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Research Article/Araştırma Makalesi

Investigating the Determinants that Influence Consent Behavior for Linking Survey Data with Administrative Records

Anket Verilerin İdari Kayıtlarla Birleştirilmesi İçin Onay Verme Davranışını Etkileyen Faktörlerin Araştırılması

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Abstract

This research investigates the determinants of consent behavior in linking survey and administrative data, filling a notable gap in existing studies. It conducts a thorough systematic review of a wide variety of surveys from multiple countries, examining survey and consent design characteristics to assess their influence on consent rates. Through statistical analysis, the study evaluates numerous factors such as survey response rate, topic, country, year, type, mode, age of target population, sponsor, and various aspects related to the consent request process. The findings suggest that higher consent rates are more likely in computer assisted telephone interview (CATI) compared to self-administered surveys, in surveys sponsored by governments, in panel surveys as opposed to cross-sectional ones, and where explicit consent is sought, especially when the consent request is made at the start of the survey. This research makes a significant contribution to academic literature by empirically demonstrating the effect of various survey and consent design features on consent behavior, providing essential insights for crafting surveys to maximize consent rates for data linkage. It closes an important research gap in survey methodology and the behavior on data linkage consent, offering a unique, extensive analysis across a broad range of international surveys.

Jel Codes: *C89, C42, C14*

Keywords: *Data Collection, Survey Methods, Semiparametric and Nonparametric Methods*

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Öz

Bu çalışmanın amacı, anket katılımcı verilerinin idari kayıtlar benzeri diğer verilerle birleştirilme aşamasında verdikleri onay davranışına etki eden tüm faktörleri araştırmaktır. Çalışma verisi, bu onayı verme oranı hesaplanmış ya da hesaplanabilen, uluslararası literatürde İngilizce olarak kaleme alınmış farklı alanlardaki anketlerin gözden geçirilmesi ve sistematik bir biçimde incelenmesi sonucu oluşturulmuştur. Diğer verilerle birleştirme onay verme oranı, o dönemin onay verenlerinin tüm anket katılımcılarına bölünmesiyle elde edilir. Bağımlı değişken onay verme oranı ve bağımsız değişkenler, anket ve onay verme süreci karakteristikleridir. Sistematik derlemenin sonrasında tüm değişkenlerin (anket cevaplama oranı, anket konusu, anket yılı, anket veri toplama metodu ve anket veri birleştirme onay isteme metodu gibi ilişkili degişkenler) değerlendirildiği istatistiksel modellerle onay verme davranışının belirleyicileri tartışılmıştır. Anketörle, bilgisayar destekli telefon anketlerinin, anketörün olmadığı anketlere göre; devlet sponsorlu anketlerin, özel anketlere göre; panel anketlerin, yatay kesit anketlere göre ve onay verme sorusunun basta sorulduğu anketlerin, diğer bölümlerde sorulanlara göre daha yüksek oranda verilerinin birleştirilmesine onay verdikleri bulunmuştur. Çalışmanın sonucu, diğer verilerle birleştirme konusunda yüksek oranlı onaya ulaşmanın anket katılımcılarının güven oluşturma süreçleri ile paralel davranış sergilediklerini düşündürmektedir. Araştırmanın bulgularının bundan sonraki onay verme süreci incelemelerine de bir perspektif kazandırabileceği görülmektedir.

Jel Kodları: *C89, C42, C14*
Anahtar Kelimeler: *Veri Toplama, Anket Metotları, Yarı Parametrik ve Parametrik Olmayan Metotlar*

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1. Introduction

In the last century, the interest in accessing as much data as possible in every sector of life has become very popular and resulted in huge demand for data research (Kim & Rao, 2012; Fobia et al., 2019). Therefore, combining survey and administrative data records aims to enhance the amount of information available in each unit and support analysis for research purposes. Government departments and other organizations collect administrative data for registration, transaction, and record-keeping purposes, while survey data is based on a more targeted population and includes specific questions. If the administrative and survey data can be merged, the results are more beneficial. First of all, if the identifier information is correct, missing survey data may be completed. Secondly, utilizing administrative data with the intention of gathering full population records can lead to shortened sample questionnaires, thereby reducing time, cost, and respondent burden. Therefore, when feasible, data linkage is widely utilized.

However, the initial step to accomplish a linkage between survey and registered data is to obtain permission from participants to use their private and confidential information for any purposes. Taking ethical concerns into consideration, it is necessary to obtain the consent, i.e. approval, of the data owners (individuals or other organizations, such as establishments), who are participants of the survey, for confidentiality purposes. For the combination of survey and administrative data, obtaining consent is a preliminary step before requesting permission to link the data from survey participants. Such permission can result in either approval or disapproval. The proportion of respondents giving consent to link their data to all survey respondents in related period is called consent rate for data linkage. At this stage, it is very important to communicate the data linkage to the public to help them understand how important it is for public policy making.

Generally, accessing information from consenters is easier than from non-consenters, as their data is not linked. Normally, not all sampled participants provide consent. There are consenters and non-consenters. The survey data from consenting respondents is linked to the administrative data. Not receiving a positive answer to record linkage consent can create several problems in a survey once survey data is required to be linked to the administrative data. The first problem starts to arise when non-consenters have different characteristics from consenters, which can result in biased survey estimates (Kho et al., 2009; Sakshaug & Kreuter, 2012; Sakshaug et al., 2017). The second issue with non-consenters is that it diminishes the effective sample size because fewer units are connected to the administrative data than anticipated, as confirmed by the survey. As a result, the sampling variance increases, and the accuracy of the estimates decreases. If the consent rate can be predicted in advance by using a past survey on a similar topic, the initial sample size may be inflated accordingly. Increasing the sample size decreases sampling variance, thereby correcting for randomly distributed non-consent. However, it does not reduce any bias introduced by systematic non-consent. In this study, it is aimed to review surveys asking consent for data linkage in the international literature and to find out what has been influential for survey respondents to permit to link their survey data with other records available, in other words, what are the significant factors

of giving consent for linkage structured as survey design and consent characteristics variables in this research (section 3.4).

Although linking administrative and survey data has been theoretically simple, the practical implementation of finding all matching records by names, dates of birth, or other identifying information has proven to be exceedingly complex. Particularly when attempting to link millions of population records together. This study examined the identifiers of consent for linkage through a systematic review and analysis, as outlined in detail in the following section2. Following the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines (Moher et.al., 2010), first, a systematic literature search has been included reading through eligible manuscripts and at the same time this has been tool to collect survey and consent design data with calculated consent rate (section 3.3). During the second phase, the study compiled data from various surveys to conduct a regression analysis. The study aimed to explain consent behavior and sought to answer the following research questions:

- Which survey design characteristics significantly impact the rate of consent?
- Which characteristics of consenting to data linkage are significant for the consent rate?

This paper is structured as follows. The next section includes a literature review on consent rates for survey and administrative data linkage, and factors that are known to influence these rates. The second section explains the methodology including research strategy, inclusion exclusion criteria, survey selection, data set and preparation of variables for statistical analysis. In the third section, the results are evaluated. Afterward, all descriptive and regression analyses implemented are discussed. In the final section, results, limitations, and present implications for further work on consent rates are discussed.

2. Former Studies

Since the beginning of linking survey and administrative data, there have been ongoing discussions in the literature about who gives consent and who does not. Although there has been a great deal of research on consent behavior for data linkage over the past decade, there is still no consensus in the literature that explains the mechanisms of survey and consent design (Baghal et al., 2019; Carter et al., 2010; Sakshaug & Kreuter, 2014; Sala et al., 2012). Studies in the literature have varied in populations, modes, and consent methods, so the results of one study cannot be directly generalized to other studies (Kreuter, Sakshaug & Tourangeau, 2016).

So far, the placement and wording of the consent question have been the leading characteristics observed. Sakshaug & Vicari (2018) found that in a web survey of establishments, a consent question for linkage placed at the beginning of the survey received a 61.3% positive response. Also, in a CATI survey of the employed/unemployed, the consent rate is 95.6 percent when the question is asked at the beginning of the survey (Sakshaug, Tutz & Kreuter, 2013). On the other hand, placing consent questions somewhere in the context of computer assisted personal interview (CAPI) survey of households results in a 65 percent

consent rate (Sala, Knies & Burton, 2014). Although the placement of the consent question is effective, the mode of the survey is also influential.

Grove's Leverage Saliency Theory (2000) explains differences in survey participation by making the survey more appealing to respondents through methods such as incentives. Most of the information in the consent form could help participants make a decision. According to this, placing relevant linkage consent questions in a beneficial frame may make them more interesting for respondents (Sakshaug, et al., 2013). What is said to explain benefit framing and how the respondent interprets it as beneficial plays a key role. Is the reason for consenting to data linkage time-saving by answering fewer questions, a scientific purpose, linkage helps for an unknown answer, or something else? For busy respondents in a CATI employee survey, time gain information is effective in obtaining a higher consent rate than neutral questioning (Sakshaug et al., 2019). However, negative wording as “less useful” emphasizing the loss in a CATI survey of US registered voters resulted in a 66.8% consent rate (Kreuter, Sakshaug & Tourangeau, 2016). It all depends on the human factor, the respondents' perception of their role in life. Elevelt (2021) reviewed some of the variables structured under network meta-analysis and descriptive reviews. The survey sponsor and the wording are found to be influential in the consent rate. However, only experimental studies were included in this review, and some reviews are not strong enough because the research sample size is too small.

3. Methodology

3.1. Research Strategy

In this study, articles using survey data asking consent for linkage were screened on the Google Scholar, Web of Science, EBSCO host, JSTOR, ProQuest, Science Direct databases that were published in English, available in full text as a report or published paper between 1946 to 2023. In this context, to analyze the phenomenon of consent rate, the study had at least one survey data with a consent question for linkage, which has been asked to the sampled respondents and a consent rate has been calculated or possible to be calculated by using survey data. Additionally, key phrases such as “survey”, “authorization”, “permission”, “consent”, “linkage”, “combine”, “match” were employed. By examining the references of found research enabled to access other surveys with consent linkage question which is called snowballing research. Similarly, the following studies have been processed further in the same method. There have been cases where those studies lacked the necessary information regarding the survey and consent characteristics. This information was first searched on the internet, if it was not available then it was computed from the existing dataset. Further investigations on those surveys have led to access to reports, other papers, data sources, etc. to be able to fill out the corresponding missing information. Otherwise, it was requested from the authors of the papers and survey staff contacts in the relevant organization via email.

This review is conducted according to the Moher et al. (2009) guidelines on PRISMA steps indicated below in section 3.2. Following that statistical procedures are used to describe the results of a number of research studies. It is one way to summarize, integrate, analyze and

interpret selected sets of measures in various disciplines. It applies only to empirical studies; it cannot be used to summarize theoretical work. Second, it applies to research studies producing quantitative findings; reporting descriptive or inferential statistics with quantitative variables to summarize results. Third, being a technique for comparing same statistics of different studies, it is necessary that comparisons are meaningful, not apples and oranges. The results of each survey are calculated to obtain an overall estimate of the magnitude of effects and assure comparability. This is called effect size, a statistic like correlation, rate, etc. summarizing the construct researched and compared which is the consent rate for this study. While Hedges (1984) tried to structure the type of meta statistical analyses like significance tests, etc. on interpreting effect sizes, according to Glass (1976), answering new questions with secondary data using any statistical technique is so-called meta-analysis.

In the review process in each survey, first of all, the titles and abstracts of the articles were examined and titles were saved in an Excel file. Articles, being a resource to reach survey data with consent, relevant survey data were found in other online resources for the missing part. Independent variables of survey and consent characteristics were created after discussions of literature and recorded as well in the file. Finally, statistical analyses were used to investigate the consent identifiers in a general sense.

3.2. Inclusion and Exclusion Criteria

A prior eligibility criterion for all survey data found and collected was that the researchers be able to calculate consent rates or have enough information to calculate consent rates for data linkage. The article should be written in English with consent asked for data linkage.

Data naturally included different types of surveys such as longitudinal surveys, cross-sectional surveys, and experimental research. The basic criteria for the data were to obtain information over a period of time about the respondents who were asked the consent question for the first time in that particular survey. Therefore, for survey types where respondents were followed over time, such as longitudinal surveys, the first wave of the survey was used. However, if there was a newly recruited refreshment sample or a methodological change in the survey that was likely to affect consent behavior over the years, the first wave of that new period was also included in the dataset. The Panel Study of Income Dynamics (PSID) and the British Household Panel Study (BHPS) are some examples of such surveys.

Different groups of respondents may participate in each period due to the sampling design of cross-sectional surveys. Therefore, consent for data linkage was required from these participants, and consent rates were recorded in each period. Also, experimental research processed by using the survey data with a consent research question and variables involved in the data. For example, in Sakshaug et al.'s (2017) Legitimation of Inequality over the Life Span (LINOS) study, the entire employment survey sample was randomly assigned to interviewer-administered (face-to-face) or self-administered (mail/web) interviews that included consent questions linked to federal employment records. The purpose of this experimental study was to determine the differences in consent rates and consent bias among the survey modes tested for the entire sample when requesting consent for record linkage. Therefore, they were treated as separate data observations in the data.

Exclusion criteria were as follows. If a study simultaneously asked for survey participation and consent for linkage, it was excluded. In other words, if they were part of the same request, those studies were not involved. As it could be diagnosed by the method itself, in such surveys, there was not any possibility to calculate consent rates and evaluate consent behavior.

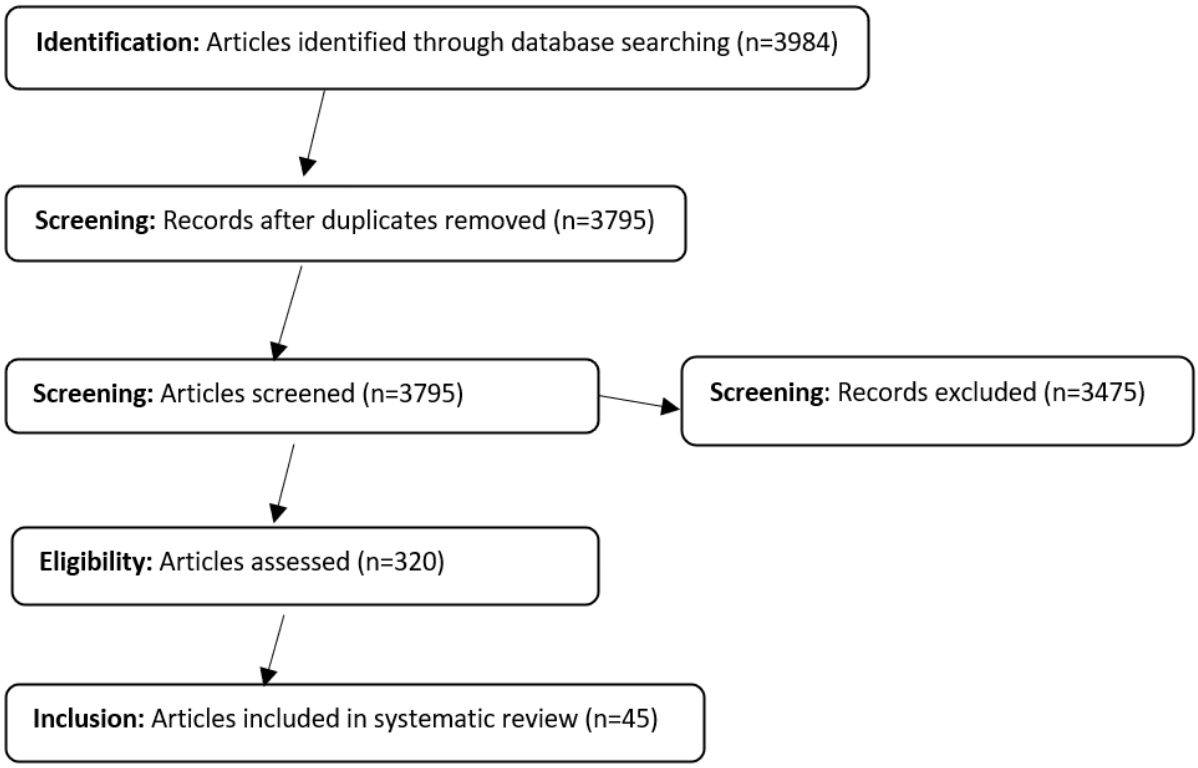
As expected, more than one article was examined using the same survey data. The strategy was to mention those articles with more information that were examined when creating variables. The others were used as a supplemental resource for missing information about the survey included. There have also been cases where the article was first studied as a working paper and later published in a journal. In this situation, published research was preferred only when there was enough of the required information. After all these steps, 45 articles were included in the systematic review.

3.3. Survey Selection

Surveys were selected according to the PRISMA checklist (Moher et al., 2010). This checklist is a specific procedure for organizing survey research and converting observations into a dataset. An initial list of 3984 references was produced by using the electronic search. Examination of the titles and abstracts, and further examination of the reference lists in the retrieved papers and other sources, led to a preliminary list of 45 potentially relevant articles in Germany, the United Kingdom, the United States, Canada, Australia, and New Zealand.

189 out of 3984 articles were eliminated because they were exact duplicates of the same article in different article references. After reviewing the remaining 3795 articles, several situations were identified. Linkage error has been studied when there are different matching procedures implemented when reaching out to larger administrative data files with more variables needed. There were some other consent forms, that is informed consent, asking for permission to participate in the survey. Physical measurement permissions for health research and health surveys had a different type of consent. As a result, 3475 articles were excluded and 320 were in scope. Of these 320 articles, 275 cases were removed because they were duplicates or asked both informed and linked consent questions at the same time in the survey. Through the systematic review of articles, papers, and reports in the literature, the information of 53 surveys were collected from 45 articles.

Figure 1: PRISMA Flowchart (Article Identification and Eligibility Assessment)



Using the data set construction strategy, these studies retained 45 articles and 158 survey data observations, in other words, these consent rates were extracted using the eligibility criteria described above. As expected, all of these surveys had different methodologies, depending on the goal of the survey research. Each of these studies found through the use of keywords was examined to determine whether it was a methodological report of a repeated cross-sectional or panel study, or a specific experimental project of a continuing or newly constructed survey project for this research. All studies reporting surveys with consent for linkage in all areas were included, including experimental research on these surveys. Although only English language resources were included in the dataset, German language resources were also used, when necessary, as a source of missing information needed to construct variables. Within the abstracts reviewed, if a study with consent to link was found, but not all information could be accessed, other resources, reports, or as a last step, authors were contacted to obtain the relevant information. Three authors were contacted. The government institution was consulted for missing data for one survey.

3.4. Dataset Preparation and Variables

This section discusses the variables that were created to be examined in statistical models to explore their effects on explaining consent rates. The variables are survey and consent design characteristics in categories. Survey response rate and consent rate are continuous variables. The categories of variables created are shown in Table 1.

Survey Topic: For each type of consent request, the consent rate for different survey topics shows variability across surveys. In most cases, health surveys have a higher rate of informed consent to participate in the survey (Voogt & Van Kempen, 2002), but according to an experiment conducted by Keusch et al. (2019), the topic has no effect on the relevant consent. In this research, surveys with topics of education, income, health, and others were categorized as a variable

Survey Country: Given the number of factors that are likely to be at play in countries, it would be very ambitious to claim that one country has more or less consent to data linkage than another. Through their socio-economic structures, cultural characteristics, and thus their laws, they develop different attitudes towards consent, privacy, and data sharing issues. Therefore, it is difficult to assess whether the variability in the laws and social and cultural conditions related to consent causes a major difference in the consent rates of Germany, the United States, Canada, Australia, New Zealand, and the United Kingdom in this study.

Survey Year: Compared to previous years, the linking of survey and administrative data has become more common, and more sophisticated procedures have been developed to obtain consent. Although respondents were more cooperative, it is unlikely that increased awareness of privacy and confidentiality issues will lead respondents to be more secure with their data, resulting in lower consent rates for data linkage. It is not easy to know whether surveys from older or later years have higher consent rates.

Survey Type: In cross-sectional surveys, consent for linkage is asked at each wave of the survey; in panel surveys, the sample constructed in the first wave of the survey responds to consent. As clarified in the consent question, they can change their decision at any time in future waves of the survey once they have been reminded of their consent to data linkage.

Panel respondents are expected to start with trust in the organization conducting the survey and build more trust over time (Sakshaug et al., 2012). However, respondents usually do not know or pay attention to whether it is a panel or cross-sectional survey until the second wave. That is, it is unclear at what stage and to what extent they will be informed about the survey type, which may determine their decision to consent to data linkage. Thus, the question is whether or not survey types differ in their consent rates for data linkage.

Survey Target Population Age: There is inconsistency across studies in how some survey characteristics affect consent behavior. The age of the participants is one of the characteristics that has been shown to be effective, possibly in both positive and negative directions. For example, some studies find that the older age group is more likely to consent to data linkage (Bryant et al., 2006; Dunn et al., 2004), while others find that the younger age group is more likely to consent to data linkage. (Hung et al., 2007; Yawn et al., 1998). In addition, some studies have found no effect of age on consent for linkage (Buckley et al., 2007; Harris et al., 2005).

Survey Mode: It is emphasized that it is necessary to explain the data linkage to survey respondents by giving as much information as possible with more clear clarifications (Thornby et al., 2017) which is guaranteed on interviewer administered surveys. There is an opportunity for participants in a survey with an interviewer to ask clarifying questions; having an

interviewer is a highly preferred option for these groups of respondents, as observed in an Understanding Society longitudinal survey. (Jäckle et.al, 2018). In a randomized mode study of the Legitimation of Inequality over the Life Span (LINOS) panel survey in Germany, the CAPI survey mode had about 40 percentage points higher linkage consent rates than the self-administered survey mode (Sakshaug et al., 2017).

In this study, to determine the effect of personal contact with interviewers on consent behavior, surveys were categorized as CAPI, CATI, self-administered, dual mode (CATI and CAPI or CAPI and Web), sequential mode. Sequential mode is the case where a mode type, such as self-administered, is first implied and then telephone mode is sequentially implied to the same sample after the previous mode failed to reach the respondent.

Survey Sponsor: The survey sponsor is usually identified to respondents during the initial contact when the purpose of the survey is explained and the consent forms request a response to the survey. In general, government-sponsored surveys may be perceived as compulsory to some degree, probably depending on the governmental system in different countries. On the other hand, non-governmental surveys tend to give respondents more flexibility in making their own decisions about whether or not to participate. Assuming that the government-sponsored survey happens to have a positive return on response (Heberlein et al., 1978), some research shows that government-sponsored surveys achieve higher response rates. (Linsky, 1975; Goyder, 1985; De Leeuw & Heer, 2002). It is believed that respondents may have stronger bonds of trust and respect for their governments, or feel a sense of obligation to participate, as well as for the consent data linkage.

Survey Consent Request Type: There are two approaches, either explicit (active) or implicit (passive), to obtaining survey consent from participants. In the explicit consent condition, subjects are asked to sign and return a consent form documenting their permission for their contact information to be transferred from administrative sources to third-party data collection agencies. In the implicit consent method, however, permission is granted if no action is taken. In other words, the signed opt-out form is not returned; the respondent has the responsibility to opt out at some point in the survey process. Consent for data linkage is the default option.

Linkage Request Placement: There is no definitive agreement on where to place the consent question in the survey, although most studies have placed the consent question closer to the end of the questionnaire. Linkage consent is interpreted as a sensitive topic, first interviewers build rapport and respondents need to trust before asking for consent to data linkage. (Sakshaug et al., 2013).

Linkage Request Records: In most surveys, the records being asked for consent linkage are on the same topic as the study. Although the need for linkage to administrative records arises mainly for employment and health surveys, there are also other records, such as education, income and tax credit records, that may be requested for linkage in the context of surveys on the same or different topics. Thus, it is questionable whether or not the consent rate would be higher if the record were about health or not.

Consent Wording: The wording of the consent request and the information provided to explain the consent to data linkage can play a significant role in respondents' attitudes. (Sakshaug et al., 2013). It is well known that a strong guarantee of data confidentiality leads to higher response rates. However, this effect can also be reversed (Singer et al., 1992, 1995). Therefore, it is discussed that framing the consent question neutrally versus negatively or positively will have different influences on respondents to give a positive return.

Survey Consent Signature and Identity Information: The decision to sign a linkage consent form can also be examined through theories of informed consent for survey participation, with the same concerns about privacy and confidentiality. If the survey is on a sensitive topic that involves income, finances, blood test questions, or something similar, the situation may become even more difficult as they are informed that their data can be much more easily linked to administrative data (Jenkins et al., 2006; Sala et al., 2010). If respondents behave in a similar way as they do while giving consent to participate in a survey with a signature, then requiring a signature for linkage consent may be disadvantageous compared to not requiring a signature. In addition, asking for identity information may make it more difficult to obtain a positive consent response. Referring to those, either signature or ID; at least one; both categorized as variable.

Survey Response Rate: Responding to a survey and allowing the linking of one's registered data are not necessarily similar issues when both are investigating their questions. Taking a role in a survey is much easier to accept than sharing relatively private registered information. Respondents may view participation in a survey as beneficial to scientific research to the extent that their confidential information is not shared through linkage. Also, some respondents are comfortable doing both. That is, consent to take a survey and consent to link data may not be relevant at all. Sometimes with lower response rates, respondents are likely to be more selective and cooperative. Because these respondents are a group that fully trusts and engages with the survey, and naturally a higher percentage of them are likely to agree to link.

Table 1: Descriptives of Constructed Variables (Factors) with Categories

Variables	Categories	Counts	Percent (%)
Survey Topic	1: Other (ref.)	17	13,3
	2: Economic	33	25,8
	3: Health	78	60,9
Survey Country	1: Australia, NZ, UK (ref.)	31	24,2
	2: US, Canada	75	58,6
	3: Germany	22	17,2
Survey Year	1: Year >=2010 (ref.)	54	42,2
	2: 2001 < Year <2009	44	34,4
	3: Year <=2000	30	23,4
Survey Type	1: Cross sectional (ref.)	79	61,7
	2: Panel, longitudinal, cohort	49	38,3
Survey Mode	1: Self-administered (ref.)	26	20,3
	2: CATI only	53	41,4
	3: Other (dual, sequential)	10	7,8
	4: CAPI only	39	30,5
Survey Target Population Age	1: All age groups (ref.)	44	34,4
	2: Age <18	46	35,9
	3: 18<= Age	38	29,7
Survey Sponsor	1: Nongovernment (ref.)	43	33,6
	2: Government	85	66,4
Survey Consent Request Type	1: Implicit/passive/opt-out (ref.)	20	15,6
	2: Explicit/active/opt-in	108	84,4
Linkage Request Placement	1: At the end	84	67,2
	2: At the middle & before consent	41	32,8
Linkage Request Records	1: Other (ref.)	31	24,2
	2: Economic	25	19,5
	3: Health	72	56,3
Consent Wording	1: Framing (ref.)	56	47,5
	2: Neutral	62	52,5
Consent Signature and Identity Info	1: Signature and idinfo (ref.)	5	4,1
	2: Signature or idinfo	49	40,2
	3: None required	68	55,7

3.5. Statistical Methods

In this research, the characteristics of surveys that can be influential in explaining the consent behavior for linking survey and administrative data were investigated. Based on previous survey research, the potential impact of various features of survey design and consent request methods were estimated. Those evaluations were based on data gathered through systematic reviews of prior survey studies. After examining literature including questionnaires, publications, and methodological documentation, it became apparent that certain survey features greatly impact obtaining consent approval. To analyze these features, the characteristics outlined in section 3.4 were utilized in generating categorical variables that were tested via statistical models, with the consent rate representing a dependent variable.

The consent rate was defined as the percentage of respondents who authorized the linkage of their survey responses to registered data over the ones who did not. During the construction of the models, the survey design and consent variables were analyzed and described as independent, exploratory variables. For each independent variable, categories were established based on the number of observations in each category and those demonstrating disparities in consent rates. The reference category was chosen as the one that is frequently compared in the literature for its response to consent for data linkage.

Initially, descriptive statistics, including frequencies, means, median, were evaluated for all variables. They were also checked for correlations with Kruskal Wallis test to describe their relationships with each other if there exist. Consent rates for each of these variables through binary regressions were estimated. Then multiple regression analysis with all variables was conducted. For final model, multicollinearity was assessed by computing a variance inflation factor (VIF) which measures how much the variance of a regression coefficient is inflated due to multicollinearity in the model. If VIFs are above 10 then that indicates multicollinearity (Dormann et al., 2013; Hair et al., 2014).

4. Results

Within the scope of the study, 128 calculated consent rates for data linkage on various topics with different design characteristics from 45 articles were systematically analyzed. The consent rate was 74.9% on the overall average, with a minimum consent rate of 15.4% and a maximum of 100%. The survey response rate was 64.2% on average, with a minimum response rate of 9.23% and a maximum of 96%.

Those variables have been studied by using the data collected in certain criteria, which were explained in section 3. Kruskal Wallis test proves that the variable categories are significantly different from each other in giving consent for linkage. Estimates, standard errors and VIFs of variables taking part in the regression model are presented in table 2. The closer to the smallest possible value of VIF, which is 1 meaning no correlation, the moderately the predictors are correlated.

The results on regressions examined suggest that six variables explained below -survey mode, target population age, linkage request placement, survey type, survey sponsor, response rate- were significantly associated with the consent rate. It was found that surveys, which were panel, interviewer-administered, government, targeting younger populations, and request for consent linkage placed at the beginning and before consent are positively related to receiving a higher consent rate.

4.1. Main Findings of Variables

The issues discussed in the studies that were included in the analyses using consent rate as a dependent and other variable created as independent variables. The amount and direction of effect of those variables in other words factors were explained below (Table 2).

Survey Topic, Country, Year, Type and Target Population Age: were some of the exploratory variables in the models that thought to be not influential. It is not expected that health surveys as a linkage request record will not have a higher rate of consent approval for linkage compared to the other records asked in the survey. That is, both the survey topic and the linkage request record are not statistically significant in explaining the data linkage consent rate. Within these, survey type and target population age have some significance in the regression model explaining consent rates. There are 49 longitudinal and 79 cross-sectional surveys in the data set. The average consent rate of longitudinal surveys is 71.9% and cross-sectional surveys are 77%. longitudinal surveys have a higher return of consent than cross-sectional surveys, likely due to the confidence maintained in the longer period. There are 29.7% of surveys specifically targeting 18 years and older; 35.5% of surveys targeting below 18 years; 34.4% surveys targeting all age groups. The younger population targeted surveys are significantly associated with an average increase of 15.8 in consent rates compared to the older population targeted ones, showing a higher consent linkage approval in younger populations than in older populations.

Survey Mode: Interviewer administered surveys - CATI only, CAPI only, dual &sequential had higher consent rates compared/reference to self-administered surveys. There was 39 CAPI, 53 CATI, 26 self-administered surveys, and 10 surveys on dual and sequential modes in the data with an average consent rate of CAPI, 62.9%; CATI, 86.2%; self-administered, 68% and others 77.5%. CATI surveys are significantly associated with an average increase of 18.2. In summary, CATI mode surveys have on average higher consent rates compared to CAPI, in comparison to self-administered interviews.

Survey Sponsor: There were 85 government-sponsored surveys with an average consent rate of 79.1% and 43 nongovernment surveys with an average consent rate of 67.2%. Government-sponsored surveys had on an average increase of 13.7 in consent rates compared to nongovernment surveys.

Survey Consent Request Type: There were 20 surveys with an implicit consent request type with an average 52.9% consent rate 108 surveys with an explicit consent request type with an average of 79.6% consent rate. Surveys with explicit consent request types were significantly associated with an average increase of 26.9 in consent rates compared to implicit ones.

Linkage Request Placement: There were 41 surveys with the placement of linkage request questions before consent questions with an average consent rate of 87.4%; 84 surveys with the placement of linkage request questions at the end with an average consent rate of 68.6%. The regression model showed that surveys, where the linkage request placement was at the beginning or before the consent question had significantly an average increase of 10 in consent rates compared to surveys with linkage request placement at the end.

Survey Response Rate: The survey response rate and consent rate have a Spearman correlation coefficient of -0.15, indicating that there is almost no association between those two variables. Pearson correlation was checked for the two numerical variables, survey response rate and consent rate. As seen, Table 2 shows that the regression coefficient of

response rate is -0.32 with a standard error of 0.13, which also means that there is a negative association between response and consent rates.

Table 2: Multiple Regression Analysis Results of Consent Behavior Variables

Variables	Categories	Estimates	Std.Err	VIF
Survey Topic	1: Other (ref.)			
	2: Economic	-3,94	7,75	1,73
	3: Health	2,68		
Survey Country	1: Australia, NZ, UK (ref.)			
	2: US, Canada	1,39	6,52	2,39
	3: Germany	-11,67	11,19	
Survey Year	1: Year >=2010 (ref.)			
	2: 2001 < Year <2009	0,59	4,48	1,36
	3: Year <=2000	-1,5	5,26	
Survey Type	1: Cross sectional (ref.)			
	2: Panel, longitudinal, cohort	15,28**	4,59	1,61
Survey Mode	1: Self-administered (ref.)			
	2: CATI only	18,21**	6	1,45
	3: Other (dual, sequential)	1,59	7,62	
	4: CAPI only	1,07	5,87	
Survey Target Population Age	1: All age groups (ref.)			
	2: Age <18	15,78**	5,25	1,55
	3: 18<= Age	0,12	5,23	
Survey Sponsor	1: Nongovernment (ref.)			
	2: Government	13,68**	4,69	1,6
Survey Response Rate		-0,32*	0,13	
Survey Consent Request Type	1: Implicit (ref.)			
	2: Explicit	26,93***	6,93	1,82
Linkage Request Placement	1: At the end			
	2: At the middle & before consent	9,95*	3,91	1,31
Linkage Request Records	1: Other (ref.)			
	2: Economic	4,83	8,44	2,03
	3: Health	0,02	6,03	
Consent Wording	1: Framing (ref.)			
	2: Neutral	8,02	5,22	1,96
Consent Signature and IdInfo	1: Signature and Idinfo (ref.)			
	2: Signature or Idinfo	-12,43	9,38	1,64
	3: None required	-6,23	9,74	

Notes: *p<0,01 **p<0,001 ***p<0,0001

5. Discussion and Conclusion

In this study, a systematic review was performed to access survey literature with consent rate for linkage of survey and administrative data. The literature with this type of consent were

aggregated and summarized and several aspects of the consent question that affect consent rates were discovered.

Based on all of this information, four factors -survey mode, survey sponsor, response rates, and linkage request placement- were supported by the results of previous research. In addition, explicit versus implicit consent and written versus oral consent forms were different than previous. A higher consent rate for explicit consent requests, or no differences between oral and written consent forms, is likely related to some other characteristic dimensions that can be explored in further research.

Results on survey mode show that respondents still prefer human interaction, although new technologies such as online web surveys limit this to some extent. Even though it is not face to face, having a possibility for communication with interviewers about survey study via telephone (CATI) increases the chance to receive higher consent approvals. Interviewers can help respondents overcome their lack of knowledge and provide them with the descriptions they need to make an informed decision, which can ultimately lead to higher consent rates for data linkage. In addition to the security concerns in online platforms, the necessity to do their reading and understanding seems to be a task to do for the respondents which they are not always willing to do. Face-to-face contact with respondents works well to get consent for linkage, similar to getting a response (Jenkins et al., 2006).

Results on sponsors, linkage request placement, consent request type and survey type prove once again the importance of trust for the participants. As known, there can be a variety of reasons for taking part as a respondent, wherein on some occasions, government sponsored surveys with a sense of obligation to participate can be a stress factor for respondents or anything else (Linsky, 1975; Goyder, 1985; De Leeuw & Heer, 2002). Clearly indicating consent question at the beginning, maintaining a longer correspondence of more than one period as in panel surveys and government being the main organization to trust likely leads to higher consent approval for linkage. Asking for consent as early as possible for panel surveys like HRS is observed to result in higher rate of positive consent approval (Sakshaug, 2021). Longitudinal surveys have a higher consent rate than cross-sectional surveys. If the survey organization in panel surveys -by giving detailed information regarding consent- builds a rapport with respondents and also by mentioning the period of the survey, they already create some kind of trust. In addition to that, explicitly asking for consent rather than implicit also supports trust mechanism. Therefore, as further research, that would be interesting to look into interactions between some trust related variables once enough sample size is reached.

Although the literature has been trying to explain the consent issue in a similar framework to the non-response theory, the behavioral characteristics of survey participation and consent for linkage are not necessarily the same. The contribution of factors such as effective interviewers, advance letters, and refusal conversion efforts to unit response and willingness to consent to administrative record linkage is predicted to be positively related (Groves et al., 2004). As opposed to general belief, this research shows that lower response rate has a higher consent for linkage approval rate than surveys with a higher response rate. Respondents can be “willing” to answer the survey questions, but they are not fine with sharing their private information by approving the consent for linkage. Thus, even though the response rates are

high in such cases, consent rates can be less. Another argument would be that in a survey with a lower response rate, sample respondents are already resistant at the response-giving phase, the remaining who respond have a higher consent.

In summary, the results of our analysis strengthen the importance of trust built with the survey participants in every field. Trusting the survey, which they participate, opens the doors for survey researchers for correspondence and commitment to a following step as consent linkage which is their confidential information at the end. Thus, any survey study by using all possible resources should aim building trust with respondents at first stage to maintain positive returns for higher consent rates.

Typically, results are subject to some limitations. First, the research only in the language of English is considered. There is a possibility to have surveys with consent asked in other languages speaking countries as well. However, the consent request, which is the output of detailed research and strategies, is relatively more commonly applied in English-speaking countries. Thus, this is not a drawback. However, this study, being a systematic review with extra statistical analysis, is interpreted within the frame of mentioned studies. It is also the largest of its kind in the systematic review of consent rates.

Despite these limitations, results are valuable to researchers investigating the consent behavior for at least two reasons: 1) they are the first to offer a systematic review of this large sample on consent rates relying on the survey literature; 2) they identify some of the key factors related to building trust with survey organization that are associated with higher consent rates. Therefore, results can provide some useful insights for researchers when designing their survey studies.

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Author Contributions: author contributions are below;
Introduction: 1. Author %70, 2. Author %30
Literature: 1. Author %70, 2. Author %30
Methodology: 1. Author %70, 2. Author %30
Conclusion: 1. Author %70, 2. Author %30