



Correlates of the Item Non-Response in Survey Research: Analysis of the KGSS Cumulative Data, 2003-2007*

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Despite the ever-increasing use and reliance on survey research data in the social science nowadays, an undue attention has been paid in Korea as to how item non-responses (or, DK responses, shortly), as one of the most important criteria for quality data, vary by certain characteristics of the respondents and survey setting and what precisely accounts for the variation. In an attempt to fill this gap, this study tries to identify the correlates of DK responses. An extensive review of methods literature suggests several important correlates of respondent and survey characteristics, and the associations postulated between each correlate and DK responses are subject to a scrutinized statistical analysis by using the cumulative, five-year rounds (2003-7) data sets of the KGSS. Results of correlation and OLS regression analyses confirm most of the predictions by demonstrating that DK responses, on average, are a function of two over-arching meta-components of respondent cognitive sophistication and normative social obligation. The findings are interpreted and a few methodological implications stemming from them are discussed with suggesting some recommendations for further studies.

Keywords: item non-response, quality data, respondent correlates, survey correlates, cognitive sophistication, normative obligation, KGSS, methodological implications

Survey researches are often called the ‘workhorse’ of quantitative data (Converse 1987) in modern social sciences. An ever-increasing number of social scientists, including sociologists, psychologists, and political scientists, are relying more and more on survey research data in recent decades to explore, describe, and explain social phenomena of their own interests and to

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test for their hypotheses and theories. Obviously, this heavy use and increasing reliance on survey data is itself a reflection of the positive net balance of survey research, as one of the data collection methods, over other methods in the social science. To emphasize, when compared to other methods, the advantage of survey research (most notably, an increased generalizability resulting from the relatively large sample size and an efficient administration of survey questionnaires) tends to outweigh its disadvantage (e.g., superficiality of the collected data).

The use and reliance on survey research, however, calls highly for the quality of its data. It goes without saying that results of survey data analysis are likely to be seriously questioned when they are based on poor-quality data. In fact, a number of criteria are readily available to assess the quality of data collected from the survey research, and the most important among these includes unit non-responses, item non-responses, psychometric properties of reliability and validity, and some atypical response patterns (e.g., response sets) (Biemer and Lyberg 2003; Groves 2004). As will be elaborated below, the two types of non-responses differ entirely from each other in that unit non-responses refer to a total failure to obtain any measurements from a given case in the selected sample while item non-responses refer only to a partial failure to obtain some measurements from a case in the sample (Groves et al. 2004). Although the efficiency criterion of time and expenses in collecting data could probably be another factor to consider in evaluating the quality of data, it is not of major concern to the consumers of survey data since they are interested only in the quality, instead of time and expenses, of the collected data.

To compare among the quality criteria, it might be indicated that item non-responses tend to be more likely to be managed in the course of fieldwork operations, while other criteria such as unit non-responses and psychometric properties are less likely to be so. To reiterate, depending on how well the researcher designs the questionnaires and maneuvers the fieldwork, item non-responses can be reduced to a considerable extent. This is primarily because a large portion of item non-responses is often known to be an outcome of motivations on the part of the respondents (Anderson, Balilevsky, and Hum 1983). Unlike item non-responses, unit non-responses and psychometric properties are less likely to be controlled or managed in the process of fielding since they tend to be vulnerable to a wider variety of sources apart from fieldwork operations *per se* (Moser and Kalton 1971). To illustrate, one can try to reduce the presence and proportion of item non-responses by means of a few deliberate designs: not offering an explicit *DK* (don't know) category in the questions; instructing interviewers to record *DK* response only when the respondents strongly volunteer it; adopting the interviewer-administration, instead of self-administration, technique (Schuman and Presser 1981; Davis and Smith 1996). Absence or reduction of item non-responses leads, of course, to an increment of valid responses across question items, which ultimately contributes to an enhancement of the usability of collected data, for one thing, and the consequent representativeness of the selected

sample, for other.

The relative feasibility associated with the practical control of item non-responses in the process of fieldwork provides a case to suggest that there be a few characteristics or variables intimately related to such responses in questionnaire surveys. As a matter of fact, a number of studies have already been conducted in overseas, the United States in particular, for the last few decades that are committed to the identification of such characteristics or variables. Apparently, these studies were prompted by the practitioner interest in how to better improve the survey quality and they could indeed identify a substantial number of such characteristics. Unfortunately, however, not a single study is available or reported in Korea that is fully dedicated to such interest, and we are consequently left with the double voids of an academic miscomprehension (i.e., lack of knowledge concerning the factors responsible for item non-responses) and a practical under- or mal-treatment (i.e., lack of intervention strategies to minimize such responses).

In order to fill these voids, this study attempts to uncover the correlates of item non-responses (shortly, *DK* responses) in survey research. To put it simply, certain respondents are more likely to provide *DK* responses than others, and certain aspects or characteristics of the survey setting tend to produce more of such responses than others. The very existence of variations in *DK* responses warrants a further sophisticated examination of specifically how these responses vary by respondent and survey characteristics and what accounts for the variation. An appropriate answer to these “how” and “why” questions is expected to contain significant methodological implications. To be more precise, survey methodologists would have a better grasp of the cognitive mechanism leading to *DK* responses and they can also develop better strategies to control such responses and promote survey quality in the course of fielding. In pursuing these questions, this study analyzes the cumulative, five-year rounds (2003-2007) data sets of the KGSS (Korean General Social Survey). As will be addressed below, there appears to be no better data than the KGSS in seeking answers to these questions due mostly to its scale, spirit, and methodological stringency.

ITEM NON-RESPONSES

Typology and Definition

Now that this study focuses on the item non-response, a rather extensive discussion is required concerning its typology and conceptual definition in a much broader context of invalid or missing data in questionnaire surveys. To introduce the image of rectangular data matrix in typical statistical packages (e.g., SPSS, SAS, STATA), missing data refers to one that fails to contain valid observation values for some part of data from a given case in the matrix (Little and Rubin 1987). Missing data, as such, differs from the routine notion of non-response, or

typically called the unit non-response, which indicates a total failure to obtain any measurements from a given case in the sample due to the non-contact, refusal, and inability to participate (Groves et al. 2004).¹ To say simply, missing data ordinarily concerns invalid or unusable values in the successfully completed case, whereas unit non-response concerns the uncompleted or failed case.

A review of methods literature consistently shows that missing data is usually broken down into a few different forms through two consecutive stages. In the first place, missing data is differentiated by whether it is system-missing or not. System-missing indicates data that results from the inapplicability or ineligibility of a certain item (e.g., abortion experience) to some group of respondents (e.g., males)—typically notated by *NA* (non-applicable)—with the rest, left-out missing is all regarded as non-system-missing. Missing data in ordinary sense of the term refers to the latter. Secondly, the (non-system) missing data is further divided into two forms, process item non-response and interview item non-response. Unlike the process item non-response stemming from problems with pre-survey questionnaire formatting or post-processing procedures (Lyberg and Kasprzyk 1997), interview item non-response refers to item missing data originating from the social, psychological, and cognitive dynamics of the interview (Anderson et al. 1983). It is this sort of non-response to which most attention, including the current study's, is drawn insofar as missing data is concerned. In short, the focus of this study is on the non-system-missing, interview item non-response.

Impacts on Substantive Research

Quantitative researchers working on survey data tend to exclude the *DK* response from their analysis often without a closer inspection and serious consideration. This practice, however, potentially brings about two sorts of problems to their substantive research, an increased sampling error and a bias in the statistical inference. To illustrate, exclusion of *DK* reduces the effective sample size (N) of the analysis, which, in turn, increases the standard, or sampling, error. Furthermore, exclusion of *DK* is known to bias test statistics by making the expected value of sample statistics deviate significantly from population parameters insofar as the excluded cases differ systematically from substantive cases (Groves 2004). Taken together, the increment of random error, for one thing, and the introduction of systematic error into the statistical estimation, for another, is very serious since it leads to the misleading inference in substantive research. This problem becomes more acute, of course, particularly when there are many *DK*'s in the data and when multivariate analysis is attempted.

Although there exist no hard principles or general guidelines about how to effectively and efficiently confront and treat the *DK* problem, two conventional remedies are reported to be

¹ Often included in the unit non-response is not merely this kind of total failure but also a 'partial' failure (Madow and Olkin 1983) in which the requested information is provided only in some part and thus contains unusable, albeit provided, information throughout the questionnaires.

available, survey design and data imputation. Survey design refers to the pre-planned, deliberate procedure of designing the sampling, constructing the questionnaires, implementing the fieldwork in such a way to reduce or minimize *DK* response (see Sudman, Bradburn, and Schwarz 1996). For researches of secondary analysis working on data of already finished survey, however, the pre-planned design becomes of no use and the only available option is data imputation. Although a wide variety of imputation models are utilized, ranging from a simple mean substitution method to some highly sophisticated multivariate imputation methods (see Anderson et al. 1983; Little and Rubin 1987; Lesser and Kalsbeek 1992), they are known to be far from a complete treatment of the problem and is often criticized, as well, for its little attention to questions of unobserved heterogeneity in the data (Mathiowetz 1998).

Meaning or Interpretation of *DK*

Apart from the typology, definition, and impacts of *DK* response, another body of literature addresses the substantive meaning or implication associated with the notion of *DK*. As a matter of fact, one of the most frequent criticisms directed against the *DK* analysis in general was that *DK* response might represent a respondent's *true underlying value* and, therefore, does not automatically qualify as item non-response. In this vein, the literature suggests that *DK* is a sort of 'catch-all' concept which includes so many off-scale response labels, such as *can't choose*, *not sure*, *not enough information to form an opinion*, *no opinion*, *question mark*, and the like (Francis and Busch 1975). Indeed, respondents are known to answer *DK* for a wide variety of reasons, including non-attitude (really don't know), ambivalent attitude (neither for nor against the issue), editing socially desirable answers (don't want socially undesirable opinion), sacrificing (don't have time or don't want to think about), question ambiguity (don't know what it means), and unavailability of mid-point (no neutral point) (Coombs and Coombs 1977; Smith 1984; Feick 1989; Krosnick and Fabrigar 1997; O'Murcheartaigh et al. 1999).

In short, respondents do actually mean so many different things when they answer *DK* or express *DK*-like responses. Obviously, some of them might as well be regarded as substantive responses (i.e., true underlying value); others could be better regarded as non-substantive responses (i.e., literally missing or unusable data); still others could aptly be regarded as a combination of the two. Since an accurate and sound interpretation of the underlying reason, rationale or motivation behind the notion of *DK* is virtually impossible in practice, however, data analysts have no other alternatives in a lot of cases but either impute or exclude some or all of them. After all, suffice it to indicate that underlying meanings of *DK* do vary for a variety of reasons, and that the current study is certainly no exception, either, to this way of interpreting *DK*.

Correlates of *DK*

Extensive research on *DK* responses so far suggests that such responses are non-random

phenomena (Converse 1977; Smith 1981; 1984; Narayan and Krosnick 1996; Krosnick and Fabriger 1997). And the research could indeed identify numerous broad correlates of *DK*, which include normative motivation, cognitive ability, socio-demographic characteristics, question formats, survey setting, and the like (Coombs and Coombs 1977; Falkenberry and Mason 1978; Smith 1984; O'Murcheartaigh et al. 1999). These correlates are usually classified into two overarching groups, individual-level and survey-level correlates. By individual-level correlates the research normally means all sorts of socio-demographic characteristics of the respondents that contribute to *DK*. Survey-level correlates are a sort of residual category that is left out after individual-level ones, and they encompass methodological characteristics of the survey as a whole: how the questionnaires are designed, how the sampling is done, how the fielding is conducted, and the like (Schuman and Presser 1981; Smith 1984).

It should be emphasized that most characteristics identified in the literature, irrespective to their levels, might have to be better called 'correlates' rather than predictors, primarily because an elaborate rationale underlying the reasoning why the characteristic leads to *DK* is not sufficient for a lot of them. Ideally, the rationale should be truly theoretical and casual, but in reality it tends to be only logical or empirical at best. In the shortage of detailed theoretical or causal rationale to support the postulated relationship between a characteristic and *DK*, the characteristic could be more aptly called correlates. Apparently, this delimitation concerning the characterization of the characteristics is itself a reflection of the limitation of the extant research in this area: a practitioner interest in what is associated with *DK* has contributed to shed less light on a theoretical or causal approach to the matter.

Individual-Level Correlates

To begin with individual-level correlates, it is often indicated that respondents who answer *DK* tend to differ systematically from those who provide substantive answers (Ferber 1966; Francis and Busch 1975; Krosnick and Milburn 1990). In fact, diverse socio-demographic characteristics of the respondents have been reported, but they are often broken down into two general groups, cognitive correlates and social correlates. Cognitive correlates refer to cognitive ability of the respondents to comprehend survey questions and they typically include knowledge level, exposure to information, mental ability, and the like. Social correlates refer to normative orientation of the respondents and they usually include the respondent motivation and the adherence to some social norms. Emphasis on social correlates stems basically from the reasoning and observation that survey setting is an instantiation of social encounter between the interviewer and interviewee and certain norms or rules ordinarily govern the relationship in such a way that the former wants to retrieve as much substantive information as possible from the latter, and the latter also feels some kind of social pressure to offer information to the former (Sudman et al. 1996; Krosnick 1999). To take the individual-level correlates together, *DK* is simply conceptualized as a function of two meta-components,

cognitive comprehension and normative motivation (Young 2001).

Although cognitive and social correlates are frequently discussed in methods literature, they tend to be too diffuse to allow for a detailed identification of respondent characteristics. Indeed, different researchers mean and propose different socio-demographic characteristics under the rubric of each correlate. It appears that this difference results primarily from the availability of measurement variables in their analysis. Although this study is certainly no exception to this measurement limitation, either, it still could identify some of the most important socio-demographic characteristics established in the literature. Specifically, they are gender, age, educational attainment, employment status, occupation, household income, and residential area. Admittedly, no simple answer can be provided in this study as to the question concerning which variable among these represents cognitive comprehension and which represents normative motivation. Perhaps, it would be correct to say that each variable is intended to represent some amount of both cognitive and normative components at the same time, although there exist some variations in the degree to which one of the two components is more likely to be reflected by each variable.

(1) Gender: The existing literature on the correlates of *DK* responses suggests that respondent's gender may explain some amount of variations in *DK* response rates. In general, females are more likely to offer *DK* answers than males (Sudman and Bradburn 1974; Francis and Busch 1975; Rapoport 1982; 1985; Smith 1984; Young 2001). Typically, two possible explanations are provided for this gender effect. For one thing, females, on average, tend to be less knowledgeable and cognitively sophisticated about the subject matters covered in surveys than their male counterparts (Francis and Busch 1975; Rapoport 1982; 1985). For another, females are ordinarily socialized in most cultures not to explicitly express their own opinions, which operates to produce higher *DK* rates (Rapoport 1982; 1985).

(2) Age: Respondent's age is reported as another important correlate of *DK* responses, with older people offering more such responses (Gergen and Back 1966; Glenn 1969; Young 2001). There are two possible explanations for the age effect, too. First is the cognitive deterioration of older people, implying that they are less cognitively able to comprehend and react to the topics in surveys than younger people. Second is the social disengagement of older people (Krosnick and Milburn 1990). As people become older, they tend to withdraw more and more, both physically and mentally, from the social world, become less informed about a variety of social issues, and more likely to give *DK* answers.

(3) Educational Attainment: *DK* responses may also result from differences in educational attainment of the respondents. Literature consistently shows that people with less education are more prone to give such responses than those with more education (Smith 1981; 1984; Schuman and Presser 1981; Krosnick and Milburn 1990; Narayan and Krosnick 1996; Krosnick and Fabrigar 1997). Again, the explanations, similar to the age effect, are suggested for the education effect. Not merely are the less educated less likely to be sophisticated

cognitively, but they are less likely to participate in a variety of civic activities, less likely to be exposed to issues found on surveys, and more likely to express *DK* responses.

(4) Employment Status: *DK* responses are further known to be a function of employment status of the respondents. A number of studies (Ferber 1966; Francis and Busch 1975) document that the unemployed, compared to employees (wage workers and self-employees), tend to produce more amounts of *DK* responses. This is because people without jobs, in general, are less likely to be knowledgeable about issues of social interests and less likely to be involved in civic activities. Viewed in another way, the effect of employment status could result from the combination of some of the socio-demographic characteristics mentioned above: people without jobs are more likely to be females, older, and have attained less amount of education, all of which leads to higher *DK* rates.

(5) Occupation: Similar to, but not same as, the effect of employment status, respondent's occupation is associated with *DK* responses, too. In general, those who hold occupations with lower skill levels (e.g., manual or clerical jobs), when compared to those holding occupations with higher skills (e.g., professionals or managers), are less likely to be sophisticated cognitively, less likely to be motivated and socialized to express their opinions publicly, thereby resulting in higher *DK* rates (Ferber 1966; Francis and Busch 1975).

(6) Household Income: Household income, along with occupation, is one of the most representative surrogates for respondent's socio-economic status. While there are not many studies dealing directly with household income, a few available literatures (Groves et al. 2002) suggest that people with lower income are more likely to give *DK* responses than those with middle or higher income due mostly to the intimate association between lower SES and lower levels of cognitive comprehension and normative motivation.

(7) Residential Area: Literature further suggests that the area in which the respondent is residing has something to do with *DK* rates, with rural area producing more *DK* responses than urban or metropolitan area (Groves et al. 2002). While far from conclusive, the area effect looks like to be an outcome of several socio-demographic characteristics combined together: people in rural area are more likely to be females, older, less educated, unemployed, have jobs with lower skills, and have less amount of income, all of which, in turn, contributes to higher *DK* rates.

Taken together, two notes are in order with respect to individual-level correlates discussed above. First, expectedly, these correlates tend to be interrelated with one another to some degree. To illustrate, those who offer more *DK* responses are likely to be females, older, less educated, unemployed, have lower SES, and reside in rural area at the same time. While these interrelationships are hardly surprising, it might introduce the statistical problem of multicollinearity to the estimation of multivariate analysis models that is going to be undertaken in this study. What is important, however, is the extent to which the interrelationships are excessive to the point of seriously jeopardizing the statistical estimation,

and this study will address the issue by means of a few statistical procedures to test for the symptom.

Second, what is meant in discussing the impact of each individual-level correlate on *DK* responses in this study, it should be emphasized, is not the extent to which certain respondent is more cooperative to and actually participate in the survey, but literally the extent to which the respondent generates *DK* responses when they do cooperate and participate. As a matter of fact, cooperativeness and participation has almost nothing to do with item non-response, or response completeness, in survey research. To reiterate, those who lack the two meta-components of cognitive comprehension and normative motivation (e.g., females, the older, less educated, etc.) are reported to be even more cooperative to and indeed participate more in surveys (Smith 1983; Groves and Couper 1988), although they tend to end up with higher *DK* rates. By the same token, those who possess the meta-components (e.g., males, the younger, more educated, etc.), despite their lower *DK* rates, are known to be less cooperative and refuse more to participate in surveys. It goes without saying that the meta-components, whether they are cognitive or social, become effective to *DK* rates only after the target respondent is already determined to take part in and actually concede to a survey request. Prior to such attitude and behavior, however, these components and each individual correlate associated with them are certainly of no use to *DK* rates. After all, analysis of individual-level correlates only concerns validly completed cases, at the expense of declined, refused, uncompleted or inaccessible cases. Study of the so-called “non-response bias,” which purports to understand the correlates of the binary outcome of case success or failure, has a considerable amount of methodological significance and might well be another subject of study in its own right.² In short, cooperativeness/participation is one thing and item non-response is entirely another in surveys, and the focus of this study is limited only to the latter, in which information is retrieved exclusively from the successfully completed valid cases.

Survey-Level Correlates

Survey-level correlates, as indicated, refer to all sorts of methodological characteristics of the survey as a whole, besides individual characteristics of the respondents, that are associated with *DK* responses. Now that they are too inclusive, even more than individual-level correlates, to allow for a detailed identification of some common characteristics, different researchers focus on different correlates, depending, in large part, on the interest of their own and the availability of data. Of particular interest in this study, however, are a few characteristics of the interview in the process of fielding: number of days elapsed to complete the interview; number of visits required to complete the interview; technique or mode of questionnaire administration

² Note that causes of unit non-response are reported to differ considerably from those of item non-response (Groves et al. 2004).

in the course of interview; provision of incentives to the interviewees.

Before elaborating on each of these interview characteristics in more details, two notes need to be made. First, this study focuses on the interview characteristics, not only because more variations in *DK* response are observed in the KGSS data for these fielding features compared to those for sampling or question format, but also because these fielding features are believed to have crucial practical, as well as academic, implications to the survey methodologists. Second, compared to the individual-level correlates, survey-level interview characteristics tend to further fall short of coherent rationale or evidence in the literature to allow for a hypothesizing of their relationships with *DK* responses. The number of elapsed days and serial visits to complete the interview, for instance, is vulnerable to so many diverse and heterogeneous factors internal or external to the survey at hand that no simple and straightforward hypothesizing is warranted over different surveys having different purposes, methods, and procedures. Perhaps, the precise way the number of those days is associated with *DK* responses, albeit its importance and implications, varies a lot by some substantive or methodological features unique to each survey. For this reason, this study will refrain, as much as possible, from postulating any directed hypotheses about most, if not all, of the interview characteristics and will try instead to illustrate the guidelines and procedures unique to the fielding of KGSS. Viewed in this way, the nature of the relationships between interview characteristics and *DK* responses pursued in this study tends to be more exploratory than explanatory.

(1) Number of Days to Complete the Interview: The number of days elapsed after an onset of the survey to complete the interview would have something to do with *DK* rates. To try to interpret what it means to have longer days, to begin with, one might say that the target respondent finally conceded to the interview request after having been reluctant to cooperate for a while. Such attitude might be subject to two different kinds of interpretations. One quick and easy interpretation is that the attitude might be a reflection of lowered motivation on the part of the respondent. If this was really the case, it should lead to higher *DK* rates. Another rival interpretation is that the attitude is probably a manifestation of serious difficulties in gaining access to the respondent in terms of time, location, and the like. Recalling that those who possess the two meta-components of cognitive comprehension and normative motivation (e.g., males, the younger, more educated, etc.) are reported to be far less accessible than those without such components (Smith 1983; Groves and Couper 1988), the very fact that they consented, at last, to the interview suggests that their responses be full of non-missing, valid answers. If this was the case, it would result in lower *DK* rates. It is not easy to foresee which of these two conflicting interpretations are correct. Perhaps it would be safe to assume that both of the two forces are operating simultaneously. As such, this appears to be a more empirical than logical question and it should be interesting to see how the elapsed days is correlated with, on the one hand, and has impacts on *DK* responses, on the other, even after controlling for the

other correlates introduced in the estimation model. Suffice it to indicate, for now, the interview protocols that the KGSS strongly urges the interviewers to try to finish their assigned interviews at their earliest conveniences during the 10-weeks period (from the 4th week of June to the end of August) every year.

(2) Number of Visits to Complete the Interview: The number of visits required to complete the interview might also have some relationship with *DK* rates. Conceptually speaking, the number of visits is not identical to the number of elapsed days, since several visits can be made for a shorter period of time, and, likewise, only a few visits may be made for a longer period. From the viewpoint of empirical reality, however, the two appear to be subject to similar driving forces. In other words, multiple visits could be interpreted either as the lowered motivation of the respondent or as the inaccessibility to the person. The motivation factor will, of course, lead to higher *DK* rates, while the accessibility factor will lead to lower rates. It remains to be seen how the number of visits is related to *DK* rates net of all other factors, on the one hand, and how the relationship differs from that of the number of elapsed days, on the other. Similar to the completion guideline indicated above, the KGSS interviewers are strongly asked to attempt a series of successive visits, normally up to a dozen, to every respondent as much as possible during its 10-weeks fielding period until the case is ultimately classified by the staff as a final failure. Visits here, of course, refer only to the in-person, independent visits to the residence of the respondents made in different days and they do not include other means of contacts (e.g., telephone, email, etc.).

(3) Mode of Questionnaire Administration: Unlike the elapsed days and visit numbers, the literature is abundant with lots of logical reasoning and empirical evidence concerning how the mode or technique of questionnaire administration is related to or has impacts on *DK* rates. Unless the questionnaires contain a number of highly sensitive and confidential items creating normative barriers (e.g., sex, crime, etc.), interviewer-administered surveys are generally known to generate fewer *DK* responses than self-administered surveys (Sudman and Bradburn 1982; Groves, Dillman, Eltinge, and Little 2002). This is, once again, attributed primarily to the two meta-components of cognitive comprehension and normative propensity. Surveys administered instantaneously by the interviewer on the spot will not merely provide the interviewee with an invaluable opportunity to better understand the questions by means of probing, debriefing, and the like, they will also prevent the interviewee from giving misleading or inappropriate answers (e.g., inaccurate, inconsistent, incomplete, or biasing ones) (Bishop, Hippler, Schwarz, and Strack 1988), which, in turn, results in lower *DK* rates. Surveys administered by the interviewee by itself, however, which are ordinarily done without the presence of the interviewer at some later point in time consequent to the access to the respondent, will be deprived of such opportunity for enhancing the understanding and will often fail to prevent such misleading or inappropriate answers, thereby resulting in higher *DK* rates.

Note that the KGSS is very adamant to sticking to the fielding protocols that all interviews should preferably be administered by the interviewer instead of the interviewee. This is, of course, designed to decrease the wrongful responses and increase the response completeness, despite the enormously heavier inputs (time, expense, efforts, and the like) associated with interviewer-administration as compared to self-administration. Given that sticking exclusively to interviewer-administration is too severe to bring more harms than gains in some situations, however, self-administration is allowed, too, only when both of the two conditions are satisfied: the respondent strongly keeps volunteering it; the respondent can be regarded (by the KGSS research staff) as one who is willing and able to fill out the questionnaires by itself without much troubles. Nonetheless, no matter how well the self-administered questionnaires are filled out, there still remains the possibility that they are far from being complete and are hardly likely to be better than the interviewer-administered ones, especially in academic social surveys like the KGSS that are inherently lengthy and complicated and thus require a considerable attention of the respondents. Taken together, interviewer-administered surveys are expected to contain fewer *DK* responses in this study than self-administered ones.

(4) Provision of Incentives to the Interviewees: Providing the respondents with some kinds of incentives as a return to their cooperation and participation is more of a norm than a choice in the in-depth personal interviews like the KGSS. Obviously, the provision is intended to contrive better responses in such a way that the respondents could feel they are properly compensated for granting the survey request. Since the 1st year round (2003) of the KGSS, it has been one of the consistent practices each year that two different kinds of incentives, gift voucher (monetary) and in-kind goods of equivalent value (nonmonetary), are prepared and the interviewers are asked to carry both of the two at all times during the fielding and have the respondents choose by themselves between the two. Although the incentives are always recommended to be handed to the respondents on the spot immediately prior to the interview, there still exist a few cases in which the respondents keep refusing to take any even after the interviews have been successfully completed. Although no reasoning or evidence is available in the literature concerning how the incentive offering relates to *DK* responses, it is believed that provision would result in lower *DK* rates than non-provision, not merely because it is consistent with the fielding protocols, but because some sort of nuisances extraneous to the fielding process could have been operating for the non-provision. Unlike the comparison between provision and non-provision, comparison between the two different kinds of incentives (gift voucher vs. in-kind goods) in terms of *DK* rates looks like a sheer empirical question.

METHODS

Data

The cumulated, five-year rounds (2003-7) of the KGSS are the source of data used to evaluate the relationships postulated between each correlate and *DK* responses. The KGSS, a national sample survey implemented every year since 2003, has the target population of all Korean adults aged 18 or over who live in households of Korea. A representative sample is drawn from this population by means of multi-stage area probability sampling procedures. Structured face-to-face, in-depth interviews that are administered typically by a trained group of interviewers are then conducted for the selected sample.³

In order to explain how the cases and variables are selected from the five-year rounds, the structure and procedure of data files constructed for analysis in this study needs to be described in some details. Basically, each year's data file consists of two parts, main and supplementary. Main data refers literally to the most essential part of the data and is typically composed of three big clusters of questions: replicating core, ISSP module, and EASS module (even years) or special contract module (odd years). Supplementary data refers to one that is obtained additionally in the course of the interviews and it usually includes a variety of information about the fielding—visit records, interviewing records, administration techniques, incentive provisions, interviewers' socio-demographic information, respondent's attitudes, and the like—as reported by individual interviewers. What is archived and released to the public, of course, is the main data and the supplementary data is kept only internally for monitoring purposes. Now that this study aims at identifying the correlates of *DK* responses, which consist of both individual- and survey-level characteristics, and that the former is contained in the main part with the latter contained in the supplementary part, the two parts of the data for each year were added together by means of a matching procedure and the resultant files for each year were consequently merged across all years.

Now, to explain the selection of cases in this study, the valid number of cases and the response rates for the main data in each year originally were: 2003 = 1,315 / 2,000 (65.8%); 2004 = 1,312 / 2,000 (65.6%); 2005 = 1,613 / 2,500 (64.5%); 2006 = 1,605 / 2,500 (62.2%); 2007 = 1,431 / 2,500 (57.2%).⁴ Sixty-seven cases among these, however, had to be dropped

³ Further details on the KGSS, plus the internationally-coordinated module surveys of the ISSP and EASS in Korea, are available in Kim (2004) and Kim et al. (2009).

⁴ Two criteria are available to assess the representativeness of the valid sample cases for each year. One is the response rates varying from 57 to 66 percents, which are, in fact, conservatively calculated figures for all years, suggesting a proper representation of the target population. The other is the distribution of a few critical demographic variables (e.g., gender, age, and employment status) of the selected samples as compared to that of the national populace, which again provides an adequate representation (The non-parametric test results are not presented to conserve space). These two criteria, taken together, allow to rule out the possibility that the findings later in this study are due to some characteristics unique to the sample analyzed.

from the analysis because they turned out to contain a number of incomplete information for the supplementary data. Exclusion of these cases has brought the final sample size (N) analyzed here to 7,209.

As for the selection of question items in the analysis, a total of three selection criteria were employed in a sequence. First, only the items were selected that are commonly included throughout all five years. The KGSS questionnaires for each year, as already indicated, are constructed in a way to combine the three big clusters of questions on the basis of impending needs and requirements of the year. This means that each year's questionnaires, especially the module questions, are likely to differ from one another to a lesser or much extent. Exclusion of question items that are included only for some years is warranted, since they keep the analysis from maintaining exactly same number of cases across all items included in the study. Maintenance of the exactly same number of cases across all items is extremely important, since a slight difference in cases, if any, as will be indicated later, will not only introduce practical difficulties in obtaining the summated measure for *DK* response rates, but it will also prevent the interpretation of the meaning of the rates from becoming completely standardized and unequivocal. Second, among the items that are commonly included over all years, another selection was done in favor of those having identical wordings throughout the years. Technically speaking, the items that are worded slightly different for some years, albeit their apparent similarities in content validity and measurement, might well have to be regarded as different items. No matter how similar in wording, those items should be dropped from the analysis in order to control for some extraneous influences on *DK* that result from the wording difference. Third, out of the items that are both commonly included and identically worded all over the years, one more final selection was made for those that are not filtered at all by any previous items. Exclusion of the filtered items from the analysis is necessary, not only because the KGSS questionnaires normally contain a number of items having a filtering structure in it, but also because an inclusion of those items makes the number of cases across all items fluctuate to a considerable extent, thereby introducing difficulties to the technical calculation and substantive interpretation of *DK* rates.

Taken together, adoption and implementation of the three series of selection criteria has brought the final number of items in the analysis to forty-eight. As such, these items are ones that are commonly included across all five years, have exactly identical wordings over the years, and do not have any other previous filtering items at all. They are, of course, mostly from the replicating core part of the main data and include some of the most important socio-demographic information about the respondents (e.g., gender, age, educational attainment, income, employment, occupation, religion, household composition, voting behavior, etc.) and dozens of attitudinal measures (social trust, political orientation, class identification, socio-economic satisfaction, etc.). As indicated in the measurement below, only the items from the main data are utilized to obtain the *DK* rates, since the items from the supplementary part (i.e.,

number of elapsed days, visit number, administration technique, and incentive provisions) are introduced merely to account for *DK* rates and have nothing to do with the calculation of the rates *per se*.

Measurement

Table 1 contains descriptive statistics for the variables used in the analysis. The *DK* response rate, the outcome variable, is obtained by counting the number of *DK* responses out of the root

Table 1. Descriptive Statistics for the Variables

Variables	No. of Cases ^a	Mean	Min-Max	Std. Dev.	Skewness
DK Rates					
Total Items	7,209	1.3405	0-31	3.1449	4.851
LN [Total Items]	7,209	.4903	0-3.47	.7155	1.486
Behavioral Items	7,209	.1993	0-6	.5681	3.188
LN [Behavioral Items]	7,209	.117	0-1.95	.3144	2.558
Attitudinal Items	7,209	1.1412	0-30	2.9713	5.100
LN [Attitudinal Items]	7,209	.4131	0-3.43	.6834	1.767
Individual-Level Correlates					
Gender ^b	7,209	.546	0-1	.4979	-.185
Age	7,203 (6)	43.52	18-93	15.89	.566
Years of Schooling	7,157 (52)	11.9322	0-22	4.3829	-1.155
Employment Status ^c	7,209	N.A.	N.A.	N.A.	N.A.
Occupation ^d	7,131 (78)	N.A.	N.A.	N.A.	N.A.
Household Income ^e	6,976 (233)	304.67	0-4,250	227.75	2.442
LN [Household Income]	6,976 (233)	5.3686	0-8.35	1.0457	-1.999
Residential Area ^f	7,209	.5273	0-1	.4993	-.109
Survey-Level Correlates					
No. of Days to Complete the Interview	7,198 (11)	30.6332	1-224	30.0479	2.296
LN [No. of Days to Complete Interview]	7,198 (11)	3.0472	0-5.41	.8557	.227
No. of Visits to Complete the Interview	7,193 (16)	3.0674	1-11	2.0653	1.161
LN [No. of Visits to Complete the Interview]	7,193 (16)	.8964	0-2.4	.6817	.025
Mode of Questionnaire Administration ^g	7,207 (2)	.913	0-1	.2819	-2.931
Provision of Incentives ^h	7,207 (2)	N.A.	N.A.	N.A.	N.A.

Notes | ^a In parentheses are missing cases.

^b 0 = Male; 1 = Female.

^c Wage earners = 2,629 (36.5%); Self-Employees = 1,471 (20.4%); Unemployed = 3,109 (43.1%).

^d Managers = 656 (9.2%); Professionals = 455 (6.4%); Semi-Professionals = 846 (11.9%); Clerical = 931 (13.1%); Service/Sales = 1,280 (17.9%); Manual = 2,087 (29.3%); Never Had a Job = 876 (12.3%).

^e Monthly average total household income. The unit is 10,000 won in Korean currency, with 10,000 won throughout the five years of 2003-7 being equivalent to approximately 9.53 U.S. dollars.

^f 0 = Non-Metropolitan; 1 = Metropolitan.

^g 0 = Self-Administered; 1 = Interviewer-Administered.

^h Gift Voucher = 4,941 (68.6%); In-Kind Goods = 2,003 (27.8%); None = 263 (3.6%).

items selected for the analysis in this study. *DK* rate, as such, is a summated measure created by counting, for each case, the occurrence of *DK* responses across a list of items included in the five-year cumulated data set. As shown in the table, there are three different summated measures for *DK* rate: total, behavioral, and attitudinal. Total *DK* rate is, literally, the rate for all of the 48 items that have been selected by applying the above-indicated criteria in this study. *DK* rate for behavioral items is one for the behavioral, or factual, items among the 48 items, whereas *DK* rate for attitudinal items is one for the attitudinal, or perceptual, items among them. There are 16 behavioral and 32 attitudinal items out of the 48 items. Breaking the total items down into behavioral and attitudinal ones is intended to figure out how the pattern of zero- and higher-order relationships between the suggested correlates and *DK* rates differs for the two substantially different types of items.⁵

An inspection of the total *DK* rate shows that 59.9% of the entire cases had no *DK* responses at all in any items, with the rate constantly decreasing for each unit increase in *DK* responses. The distribution is thus skewed to the right (skewness = 4.851) with the average rate becoming 1.3405 (Table 1). Since this amount of skewness is sufficient to violate the multivariate normality assumption in estimating the relationship between each correlate and *DK* rates, all the three measures of *DK* rates were transformed by taking each of their natural logarithms. To compare the *DK* rates for behavioral and attitudinal items, behavioral items turn out to have a mean rate (.1993) substantially lower than that of attitudinal items (1.1412) ($p < .001$).⁶ The *DK* rates observed in this study are, in fact, fairly low, and, as will be discussed later, this is hardly surprising considering a few critical features of the fielding operation in the KGSS. Apparently, reliance primarily on the interviewer-administration in the face-to-face, in-depth interview setting, along with very strict guidelines and interview protocols adopted and recommended for the interviewers to follow in fielding the survey, has operated to reduce *DK* responses to the degree that is unlikely to be excelled by any other social surveys.

The measurement of the correlates in Table 1 tends to be relatively straightforward. Suffice it to mention only about occupation, however. The occupational categories are based on the International Standard Classification of Occupations 1988 (ISCO-88) (ILO 1990).⁷ Apart from

⁵ Notice that no *a priori* hypothesis is suggested in this study concerning the difference between the two types of items. This is because the literature is short of rationale and evidence sufficient to support it. This matter will thus be approached in an exploratory manner and a few *ex post factum* interpretations will be attempted subsequently.

⁶ *DK* rates for behavioral items observed in this study is lower than those for attitudinal items even after taking into account the number of items associated with each type. That is, the relative average *DK* rate, $.1993/1.1412 = .175$, is substantially lower than the proportion of behavioral items among all items ($16/48 = .333$).

⁷ The first digit of the ISCO-88 four digit codes, which consist of 390 unit groups in total, hierarchically distinguishes a total of nine major categories: (1) legislators, senior officials, and managers; (2) professionals; (3) technicians and associate professionals; (4) clerks; (5) service workers and shop and market sales workers; (6) skilled agricultural and fishery workers; (7) craft and related trades workers; (8) plant and machine operators and assemblers; (9) elementary occupations. This categorization differentiates skills acquired through education and training, rather than other differences such as industry or employment status (Ganzeboom and Treiman 1996). Categories (6) through (9) are all clearly manual occupations (ILO 1990) and are grouped together accordingly (The ANOVA results for these

the measurement of occupation, the three continuous measures of household income, number of days to complete the interview, and number of visits to complete the interview were log-transformed, too, to accommodate their skewed distributions observed in the sample.

Analysis

The relationships between the correlates and *DK* rates postulated in this study are analyzed by correlation and OLS regression analyses. The bivariate analysis of correlation is to assess the zero-order relationships between each correlate and *DK* rates, while the multivariate analysis of OLS regressions is to estimate the impacts of each correlate on *DK* rates after controlling for the other correlates in the equation.

A few notes need to be made with respect to the method of data analysis in this study. First, the binominal logistic regression is not appropriate, since the primary focus of this study is not simply on estimating the binary result of occurrence or non-occurrence of *DK* response events but on estimating the continuous outcome of various degrees of such responses. Various degrees of such responses are log-transformed, of course, in order to cope with the skewed distribution. Second, recalling that some of the correlates are unlikely to be orthogonal in estimating their impacts on *DK* rates, the statistical assumption of multicollinearity was tested by the eigenvalue decomposition method (Gunst 1983). The result indicated that the smallest eigenvalue exceeded .05, a conventionally accepted criterion to determine the symptom, thereby suggesting no severe problem of multicollinearity. Another evidence on the symptom is also available in the correlations among the correlates (Table 2), which suggests that no correlation tends to be excessive. Third, this study will refrain from putting much emphasis on the statistical significance in testing for the postulated relationships, since the number of cases (listwise deleted $N = 6,839$) is too large to assign a critical importance to statistical tests. With such a large number of cases, a lot of relationships are likely to attain the statistical significance. An alternative attention will thus be paid, as much as possible, to the substantive, apart from statistical, associations observed from the results of analysis.

RESULTS

Before delving directly into the results concerning the relationships between the correlates and *DK* rates, a brief description is required for some of the most important descriptive statistics of the correlates. As shown in Table 1, the breakdown of the entire cases in terms of individual-level correlates indicates: 54.6% are female; they are in their 20s (18.3%), 30s (25.1%), 40s

four manual categories indicated no significant mean differences in *DK* rates). The remaining categories are all distinct occupational categories and each of them is retained as it is.

(23.5%), 50s (12.2%), or 60s and over (18.6%), with the average age of 43.52; most of them are either high-school (30.4%) or college (45.6%) graduates, with the average schooling years of 11.93; they are employed as wage earners (36.5%), self-employees (20.4%), or unemployed (43.1%); they have occupations of managers (9.2%), professionals (6.4%), semi-professionals (11.9%), clerical (13.1%), service/sales (17.9%), manual (29.3%), or never had a job previously (12.3%); their monthly household income, on average, is 3,047,700 won; about half of them (52.7%) are residing in metropolitan areas. As for the distribution of survey-level correlates: the average number of days taken to complete the interview is 30.63, with most of them (90.3%) being completed within the designated fieldwork period of ten weeks; the average number of visits required to complete the interview is 3.07, with the visit numbers distributed relatively evenly for the 1st (28.1%), 2nd (20.9%), 3rd (17.0%), 4th (12.4%), and 5th or more (21.6%); a substantial proportion of the completed interviews (91.3%) are administered by the interviewers with only a small remainder (8.7%) administered either entirely or partially by the respondents; the kind of incentives provided to the respondents is mostly the gift voucher (68.6%), followed by in-kind goods (27.8%) and no provision (3.6%).

Table 1 further indicates that some correlates contain more *DK* responses than others. Particularly noteworthy is the relatively high number of *DK*'s for years of schooling (52), occupation (78), and household income (233). This finding is not surprising at all, given that some respondents would really feel reluctant to provide the interviewers with these sorts of relatively private and confidential information, even in spite of the strict fielding protocols delivered to the interviewers to minimize the *DK* responses to any sort of items as much as possible.

Turning now to the major focus of this study, results of correlation analysis are presented in Table 2. To focus on the inter-correlation between behavioral and attitudinal measures of *DK* rates, first of all, they are only weakly, or moderately at best, correlated with each other ($r = .20, p < .001$). This finding is interesting since it suggests that *DK* responses to behavioral items do not necessarily bring about such responses to attitudinal items, or vice versa. To focus on correlations for the individual-level correlates, next, those respondents who show consistently higher levels of *DK* rates, regardless of the type of question items, are females, aged, less educated, unemployed, those who have manual jobs and who never had a job previously, and who are residing in non-metropolitan areas. Obviously, all these correlations, without any exception, are consistent with the predictions made earlier in this study. Unlike the case for individual-level correlates, however, correlations for survey-level correlates tend to be somewhat inconsistent for behavioral and attitudinal items. Of particular interest in this respect are the number of days to complete the interview and the mode of administration: the longer days taken to complete the interview resulted in lower *DK* rates for behavioral items, but higher rates for attitudinal items; interviewer-administration brought up higher *DK* rates for behavioral items, but lower rates for attitudinal items. The remaining two survey-level

correlates, however, show consistent correlations: the more frequent visits required to complete the interview produced lower *DK* rates for both types of items; provision of gift vouchers as the incentives ended up with lower rates, whereas provision of in-kind goods ended with higher rates for both types. One more observation that could be made in comparing the correlations for behavioral and attitudinal items is that the magnitude of correlations tend to be bigger, in general, for attitudinal than behavioral items, often irrespective to the level of correlates.

Taken together, the results of correlation analysis exhibit four major findings: (1) *DK* rates for behavioral items have only a weak, or moderate at best, correlation with those for attitudinal items; (2) the directions each individual- and survey-level correlate is related to *DK* rates are pretty much consistent with the predictions in this study; (3) insofar as the individual-level correlates are concerned, the directions are consistently same for both behavioral and attitudinal items; in case of the survey-level correlates, however, the directions tend to be inconsistent and fluctuate for the two types of items; (4) the magnitude of correlations tend to be substantially bigger for attitudinal than behavioral items.

The bivariate correlations are likely to be spurious since they represent not so much a unique net effect of a correlate on *DK* rates as a total association between the two without controlling for the other correlates in the equation. In order to find out non-spurious relationships, a multivariate analysis is required, and the results of OLS regressions are presented in Table 3. When the summated *DK* rates for total items are regressed on the suggested correlates, first, significant correlates were gender, age, years of schooling, employment status, occupation, household income, residential area, number of days to complete the interview, number of visits to complete the interview, and mode of administration. Specifically, higher level of logged *DK* rates for total items was found among females, aged, less educated, unemployed, those who have never had a job, who have lower income, who live in non-metropolitan areas, when the interview has been completed after longer days, when fewer visits have been made to complete the interview, and when the questionnaires were administered by the respondents themselves. To compare the relative importance of the significant correlates, years of schooling ($B = -.322$) has by far the most prominent impact, followed by household income ($B = -.127$), and mode of administration ($B = -.100$). Taken together, the correlates included in the model help to account for 23.9% of the variance in logged *DK* rates for total items.

With respect to *DK* rates for behavioral items, second, fewer correlates retain the statistical significance. To be precise, higher level of logged *DK* rates are observed among females, aged, less educated, wage earners, those who have lower income, who reside in metropolitan areas, and when fewer days were taken to complete the interview (Table 3). Note that the directions of impacts have been reversed for some correlates, such as employment status, residential area, and number of days taken to complete the interview, between the total and behavioral items of *DK* rates. Similar to the results for *DK* rates for total items, years of schooling ($B = -.186$)

Table 3. OLS Regression Estimates for the *DK* Rates (N = 6,839)

	DV = LN [<i>DK</i> Rates for <i>Total</i> Items]		DV = LN [<i>DK</i> Rates for <i>Behavioral</i> Items]		DV = LN [<i>DK</i> Rates for <i>Attitudinal</i> Items]	
	b	B	b	B	b	B
Individual-Level Correlates						
Female	.135***	.097	.022**	.041	.124***	.092
Age	.003***	.076	.001***	.054	.003***	.066
Years of Schooling	-.051***	-.322	-.011***	-.186	-.047***	-.302
Wage Earners ^a	.024	.016	.023**	.042	.005	.003
Self-Employees ^a	-.062**	-.036	.003	.004	-.066**	-.040
Managers ^b	-.050	-.021	-.002	-.002	-.047	-.021
Professionals ^b	-.009	-.003	-.005	-.005	.006	.002
Semi-Professionals ^b	-.038	-.018	-.012	-.015	-.023	-.011
Clerical ^b	-.096**	-.047	-.017	-.021	-.086**	-.043
Service/Sales ^b	-.067*	-.037	.013	.018	-.080**	-.046
Manual ^b	-.071*	-.047	.013	.023	-.084**	-.057
LN [Household Income]	-.085***	-.127	-.013***	-.051	-.081***	-.125
Metropolitan Area	-.055***	-.040	.020**	.037	-.073***	-.055
Survey-Level Correlates						
LN [No. of Days to Complete Interview]	.047***	.058	-.009*	-.027	.054***	.068
LN [No. of Visits to Complete Interview]	-.038***	-.038	.005	.013	-.041***	-.042
Interviewer-Administered	-.250***	-.100	.001	.001	-.256***	-.106
Gift Voucher ^c	-.037	-.024	-.004	-.006	-.042	-.029
In-Kind Goods ^c	.028	.018	-.013	-.022	.035	.023
Constants	1.531***		.242***		1.434***	
<i>R</i> ² (Adj. <i>R</i> ²)	.239 (.237)		.074 (.072)		.218 (.216)	

Notes | ^a Omitted is Unemployed.

^b Omitted is Never Had a Job.

^c Omitted is No Incentives.

* $p < .05$, two-tailed test. ** $p < .01$, two-tailed test. *** $p < .001$, two-tailed test.

retains the strongest impact on logged *DK* rates for behavioral items. Unlike the case for total items, however, the correlates altogether explain much smaller proportion (7.4%) of the variance in logged *DK* rates for behavioral items.

As for the *DK* rates for attitudinal items, lastly, higher level of logged *DK* rates are observed among females, aged, less educated, unemployed, those who have never had a job, who have lower income, who live in non-metropolitan areas, when longer days were taken to complete the interview, when fewer visits have been made to complete the interview, and when the questionnaires were self-administered. In general, these results are pretty much consistent with those about the total items. That is, comparison between the results for total and attitudinal items indicates some similar findings: exactly same correlates turn out to be

significant; the most salient correlates include the same list of variables (years of schooling, household income, and mode of administration); the correlates, as a whole, serve to explain the amount of variance in logged *DK* rates for attitudinal items (21.8%) that almost reaches to one for total items (23.9%).

To summarize the results from the OLS regression analysis, several findings are noteworthy. (1) In general, the results tend to be similar to those of correlation analysis in terms of significant correlates, directions of relationships, confirmation to initial predictions, and the like. (2) Overall, the results tend to be similar between total items and attitudinal items, but they tend to be somewhat different between behavioral and attitudinal items. (3) The most salient correlates include educational attainment, household income, and administration technique, especially for total and attitudinal items. (4) In general, individual-level correlates turn out to be better predictors of *DK* rates than survey-level correlates. (5) The correlates specified in the equation account for some moderate amount of variance in total (23.9%) and attitudinal (21.8%) items, but much smaller amount in behavioral (7.4%) items. (6) Some correlates (i.e., employment status, residential area, and number of days taken to complete the interview) turn out to have conflicting, or sign-flipping, impacts on *DK* rates for behavioral and attitudinal items, respectively. Substantive interpretations and discussions on these will follow now.

DISCUSSION AND CONCLUSIONS

This study was prompted by the rather simple research question that item non-response, or *DK* shortly, in survey research, as one of the most important criteria for quality data, should be related with a few characteristics of the respondents and survey settings. An extensive review of methods literature suggested several correlates of individual- and survey-level characteristics. The associations postulated between *DK* and each correlate were then put to a scrutinized statistical analysis by using the cumulative, five-year rounds (2003-7) data sets of the KGSS. The results of correlation and OLS regression analyses tended to confirm most of the predictions made earlier in this study.

Interpretations of the findings and discussion of the implications stemming from them, however, do not look as simple as the initial research question. Since the findings tend to be complicated with a dozen of correlates behaving in different ways, interpretations and discussion needs to be done by focusing on the suggested correlates altogether on an aggregate level instead of dealing with them individually. A conclusion running through the discussions will then follow at the end.

First, it should be emphasized that *DK* responses are indeed a function of the two overarching, respondent-level, meta-components of cognitive comprehension and normative

obligation. To be precise, respondents who are less sophisticated cognitively are more likely to answer *DK*, and those who fail to feel socially obliged to provide substantive responses are more likely to do so. This tendency was, in fact, confirmed by the findings that higher *DK* rates, irrespective to the type of question items, and also often irrespective to the introduction of controls for the other correlates in the estimation, have been observed among the females, aged, less educated, unemployed, those who have never had a job previously, and who have lower income. Perhaps, these respondents might be giving *DK* responses due to the intimate empirical association among their own socio-demographic characteristics: they are females, older, less educated, do not have a job, and have lower income at the same time. In addition, each of these characteristics, as indicated already, might be representing some amount of both cognitive and normative components simultaneously. For instance, females are more prone to answer *DK* than their male counterparts due either to their lower level of cognitive sophistication or to their socialization experience of refraining from expressing their opinions more explicitly.

Regardless of the degree of inter-relationship and the relative weight between the two components, it might still be said that those who are less familiar with survey topics, or less competent to comprehend survey questions, and who are less motivated or socialized to respond to survey questions (i.e., female, older, less educated, unemployed, and lower incomer) give off more *DK* responses, whereas those who are more familiar with or able to understand such topics or questions and who are more motivated or socialized to react to such questions (i.e., male, younger, educated, employed, and higher incomer) give fewer *DK* responses. The finding, as such, is consistent with a number of studies conducted in the U.S. (Francis and Busch 1975; Smith 1984; Rapoport 1985; Krosnick and Milburn 1990; Young 2001) and provides a case to suggest that the demographic groupings of people who answer *DK* in Korea tend to be basically similar to those in the U.S., thereby supporting for the cross-cultural generality of the existing studies.

Second, not only are *DK* responses a function of respondent-level components or characteristics, they are also a function of survey characteristics. Of particular interest in this respect are some of the most important interview characteristics in the course of fielding, such as number of days taken to complete the interview, number of visits required to complete the interview, and administration technique. Specifically, higher *DK* rates throughout the entire items were observed when longer days are elapsed to complete the interview after an onset of the survey, when fewer visits are made to complete the interview, and when questionnaires are administered by the respondents themselves instead of interviewers.

Apparently, the results concerning the number of days and number of visits require special attention. Interestingly enough, it turned out that longer days ended up with more *DK*'s and multiple visits ended up with less *DK*'s. Recall that this study tried to refrain from *a priori* hypothesizing about the direction of relationships for these correlates due to the lack of support

in the literature, and opted instead to approach the matter on a sheer empirical or *ex post factum* manner. Also recall that longer days and multiple visits, albeit their conceptual and logical distinctiveness, were expected to be subject to either of the two similar driving forces, respondent motivation and accessibility to the respondent. The results, then, suggest that the longer days (and the resultant more *DK*'s) is more likely to be a reflection of the lack of motivation on the part of the respondents rather than the difficulties in accessing them, whereas multiple visits (and the resultant less *DK*'s) is more likely to be a reflection of the accessibility, rather than motivation, problem. To extrapolate, when the interviewer has to try a given interview case for a longer period of time, he or she might have been facing an ill-motivated or recalcitrant, if not inaccessible, respondent, who is not sincere or serious enough to provide all substantive answers. When the same interviewer has to make a series of successive visits for a given case, however, he or she might have been facing a situation in which the respondent cannot be easily accessed during the designated fielding period since the person could have been busy with its own socio-economic activities or something similar to it. Although one cannot rule out the possibility that this interpretation is misplaced or misleading on account of the fact that forces or factors other than the motivation and accessibility might well be operating, too, in the fielding, one can still provide some merit to the interpretation granted that interview protocols of the KGSS in each year round always urge the interviewers to adhere to very stringent guidelines and procedures in the process of fielding, including the completion deadline and visit numbers, which operates to reduce the possibly uncontrolled extraneous factors related to the interviewers themselves to a considerable extent. Whether the interpretation is right or wrong, it is interesting to find that, insofar as this study is concerned, longer days and multiple visits produce conflicting outcomes in *DK* responses.

With respect to one more survey-correlate of administration technique that turned out to be prominent, this study serves to confirm previous studies (Sudman and Bradburn 1982; Bishop et al. 1988; Groves, Dillman, Eltinge, and Little 2002) by demonstrating that interviewer-administered surveys generate fewer *DK* responses than self-administered ones. Recalling that the KGSS questionnaires normally contain a substantial number of complicated question items taking up approximately 50 minutes of an intensive interviewing time, the administration technique becomes a critical concern. What is most important is to draw the attention of the respondents as much as possible during the interviews in such a way to make them understand all items appropriately, prevent them from providing misleading or inappropriate answers, and become fully motivated to answer all questions with a minimum number of *DK* responses. It is not surprising, then, to find that this kind of survey, when filled out instantaneously by the interviewer on the spot in a face-to-face situation, ends up with an enhanced completeness of the responses. When the same survey is allowed to be filled out by the respondent alone at some later point in time, however, the response completeness tends to suffer due either to the inability to probe or clarify the questions or to the lack of motivation of the respondent to

provide all substantive answers. This is even the case when self-administration is allowed, as indicated, in the KGSS only under a few very stringent conditions. Therefore, the finding in this study suggests a case to argue that the questionnaires lengthy and abundant with a lot of complicated items, when allowed to be administered by the respondent, are highly likely to result in a substantial number of non-substantive and unusable answers.

Third, comparison of the performance between respondent and survey characteristics indicates that, irrespective to the type of question items (behavioral vs. attitudinal), the former is more salient correlates than the latter. This was shown by the finding that, when compared to survey-level correlates, individual-level correlates, on average, turned out to possess stronger impact coefficients (B 's in Table 3), even after taking into account the total number of correlates associated with each. Particularly salient among them are the three respondent characteristics of educational attainment ($B = -.322$), household income ($B = -.127$), and gender ($B = .097$), coupled with the survey characteristic of administration technique ($B = -.100$). The importance of the three individual-level correlates, as critical proxies for respondent's cognitive ability and normative propensity, has been well documented in past researches. Presumably, it is not quite certain to figure out if the result in this study is due to the better and worse specifications in equation models for individual- and survey-level correlates, respectively. Nor can an equivalent comparison be made between this result with other studies due to the unavailability of such studies. Nevertheless, insofar as this study is concerned, it might be said that individual-level correlates are better performers than survey-level correlates, and that further attempts need to be made to overcome the potential misspecification problem by identifying better or stronger correlates for survey characteristics.

Fourth, it is worthwhile to note that the two types of items, behavioral and attitudinal, do indeed behave differently as they relate to *DK* responses and suggested correlates. A detailed comparison exhibited several noticeable differences: behavioral items contain substantially lower *DK* rates than attitudinal items; the two types of items are only weakly correlated; the extent to which correlates, on average, are correlated with *DK* is far stronger for attitudinal than behavioral items; overall results for total items are more similar to those for attitudinal than for behavioral items; some correlates, such as employment status, residential area, and number of days taken to complete the interview, turn out to have conflicting signs of impacts on behavioral and attitudinal items, respectively. Recall that this study refrained from postulating any *a priori* hypotheses concerning the difference between the two types of items due to the lack of support in the literature and, instead, wanted to explore the matter and try, if any, some afterwards interpretations. Apparently, this study is full of evidence that provides support for the attempt to demarcate the two types of items rather sharply.

What attracts the most attention in this regard would be the two interrelated, but substantially different, observations. On the one hand, respondents, in general, tend to feel free to disclose some of the factual or behavioral things about themselves (i.e., socio-demographic

information, voting behavior, etc.), while they feel more burdensome in expressing their own opinions on some issues (i.e., socio-economic or political orientation, identification, etc.). On the other hand, however, the extent to which the respondents feel free or burdensome to express facts or opinions of their own does vary by some of the individual, as well as survey, characteristics. That is to say, the unemployed and rural residents experience more difficulties in expressing their own opinions on some social issues as compared to the employed and urban residents, whereas the latter are more reluctant to reveal some factual information about themselves as compared to the former. Not surprisingly, this interesting observation might be aptly attributed, in part, to the meta-components of cognitive comprehension and normative propensity indicated above and, in part, to the inherently confidential orientation of the cognitively sophisticated and normatively motivated people. To reiterate, the unemployed and rural residents are more likely to provide non-substantive answers to attitudinal questions since they tend to be less knowledgeable or sophisticated cognitively and less obliged socially to provide such answers, while they are more likely to provide substantive answers to behavioral questions since they tend to be less sensitive to release some of the factual information about themselves. In sharp contrast to them, however, the employed and urban residents are less likely to provide non-substantive answers to attitudinal questions due to their cognitive sophistication and normatively propensity, while they are less likely to provide substantive answers to behavioral questions due to their inherent sensitivity to disclose factual information about themselves. In a similar vein, the finding that longer days taken to complete the interview results in higher *DK*'s for attitudinal items and lower *DK*'s for behavioral items suggests the possibility that the motivation factor, rather than accessibility factor, might have been working, which is so typical to those who are less sophisticated cognitively and less obliged socially that they frequently end up with more number of non-substantive responses to attitudinal questions and less number of such responses to behavioral questions at the same time.

Taken together, this study provides a case to suggest that not merely are behavioral and attitudinal items fairly distinct questions themselves with differential number of *DK* responses, they are distinct outcome variables, too, possessing different and, often sign-flipping, predictor variables associated with each. At the minimum, it could be argued that behavioral items tend to work differently from attitudinal items and the former is under the explanatory mechanism different from the latter. Further, considering that the amount of variance the correlates altogether help to account for in *DK*'s for behavioral items is merely one-third (.074/.218) of the variance for attitudinal items, an extra effort might have to be made to find out some better and more powerful correlates, besides those specified in this study, for behavioral items.

To conclude, finally, the findings in this study appear to have a few important methodological implications for survey research. Recalling that this study was aimed at addressing the question of how *DK* responses vary by respondent and survey characteristics

and what accounts for the variation, and that an analysis of data could indeed identify several prominent characteristics or correlates, a careful interpretation of the findings can help to guide survey methodologists to a better understanding of the mechanism leading to *DK* responses, on the one hand, and to a proper development of some practical strategies to maximize survey responses, on the other. To begin with the academic implication, the finding that *DK* responses are non-random phenomenon varying systematically by several characteristics of the respondents and survey setting does imply that the respondents are indeed offering such responses for some obvious reasons, notably the cognitive sophistication and normative propensity. Since this kind of understanding helps to figure out the demographic or social grouping of people who are prone to give off *DK* responses, it is, in effect, adding and expanding an important knowledge to our grasp of the mechanism underlying *DK* responses by means of confirming the soundness of the reasoning or rationale behind the postulated relationships. Albeit this implication, however, it should be admitted that we are still left with the pending causal reasoning underlying the detailed social and cognitive dynamics leading to *DK* responses. This is because, as indicated earlier, such reasoning is not so well documented in the methods literature and relatively little is known as to the “why” question. Notice that this was exactly the reason why the characteristics suggested in this study have been opted to be called correlates instead of predictors.

What is more meaningful than the academic implication would probably be a few practical implications stemming from the findings. The significance of practical over academic implication is hardly surprising recalling that studies in this area are normally propelled by some practitioner interest in controlling for missing data. Ideally, practical implications should be far-fetching throughout the entire stage or process of survey research, including sampling, questionnaire construction, fieldwork, and data processing. Since the main focus of this study centers on the fielding stage, however, several intervention strategies to minimize *DK* responses have to be limited to the fieldwork. First of all, survey administrators and researchers might have to normatively motivate respondents by stressing the importance of the survey. Although this looks too obvious, it is still enormously important because a large proportion of *DK* responses is indeed an outcome of motivation on the part of the respondent. What is most critical in this respect would be to develop well devised standardized interview protocols that make respondents really feel motivated and obligated to cooperate with the survey. Second, granted that *DK* responses are found to be a function of the two meta-components of cognitive sophistication and normative propensity, some prudent surveying strategies targeted mainly for the respondents who lack such components—i.e., female, older, less educated, unemployed, low incomer, and rural resident—had better be developed. These people tend to be pretty inactive socio-economically and, despite their stronger will to participate in the survey, they actually undergo a lot of difficulties in offering all substantive answers to all questions. Perhaps, more amounts of interviewer attention, interview time, clarification, probing, and the

like would result in better results for them. Third, what is important for the respondents who possess the two meta-components—i.e., male, younger, educated, employed, middle- to high-incomer, and urban resident—would be to develop strategies to make them more easily accessible and actually concede to the survey request. As a socio-economically active populace, concern for them is not reducing *DK* responses but accessing them in an appropriate time and place. Preparation of deliberate protocols, notably repeated call-backs in different times and places, looks necessary to enhance their accessibility and actual participation.

Taken together, the methodological implications illustrated here are all targeted to the question of how to minimize item non-responses and maximize substantive responses in survey research and thereby obtain the quality data. It is believed that the virtue, if any, of this study should be sought not in its methodological rigor or soundness but, instead, in its first full-fledged, comprehensive attempt in Korea. As pointed out earlier, not a single study like this has yet been conducted in Korea, and we are consequently left with methodological voids from both domestic and cross-cultural perspectives. No argument is made, however, that this study is fully generalizable beyond the KGSS, a survey framework that contains several features unique to it. Although some evidence was readily available in this study that exhibited the cross-cultural generality of the correlates of *DK* responses in Korea, an appropriate answer to the specificity or generality of the findings in this study cannot be provided until a cross-cultural comparative study has been conducted. Therefore, further studies are strongly encouraged in order to overcome the possible sample-specificity and promote the generalizability of research findings in this area.

REFERENCES

- Anderson, A. B., A. Balilevsky, and D. P. Hum. 1983. "Missing Data." in *Handbook of Survey Research*. Edited by P. Rossi et al. NY: Academic Press.
- Biemer, P. P. and L. E. Lyberg. 2003. *Introduction to Survey Quality*. NY: Wiley.
- Bishop, G., H. Hippler, N. Schwarz, and F. Strack. 1988. "A Comparison of Response Effects in Self-Administered and Telephone Surveys." Pp. 321-40 in Groves et al. (eds.). *Telephone Survey Methodology*. NY: Wiley.
- Converse, J. M. 1977. "Predicting No Opinion in the Polls." *Public Opinion Quarterly* 30: 515-30.
- _____. 1987. *Survey Research in the United States*. Berkeley, CA: Univ. of California Press.
- Coombs, C. H. and L. C. Coombs. 1977. "'Don't Know': Item Ambiguity or Respondent Uncertainty." *Public Opinion Quarterly* 40: 497-514.
- Davis, J. A. and T. W. Smith. 1996. *General Social Surveys, 1972-1996: Cumulative Codebook*. Chicago, IL: The Roper Center for Public Opinion Research.
- Falkenberry, G. D. and R. Mason. 1978. "Characteristics of Nonopinion and No Opinion Response Groups." *Public Opinion Quarterly* 42: 533-43.
- Feick, L. F. 1989. "Latent Class Analysis of Survey Questions that Include Don't Know Response." *Public Opinion Quarterly* 53: 525-47.
- Ferber, R. 1966. "Item Nonresponse in a Consumer." *Public Opinion Quarterly* 30: 399-415.
- Francis, J. and L. Busch. 1975. "What We Don't Know about 'I Don't Know'." *Public Opinion Quarterly* 39: 207-18.
- Ganzeboom, H. B. G. and D. J. Treiman. 1996. "Internationally Comparable Measures of Occupational Status for the 1988 International Standard Classification of Occupations." *Social Science Research* 25: 201-39.
- Gergen, K. J. and K. W. Back. 1966. "Communication in the Interview and the Disengaged Respondent." *Public Opinion Quarterly* 30: 17-33.
- Glenn, N. G. 1969. "Aging, Disengagement, and Opinionation." *Public Opinion Quarterly* 33: 17-33.
- Groves, R. M. 2004. *Survey Errors and Survey Costs*. 2nd Edition. NY: Wiley.
- Groves, R. M. and M. P. Couper. 1988. *Nonresponse in Household Interview Surveys*. NY: Wiley.
- Groves, R. M., D. Dillman, J. Eltinge, and R. Little (eds.). 2002. *Survey Nonresponse*. NY: Wiley.
- Groves, R. M., F. J. Fowler, Jr., M. P. Couper, J. M. Lepkowski, E. Singer, and R. Tourangeau. 2004. *Survey Methodology*. Hoboken, NY: Wiley.
- Gunst, R. F. 1983. "Regression Analysis with Multicollinear Predictor Variables: Definition, Detection, and Effects." *Communications in Statistics: Theory and Methods* 12: 2217-60.
- International Labor Organization [ILO]. 1990. *International Standard Classification of Occupations: ISCO-88*. Geneva.
- Kim, S. W. 2004. "A Comparison of the Characteristics of General Social Surveys in East Asia." *Sungkyun Journal of East Asian Studies* 4(2): 137-54.
- Kim, S. W., C. Y. Koh, S. H. Kim, S. I. Kim, B. J. Park, J. H. Yang, S. S. Chang, S. B. Choe, and N. C. Han. 2009. *Hanguk chonghap sahoe chosa 2008* (Korean General Social Survey 2008). Seoul: Sungkyunkwan Univ. Press.

- Krosnick, J. A. 1999. "The Causes and Consequences of No-Opinion Responses in Surveys." Paper Presented at the International Conference on Survey Nonresponse. Portland, OR, Oct. 28-31.
- Krosnick, J. A. and L. R. Fabriger. 1997. "Designing Rating Scales for Effective Measurement in Surveys." Pp. 141-164 in Lyberg et al. (eds.). *Survey Measurement and Process Quality*. NY: Wiley.
- Krosnick, J. A. and M. A. Milburn. 1990. "Psychological Determinants of Political Opinionation." *Social Cognition* 8(1): 49-72.
- Lesser, J. T. and W. D. Kalsbeek. 1992. "Nonsampling Error in Surveys." in Lyberg et al. (eds.), *Survey Measurement and Process Quality*. NY: Wiley.
- Little, J. A. R. and B. E. Rubin. 1987. *Statistical Analysis with Missing Data*. NY: Wiley.
- Lyberg, J. and D. Kasprzyk. 1997. "Some Aspects of Post-Survey Processing." in Lyberg et al. (eds.), *Survey Measurement and Process Quality*. NY: Wiley.
- Madow, W. G. and I. Olkin (eds.). 1983. *Incomplete Data in Sample Surveys*. Vol. 3, Proceedings of the Symposium. NY: Academic Press.
- Mathiowetz, N. A. 1998. "Respondent Expression of Uncertainty: Data Source for Imputation." *Public Opinion Quarterly* 62(2): 47-56.
- Moser, C. A. and G. Kalton. 1971. *Survey Methods in Social Investigation*. London: Heinemann Educational Books.
- Narayan, S. and J. A. Krosnick. 1996. "Education Moderates Some Response Effects in Attitude Measurement." *Public Opinion Quarterly* 60: 86-96.
- O'Murcheartaigh, C., J. A. Krosnick, and A. Helic. 1999. "Middle Alternatives, Acquiescence, and the Quality of Questionnaire Data." Paper Presented at the 1999 AAPOR Meetings, St. Petersburg, FL.
- Rapoport, R. B. 1982. "Sex Differences in Attitude Expression: A Generational Explanation." *Public Opinion Quarterly* 46: 86-96.
- _____. 1985. "Like Mother, Like Daughter: Intergenerational Transmission of DK Response Rates." *Public Opinion Quarterly* 49: 198-208.
- Schuman, H. and S. Presser. 1981. *Questions and Answers in Attitude Surveys: Experiments on Question Form, Wording, and Context*. Thousand Oaks, CA: Sage.
- Smith, T. W. 1981. "Educated Don't Know's: An Analysis of the Relationship between Education and Item Nonresponse." *Political Methodology*: 47-57.
- _____. 1983. "The Hidden 25 Percent: An Analysis of Nonresponse on the 1980 General Social Survey." *Public Opinion Quarterly* 47: 386-404.
- _____. 1984. "Nonattitudes: A Review and Examination." Pp. 215-255 in C. F. Turner and E. Martin (eds.), *Surveying Subjective Phenomena 2*: 215-55.
- Sudman, S. and N. M. Bradburn. 1974. *Response Effects in Surveys*. Chicago, IL: Aldine.
- _____. 1982. *Asking Questions: A Practical Guide to Questionnaire Design*. San Francisco, CA: Jossey-Bass.
- Sudman, S., N. M. Bradburn, and N. Schwarz. 1996. *Thinking about Answers*. San Francisco, CA: Jossey-Bass.
- Young, C. A. 2001. "Explaining Why Survey Respondents Answer 'I Don't Know': An Analysis of Missing Data and Data Quality on the General Social Survey." Unpublished Ph.D. Dissertation, Department of Sociology, University of Chicago.