Research Hypotheses

The impact of response alternatives on behavioral frequency judgments is postulated to depend on the regularity of the behavior. If the behavior occurs regularly, frequency estimates can be computed on the basis of highly diagnostic rate-of-occurrence information, thereby limiting the impact of information provided by the response alternatives. However, because rate-of-occurrence information is not accessible for irregular behaviors, in this case respondents are expected to utilize the information provided by the response alternatives. Therefore,

   H1: The effect of response alternatives on frequency judgments about oneself will be moderated by the regularity of the behavior such that (*a*) for irregular behaviors, frequency judgments elicited through response alternatives using low (vs. high) frequencies will result in a lower (vs. higher) frequency judgment, and (*b*) for regular behaviors, frequency judgments will not be affected by the frequencies presented in the response alternatives.

Method

Design. A mixed 2 × 3 design was used, with three levels of a third variable nested within the second variable. The independent variables were (*a*) response alternatives manipulated at two levels between subjects (low vs. high frequency), (*b*) the regularity of the behavior manipulated within subjects at three levels (very regular, moderately regular, and irregular), and (*c*) behavior replication, which was nested within regularity and administered within subjects; we used three behaviors for each level of regularity.

We used three levels of regularity because we predicted that a rate of occurrence would be accessible in memory only for very regular behaviors. For example, Menon (1993) found that the behaviors for which respondents tended to use a rate-based estimation strategy

TABLE 1

EXPERIMENT 1 RESULTS: BEHAVIORAL FREQUENCY REPORTS (HYPOTHESIS 1)

Regularity of the behavior	Behavior	Regularity rating[a]	Response alternatives (percentage responding "more than 7 times")	
			High frequency ($n = 77$)	Low frequency ($n = 74$)
Very regular	Brushing teeth	6.8	89.6	82.4
Very regular	Washing hair	6.5	39.0	39.2
Very regular	Attending class	5.8	58.4	59.5
Moderately regular	Watching television	5.0	62.3	27.4[b]
Moderately regular	Snacking	4.9	54.5	17.8[b]
Moderately regular	Going out in the evenings	4.8	14.3	4.1[b]
Irregular	Buying soft drinks from a vending machine	3.7	20.8	9.5[b]
Irregular	Making unplanned stops to talk to friends during the day	3.7	31.2	16.2[b]
Irregular	Drinking water from a public fountain	2.7	16.0	4.1[b]

[a]Regularity ratings were elicited on a seven-point scale where 1 was "irregular" and 7 was "regular."
[b]Differences between high and low conditions are significant by a z-test, $p < .05$.

in formulating a frequency judgment were rated very high on regularity (6.9 on a seven-point semantic differential scale). Therefore, we predicted that response alternatives would not have an effect for very regular behaviors but would have an effect for moderately regular or irregular behaviors.

The dependent variable was the frequency judgment elicited for each behavior by the following question: "How often, in an average week, do you . . . ?"

Choice of Frequent Behaviors. We pretested the behaviors used by Menon (1993) in order to arrive at behaviors that were performed at least four times a week and that spanned a range of regularity ($n = 45$). The list of behaviors is reported in Table 1.

Choice of Response Alternatives. We constructed two sets of response alternatives, following the procedure used by Schwarz et al. (1985):

Low-frequency response alternatives	*High-frequency response alternatives*
Up to 1 time	Up to 7 times
2–3 times	8–9 times
4–5 times	10–11 times
6–7 times	12–13 times
More than 7 times	More than 13 times

Note that the first four categories of the low-frequency response alternatives are accommodated by the first category of the high-frequency response alternatives. Hence, reports along these two sets of response alternatives can be compared by determining the percentage of respondents who report frequencies of less (or more) than seven times.

Procedure. Subjects were asked to report frequency judgments for the nine behaviors. The order in which

these behaviors were presented was counterbalanced. Subjects then rated the regularity of each of these nine behaviors using a seven-point semantic differential scale. Because the order of presenting behaviors did not make a difference, this factor was dropped in further analysis.

Subjects. One hundred and fifty-one undergraduate business students enrolled in an introductory marketing course at New York University participated in the experiment for partial course credit.

Results

Manipulation Check. We elicited regularity ratings for each of the nine behaviors on a seven-point semantic differential scale anchored at "irregular" and "regular" (see Menon 1993). The mean regularity rating for each behavior is presented in Table 1.

As intended, there was a significant main effect of regularity ($F(2,300) = 342.74$, $p < .001$; $\eta^2 = .696$). Further, each mean regularity rating in any one regularity condition was significantly different from the six means in the other two conditions (p's $< .05$).

Hypothesis 1: Behavioral Frequency Reports of Oneself. The results from experiment 1 are consistent with the hypothesis that the effects of response alternatives on frequency judgments are moderated by the regularity of the behavior (see Table 1). The two sets of response alternatives used can be compared with regard to the proportion of respondents who reported a behavioral frequency of more than seven times a week. We used respondents' frequency reports as a binary dependent variable (0 = up to seven times; 1 = more than seven times).

We first ran a log-linear analysis within each level of regularity in order to ensure that the response alter-

natives provided did not affect the three behavior replicates differently. We used model A for each level of regularity.

MODEL A.   Self-report = main effect of response alternatives + main effect of behaviors + interaction between response alternatives and behaviors.

Using this model, we confirmed that there was no interaction between the behavior and response alternatives (for very regular: $\chi^2(2) = 1.42$, $p = .492$; moderately regular: $\chi^2(2) = 0.289$, $p = .865$; and irregular: $\chi^2(2) = 0.751$, $p = .687$).

Having confirmed that the behaviors, nested within regularity, were not affected differently by the response alternatives provided, we ran a hierarchical log-linear analysis across the three levels of regularity, with the three specific behaviors within each level treated as equivalent. We used model B for this purpose:

MODEL B.   Self-report = main effect of response alternatives + main effect of regularity + interaction between response alternatives and regularity.

The results from this analysis confirmed our prediction of a significant interaction between regularity and response alternatives ($\chi^2(2) = 20.6$, $p < .001$). Further, the analyses conducted with model A within each of the three levels of regularity established that while response alternatives did not have an effect for very regular behaviors ($\chi^2(1) = 0.2$, $p = .638$), they did have an effect for moderately regular behaviors ($\chi^2(1) = 46.2$, $p < .001$) and for irregular behaviors ($\chi^2(1) = 14.1$, $p < .001$).

Table 1 shows that a larger proportion of respondents reported frequencies of more than seven times a week when presented with high- than with low-frequency response alternatives for moderately regular and irregular behaviors, but not for very regular behaviors. For example, 54.5 percent of the respondents reported snacking (a moderately regular behavior) more than seven times a week when presented with the high-frequency response alternatives, as compared to only 17.8 percent of the respondents presented with the low-frequency response alternatives, a difference statistically significant at $p < .01$. The same pattern was observed for the two other moderately regular behaviors (watching television: 62.3 percent vs. 27.4 percent; going out in the evenings: 14.3 percent vs. 4.1 percent), and the three irregular behaviors (buying soft drinks: 20.8 percent vs. 9.5 percent; making unplanned stops: 31.2 percent vs. 16.2 percent; and drinking water from a public fountain: 16.0 percent vs. 4.1 percent). However, as predicted, for the three very regular behaviors the range of frequencies of the response alternatives did not lead to any difference in reports of how often a behavior was performed (brushing teeth: 89.6 percent vs. 82.4 percent; washing hair: 39.0 percent vs. 39.2 percent; and attending class: 58.4 percent vs. 59.5 percent). Therefore, the data support Hypothesis 1.

Discussion

In summary, experiment 1 demonstrates that the accessibility of information relevant to the judgment task moderates the use of external context-based information. Specifically, the impact of response alternatives depends on the regularity of the behavior under study. As expected, the range of response alternatives affected frequency reports of moderately regular and irregular behaviors, but not of very regular behaviors. This is presumably because relevant frequency information was inaccessible for the less regular behaviors, causing respondents to rely on response alternatives as a cue in computing a frequency estimate. In contrast, relevant rate-of-occurrence information was accessible for very regular behaviors, thereby allowing respondents to compute a rate-based estimate. This pattern of findings suggests that respondents may turn to the information provided by the response alternatives only if more directly relevant information is not accessible. While this conclusion is compelling, we wished to explore this issue further by assessing the degree of cognitive effort associated with generating responses. This is one of the issues examined in experiment 2.

EXPERIMENT 2

The second experiment was designed to investigate the effects of memory-based and context-based information made accessible by a prior question on responses to subsequent questions.

Research Hypotheses

Effort Associated with Behavioral Frequency Judgments of Oneself.   The frequency judgment formulation process described before predicts that if memory-based information is not accessible, respondents will search for alternate information that is diagnostic for their judgment task. This implies that the effort associated with making a judgment for oneself for a regular behavior is lower than the effort associated with making a judgment for oneself for an irregular behavior.

Further, conventional wisdom dictates that the use of response alternatives reduces the effort on the part of respondents in making judgments (Sudman and Bradburn 1982, p. 151). This would be true only if, in fact, respondents used the information they gathered from the response alternatives. We have argued that for regular behaviors, respondents use accessible rates of occurrence without any attempt to integrate the information provided by the response alternatives. For such behaviors, therefore, providing response alternatives should make the judgment task no easier than if they were not provided. However, for irregular behaviors, respondents rely on the information provided by the response alternatives. For such questions, providing response alternatives should make the judgment task easier. Therefore,

H2: The effects of providing response alternatives on the cognitive effort required to formulate frequency judgments will be moderated by the regularity of the behavior such that (*a*) the cognitive effort associated with formulating a frequency judgment for a regular behavior will be lower than that associated with an irregular behavior, regardless of whether response alternatives are provided, (*b*) for an irregular behavior, cognitive effort will be greater if the frequency judgment is elicited through an open-ended question than when it is elicited by a question using response alternatives, and (*c*) for a regular behavior, cognitive effort will not be affected by whether the frequency judgment is elicited through a question using *response alternatives or an open-ended question.*

Behavioral Frequency Judgments of the Average Person. The absence of any impact of response alternatives on frequency reports of regular behaviors predicted in Hypothesis 1 could reflect two different processes. On the one hand, respondents may pay attention to information provided by the response alternatives only when more relevant rate-of-occurrence information is not accessible. On the other hand, respondents may well pick up relevant information from the response alternatives but may not use it in making a frequency estimate when rate information is also accessible because of its low diagnosticity. Because respondents have to pay attention to the response alternatives anyhow (given that they have to choose the appropriate response from the set of alternatives provided) we predict the latter process. We therefore expect respondents to pick up information from response alternatives and use it selectively in responding to subsequent (open-ended) questions even under conditions where response alternatives were not used for constructing behavioral frequency reports for oneself.

As respondents infer average frequencies from the range of response alternatives presented, estimates of the frequency with which a typical or average person engages in a given behavior should be higher when the range is high (vs. low). In a scenario where a respondent is identifying cues to use in judging the typical frequency of an average person (where this question is an open-ended one), the two most likely to be used are one's own frequency (Hoch 1988) and the information provided by the response alternatives in the prior question (Schwarz et al. 1985). In the latter regard, it has been shown that respondents may infer the typical behavioral frequency of an average person by assuming that it is represented by values in the middle of the set of response alternatives. For example, in the Schwarz et al. (1985) television study, respondents estimated the average television viewership of a typical German to be twice as high when they gave their own report along high-

frequency rather than low-frequency response alternatives.

In general, response alternatives provided in a question may affect responses to similar, subsequent questions, even when they do not affect the responses to the original question. In the specific context of the current experiment, although robust rate-of-occurrence information limits the impact of response alternatives on frequency estimates of one's own regular behavior, as shown in experiment 1, people are unlikely to store such rates for the average person. Therefore, response alternatives provided in the prior question may affect judgments of how often an average person engages in a behavior (Schwarz et al. 1985), even under conditions where they have no impact on one's own behavioral frequency estimates.

However, there is also the operation of the false consensus effect, which is the tendency for individuals to assume falsely that other people are similar to them (i.e., "They are like me"; Perloff and Brickman 1982). For example Hoch (1988) found that marketing experts and novices weighted their own positions too heavily when estimating the activities, interests, and opinions of the average American consumer. In general, this bias might manifest itself when consumers are asked to provide information about other people.

In our current context, we predict that this false consensus phenomenon will cause respondents to integrate information gleaned from the response alternatives with information accessible in memory about oneself. Therefore, for regular behaviors, because of the highly accessible rate-of-occurrence information that respondents have about their own behavior, they are likely to incorporate this with the information provided by response alternatives in arriving at an estimate of the typical frequency of the behavior. However, irregular behaviors are characterized by an absence of any rate-of-occurrence information. Given the relative inaccessibility of information in memory about one's own behavioral frequency, respondents are likely to base their own self-reports primarily on the information provided by the response alternatives (i.e., Hypothesis 1). As a consequence, these response alternatives are likely to affect their estimates of typical frequencies both directly and indirectly (through their self-reports). Therefore, the influence of response alternatives on typical frequencies will be more apparent in the case of irregular than in the case of regular behaviors. In sum,

H3a: Respondents will provide lower estimates of the behavioral frequency of an average person when they report their own behavioral frequency along response alternatives using low rather than high frequencies.

H3b: This effect will be greater for irregular behaviors than for regular behaviors.

Method

Design. We used a 3 (response alternatives for eliciting self-reports: low, high, open-ended) $\times$ 2 (regularity: regular and irregular behavior) mixed design, where response alternatives used to elicit self-reports were administered between subjects and regularity was a within-subjects factor. The open-ended condition was operationalized by eliciting frequency judgments of oneself in an open-ended fashion, and it behaved like a control "no response alternative" condition.

We included two behaviors: one regular behavior (washing hair) and one irregular behavior (making unplanned stops). This was done on the basis of a pretest ($n = 32$) in which students indicated the frequency of engaging in each of the nine behaviors used in experiment 1 in the past week. These frequency judgments were elicited in an open-ended format. The two behaviors differed significantly from each other on regularity (regular behavior $\bar{X} = 6.5$, irregular behavior $\bar{X} = 3.6$; $F(1,31) = 112.82$, $p < .001$; $\eta^2 = .591$). In addition, they were matched on reported frequency (regular behavior $\bar{X} = 5.9$, irregular behavior $\bar{X} = 5.5$; $F(1,23) = .05$, $p = .80$; note that the lower degrees of freedom are due to partial nonresponse). This was desirable in the selection of behaviors, as the absolute frequency of engaging in a behavior has been shown to affect the frequency formulation process (Blair and Burton 1987; Burton and Blair 1991).

The dependent variables were (*a*) frequency judgments pertaining to the subject's own behavior (to replicate Hypothesis 1) and the behavior of the average person (to test Hypothesis 3) and (*b*) reported effort ratings for the behavioral frequency judgment tasks (to test Hypothesis 2).

Procedure. Subjects were asked for their frequency of engaging in the target behavior in the past week, through either response alternatives (high or low frequency) or an open-ended question (no response alternative control condition), depending on the experimental condition to which they were assigned. They were then asked "In your opinion, how often in a week, does the AVERAGE PERSON . . . ?" in an open-ended format. Next, subjects rated the behavior on its regularity.

They also assessed how difficult it was to answer the behavioral frequency question about oneself, and how much effort, time, and thought the response took, using seven-point semantic differential scales. These ratings were combined to form the "effort index" (regular behavior Cronbach's $\alpha = .80$, irregular behavior Cronbach's $\alpha = .83$).

After an unrelated filler task, subjects were asked identical questions on the second target behavior. The response alternatives (high vs. low frequency) to which they were exposed were the same for the two behaviors. The order in which the behaviors were presented was counterbalanced. As the order of administration made

no difference, this factor was dropped from further analyses.

Subjects. A total of 177 undergraduate business students enrolled in an introductory marketing course at New York University participated in this experiment for partial course credit.

Results

Manipulation Checks. The regular behavior was rated as significantly more regular ($\bar{X} = 6.23$) than the irregular one ($\bar{X} = 3.69$; $F(1,176) = 254.63$, $p < .001$; $\eta^2 = .591$). In addition, frequency judgments related to oneself were elicited in an open-ended fashion in the control condition. The means were 7.05 (SD = 9.45) for the regular behavior and 6.58 (SD = 8.36) for the irregular behavior ($p > .25$). Therefore, the two behaviors were matched on frequency.

Hypothesis 1: Behavioral Frequency Judgments of Oneself. The results from experiment 2 parallel the results from experiment 1. We obtained a significant interaction between the response alternatives subjects were exposed to and the regularity of the behavior ($\chi^2(4) = 53.06$, $p < .001$). The difference between the percentages of respondents reporting a frequency of more than seven times using the low- and the high-frequency response alternatives for the regular behavior is not statistically significant (23.9 percent and 23.5 percent, respectively; $\chi^2(1) = 0.003$, $p = .95$), whereas the difference is significant for the irregular behavior (29.6 percent and 54.4 percent, respectively; $\chi^2(1) = 8.81$, $p < .003$).

Hypothesis 2: Cognitive Effort. As predicted by Hypothesis 2a, respondents found it easier to estimate frequencies of regular behaviors ($\bar{X} = 1.7$) than irregular behaviors ($\bar{X} = 3.4$; $F(1,175) = 207.55$, $p < .001$; see Table 2).

Further, we predicted that the presence of response alternatives would ease the frequency judgment task for the irregular behavior (Hypothesis 2b) but not for the regular behavior (Hypothesis 2c). After ensuring that the effort ratings associated with the frequency judgments elicited through the low- and high-frequency response alternatives did not differ from each other for either of the two behaviors ($F(1,137) = .32$, $p > .50$), we combined these two conditions. An ANOVA using the effort index as the dependent measure revealed the predicted significant interaction between response alternatives (high/low vs. open-ended) and the regularity of the behavior ($F(1,175) = 5.54$, $p < .02$). As predicted, for the regular behavior, the cognitive effort required to respond when response alternatives were present ($\bar{X} = 1.7$) was not significantly different from the effort when response alternatives were not provided ($\bar{X} = 1.6$; ($F(1,175) = .37$, $p = .544$). For the irregular behavior, however, respondents in the open-ended condition (i.e., when no response alternatives were provided) rated the

Dependent variable	Regularity of the behavior	Response alternatives		
		Low frequency ($n = 71$)	High frequency ($n = 68$)	Open-ended ($n = 38$)
Hypothesis 2: effort index (means; 1 = not at all effortful, 7 = very effortful)	Regular	1.8 (1.1)	1.6 (.8)	1.6 (.7)
	Irregular	3.1 (1.2)	3.4 (1.3)	3.8 (1.1)
Hypothesis 3: estimates of typical frequencies (means)	Regular	4.9 (2.0)	5.9 (1.8)	4.6 (1.7)
	Irregular	6.2 (4.0)	13.9 (15.5)	9.5 (1.4)

NOTE.—Figures in parentheses are SDs.

task significantly more effortful ($\bar{X} = 3.8$) than respondents provided with response alternatives ($\bar{X} = 3.3$; $F(1,175) = 5.48, p < .02$). Hypothesis 2 was, therefore, supported.

Hypothesis 3: Estimates of Frequencies for the Average Person. As predicted in Hypothesis 3a, behavioral frequency estimates of an average person were higher when subjects reported their own behavior along response alternatives using high frequencies ($\bar{X} = 10.2$) than low frequencies ($\bar{X} = 5.5$; $F(1,137) = 20.12, p < .001$; see Table 2).

However, this main effect should be interpreted in the light of a significant interaction of response alternatives and regularity ($F(1,137) = 11.87, p < .001$) that confirmed Hypothesis 3b. Specifically, the effect of response alternatives, though significant in each case, was greater for the irregular behavior ($\bar{X}$'s: 6.2 vs. 13.9; $F(1,137) = 16.20, p < .001$) than the regular one ($\bar{X}$'s: 4.9 vs. 5.9; $F(1,137) = 11.22, p < .001$). This overall pattern of results confirms Hypothesis 3.

In addition, we obtained an unexpected main effect of the regularity of the behavior, such that the average person was estimated to engage in the irregular behavior significantly more than the regular behavior ($\bar{X}$'s: 9.9 vs. 5.4; $F(1,137) = 23.90, p < .001$). This is surprising given that the two behaviors were matched on self-reported frequency based on pretest data.

Discussion

To summarize, as in experiment 1, we found that in estimating frequencies for a regular behavior for themselves, respondents do not use the information provided by the response alternatives, presumably because they rely on memory-based rates of occurrence. However, they do use the information provided by the response alternatives in making frequency estimates pertaining to an irregular behavior. We obtained corroborative support through (a) actual frequency judgments and (b) subjective effort ratings.

Further, we demonstrated that even when respondents do not use information inferred from the response

alternatives in estimating their own behavioral frequency, they do use this information when estimating the behavioral frequency of an average person. These findings extend previous research (e.g., Schwarz et al. 1985) by indicating that response alternatives may bias related judgments even under conditions where they do not affect behavioral reports about oneself. Moreover, we observed that the impact of response alternatives on estimates of others' behavior is more pronounced for irregular than for regular behaviors, as would be expected on theoretical grounds.

EXPERIMENT 3

The last experiment was designed to investigate the use of different pieces of information as a function of their diagnosticity for the judgment task.

Research Hypotheses

Use of Self-Reports as a Source of Information for Judgments about Others. Previous research demonstrates that respondents have a tendency to project information about themselves onto others because of the operation of the false consensus bias (Hoch 1988; Perloff and Brickman 1982). This leads them to believe that others' attitudes are similar to their own (see, e.g., Hoch 1988) and that others behave in ways similar to way they themselves behave (see, e.g., Davis et al. 1986; Menon et al. 1995). This implies that judgments of another person's behavioral frequency will be based, in part, on self-reports.

However, the diagnosticity of the information about oneself in formulating judgments about other people is likely to vary as a function of the similarity of the other person to oneself. This is because the underlying reason for the false consensus bias is peoples' beliefs that others are similar to them. It should follow that the more similar the other person is perceived to be, the greater respondents' tendency to use their own self-reports as a basis for formulating the other's behavioral frequency. This has not been addressed in previous research. We

expect respondents to consider their own self-reports more diagnostic when the other person is perceived to be more similar than when the other person is perceived to be less similar. Therefore, the greater the perceived similarity of the other person, the greater should be the impact of self-reports on judgments of others. Thus,

H4a: Self-reports will be used as a diagnostic source of information in formulating judgments about other people.

H4b: They will be relied on more when formulating judgments about similar than about less similar others.

The Process by Which Response Alternatives Affect Judgments about Other People. There are two ways in which the response alternatives used to elicit self-reports may affect subsequent judgments about other people (see Fig. 1). The first way is indirect. Respondents may use information inferred from response alternatives to construct the earlier self-reports and then use only their prior self-reports as a basis for judging the other person. This is illustrated by paths 1 and 2 in Figure 1. The second way is direct. Even if subjects did not incorporate information inferred from the response alternatives into their self-reports, because the information from these alternatives from the prior question is accessible in memory, they could still use this to form judgments about the other person. This direct influence is highlighted by path 3 in Figure 1. This direct versus indirect use of response alternatives in formulating frequency judgments about other people is predicted to vary as a function of (*a*) the regularity of the behavior and (*b*) the similarity of the other person to oneself.

The results of experiments 1 and 2 indicate that the use of information inferred from response alternatives in formulating self-reports is moderated by the regularity of the behavior. When the behavior is regular, respondents rely on memory-based information in formulating a self-report, and therefore do not rely on information inferred from response alternatives (i.e., path 1 in Fig. 1 is not significant). If the other person about whom the judgment is being made is similar to oneself, we expect that self-reports will be a diagnostic input in formulating the judgment (i.e., path 2 is significant). Further, response alternatives are not likely to have a direct effect on the judgment (i.e., path 3 is not significant). If the other person about whom the frequency judgment is being formulated is less similar to oneself, then we expect a direct effect of response alternatives on the judgment, over and above the use of self-reports (i.e., paths 2 and 3 are significant).

When the behavior is irregular, respondents rely on context-based information to formulate self-reports (i.e., path 1 is significant). Therefore, if the other person is similar to oneself, we can expect the indirect effects of response alternatives on frequency judgments of other people to be manifested (i.e., paths 1 and 2 are
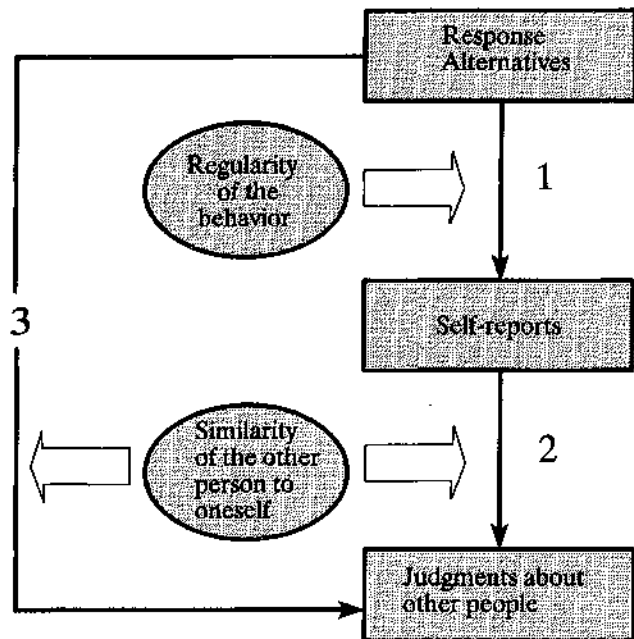
NOTE.—The paths predicted to be significant are, for a regular behavior and a similar person, path 2 (i.e., no direct or indirect effects of response alternatives); for a regular behavior and a less similar person, paths 2 and 3 (i.e., direct effects of response alternatives); for an irregular behavior and a similar person, paths 1 and 2 (i.e., indirect effects of response alternatives); for an irregular behavior and a less similar person, paths 1, 2, and 3 (i.e., direct and indirect effects of response alternatives).

significant). Further, if the other person is less similar to oneself, response alternatives provide diagnostic information for the judgment task and will thus be incorporated into the judgment. Therefore, we predict that there will be both direct and indirect effects such that paths 1, 2, and 3 are significant.

H5: The direct versus indirect use of information inferred from response alternatives in subsequent judgments about the other people is predicted to be moderated by factors that determine the diagnosticity of the information, namely, the *regularity* of the behavior, and the *similarity* of the other person about whom the judgment is being formulated to oneself.

a) For a *regular* behavior, (i) when the target judgment is about a *similar* other, response alternatives will have neither a direct nor an indirect effect, and (ii) when the target judgment is about a *less similar* other, response alternatives will have a direct, but not an indirect effect.

b) For an *irregular* behavior, (i) when the target judgment is about a *similar* other, response alternatives will not have a direct

effect, but will have an indirect effect, and (ii) when the target judgment is about a *less similar* other, response alternatives will have both a direct and an indirect effect.

Method

Design. We used a 2 (response alternatives: low or high frequency) $\times$ 2 (regularity: regular and irregular behavior) $\times$ 2 (other person: more or less similar) mixed design, where response alternatives were administered between subjects, and regularity and other person were administered within subjects.

Response alternatives used to elicit self-reports were operationalized at the same levels as in experiment 1: high- versus low-frequency response alternatives. The same behaviors used in experiment 2 were used to operationalize regularity: washing hair (regular behavior) and making unplanned stops (irregular behavior). We used two levels of the other person: the respondent's "best friend" and the "average American student." We expected these two categories to vary on the extent to which they were perceived to be similar to the respondent, with one's best friend being perceived more similar to oneself than the average American student.

The dependent measures were the same as those used in experiment 1: frequency estimates of oneself and the target others. However, respondents who indicated the "more than seven" category in the low-frequency response alternatives condition, and "less than seven" or "more than 13" in the high-frequency response alternatives condition, were asked to write down the actual number of times they engaged in the behavior. This was done so that we could get a specific numeric self-report and the frequency judgment could then be treated as a continuous variable in the analysis. This would make the data more amenable to regression analyses, which we planned to conduct in order to examine the weights given to different information sources during the frequency formulation process.

Procedure. Subjects were asked for a frequency judgment for the past week for one target behavior elicited through response alternatives (high or low frequency depending on the experimental condition they were randomly assigned to). They were then asked to estimate the behavioral frequency of two other persons, a best friend and an average American student, elicited through an open-ended question. Next, subjects rated each question on its difficulty, and time, thought, and effort required to respond as in experiment 2. We then asked subjects to rate how similar they were to the two other people, using seven-point semantic differential scales. Finally, they rated the behavior on its regularity on a seven-point semantic differential scale anchored at "irregular" and "regular."

After an unrelated filler task, subjects were asked identical questions on the second target behavior. The

response alternatives (high vs. low frequency) they were exposed to were the same for the two behaviors. The order in which the behaviors were presented was counterbalanced. The order in which subjects made judgments for the two other persons was also counterbalanced. As the order of administration of these two factors made no difference, it was dropped from further analysis.

Subjects. A total of 80 undergraduate business students enrolled in an introductory marketing course at New York University participated in this experiment for partial course credit.

Results

Manipulation Checks. The difference in the regularity of the two behaviors was statistically significant, as expected (regular behavior $\bar{X} = 6.60$ and irregular behavior $\bar{X} = 4.86$; $F(1,79) = 76.01$, $p < .001$; $\eta^2 = .490$).

Further, the best friend was rated more similar to oneself than the average American student (best friend $\bar{X} = 4.86$ and average American student $\bar{X} = 3.72$; $F(1,79) = 38.88$, $p < .001$; $\eta^2 = .326$). Therefore, the manipulation of the similarity of the two other persons to oneself worked in the manner intended.

Hypothesis 1: Behavioral Frequency Judgments of Oneself. We replicated the results of experiments 1 and 2. As in experiment 1, we categorized responses into frequencies of less than or equal to seven and more than seven times. As in the previous experiments, the proportion of respondents who reported frequencies of more than seven times along the high- and low-frequency response alternatives did not differ significantly if the behavior was regular (high = 68.4 percent, low = 77.5 percent; $\chi^2(1) = 0.816$, $p = .366$), but differed significantly if the behavior was irregular (high = 42.1 percent, low = 13.5 percent; $\chi^2(1) = 7.60$, $p < .006$).

Hypothesis 2: Cognitive Effort Associated with Frequency Judgments of Oneself. Moreover, the data bearing on cognitive effort also replicated the results obtained in experiment 2, supporting Hypothesis 2a. The more regular the behavior, the lower the experienced ease of making a judgment for oneself (regular behavior $\bar{X} = 1.6$ and irregular behavior $\bar{X} = 3.2$; $F(1,77) = 51.41$, $p < .001$). However, because we did not need an open-ended condition given the objectives of this experiment, we did not test Hypotheses 2b and 2c in the present study.

Hypothesis 3: Estimates of Behavioral Frequencies of Other People. In experiment 2 we had asked subjects to estimate the frequency of an average person. In experiment 3, we could conceptually replicate the results of experiment 2 by testing whether estimates for a best friend and an average American student would also be affected by the range of response alternatives provided for eliciting one's own judgment. As in ex-

periment 2, we found that irrespective of whether the response alternatives affected responses to self-judgments, the higher the response alternatives respondents were exposed to, the higher the estimate of frequencies of other people. Specifically, an ANOVA using the regularity of the behavior and the similarity of the other person to oneself as within-subjects factors and response alternatives as a between-subjects factor showed an overall main effect of response alternatives presented ($F(1,69) = 10.46$, $p < .002$; see Table 3 for means).

Further, we obtained a significant interaction between the regularity of the behavior and the response alternatives ($F(1,69) = 4.57$, $p < .036$), which indicates that this effect is greater for irregular than for regular behaviors. Hypothesis 3 was, therefore, supported once again.

Hypothesis 4: Use of Self-Reports in Formulating Frequency Judgments of Others. We had predicted that self-reports would be used to make judgments of other persons (Hypothesis 4a), and that the weight given to the self-report would be greater, the higher the perceived similarity of the other person to oneself (Hypothesis 4b).

To test this hypothesis, we used regression analysis. We first regressed each subject's frequency judgment about the other person (across similar and dissimilar others) on his or her self-report. We included dummy variables for each subject in order to account for the repeated-measures design. This model was significant ($R^2 = .36$, $p < .01$), and the coefficient associated with the self-report was significant ($B = .51$, $t = 12.28$, $p < .01$). Therefore, Hypothesis 4a was supported.

We then regressed the frequency report pertaining to the other person on the interaction between self-reports and the similarity of the other person to oneself (dummy coded as $0 =$ similar and $1 =$ less similar) in order to determine whether self-reports are used to different degrees depending on how similar the other person is to oneself. We also included the two main-effect terms in the model. Again the model was significant ($R^2 = .38$, $p < .01$), as was the coefficient associated with the interaction term ($B = -.25$, $t = -3.12$, $p < .01$), indicating a greater reliance on self-reports in forming judgments about a person more similar to oneself.

In order to test Hypothesis 4b more directly, we ran two separate regression models, one each for predicting the frequency with which the behaviors were engaged in by similar and less similar others. We used self-reports as the predictor for each model. Both models were significant (R^2s were .44 for the similar other and .22 for the less similar other, $p < .01$ for both). As expected (given that Hypothesis 4a was supported), the beta coefficients associated with self-reports were significant in both cases (similar other: $B = .62$, $t = 10.79$, $p < .01$; less similar other: $B = .35$, $t = 6.35$, $p < .01$). Further, as predicted by Hypothesis 4b, this coefficient was higher for the similar other than for the less similar

Dependent variable	Low-frequency alternative ($n = 40$)[a]		High-frequency alternative ($n = 40$)[a]	
	Regular	Irregular	Regular	Irregular
Self	6.0	4.6	6.5	6.9
	(2.4)	(3.6)	(2.8)	(4.2)
Best friend	5.6	5.1	6.2	7.5
	(1.9)	(2.4)	(2.0)	(4.0)
Average American student	5.1	5.9	5.8	7.5
	(1.6)	(2.6)	(1.2)	(3.3)

NOTE.—Figures in parentheses are SDs.

[a]Owing to partial nonresponse, there are fewer than 40 observations for some cells. These lead to fewer degrees of freedom for some of the analyses reported.

other ($t = 2.44$, $p < .01$; see Cohen and Cohen [1983, p. 480], for testing the difference between regression coefficients from the same sample). Therefore, Hypothesis 4 was completely supported.

Hypothesis 5: The Direct versus Indirect Effects of Response Alternatives on Frequency Judgments of Other People. In order to test for the direct and indirect effects of response alternatives on judgments about others, we used mediation analysis as specified by Baron and Kenny (1986). The mediation model we tested is the one presented in Figure 1, where response alternatives are the independent variable, self-reports are the mediating variable, and frequency judgments about the other person are the dependent measure (cf. Baron and Kenny 1986, pp. 1176–1177). Because our hypotheses are those of moderated mediation, we first ran the overall moderation models. Having found support for moderation, we then ran mediation analyses separately for each of the four types of regularity × similarity judgments.

Two *moderation* models emerge from Figure 1.

MODEL 1. Self-report $= a + b_1$response alternatives $+ b_2$regularity of the behavior $+ b_3$(response alternatives × regularity), where we expect b_3 to be significant, thereby reflecting that self-reports are affected by response alternatives only for irregular behaviors (Hypothesis 1).

MODEL 2. Judgments about other people $= a + b_1$response alternatives $+ b_2$self-reports $+ b_3$similarity of the other person to oneself $+ b_4$(self-reports × similarity) $+ b_5$(response alternatives × similarity), where we expect b_1, b_2, b_4, and b_5 to be significant, thereby reflecting that response alternatives affect judgments about other people (Hypothesis 3) especially those about people less similar to oneself, and that self-reports are used while making such judgments (Hypothesis 4a), albeit to a greater extent the more similar the other person is to oneself (Hypothesis 4b).

TABLE 4

EXPERIMENT 3: RESULTS OF THE MEDIATION ANALYSES

Regularity of the behavior	Similarity of the other person to oneself	Regression A (regress self-reports on response alternatives)		Regression B (regress judgment about other on response alternatives)		Regression C (regress judgment about other on self-reports and response alternatives)		
		Self-reports (B)	R^2	Response alternatives (B)	R^2	Self-reports (B)	Response alternatives (B)	R^2
Regular	Similar	.24	.01 (NS)	.95	.03 (NS)	.71[a]	.55	.60
Regular	Less similar			.55	.02 (NS)	.48[a]	.37	.48
Irregular	Similar	2.1[a]	.07	2.22[a]	.10	.52[a]	.96	.38
Irregular	Less similar			1.75[a]	.08	.27[a]	1.16[b]	.19

NOTE.—B's reported are unstandardized beta coefficients.
[a] $B \neq 0$, $p < .01$.
[b] $B \neq 0$, $p < .05$.

We included dummy variables for each respondent to take into account the within-subjects design in both models.

The overall regression on model 1 was significant ($R^2 = .12$, $p < .01$), as was the predicted significant interaction between response alternatives (dummy coded as $0 = $ low and $1 = $ high) and regularity of the behavior (dummy coded as $0 = $ regular and $1 = $ irregular; $B = 1.70$, $t = 2.23$, $p < .013$). This was to be expected in the light of the fact that Hypothesis 1 was supported. Further, while the main effect of regularity of the behavior was also significant ($B = -1.65$, $t = -3.08$, $p < .01$), the main effect of response alternatives was not ($B = .72$, $t = 1.30$, $p = .19$).

The overall regression on model 2 was also significant ($R^2 = .39$, $p < .01$). The predicted interaction between self-reports and similarity of the other person to oneself (the latter dummy coded as $0 = $ similar and $1 = $ less similar; $B = -.25$, $t = -3.10$, $p < .01$), together with the predicted main effects of response alternatives ($B = .64$, $t = 2.12$, $p < .03$) and self-report, was significant ($B = .61$, $t = 10.67$, $p < .01$). However, the interaction between response alternatives and the similarity of the other person to oneself was not significant ($p > .10$). The analysis also yielded a significant main effect of similarity of the other person to oneself ($B = 1.58$, $t = 2.74$, $p < .01$). These results suggest that while self-reports are used to varying extents as a function of the similarity of the other person to oneself, response alternatives are used to the same extent regardless of similarity.

For the *mediation* analysis, we then ran four regressions (two for each level of regularity), each with a two-way interaction term between either the independent variable (response alternatives) or the mediator (self-reports) and the similarity of the other person to oneself to predict the frequency judgment of the other person. We found that the use of self-reports varied as a function of the similarity of the other person to oneself for both regular and irregular behaviors (i.e., the interaction

terms were significant; regular: $R^2 = .56$, $B = -.22$, $t = -2.41$, $p < .02$; irregular: $R^2 = .37$, $B = -.24$, $t = -1.90$, $p < .03$). On the other hand, the use of response alternatives did not vary as a function of the similarity of the other person to oneself for either behavior (i.e., the interaction terms were not significant; regular: $R^2 = .07$, $B = -.41$, $t = -.51$, $p = .61$; irregular: $R^2 = .08$, $B = -.36$, $t = -.34$, $p = .74$).

According to Baron and Kenny (1986), to test for mediation, three regressions are necessary.

REGRESSION A.   Regress the mediator on the independent variable.

REGRESSION B.   Regress the dependent variable on the independent variable.

REGRESSION C.   Regress the dependent variable on both the independent and mediator variables.

We ran these mediation analyses separately for each regularity $\times$ similarity condition. The results are presented in Table 4.

The pattern of results obtained for the regular behavior suggests that response alternatives have no impact on self-reports ($B = .24$, $R^2 = .01$, $p > .05$; see results of regression A in Table 4), and, therefore, there are no indirect effects of response alternatives on subsequent judgments about other people, regardless of the similarity of the target other to oneself. This is consistent with Hypothesis 5a, which predicts the absence of indirect effects for similar (Hypothesis 5a, part i) as well as less similar (Hypothesis 5a, part ii) others. Further, there are no direct effects of response alternatives either, as can be seen from the results of regression B (R^2s are both nonsignificant). This is consistent with predictions for similar others (Hypothesis 5a, part i), but not for less similar others (Hypothesis 5a, part ii), for whom a direct effect has been predicted. In summary, then, Hypothesis 5a is partially supported.

In the case of the irregular behavior, we expected response alternatives to have a significant effect on self-reports. This is what the data suggest, as can be seen by the significant beta coefficient associated with response

alternatives in arriving at self-reports (regression A: B = 2.1, R^2 = .07, $p < .05$). For similar others, we predicted that response alternatives would have only an indirect effect, and for less similar others, response alternatives would have both direct and indirect effects. This is exactly what the results suggest. According to Baron and Kenny (1986), an indirect effect is manifested when regressions A and B are significant, and the effect of the independent variable on the dependent variable is reduced in regression C as compared to regression B. The results of the regression runs presented in Table 4 indicate that regressions A and B are both significant in the case of both similar and less similar others ($p < .01$). Further, the beta coefficient associated with response alternatives becomes nonsignificant in regression C for similar others, indicating "perfect mediation" (Baron and Kenny 1986, p. 1177). Therefore, while response alternatives have an indirect effect on judgments of similar others, they do not have a direct effect, which is consistent with the predictions of Hypothesis 5b, part i. For less similar others, on the other hand, the beta coefficient associated with response alternatives in regression C (B = 1.16, t = 1.73, p = .044) is lower than in regression B (B = 1.75, t = 2.44, p = .008) and remains significantly different from zero. This pattern indicates that response alternatives have a direct effect on judgments of less similar others, and also some indirect effect, as predicted by Hypothesis 5b, part ii. Hypothesis 5b is, therefore, supported.

Discussion

Experiment 3 was designed to follow up the findings of experiments 1 and 2 that information gathered from response alternatives affects subsequent judgments made by respondents. In this experiment, we demonstrated that respondents use contextual information selectively, depending on its diagnosticity. In the presence of other alternative inputs (e.g., "This other person is like me"), the information provided by response alternatives has a smaller effect. The process of making judgments about other people appears to follow an anchor-and-adjustment strategy (see, e.g., Davis et al. 1986; Tversky and Kahneman 1974), where respondents are anchoring on their self-judgments and adjusting this estimate by incorporating the information from response alternatives when their starting anchor is less diagnostic of their final judgment. As a result, the previously reported strong effects of response alternatives on estimates of others' behaviors (Schwarz et al. 1985) are likely to be limited to conditions where no alternative inputs are accessible. Further, in this experiment, we were able to tease apart the indirect effect of response alternatives (through self-reports) from their direct effects on frequency judgments of other people, providing support for the model proposed in Figure 1.

GENERAL DISCUSSION

The effects of response alternatives have received considerable attention in research on questionnaire de-sign in recent years (e.g., Bless et al. [1992]; Schwarz et al. [1985]; Schwarz and Bienias [1990]; Schwarz et al. [1985]; see Schwarz and Hippler [1991] for a review). The research presented in this article extends this previous work by proposing relevant moderating variables and demonstrating that the use of such context-based information is subject to the accessibility of memory-based information. In addition, we examined the effects of the response alternatives used to elicit a self-report of behavioral frequency on subsequent estimates of the behavioral frequencies of others.

We found that the existence of a rate of occurrence in memory renders the information provided by the response alternatives less influential when respondents are asked about their own behavioral frequency. As the studies reported indicate, respondents rely on the information provided by response alternatives for irregular but not for regular behaviors. This finding was replicated over three experiments. Moreover, the self-reports of cognitive effort obtained in experiments 2 and 3 are consistent with this process.

The findings of experiment 2 also indicate that the response alternatives convey information about the typical frequency of an average person. Because of lack of other information about the average person, this information is relied on to a large extent in arriving at estimates of typical behavioral frequencies for regular and irregular behaviors.

Finally, experiment 3 demonstrated that information about oneself is used selectively, depending on how similar one thinks the target person is to oneself. Respondents rely less on memory-based information and more on the information provided by response alternatives as the target person is perceived to be less similar to oneself. We also trace the direct and indirect influences that context-based information may have on judgments of others.

Theoretical Implications

The present research advances existing theory relating to the cognitive processes involved in formulating behavioral frequency judgments.

Robustness of Rates of Occurrence as a Heuristic. Menon (1993) demonstrated that respondents are most accurate in formulating behavioral frequencies for a behavior that is regular and for which they have a rate of occurrence accessible in memory. The three experiments presented in this article substantiate the robustness of the rate of occurrence as a heuristic to be relied on. Using regularity as a proxy indicator for the presence of rates of occurrence, we demonstrated that the effects of response alternatives are moderated by the regularity of the behavior. For a regular behavior, respondents rely on a rate of occurrence accessible in memory in formulating frequency judgments and thus are not affected by the response alternatives provided.

The Impact of Response Alternatives. In addition, the present research extends our understanding of the operation of response alternatives in important ways. Although previous research had indicated that the impact of response alternatives decreases as relevant information about the behavior becomes more accessible, this research had not addressed characteristics of the behavior as a determinant of information accessibility. For example, Schwarz and Bienias (1990, experiment 3) found that respondents who scored high on private self-consciousness, a trait associated with higher knowledge about oneself, were less affected by response alternatives than respondents who scored low on that trait. Further, Schwarz and Bienias (1990, experiments 1 and 2) also observed that proxy reports were more affected by response alternatives than self-reports. All of these findings presumably reflect the attenuating impact of alternative inputs on the influence of response alternatives. Drawing on Menon's (1993) analysis of behavior regularity, the present studies extend this evidence by identifying regularity as an important moderator of the accessibility of behavioral frequency information that results in an elimination of the otherwise obtained impact of response alternatives. By the same token, we would also assume that reports of rare behaviors, which are likely to be well represented in episodic memory, are unaffected by response alternatives.

Extending the theme of alternative inputs, the present research also demonstrated that the impact of response alternatives on proxy reports depends on the proxy's similarity to the self and the accessibility of alternative information about one's own behavioral frequencies. Most important, the impact of response alternatives is strongly attenuated when the proxy is similar to the self and rate-based frequency information pertaining to the self is accessible, a contingency that had not been addressed in previous research (e.g., Schwarz and Bienias 1990).

Finally, the present studies support the hypothesis that reliance on the information provided by response alternatives reflects a heuristic strategy that allows respondents to simplify the judgment task. Specifically, respondents' effort ratings indicated that they found it easier to report the frequency of irregular behaviors along the response alternatives provided to them rather than in an open-ended format. In accordance with the idea that response alternatives serve to simplify the judgment process, Bless et al. (1992) had previously observed that respondents were more likely to rely on the information provided by the response alternatives when they had to report relative than absolute frequencies, thereby reflecting that the former are not directly represented in memory and require additional computational effort. Similarly, respondents were more likely to rely on response alternatives in the present studies when faced with the more demanding task of estimating the frequency of irregular behaviors, for which rate-of-occurrence information was not available. Whereas re-

liance on response alternatives as a heuristic strategy results in systematic bias, reliance on other heuristics, such as a rate of occurrence, may result in increased accuracy.

Diagnosticity of Information Sources and Accuracy of Heuristic Strategies. Our findings support the outcome of previous research that the use of information sources is a function of their accessibility. Given that more than one information source is accessible, their relative use is a direct function of their perceived diagnosticity (Feldman and Lynch 1988). Both sources of information studied in this article, rates of occurrence and response alternatives, can be thought of as heuristic cues, the use of which obviates the necessity to recall and count individual behavioral episodes. Typically, heuristics are associated with inaccuracy (see, e.g., Tversky and Kahneman 1974). Information-processing theories incorporating the use of heuristics also implicitly assume an efficiency-efficacy trade-off (see, e.g., Chaiken, Liberman, and Eagly 1989). That is, heuristics are thought to make the decision process easier, but often at the cost of accuracy. However, Menon's (1993) findings indicated that some heuristics, such as the use of rates of occurrence, can be highly reliable aids to formulating judgments. As the present findings indicate, the use of the rate-of-occurrence heuristic (vs. the information provided by response alternatives) is associated with a lower level of cognitive effort in the judgment and reduced effects of response alternatives, which suggests that their use represents an efficient and effective strategy. The conditions under which heuristic use can lead to greater accuracy and confidence in a judgment would be an interesting area for future research.

Practical Implications

What does all this mean to consumer researchers? Because collecting information on behavioral frequencies is an integral part of consumer research, it is important to ensure that (*a*) such frequency reports are not affected by the manner in which they are elicited and (*b*) even if the frequency reports are not affected by the response alternatives, the response alternatives do not affect answers to subsequent related questions.

Boundary Conditions for the Effect of Response Alternatives. One of the reassuring findings of this research, in combination with the research reported by Menon (1993), is that regular behaviors are reported fairly reliably. An overall implication of this research is that given that rates of occurrence are reliable frequency estimation heuristics, making such rates more accessible will increase response accuracy.

Question-Order Effects. The response alternatives used to elicit a behavioral frequency judgment were shown to affect the respondent's estimate of the typical frequency in the population, more so for irregular behaviors. This implies that we have to be more careful

when eliciting a proxy report (e.g., eliciting information about a significant other; see Menon et al. 1995), as the information provided by response alternatives may be relied on much more, even if the behavior is a regular one. Further, we demonstrated that the integration of information about oneself and that inferred from the response alternatives provided is moderated by the similarity of the person about whom the judgment is being made. Depending on the person about whom the proxy report is being elicited, therefore, questions may have to be separated physically in a questionnaire.

Open-Ended versus Closed-Ended Frequency Questions. A common argument for the use of response alternatives (vs. open-ended questions) is that respondents find them easier to answer and they are more reliable. Of course, the process of data entry is also simplified when closed-ended questions are used. Consumer researchers are therefore advised to evaluate the potentially biasing nature of such questions vis-à-vis increasing the ease of responding to such questions. Where open-ended questions are not expected to substantially increase the effort of the response, and are expected to provide fairly accurate results, their use is recommended. Take, for example, the case of frequency questions on regular behaviors. Despite response alternatives not leading to a measurement bias (experiment 1), researchers would still be advised to use open-ended questions to elicit such responses. This is because they are associated with no context effect and no greater task difficulty (experiment 2), and they are based on the use of a reliable rate of occurrence (Menon 1993).

In conclusion, through a series of three experiments, we have demonstrated that while the accessibility of memory-based information is dependent on the regularity of the behavior, the perceived diagnosticity of the alternate sources of information (i.e., memory-based vs. context-based) is dependent on the judgment task at hand. We find that when both memory-based information and context-based information are available, the diagnosticity of the alternate inputs moderates their use in the judgment task.

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