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# Response Burden – Review and Conceptual Framework

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Concerns about the burden that surveys place on respondents have a long history in the survey field. This article reviews existing conceptualizations and measurements of response burden in the survey literature. Instead of conceptualizing response burden as a one-time overall outcome, we expand the conceptual framework of response burden by positing response burden as reflecting a continuous evaluation of the requirements imposed on respondents throughout the survey process. We specifically distinguish response burden at three time points: initial burden at the time of the survey request, cumulative burden that respondents experience after starting the interview, and continuous burden for those asked to participate in a later round of interviews in a longitudinal setting. At each time point, survey and question features affect response burden. In addition, respondent characteristics can affect response burden directly, or they can moderate or mediate the relationship between survey and question characteristics and the end perception of burden. Our conceptual framework reflects the dynamic and complex interactive nature of response burden at different time points over the course of a survey. We show how this framework can be used to explain conflicting empirical findings and guide methodological research.

*Key words:* Response burden; initial burden; cumulative burden; continuous burden.

## 1. Introduction

Concerns about the burden that surveys place on respondents have a long history in the survey field. As early as the 1920s, survey researchers and organizations were warned that lengthy interviews would impose excessive burden for respondents (Chapin 1920; Sharp and Frankel 1983). In one of the most influential papers on burden, Bradburn (1977, 49) stated that "the topic of respondent burden is not a neat, clearly defined topic about which there is an abundance of literature". More than four decades later, falling response rates and the establishment of regulations to reduce the time and effort required of respondents to government surveys have contributed to a growing empirical literature on this topic. However, the term "burden" is loosely defined and it is conceptualized and measured in various ways.

As a matter of fact, burden is used as a blanket term throughout the literature referring to both actual or objective burden and subjective or perceived burden. Researchers in the last four decades have used burden (e.g., Groves et al. 1999), respondent burden (e.g., Bradburn 1977), response burden (e.g., Filion 1981), perceived burden (e.g., Hedlin et al. 2008) and reporting burden (e.g., Eurostat 2011) in their work.

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While these terms are sometimes used interchangeably, researchers vary in the extent to which they use these terms to refer to actual burden imposed on respondents (e.g., the number of pages in a mail questionnaire) or perceived burden felt by respondents (e.g., the feeling of burdened out). In this article, we define response burden as negative feelings or hardships experienced by survey respondents (Graf 2008; Frankel 1980; Sharp and Frankel 1983). It is subjective burden perceived by respondents. The focus of the article is on factors contributing to, mediating, or moderating subjective burden. Actual or objective burden will be discussed as a cause of subjective burden.

To guide future research on response burden, this article has two goals. First, we review the many ways response burden or components of response burden have been conceptualized and summarize the state of the literature on the measurement of response burden for household surveys. (For business surveys, we refer readers to the Total Business Survey Burden Model described in Haraldsen et al. 2013.) Second, we propose a dynamic conceptual framework of response burden that builds on earlier conceptual frameworks and consolidates and synthesizes empirical research on response burden. Our conceptual framework allows survey researchers to have a comprehensive understanding of factors contributing to survey respondents' perception of response burden as well as the consequences of response burden through a survey fielding cycle. The conceptual framework we propose is an important contribution, providing a foundation for planning and designing future research around a topic that has thus far eluded a clear conceptualization. With this framework, we provide survey researchers a tool for identifying gaps in the existing literature to guide new research designs. Survey practitioners, on the other hand, can use the framework to inform the design of their survey protocols to identify and reduce response burden.

## 2. A Review of Conceptualization of Response Burden

As one of the earliest conceptualizers of response burden, Bradburn envisioned burden as the product of "an interaction between the nature of the task and the way in which it is perceived by the respondent" (Bradburn 1977, 49). Although he used the term "respondent burden" in his article, his conceptualization of burden is the same as our definition of response burden. Bradburn identified four factors influencing response burden: interview length, the effort required of respondents, the frequency of interviewing, and the amount of stress on respondents. The first three factors are objective burden whereas the fourth one is subjective burden. Bradburn concluded with his conceptualization that response burden is largely mediated by the importance (to the respondent) of the survey data, implying a simplified conceptualization of burden. That is, if only we can convey the importance of the survey, respondents will willingly accept greater burden.

Haraldsen (2004) outlines a model where the subjective perception of burden is shown as a mediating variable explaining the relationship between the various causes of survey burden and data quality (Figure 2). Causes of response burden are further divided into survey properties reflecting objective burden and respondent characteristics (Figure 3). Haraldsen (2004) then expanded the model to serve as a toolbox to decompose and test burden properties of Internet business surveys (Figure 4) and presented qualitative test results to shed light on survey properties and their impact on data quality. However, these

tests were unable to shed light on the interaction between the survey properties and respondent characteristics.

Read (2019) proposes seven factors contributing to response burden: length, effort, emotional stress, frequency, availability/opportunity, ability/competence, and motivation/interest. The seven factors are a combination of objective burden, subjective burden and moderators of burden. In addition, Read (2019) makes a distinction between discrete burden and cumulative burden in the setting of an app use study. Discrete objective burden is the amount of actual burden placed by each individual task whereas cumulative burden is the sum of discrete objective burden across all tasks. Similarly, discrete subjective burden is the respondents' perception of burden for each task or for the same task at a different time point. Cumulative subjective burden refers to the trend of discrete burden over a period of time. Using data from an app use study, he then empirically examined the relationship between objective burden and subjective burden. He found that measures of objective burden (that is, the number of app uses completed, total time spent completing these app uses, average time per app use, and the durations of each app use) are not closely related to measures of subjective burden (likelihood of participation, time/effort well spent, interest in the survey, and perceived difficulty of the survey). Furthermore, there was no consistent change in subjective burden throughout the four weeks of data collection, failing to support his definition of cumulative subjective burden and calling for an updated framework.

Yan et al. (2020) combined Bradburn's and Haraldsen's work and posited a path model in an attempt to quantify the joint impact of survey properties and respondent characteristics on respondents' perception of response burden. They are the first to present empirical results for their conceptual model. They showed, through observational data, that low motivation, difficult tasks, challenging survey effort, and negative perceptions of the survey all contribute to the perception of response burden. Specifically, respondents with lower motivation, harder recall tasks, challenging survey effort, and negative attitudes towards the survey are more likely to experience (or report the perception of) burden than those with higher motivation, easier reporting tasks, and positive perceptions. In addition, a negative perception of the survey mediates the effects of motivation, task difficulty, and survey effort on response burden.

A common weakness with three of the four conceptual models of response burden (Bradburn 1977; Haraldsen 2004; Yan et al. 2020) is that response burden is envisioned as a one-time overall outcome. In reality, the level of perceived burden is likely to fluctuate throughout a survey cycle and may be affected by different factors at different time points. For instance, when faced with a new survey request, respondents may have an initial expectation about the likely level of burden associated with the survey request, which affects their decision to participate in the survey. However, once they start the survey and as they continue progressing through the survey, an extremely difficult or sensitive survey item may sharply increase the level of the perceived burden, causing them to reconsider their decision to stay on or to quit (compare the "sample-decide-reconsider" model of breakoffs proposed in by Tourangeau et al. 2013). Furthermore, when respondents are invited back by the same survey for another interview, experience with the prior interview affects the level of perceived burden about this new survey request. A conceptual

framework that considers response burden at different time points through a survey cycle is much needed to understand the dynamic change of perceived burden.

## 3. A Review of Measurement of Response Burden

A review of empirical literature shows that researchers have used four different approaches to measure response burden throughout four decades of research (see Table 1 in Yan et al. (2020) for a summary of measurements of and uses of burden in empirical research). The first approach follows the meaning of the term "perceived burden" by directly asking respondents how burdensome the survey was (Bottone et al. 2018; Galesic 2006; Hedlin et al. 2008; Yan et al. 2020). This single measurement of burden is found to be related to respondents' decision to break off a web survey (Galesic 2006), difficulty of contacting and recruiting respondents to take part in a survey (Yan et al. 2020), the amount of item missingness (Yan et al. 2020), and the level of respondents' concerns with a survey request (Yan et al. 2020).

The second approach measures properties of surveys or tasks that are believed to impose response burden. This is primarily the length of an interview, in terms of time spent completing the interview, or number of pages or questions required of the survey, difficulty of the response task and the number of survey requests (Filion 1981; Warriner 1981; Hoogendoorn and Sikkel 1998; Groves et al. 1999; Singer et al. 1999; Hoogendoorn 2004; Rostald et al. 2011; Read 2019; Kleinert et al. 2021). This method identifies likely *sources* of response burden rather than measuring response burden as experienced by respondents. They are essentially "actual burden" or "objective burden". This measurement of burden is typically used in understanding unit nonresponse and attrition (e.g., Groves et al. 1999; Hoogendoorn and Sikkel 1998).

The third approach measures respondents' attitudes and beliefs toward surveys, such as their interest in the survey topic, their views about the importance of the survey, and their perception of the time and effort spent (Sharp and Frankel 1983; Hoogendoorn 2004; Stocke and Langfeldt 2004; Galesic 2006; Fricker et al. 2011, 2012; Geisen 2012; Read 2019; Atkinson et al. 2019). Sometimes, response burden is inferred or extracted from respondents' doorstep concerns, complaints, and verbatim answers (Giesen et al. 2018; Wenemark et al. 2010). These respondent attitudes are potential mediators of the perception of response burden, resulting in differential perceptions of burden for the same survey across respondents, but they are not direct measures of response burden themselves.

The last approach measures response burden through the consequence of 'feeling burdened' such as respondents' willingness to be re-interviewed and their feeling of exhaustion, and so on (Sharp and Frankel 1983; Stocke and Langfeldt 2004).

Although these very different measurements of response burden inform our understanding of the concept of response burden, only the first approach measures subjective burden directly.

## 4. A Dynamic Conceptual Framework of Response Burden

We expand the conceptual framework of response burden to incorporate and reflect the dynamic and complex interactive nature of response burden at different time points over

the course of a survey. Instead of conceptualizing burden as a static outcome at one point in time, we propose a framework positing burden as reflecting a continuous evaluation of the requirements imposed on respondents throughout the survey process. We specifically distinguish burden at three time points: (1) the initial perception of response burden at the time of a new survey request (or with mail surveys, at the initial receipt of the questionnaire); (2) cumulative subjective burden that respondents experience after starting the interview; and (3) continued burden for those who are asked to participate in a later round of interviews in a longitudinal setting. At each time point, response burden has different causes, moderators or mediators, and outcomes and consequences. We show this in our expanded conceptual framework in Figure 1. (Please note that Figure 1 is not a path diagram as in structural equation modeling. Instead, it is a figure aimed to show perceived burden as well as contributing factors at three time points of a survey cycle.) In addition, at each time point, response burden can be measured continuously, once, or at a few meaningful time points, and directly or indirectly.

*Initial burden* refers to response burden perceived at the time of a brand new survey request. The survey request could be an advance postcard or an invitation letter sent to a respondent's address, a voice mail left by an interviewer, or an introduction made by an interviewer at the door step. Initial burden changes as respondents learn more about the survey request, when their concerns are addressed, or when the interviewer offers an incentive. The consequence of initial burden is sampled members' decision to participate; those who anticipate response burden to be high are less likely to take part in the survey request and, even if they finally decide to participate, require more contacts and recruitment effort (Yan et al. 2020). Typical outcomes influenced by initial burden include unit nonresponse rates at the survey level and response propensity at the individual level.

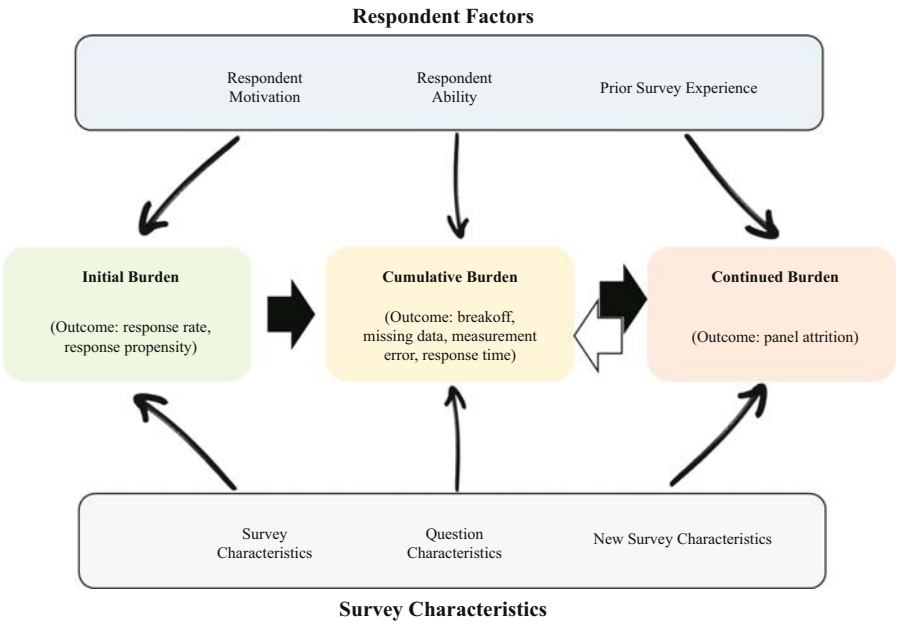


*Fig. 1. Conceptual framework of response burden.*

Initial burden is rarely measured directly but is often measured indirectly through proxies such as the number of contact attempts required to complete an interview, the number of times a respondent expresses unwillingness to participate in a survey request, and whether additional mailings are needed and so on.

*Cumulative burden* refers to response burden experienced by respondents as they progress through (i.e., answer) the survey. It is closely associated with the amount of effort exerted by respondents in answering the survey. Cumulative burden changes as respondents progress through different types of survey items in a survey questionnaire. For instance, a complex grid on a web screen or a difficult question asking about the number of doctor visits in the last five years could potentially increase cumulative burden felt by respondents. By contrast, a running tally feature that sums up numbers entered by respondents may decrease the level of cumulative burden perceived by respondents. The outcomes of cumulative burden include breakoffs and satisficing response behaviors. Specifically, those who feel burdened are more likely to break off the interview, as predicted by the "sample-decide-reconsider" model of breakoffs (Tourangeau et al. 2013) and demonstrated empirically by Galesic (2006). They are also more likely to skip questions (Yan et al. 2020), to satisfice by taking mental shortcuts, and to provide lower quality data (Warriner 1981). In countries where respondents are asked explicitly for consent to be contacted for the next round of interviews, consent is another outcome of cumulative burden. Cumulative burden can be measured directly by asking respondents how burdened they are; Galesic (2006) provides a great example of gauging cumulative burden experienced by respondents throughout a web interview. Indirect measurements of cumulative burden include time taken to answer survey questions (e.g., Yan et al. 2015), the amount of pupil dilation (e.g., Neuert 2020; Yan 2021) and the number and duration of fixations (e.g., Lenzner et al. 2010) captured by eye-tracking, the number of times respondents asked for definitions or clarification, and so on.

*Continued burden* pertains to longitudinal surveys that ask respondents to participate in more than one round of interviews. We specifically define this in the context of longitudinal surveys, where subsequent requests are built upon prior survey request and participation. The outcome of continued burden is panel attrition; that is, panel respondents' decision to participate in multiple rounds of surveying. Although multiple survey requests of farm establishments were not found to have an effect on future survey participation, those who experience a higher level of continuous burden are less likely to participate in the later rounds of interviews (Hoogendoorn and Sikkel 1998; Kleinert et al. 2021; McCarthy et al. 2006). Continued burden can be measured directly (e.g., Yan et al. 2020) or indirectly through similar proxy measurements for initial burden (e.g., the number of contact attempts needed to complete a subsequent interview round).

At each stage or time point, factors external to the survey and question features of the survey affect response burden as the sources or causes of response burden; they can be considered as objective or actual burden. In addition, respondent characteristics may contribute to response burden directly, or they may moderate or mediate the relationship between the external survey and question characteristics (i.e., objective burden) and the perception of response burden at that assessment. As shown in Figure 1 (and further elaborated below and summarized in Table 1), different factors come into play at different time points in the continuum influencing the perception of response burden, leading to different decisions and perceptions on the respondents' part.

Furthermore, initial burden is expected to influence cumulative burden; respondents with a higher level of initial burden are more likely to experience a higher level of cumulative burden than those feeling less burdened at the initial survey request. The response continuum model postulated by Yan and Curtin (2010) provides support to the impact of initial burden on cumulative burden. The response continuum model predicts that reluctant respondents who are more likely to *not* respond to a survey request are also more likely to *not* answer survey items. The model also predicts that respondents who have more missing data are more likely to *not* respond to the next wave of interviews, suggesting that cumulative burden also influences continued burden. Once respondents agree to participate in the next round of an interview, the perception of continued burden will affect the cumulative burden of this new interview round.

This conceptual framework applies to surveys of all topics and of all modes of data collection. That is, survey and question features as well as respondent characteristics are expected to separately and jointly influence response burden across different survey designs. However, specific characteristics influencing response burden could vary by survey and by mode of data collection (Yan et al. 2020).

We draw on existing conceptual models of response burden and empirical literature to identify factors contributing to response burden as well as factors moderating or mediating the perception of response burden. Previous research demonstrates that these factors have either direct relation with response burden or have indirect effects on behavioral outcomes as a result of response burden (e.g., decision to participate in the survey, decision to optimize, and/or decision to take part in the later rounds of the interview). We expand our conceptualization to include and discuss these additional influences below.

### *4.1. Factors Contributing to Initial Burden*

There are three survey characteristics that we identify as the major contributors to respondents' perception of initial burden about the survey request, which directly affects the decision to participate in a survey and are shown in Figure 2. While Figure 1 also recognizes the possible influence of question characteristics, these are only relevant for surveys where respondents can view the questions ahead of time (e.g., mail surveys) and require processing or an investment of effort on the part of respondents. Because of these, we focus on survey design features that are often made available to respondents.

Research demonstrates that the *advertised interview length* is negatively associated with response rates to web surveys (Crawford et al. 2001; Heerwegh and Loosveldt 2006; Marcus et al. 2007; Galesic and Bosnjak 2009; Yan et al. 2011) and to telephone surveys (Collins et al. 1988; Hansen 2007). In addition, advertised interview length is positively associated with breakoffs in the web surveys (Galesic 2006; Galesic and Bosnjak 2009), even though it did not directly affect perceived burden in one non-probability Web study (Galesic 2006). Yu et al. (2015) manipulated the framing of a main study after a screener questionnaire was completed. A random third of respondents were told that they were selected into a long survey and would need to complete more questions. Another random third were told the opposite – they were selected into a short survey and would need to complete fewer questions, whereas the last third were not told anything about the length of the main interview. Not surprisingly, those who were told that they would answer more

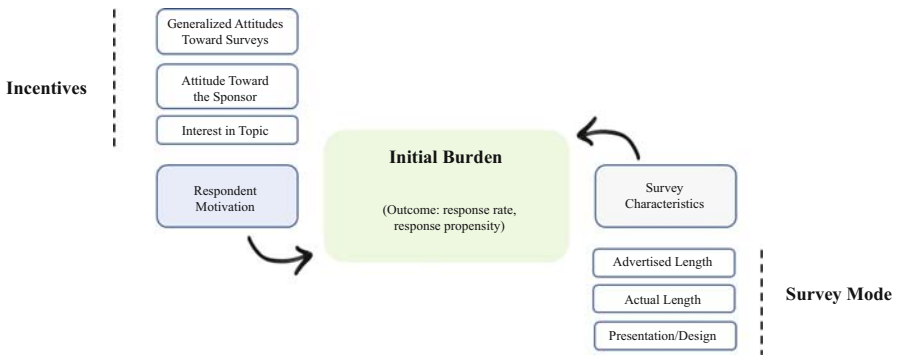


*Fig. 2. Survey features and respondent characteristics influencing initial burden.*

items found the survey more burdensome than those who were not told about the length of the main interview and those who were told to complete fewer items (Yu et al. 2015).

*Actual interview length* (in terms of number of pages in a paper questionnaire, number of survey items, or actual time spent on the task) is negatively related to response rates to mail surveys (Burchell and Marsh 1992; Dillman et al. 1993; Bogen 1996; Edwards et al. 2002; Burdein 2013) and positively related to breakoffs in the web surveys (Yan et al. 2011). The number of pages of a questionnaire and the number of survey items is found to be significantly related to respondents' perception of burden (Bottone et al. 2018). But actual time spent is only weakly related to data quality in a business survey (Lund and Haradelsen 2015) and unrelated to subjective burden (Yu et al. 2015; Read 2019).

By contrast, better *survey presentation and design* (e.g., how a mail survey looks in terms of color, spacing, and layout) has been shown to have a positive impact on response rates (e.g., Diaz de Rada 2005; Dillman et al. 2014).

Two survey design features do not necessarily directly lead to initial burden, but we recognize their impact on initial burden through their impact on respondent motivation and ability. *Incentives* are found to successfully increase respondent motivation to participate in a survey request (Mercer et al. 2015). *Mode of data collection* could also affect a respondents' motivation to participate by changing the saliency of the perceived initial burden. For instance, respondents may exhibit differential motivation toward participating in a web survey. The inability to review the survey content (versus a paper survey) requires the respondent to rely on the practitioners' assessment of the survey length or relevance to the survey topic. The lack of being able to preview content in advance may also be beneficial, as the survey content may be unappealing or viewed as not relevant to the survey topic. For interviewer-administered modes, the interviewer may overcome barriers to motivation. However, in both circumstances, mode potentially affects motivation, but does not directly change initial burden. Mode could affect response burden through their interaction with respondent ability. For instance, older respondents who are less comfortable with advanced technology such as smartphone apps; as a result, they are less likely to participate in a survey involving the use of a smartphone app (Jäckle et al. 2019).

Figure 2 shows three respondent level motivation-related characteristics that are hypothesized to affect the perception of the initial burden. Again, Figure 1 recognizes the influence of respondent ability on the initial stages of survey participation (as described in

the prior paragraph). Here, we focus on motivation-related variables that may have a main effect on response burden and interact with advertised interview length, actual survey length, and survey presentation and design in affecting response burden. *Interest* in a survey topic is a significant contributor to sample members' decision to take part in the survey (Baumgartner and Rathbun 1997; Groves et al. 2004; Groves et al. 2006) and is associated with fewer breakoffs in web surveys (Galesic 2006). It may also reduce the impact of actual survey length on the perception of burden. Similarly, a positive *attitude toward the sponsor* of a survey affects respondents' initial decision to participate in the survey; surveys sponsored by government agencies have higher response rates than surveys sponsored by non-government agencies (Heberlein and Baumgartner 1978; Presser et al. 1992). Again, respondents who have a positive view of the survey sponsor may tolerate longer surveys better than those with a negative view. Furthermore, respondents are more likely to respond to surveys when they support the sponsor of the survey (Groves et al. 2012). *Generalized attitudes toward surveys* (such as views about the usefulness and values of surveys, legitimacy of surveys, invasiveness of surveys, and trust in survey organizations and so on) affect potential respondents' likelihood to participate in surveys; those respondents with a positive attitude toward surveys, compared with those who have a more critical position, have been found to have participated more often in surveys in the past (Sharp and Frankel 1983; Goyder 1986; Bergman and Brage 2008; Giesen 2012) and to have a lower level of response burden (Yan et al. 2020). Again, these attitudes may interact with survey characteristics like length and design to affect response burden.

### *4.2. Factors Contributing to Cumulative Burden*

The middle part of Figure 1 represents cumulative burden, which influences respondents' decisions to break off, to skip a question, to satisfice or optimize, or to provide poor quality data (Galesic 2006; Yan et al. 2014; Yan et al. 2020). Outcomes of cumulative burden include breakoffs, missing data, measurement error, quality of data, and response times. Cumulative burden is affected by three question characteristics, two survey characteristics, and two respondent characteristics related to ability. These characteristics are shown in Figure 3.

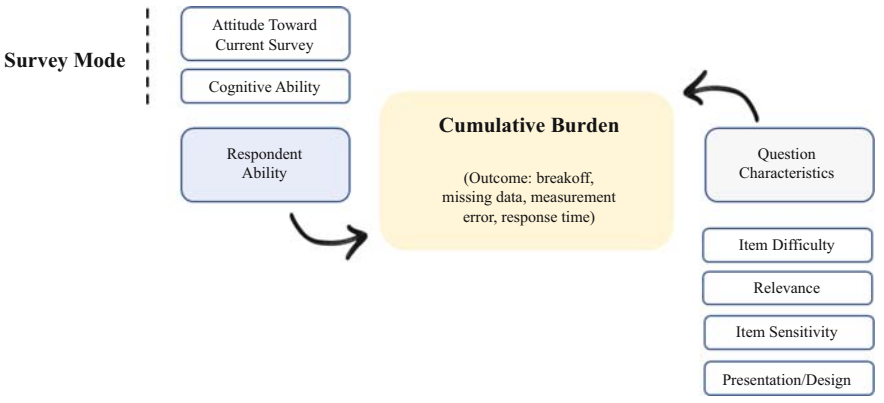


*Fig. 3. Question and respondent characteristics influencing cumulative burden.*

*Item difficulty* is measured in many different ways. Longer questions in terms of the number of words, the number of clauses or sentences, and the number of response options take longer to answer (Yan and Tourangeau 2008; Couper and Kreuter 2013), are more prone to response order effects (Schuman and Presser 1996; Holbrook et al. 2007), and are more likely to induce breakoffs (Peytchev 2009). Question text features making a question difficult to understand lead to an increase in cognitive burden (Lenzner et al. 2010). Questions requiring extensive retrieval and integration are subject to longer processing time (Yan and Tourangeau 2008) and more item nonresponse (e.g., Yan et al. 2010). In addition, open-ended questions requiring verbal input are associated with higher breakoffs (Galesic 2006; Peytchev 2009). The difficulty of recall also increases response burden (Yan et al. 2020). On the other hand, psychological studies of task complexity have often found that people are more motivated to complete tasks when they are intricate, challenging, and enriching (e.g., Taylor 1981; Campbell 1988; Maynard and Hakel 1997). Malhotra (2009) demonstrated that a complex ranking task is less prone to response order effects than a simple rating task. *Item sensitivity* tends to increase missing data (Yan et al. 2010; Tourangeau et al. 2000) and measurement error (Tourangeau et al. 2000; Tourangeau and Yan 2007; Kreuter et al. 2008; Sakshaug et al. 2010). Apparent *relevance* of the survey items refers to how strongly the survey items are related to the stated survey topic. Williams and colleagues found that respondents did not mind more survey items in a screener questionnaire when the additional items are clearly relevant to the survey topic (Williams et al. 2016). Apart from their main effects on response burden and other survey outcomes, these variables may interact with the characteristics of the survey to affect response burden.

For self-administered surveys (such as web and mail surveys), poor *survey presentation and design* (e.g., a complex grid on a web screen) has been shown to induce breakoffs (e.g., Peytchev 2009).

We recognize the role that *mode of data collection* has on data quality, but this is not a direct effect on cumulative burden. The effect on data quality is through influencing other direct factors (e.g., respondents' motivation, attitudes about the survey and so on). For instance, a self-administered mode of data collection reduces social desirability reporting than an interviewer-administered survey (Tourangeau and Yan 2007). Further, there is less differentiation in responses in a web survey than a telephone survey (Fricker et al. 2005).

In terms of respondent characteristics related to respondent ability, *cognitive ability* is found to be associated with the level of response burden in answering survey questions (Krosnick 1991; 1999). Everything else being equal, people with a lower level of cognitive ability are more likely to feel burdened than those with a higher level of cognitive ability (Atkinson et al. 2019); they are more likely to take cognitive shortcuts (Krosnick 1991; 1999), take more time to come up with answers (Yan and Tourangeau 2008), are more likely to provide missing data (Yan and Curtin 2010), and are more likely to exhibit response order effects (Holbrook et al. 2007; Malhotra 2008). Age and education are commonly used as measures of cognitive ability (see Salthouse 1991) in the survey literature. *Attitudes toward the current survey* (e.g., perceived difficulty of the survey, perceived effort required, perceived length, and so on) are thought to affect response burden, with more negative attitudes leading to higher levels of response burden (Bradburn 1977; Giesen 2012; Yan et al. 2020). For instance, Yan et al. (2020) showed

that respondents with a negative perception of a survey (e.g., those who found the survey to be less interesting, more difficult, too long, and were asked to do multiple rounds of interviews) are more likely to be "burdened out" than those with less negative perception. In addition, these attitudes mediate the relationship between survey effort and response burden. Furthermore, those with positive attitudes about the current survey tend to have less missing data than those with negative attitudes (Stocke 2006).

### 4.3. *Factors Contributing to Continued Burden*

The rightmost part of Figure 1 pertains to longitudinal surveys when respondents are invited back to participate in additional rounds of interviews (e.g., panel surveys). Continued burden affects respondents' decision to agree to future survey requests, leading to panel attrition. We hypothesize that two characteristics of the current survey request (comparative length and framing of the survey request) contribute to continued burden, shown in Figure 4.

For many panel surveys, the initial interview is the most burdensome because more information is gathered in that interview. Subsequent interviews may be shorter because the respondent is only requested to update his or her status on many variables since the prior interview. Other information collected such as demographic or household characteristics are unlikely to have changed or can be confirmed in the interview. We suspect that the length of the current round's interview is usually compared with that of the first round (*comparative length*). If respondents' experience with the first round is pleasant (i.e., the first round is short and easy), participation in subsequent requests is more likely, even if the rounds are longer than the initial request. On the other hand, if respondents are told that the length of the new survey is shorter, they may be more likely to participate.

Message *framing* has been used to emphasize the potential losses from not acting to encourage participation. Largely based on prospect theory (Kahneman and Tversky 1979), it has been used to encourage parents to increase physical activity in their children (Drouin et al. 2018 ), and to participate in additional survey request. Tourangeau and Ye (2009) used this theory to emphasize the loss (versus the gain) in value of the information that the respondent had already provided if the respondent stopped participating to increase the

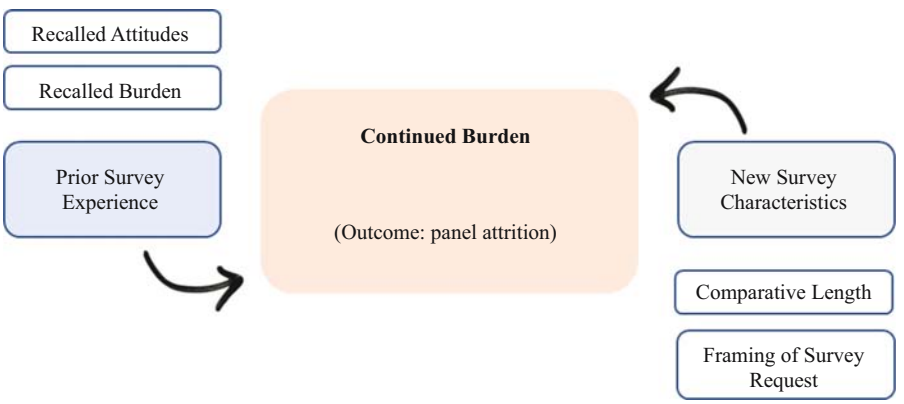


*Fig. 4. Survey and respondent characteristics influencing continued burden.*

likelihood that the respondent would complete a second interview. Emphasizing these sunk costs may reduce the impact of the anticipated effort in the next round on decisions to take part or not.

The left part of Figure 4 shows that *recalled burden* and *recalled attitudes to the survey*, which are consequences of respondents' prior experience with the survey, affect how they react to a new or subsequent interview request. For instance, respondents who feel overburdened have been shown to be less likely to participate in a new survey request (Hoogendoorn and Sikkel 1998; Martin et al. 2001; Bergman and Brage 2008). In addition, those who were burdened at the previous interview were found to develop more negative attitudes to the survey (Stocke and Langfeldt 2004), which subsequently influences respondents' perception of the level of burden associated with the next round of interviews (Fricker et al. 2012; Yan et al. 2020). Respondents who had a bad experience with the prior interview (such as a bad test score in the last round of interview) were less likely to participate and take the test again in the next interview round (Kleintert et al. 2021).

The peak-end theory explains how recalled burden and recalled attitudes are formed and how they can influence response burden and continued participation in longitudinal surveys. According to peak-end theory, the evaluation of an experience is based on the most extreme moment and the final moments of that experience (Redelmeier and Kahneman 1996). The peak-end theory has been used to explain how the perception of the final moments of the experience can color the entire experience and lead people to prefer longer periods of discomfort that end on a more positive note to shorter periods of discomfort (see Kahneman 2000, for a review). A key component of this theory is that the sheer duration of the event is discounted in the evaluation. This peak-end model is pertinent to the recall of the cumulative burden from an earlier interview round in a longitudinal survey context. Applied to our burden framework, we believe that a persons' evaluation of response burden is constructed based on easily recalled features of the survey experience such as the duration of the survey and the difficulty of the survey items and so on. The final (that is, the most recent) experience and the peak (worst or best) experience with these features in the prior wave of a longitudinal survey affects response burden. As a result, the theory hypothesizes that if the earlier survey begins with the most burdensome questions and ends with relatively easy or interesting questions, that earlier survey will be recalled as less burdensome than if the questions exhibit the opposite organization (starting with easy and ending with more burdensome questions). That difference in recalled burden may affect respondents' perception and the decision to continue with the survey request. As mentioned earlier, Yu et al. (2015) provided some evidence to this model by manipulating, at the end of a short screener interview, how the main study was described. Some were told that they would complete a long survey ("screen in" condition) whereas others told that they would experience a short survey ("screen out" condition). Respondents in the "screen in" condition rated the survey as longer and more burdensome than those in the "screen out" condition, regardless of the actual length of the survey and the actual time spent on the survey. In addition, those in the "screen in" condition were also more likely to breakoff at the main interview than those in the "screen out" condition. Apparently, the negative experience from the ending message of a short screener interview affected how respondents perceived the main interview.

## 5. Using the Dynamic Conceptual Framework of Response Burden to Unify Existing Research and to Motivate Future Research

Prior research on response burden has relied on incomplete conceptualizations and unsystematic measures of response burden. Consequently, it is not surprising that empirical research on response burden sometimes produces equivocal findings, further making it difficult to draw firm predictions about survey features or respondent characteristics that are most likely to give rise to response burden. For instance, researchers and practitioners too often believe that longer surveys (one of the most frequently used indicators of actual burden) impose greater response burden and yield lower response rates. However, the evidence is at best mixed on the relationship between interview length and response rates. When length is measured in terms of number of pages, only six (out of the 25) empirical studies included in a meta-analysis supported the speculation that longer surveys yield lower response rates (Rolstad et al. 2011). The rest of the 19 surveys failed to bear evidence for the assumed negative impact of survey length on response rates. Survey length is a common measure of actual burden used by regulatory agencies, however, from these findings it is not clear whether or not survey length actually does lead to response burden and lower response rates and what the survey field (and regulators) should do with regard to survey length.

The mixed evidence results from the fact that researchers only looked at the bivariate relationship between interview length as a measure of response burden and response rate (as an outcome of response burden), overlooking the many factors that could mediate and moderate the relationships between interview length (a measure of actual burden), response burden, and response rate as a consequence of response burden. To advance the research on the relationship between response burden and survey participation, our conceptual framework calls for attention to the moderators and mediators and provides suggestions for the additional factors that a researcher could look into in multivariate analyses. Factors displayed in Figure 2 are great candidates. For instance, it is not enough to focus on the bivariate relationships between, for example, interview length and response rates, or survey interest and response rates. The moderators and mediators (such as respondents' motivation, generalized attitudes towards surveys, attitudes towards the sponsor and the survey topic) all need to be taken into consideration. Predictions could be drawn using the conceptual framework. A long survey would be more unbearable to those with negative attitudes towards surveys, lower trust of sponsors, and disinterest in the topic than those with positive attitudes and higher regard of sponsors.

Yan et al. (2020) empirically demonstrated that, although the objective burden (e.g., interview length) has a significant direct impact on response burden, this direct effect is canceled out by the indirect effect of respondents' perception of the survey, producing small and non-significant overall effects on response burden. The seemingly contradictory empirical evidence that a longer questionnaire sometimes leads to a lower response rate and sometimes has no impact on response rate can be accounted for and unified under our dynamic conceptual framework of response burden, which examines the relationship between survey features and respondent characteristics.

The conceptual framework is useful in explaining existing research evidence. More importantly, it is useful in motivating future research. Researchers can choose to focus on

one part of the framework (e.g., what can be done to reduce panel attrition?) or look at the dynamic nature of response burden (e.g., how offering an incentive affects initial burden and continued burden at the next survey request?).

## 6. Conclusions and Discussion

This article reviews the state of the literature on conceptualization and measurement of response burden in the four decades of research. The review reveals that response burden is under-conceptualized and is measured in various ways, indicating the need for an updated framework. Our theoretical framework builds on the concept of burden as a subjective phenomenon, affected by respondents' psychological responses to various elements of the survey.

Our model has several innovative features. First, it distinguishes three forms of response burden: initial burden; cumulative burden within a survey; and continued burden across waves of a longitudinal survey. Each has distinctive causes, moderators, and mediators, and consequences.

Second, it attempts to synthesize empirical research to more completely account for a full range of variables thought to affect response burden. The impact of these variables on response burden is summarized in Table 1 and can be used to inform new survey designs and to encourage new research.

Third, despite its elaboration and comprehensiveness, the gist of the framework applies to all modes of data collection, all topics, and all samples. Yan et al. (2020) demonstrate that the modes of data collection did not affect the relationship between the underlying factors and perception of response burden; the same set of factors have the same impact on response burden regardless of whether respondents were attempted mostly by phone or in person. Of course, indicators of the latent factors will differ by the nature of the survey.

Fourth, due to its wide application across different contexts, our framework can be used to derive specific testable hypotheses on the impact of various design features and respondent characteristics on response burden. The framework can also be used to summarize and consolidate apparent inconsistent empirical findings.

Finally, the framework also provides practical guidance and generates strategies to reduce response burden. For instance, our model postulates the mediating and moderating effects of respondent perceptions on response burden at different stages, suggesting the importance of paying attention to strategies or methods that are able to improve respondents' perception of the survey, of the sponsor, and of surveys in general, for instance. Yan et al. (2020) advocates for including an evaluation of respondents' perceptions about surveys in the question testing and evaluation stage. Our model provides theoretical support to their suggestion. Another example is to the placement of survey items in a longitudinal setting. Questionnaire design textbooks recommend starting with easy and interesting questions and placing more difficult and sensitive questions at the end of a questionnaire to avoid breakoffs (e.g., Bradburn et al. 2004). However, this recommendation may not be beneficial for longitudinal surveys as predicted by peak-end theory. There may be benefit to manipulating the placement of survey items in order to influence recalled burden.

Our conceptual framework also draws upon psychological theory to understand and form predictions for how response burden is driven by perceptions. However, more

*Table I. Summary of impact of variables on response burden.*

| | Variable | Impact on response burden |
|---|---|---|
| Survey design features | Advertised interview length | Announcement of a long interview is shown to increase perception of initial burden |
| | Actual interview length | Longer interview is shown to increase perception of initial burden |
| | Survey presentation and design | Better survey presentation and design is shown to reduce initial burden and cumulative burden |
| | Incentive | Incentives are shown to reduce initial burden through motivation |
| | Mode | Mode is shown to affect initial burden and cumulative burden through interaction with respondent ability and motivation |
| | Comparative length | Shorter interview in the earlier round or announced in the new round is expected to reduce continued burden |
| | Framing of survey request | Loss framing is shown to reduce continued burden |
| Question characteristics | Item difficulty | Difficult items are shown to increase cumulative burden |
| | Item sensitivity | Sensitive items are shown to increase cumulative burden |
| | Item relevance | Relevant items are shown to reduce impact of survey length on cumulative burden |
| Respondent characteristics | Interest | Interest in survey is shown to reduce initial burden and shown to reduce negative impact of survey characteristics (e.g., survey length) on initial burden and cumulative burden |
| | Attitude toward the sponsor | Positive attitude toward sponsor is shown to reduce initial burden and is expected to reduce negative impact of survey characteristics (e.g., survey length) on initial burden and cumulative burden |
| | Generalized attitudes toward surveys | Positive attitudes toward surveys are shown to reduce initial burden and are expected to reduce impact of announced and actual survey length on initial and cumulative burden |
| | Cognitive ability | Cognitive ability is shown to reduce cumulative burden and shown to interact with mode on initial burden |
| | Attitudes toward the current survey | Positive attitudes toward the current survey is shown to reduce cumulative burden and shown to mediate the relationship between survey features and cumulative burden |
| | Recalled burden | Recalled burden is shown to increase continued burden |
| | Recalled attitudes | Recalled negative attitudes are shown to increase continued burden |

research is needed to better understand the limitations of these theories. For instance, in the context of peak-end theory, placing the least cognitively demanding, or the most interesting questions at the end of a survey just to end with a positive experience benefits the recalled burden of a prior survey. But when respondents start a subsequent interview and encounter questions where the burden is now greater than what the recalled experience from the prior interview, will it result in an increase in breakoffs or satisficing strategies? In other words, does influencing a positive evaluation to possibly increase subsequent cooperation simply result in breakoffs or poor data quality? Prospect theory may have broader applications, for instance, influencing initial burden. Using the conceptual framework to structure testable hypothesis will do much to inform the survey field.

Finally, our model assumes that response burden is a measurable subjective phenomenon, supporting the direct question approach that asks people how burdensome the survey is to them. This direct question approach is used in several studies (e.g., Galesic 2006; Yan et al. 2020) and is found to be a useful and promising measure of burden. When direct questioning is not feasible, we encourage researchers to use auxiliary information such as paradata to measure response burden indirectly, and examine correlates and moderators of response burden. However, in that case, researchers need to be explicit as to their exact measurement and conceptualization of response burden.

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