

Real and Perceived Discordance in Physicians and U.S. Adults' Beliefs Regarding the Causes and Controllability of Type 2 Diabetes

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Abstract

Discordance between physicians and patients' health beliefs can impede health communication efforts. However, little research considers physicians' *perceptions* of patient beliefs, despite the importance of perceptions in shaping communication. In the current work, we examine instances of actual and perceived discordance between physicians and U.S. adults' beliefs regarding the causes and controllability of type 2 diabetes. 229 family physicians completed an online survey measuring their health beliefs and perceptions of their patients' beliefs. Physicians' responses were contrasted against beliefs from a national survey sample of 1,168 U.S. adults. T-tests assessed whether (a) physicians' beliefs diverged from the national sample's beliefs (actual discordance), (b) physicians perceived that their health beliefs diverged from their patients' beliefs (perceived discordance), and (c) physicians' perceptions of patient beliefs diverged from the national sample's beliefs (accuracy of perceived discordance). Findings revealed evidence of actual discordance; compared to the national sample, physicians were more likely to attribute type 2 diabetes to genes (versus lifestyle factors) and perceived greater control over developing diabetes. Moreover, although physicians perceived discordance between their own and their patients' beliefs, data from the national sample suggested that these gaps were less substantial than physicians expected. In particular, findings showed that physicians generally overestimated discordance, expecting that people would be less likely to (1) attribute the development of diabetes to lifestyle factors (versus genes), and (2) perceive control over developing diabetes, than was actually reported. Implications of actual and perceived discordance for effective health communication and patient education are discussed.

Keywords: discordance; doctor-patient communication; health communication; health beliefs; type 2 diabetes; perceptions; patient education

Real and Perceived Discordance in Physicians and U.S. Adults' Beliefs Regarding the Causes and Controllability of Type 2 Diabetes

Effective physician-patient communication has a central role in facilitating high-quality clinical encounters. For example, alignment of physician and patient beliefs has been identified as an important feature of communication that is associated with improved clinical decision-making, quality of care, and patient behavior (e.g., adherence to recommendations; Clucas et al., 2010; Janz et al., 2004). Given that high-quality communication has important implications for a myriad of health outcomes, understanding factors that undermine communication is a particularly important goal for health communication scholars. In the current paper, we explore one specific barrier to effective communication: discordance in physician-patient health beliefs. Whereas belief concordance denotes agreement in physicians and patients' beliefs, such that physicians and patients report beliefs that are similar in direction and degree, belief discordance refers to differences in physician-patient beliefs (either in direction or degree).

To date, prior research has focused primarily on identifying instances of actual discordance in physicians and patients' beliefs (e.g., control over health outcomes; Christensen et al., 2010). However, equally compelling, yet unanswered questions, are (a) whether physicians *perceive* discordance from their patients' beliefs, and (b) the extent to which these perceptions are accurate. Examining perceptions of discordance is critical for health communication because information sources often design and disseminate information to target audiences based on their perceptions of the target audience's beliefs (Maibach & Parrott, 1995). As a result, physicians' perceptions of patient beliefs, rather than patients' actual beliefs, may be the starting point for conversations; thus, perceptions reflect an important, yet understudied, factor influencing communication.

The present work examines belief discordance in the context of type 2 diabetes given that type 2 diabetes is a growing epidemic that manifests largely due to modifiable lifestyle risk factors (e.g., physical inactivity and unhealthy nutrition habits; American Diabetes Association, 2017). Consequently, many communication efforts specifically target people who have diabetes risk factors, but have not yet developed diabetes, in order to prevent diabetes onset (Albright & Gregg, 2013; Diabetes Prevention Program Research Group, 2002). Therefore, the growing prevalence of type 2 diabetes, as well as the consequences associated with suboptimal physician-patient communication, underscore the importance of mitigating factors that may impede physicians' ability to effectively educate patients about diabetes. To address this aim, the current report examines instances of actual and perceived discordance in physician-patient beliefs, as well as the accuracy of the perceived discordance, to identify gaps that can undermine health communication and subsequently, diabetes prevention in the United States.

The Importance of Accurately Perceiving Audience Beliefs

“Knowing one’s audience” has been identified as a fundamental tenet of message development (Wilson, 2007). Because information exchange is a dynamic process, a message source must consider characteristics of the target audience that can directly influence how recipients decode and respond to the message. Although accounting for audience characteristics should increase receptivity to the message, misperceiving audience characteristics may unintentionally undermine message efficacy. For instance, public health campaigns often highlight healthcare disparities to signal relevance for high-risk audiences (e.g., members of the LGBTQ+ community); however these campaigns can inadvertently increase anger among recipients who perceive that their group is being misrepresented (Lee et al., 2017; see also Derricks & Earl, 2019). Thus, although message developers often customize messages to reach a

specific audience, these efforts may fail to yield the intended benefits when perceptions of the audience's characteristics (e.g., their personal goals and values) are inaccurate (Pope et al., 2017). For example, in a clinical context, physicians' efforts to communicate pertinent information about type 2 diabetes to patients may be ineffective (or backfire) when communication is based on misperceptions about patients' health beliefs. As such, developing a deeper understanding of barriers that undermine physician-patient communication requires exploration of both actual and perceived discordance.

Understanding How Actual and Perceived Discordance Influences Communication

Although many clinicians rely on effective communication to enhance patient education and motivate behavior change, these efforts may be impeded if patients' beliefs regarding the development of diabetes are discordant from physicians' beliefs (Heisler et al., 2003). For example, if physicians believe that diabetes is due to lifestyle factors but patients attribute diabetes to genes, communication may be negatively impacted because physicians may emphasize behavioral recommendations that patients deem futile. In support of this idea, prior research shows that belief discordance between physicians and patients can result in lower-quality communication, unmet expectations, reduced satisfaction with the provider, worse self-management of health conditions, and decreased intentions to adhere to treatment recommendations (Christensen et al., 2010; Coran et al., 2013; Street et al., 2009; Weller et al., 2013). Given the importance of these outcomes for patient care, extant research has focused primarily on identifying instances where actual gaps in beliefs emerge.

Although substantial research has examined instances of actual discordance (Bleich et al., 2000; Colgan et al., 2015; Meropol et al., 2003), little work considers how physicians' *perceptions* of patient beliefs may contribute to the development of these gaps. We theorize that

efforts to communicate with patients may be further impaired if physicians' expectations of patients' beliefs, which are often used to shape conversations about prevention and treatment recommendations, differ from patients' actual beliefs (Street et al., 2007; Van Ryn & Burke, 2000). Therefore, although physicians' perceptions are not inherently problematic, inaccurate perceptions can undermine effective communication. For instance, if both physicians and patients believe that diabetes is due to lifestyle factors, but physicians misperceive that patients attribute diabetes to genes, physicians may overemphasize the importance of behavioral recommendations. This approach, in turn, may make patients feel patronized and subsequently lead to disengagement from the recommended behavior (Fogarty & Youngs, 2000).

As such, assessing the accuracy of physicians' perceptions has particularly important implications for subsequent communication and patient outcomes (Hall et al., 2014; Platt & Keating, 2007). For example, physicians who overestimate patients' health literacy may fail to address gaps in understanding or utilize jargon that can reduce patients' accessibility to health knowledge (Kelly & Haidet, 2007). Moreover, the accuracy with which medical students perceive nonverbal behavior can directly impact their communication behaviors (e.g., posture, nodding, and speech fluency) and rapport with patients (Hall et al., 2009). Therefore, prior research suggests that perceiving discordance may be just as consequential as instances of actual discordance for health communication, particularly when these perceptions are inaccurate. The knowledge gained from examining (a) physicians' perceptions of patient beliefs, and (b) the accuracy of these perceptions, can more clearly elucidate barriers to communication that may undermine effective diabetes prevention.

The Importance of Assessing Discordance in Health Beliefs

Understanding discordance in physician-patient beliefs is critical because health beliefs

can shape communication and predict subsequent behavior (Champion & Skinner, 2008; Fujioka & Stewart, 2013). In the context of type 2 diabetes, prior research has identified instances of discordance between physicians and patients' treatment goals, preferred treatment strategies, perceived barriers to diet and exercise, and perceived adherence to treatment recommendations (Boyer et al., 1996; Freeman & Loewe, 2000; Heisler et al., 2003; Shultz et al., 2001). However, limited research investigates discordance between physicians and patients' beliefs regarding the (a) causes, and (b) controllability of diabetes, despite the importance of these beliefs for health communication and diabetes prevention. Past research has documented the implications of these beliefs for other health conditions and behavior; for instance, physicians' beliefs about the causes and controllability of obesity and smoking behavior influence whether they communicate relevant health risks to patients, the types of treatments they discuss, and the likelihood of providing guideline-concordant care (Ogden & Flanagan, 2008; Phelan et al., 2015; Thompson et al., 1993). Moreover, patients' beliefs about the causes and controllability of health conditions predicts their utilization of preventive healthcare services, compliance with treatment recommendations, and engagement in self-monitoring behavior (Bundek et al., 1993; Fishbein & Cappella, 2006; Goodwin et al., 1999). Given these implications, it is crucial to identify discordance for these particular health beliefs, which may be especially likely to undermine diabetes prevention efforts.

Current Study

The current report examines beliefs about the perceived causes and controllability of type 2 diabetes by comparing and contrasting (a) physicians' beliefs, (b) physicians' perceptions of non-diabetic patients' beliefs, and (c) beliefs from a national sample of U.S. adults without diabetes. This study focused specifically on beliefs for people without diabetes to identify the

ways in which physicians' perceptions may shape patient education and preventive care.

Additionally, because communication with non-diabetic patients is more likely to emphasize risk factors and the importance of personal behavior to motivate behavior change (relative to communication with patients who have already been diagnosed with diabetes), the current study aims are particularly relevant for communication with non-diabetic adults (Evans et al., 2007).

Thus, the primary research questions are as follows:

RQ1: To what extent do physicians' beliefs about the perceived causes and controllability of type 2 diabetes diverge from the general public's beliefs?

RQ2: Do physicians perceive that their health beliefs diverge from patients' beliefs (e.g., by rating patients' beliefs differently from their own)?

RQ3: To what extent do physicians' perceptions of patient beliefs diverge from the general public's beliefs (e.g., are physicians' perceptions of the discordance in beliefs accurate)?

These comparisons have important implications for health communication and prevention efforts; identifying actual instances of belief discordance (RQ1) is critical for directing patient education and communication to increase concordance and improve patient outcomes.

Physicians' perceptions of patient beliefs (RQ2), however, may influence where physicians believe the starting point for these conversations are; specifically, physicians may tailor patient education based on what they *believe* patients know, rather than what patients *actually* know.

Given this possibility, it is particularly important to assess whether physicians' perceptions are accurate (RQ3); under or overestimating gaps in beliefs may cause physicians to tailor communication ineffectively and result in worse patient communication.

Method

National Sample

To assess discordance, we used data from a national sample of non-diabetic adults that could be compared against physicians' responses.

Participant Recruitment

The presented data is based on a secondary analysis of selected variables from the Genetic Explanations for Type 2 Diabetes: Prevention Implications project, which focused on respondents' beliefs, attitudes, and behaviors related to obesity and type 2 diabetes. The study was approved by the University of Michigan Health and Behavioral Sciences Institutional Review Board. Professionally trained interviewers obtained informed, verbal consent and conducted structured telephone interviews with participants through list-assisted, random-digit dialed, landlines selected by a computer between August 2011-February 2012.¹

Survey Participants

This national survey included a sample of 1,168 non-diabetic U.S. adults aged 18-75 who self-identified as non-Hispanic Black ($n = 387$), non-Hispanic White ($n = 396$), or Mexican American ($n = 385$; see Table 1 for demographics).² The inclusion criteria were individuals within the 48 contiguous states of the U.S. (excluding Hawaii and Alaska) who (a) self-identified as Black, White, or Mexican American, (b) were between the ages of 18 and 75, and (c) did not have a diagnosis of any kind of diabetes, excepting a history of gestational diabetes.³

¹ To address concerns about the time lag in data collection with the physician survey, we conducted a follow-up replication survey using Amazon Mechanical Turk. Additional details about this study are reported in the analytic strategy and online supplement.

² A sample of 1,201 participants (approximately 400 per racial/ethnic group) were recruited. During data cleaning, 33 participants were dropped from analysis due to ineligibility (diabetic status: $n = 4$; race/ethnicity status: $n = 29$).

³ In this paper, non-diabetic adults are defined as individuals who may have diabetes risk factors, but whose HbA1c levels have not reached a clinical threshold of concern. Although our sample included individuals who were pre-diabetic (e.g., individuals who have elevated HbA1c levels that can be managed with lifestyle changes alone), patients who have been diagnosed with diabetes were excluded.

Participants were recruited using a stratified sampling technique. The sample was stratified at four geographic levels: census region, state, county, and telephone exchange. After determining the eligible population size and corresponding race/ethnicity distributions for each telephone exchange, each exchange was then assigned to one of seven strata based on the approximately equivalent diabetes prevalence rates, telephone usage, and detailed race/ethnicity distributions. Additional details about the characteristics of the generated strata are reported in the supplement (see Appendix A).

To recruit participants, trained interviewers dialed landline telephone numbers and conducted a screening process. The individual who picked up the telephone served as the “informant” and answered screener questions (e.g., age, diabetes status) about all of the members of their household to determine who was eligible to participate in the study. If more than one eligible member was identified, the computer would randomly choose a respondent from the eligible household members (65% of the time, the computer chose the “informant”). If the computer selected a household member who was not the informant, that individual re-confirmed their eligibility by completing the screening questions (e.g., “Have you ever been told by a doctor or health professional that you had diabetes?”). Participants reported their race/ethnicity at the end of the survey. An overall, unweighted response rate of 40.8% was achieved based on the American Association for Public Opinion Research (AAPOR) RR3 formula (AAPOR, 2009).

Measures

To assess the general public’s health beliefs, participants answered survey items regarding the perceived (a) causes of type 2 diabetes (4 items; e.g., How much is your chance of getting type 2 diabetes due to what you eat?; 1 = *Not at All*; 6 = *All*), and (b) controllability of developing type 2 diabetes (3 items; e.g., Someone with type 2 diabetes will have their illness for

the rest of their life; 1 = *Strongly Disagree*; 5 = *Strongly Agree*). Complete wording for all survey items is reported in the online supplement (see Appendix B).

Survey items were derived from similar items used in previous research (Cole et al., 2007; Keller, 2005; O'Connell & Price, 1985). To ensure comprehension and validity of the measures, the survey items were rigorously piloted both informally and with professional interviewers using a sample of respondents who were demographically similar to the study sample.

Physician Sample

Participant Recruitment

After obtaining approval from the Touro University California Institutional Review Board, an online Qualtrics survey was embedded in a monthly electronic newsletter and disseminated to family physicians through the American College of Osteopathic Family Physicians (ACOFPP) email listserv between December 2016 and January 2017. A reminder email was sent to the listserv two weeks after the initial invitation, and data collection ceased the week after no new responses were collected. Survey instructions explicitly recruited family physicians who managed the care of patients with type 2 diabetes because they have sufficient knowledge of the disease course, as well as how to treat and prevent diabetes.

Participants

229 physicians completed the survey and were included in the final sample (see Table 1 for physician demographics).

Measures

Physicians were told that the study assessed their health beliefs and methods for communicating information about type 2 diabetes to non-diabetic patients. The survey focused on non-diabetic patients to understand how physicians familiar with type 2 diabetes perceive the

health beliefs of patients for whom preventive care is most impactful.

To assess their health beliefs, physicians completed survey items that were derived from the survey conducted for the national sample of U.S. adults.

Physicians' health beliefs. Physicians reported their beliefs about (a) the causes of type 2 diabetes (4 items; e.g., In general, how much is a patient's chance of getting type 2 diabetes due to what he/she eats; 1 = *Not at All*; 6 = *All*), and (b) the controllability of type 2 diabetes (3 items; e.g., A person with type 2 diabetes will have this illness for the rest of his/her life; 1 = *Strongly Disagree*; 5 = *Strongly Agree*).

Physicians' perceptions of patient beliefs. Physicians also reported their perceptions of their patients' beliefs regarding (a) the causes of type 2 diabetes (4 items; e.g., How much do your non-diabetic patients believe their chance of getting type 2 diabetes is due to what they eat; 1 = *Not at All*; 6 = *All*), and (b) the controllability of type 2 diabetes (3 items; e.g., How much would a non-diabetic patient agree with this statement: Someone with type 2 diabetes will have this illness for the rest of their life; 1 = *Would Strongly Disagree*; 5 = *Would Strongly Agree*). The content reflected in these survey items directly matched the items assessing physicians' own health beliefs.

Analytic Strategy

Data for the national sample was weighted to be nationally representative of the targeted racial and ethnic groups. The researchers generated sample weights to account for limitations that arose from participant recruitment. Specifically, these weights were used to (a) compensate for unequal selection probability across sampled telephone numbers, and (b) reduce nonresponse and noncoverage errors. Because nonresponse and noncoverage adjustments produced exceptionally large weights for individual cases that were overly influential on analyses, weight

trimming was used to reduce the variance in the estimates. In addition to these adjustments, ratio-raking estimation was used to increase the representativeness of the target populations included in the dataset. Additional details regarding the creation of the sampling weights are reported in the online supplement (see Appendix A).

Physician survey data were analyzed using SPSS (version 24.0). Because data from the national sample used complex sampling weights, weighted means and standard errors were obtained using Stata (version 14.2). Paired t-tests compared physicians' health beliefs with their perceptions of their patients' beliefs, and independent samples t-tests compared the national sample's health beliefs with (a) physicians' beliefs, and (b) physicians' perceptions of patient beliefs. Paired t-test and independent samples t-test comparisons were analyzed using SPSS (paired samples t-tests and summary independent samples t-tests, respectively).

Although we attempted to collapse the survey items into indices, we found low-to-adequate reliability for indices measuring the perceived causes ($\alpha = 0.38-0.70$) and controllability ($\alpha = 0.41-0.56$) of type 2 diabetes across the national and physician samples. Given the nuance associated with the individual items, these items remained separate for data analysis.

Additionally, in the survey conducted for the national sample, a small subset of participants generated responses that were not part of the initial response options (e.g., "I neither agree nor disagree"). We included these volunteered responses in the physician survey to directly match the range of responses reported by the national sample. However, given the disproportionately higher rates at which physicians chose these "volunteered" responses, two adjustments were made at the data analysis stage. First, we collapsed across "Almost All" and "All" (a volunteered response), and second, we dropped any responses of "Neither agree nor Disagree" (a volunteered response). The adjusted survey response scales, as well as means and standard errors for

participants' responses, are presented in Table 2. Effect sizes are reported as Cohen's *d*.

MTurk Sample: Replication of the National Sample

To mitigate concerns about the time lag in data collection between the physician and national surveys, we conducted a follow-up survey in September 2018 using 101 non-diabetic U.S. adults recruited via Amazon Mechanical Turk (MTurk). Recruitment efforts sought to match the racial and ethnic demographics of the national sample after sampling weights were applied (82% non-Hispanic White, 10% non-Hispanic Black, and 8% Mexican American). In addition to completing survey items that directly matched the items answered by the national sample, participants were asked about their experiences discussing their health beliefs with their primary care providers.⁴ Analyses using the MTurk sample generally replicated the findings observed for the national sample, and any discrepancies are reported below. Additional details about these findings are reported in the online supplement (see Tables S1a-S1b).

Results

To assess physicians and the general public's beliefs about the causes and controllability of type 2 diabetes, comparisons were made at three levels: (a) physicians' beliefs versus the national sample's beliefs (actual discordance), (b) physicians' beliefs versus their perceptions of patient beliefs (perceived discordance), and (c) physicians' perceptions of patient beliefs versus the national sample's beliefs (accuracy of perceived discordance).

Therefore, each set of beliefs is analyzed in three parts (see Figures 1-2). We will first begin by comparing physicians and the national sample's beliefs to identify instances of actual

⁴ Due to a manual error, one item ("In your opinion, is type 2 diabetes due more to a person's genes or more to their lifestyle and health habits?") was not included in the survey. Moreover, to avoid losses in statistical power, survey response scales did not include responses that were volunteered by the national sample (e.g., "Neither Agree nor Disagree").

discordance (e.g., do physicians and U.S. adults' beliefs diverge from each other?). This comparison (i.e., actual discordance) reflects the primary focus of extant literature. Next, we will transition to our main comparisons of interest: (1) whether physicians perceive discordance between their own and their patients' beliefs (e.g., do physicians believe that their patients' beliefs diverge from their own?), and (2) whether these perceptions are accurate (e.g., do physicians' perceptions of discordance match the degree of discordance that actually exists?).

Perceived Causes of Type 2 Diabetes

Comparing Physicians' Beliefs with the National Sample's Beliefs

Physicians' beliefs about the causes of type 2 diabetes generally diverged from the national sample's beliefs. Compared to physicians, the national sample was less likely to believe that the development of type 2 diabetes is due to genes, $t(1386) = 9.12, p < .001, d = .49$. Moreover, when weighing the causes of type 2 diabetes to genetics, versus lifestyle and health habits, the national sample was more likely to attribute diabetes to lifestyle factors than physicians, $t(1373) = -2.34, p = .019, d = -.13$. However, the national sample was also less likely than physicians to attribute the development of diabetes specifically to diet and exercise, $t_{\text{diet}}(1385) = 9.72, p < .001, d = .52; t_{\text{exercise}}(1388) = 3.75, p < .001, d = .20$.

Collectively, findings suggest that compared to physicians, U.S. adults are (a) less likely to attribute the development of diabetes to genetics, and (b) more likely to attribute diabetes to lifestyle factors. However, although U.S. adults were *more* likely to attribute diabetes to lifestyle factors broadly, they were also *less* likely to attribute diabetes to diet and exercise specifically.

Comparing Physicians' Beliefs with Their Perceptions of Patient Beliefs

Physicians perceived that their beliefs about the causes of type 2 diabetes were strongly discordant from their patients' beliefs. Physicians reported that, compared to themselves, their

patients would be more likely to (a) believe that diabetes is caused by genetics, $t(228) = -3.06$, $p = .002$, $d = -.21$, (b) believe that diabetes is caused by genetics more so than lifestyle and health habits, $t(227) = 10.83$, $p < .001$, $d = .72$, and (c) underestimate the role of diet and exercise in the development of diabetes, $t_{\text{diet}}(228) = 10.58$, $p < .001$, $d = .71$; $t_{\text{exercise}}(228) = 10.48$, $p < .001$, $d = .70$. Thus, physicians generally perceived that patients would (1) overestimate the role of genetics, and (2) underestimate the role of lifestyle factors in developing type 2 diabetes.

Comparing Physicians' Perceptions of Patient Beliefs with the National Sample's Beliefs

In direct contrast to physicians' perceptions, the national sample was (a) less likely to believe that genetics contributed to the development of type 2 diabetes, $t(1386) = 11.95$, $p < .001$, $d = .64$, and (b) more likely to believe that diabetes is caused by lifestyle and health habits (versus genetics), $t(1372) = -14.34$, $p < .001$, $d = -.77$. Although physicians accurately perceived beliefs regarding the role of diet in developing diabetes, $t(1385) = -0.40$, $p = .688$, $d = -.02$, the national sample was more likely to attribute the development of diabetes to exercise than physicians expected, $t(1388) = -7.33$, $p < .001$, $d = -.39$.

Therefore, although physicians perceived discordance between their own and patients' beliefs, data from the national sample indicated that these perceptions were generally inaccurate in direction or degree. Specifically, physicians (1) overestimated the extent to which people would attribute the development of diabetes to genes, and (2) underestimated the extent to which people would attribute the development of diabetes to exercise and lifestyle factors broadly. However, physicians accurately perceived the extent to which people would attribute the development of diabetes to diet.

Although study results using the national sample revealed a non-significant finding regarding the role of diet, findings using the MTurk sample showed a different pattern.

Specifically, means revealed that MTurk participants were more likely to attribute the development of diabetes to diet than physicians expected, $t(328) = -3.63, p < .001, d = -.40$.

Perceived Controllability of Type 2 Diabetes

Comparing Physicians' Beliefs with the National Sample's Beliefs

The national sample reported more fatalistic beliefs about diabetes than physicians. In particular, they were more likely to (a) believe that they could not avoid diabetes if it ran in one's family, $t(1376) = -6.08, p < .001, d = -.33$, (b) believe that people with diabetes would have the illness for the rest of their life, $t(1338) = -3.48, p = .001, d = -.19$, and (c) report having less control over developing diabetes, $t(1391) = 6.09, p < .001, d = .33$. Taken together, these findings identify real, significant gaps between physicians and the general public's beliefs about the controllability of type 2 diabetes.

In contrast to the significant comparison revealed for the national sample, findings using the MTurk sample indicated that physicians and MTurk participants were equally likely to believe that people with diabetes would have the illness for the rest of their life, $t(287) = -1.43, p = .155, d = -.17$.

Comparing Physicians' Beliefs with Their Perceptions of Patient Beliefs

Physicians expected that, compared to themselves, patients would report more fatalistic beliefs about type 2 diabetes. Thus, physicians perceived that patients would (a) be more likely to believe that if diabetes runs in a person's family, there's not much they can do to avoid getting it, $t(170) = -18.43, p < .001, d = -1.41$, (b) be more likely to report beliefs that people with diabetes would have the illness for the rest of their life, $t(161) = -5.56, p < .001, d = -.44$, and (c) underestimate how much control they have over developing diabetes, $t(228) = 12.47, p < .001, d = .84$. Thus, physicians perceived that patients are more likely to hold fatalistic beliefs

about developing type 2 diabetes than themselves, consistent with the gaps that actually exist.

Comparing Physicians' Perceptions of Patient Beliefs with the National Sample's Beliefs

Although physicians accurately perceived the direction of patients' beliefs regarding the controllability of type 2 diabetes, they generally overestimated the extent to which people believe that diabetes is uncontrollable. Responses from the national sample revealed that, compared to physicians' expectations, U.S. adults (a) were less likely to endorse beliefs that they cannot avoid diabetes if it runs in one's family, $t(1336) = 10.18, p < .001, d = .56$, (b) were less likely to endorse beliefs that people will have diabetes for the rest of their life, $t(1342) = 2.78, p = .006, d = .15$, and (c) perceived greater control over developing diabetes, $t(1391) = -5.91, p < .001, d = -.32$. Therefore, findings show that physicians overestimated discordance between their own and patients' beliefs regarding the controllability of diabetes, perceiving these gaps to be larger than they actually are.

General Discussion

Although physicians are motivated to engage patients in high-quality communication to promote preventive care, discordant health beliefs between physicians and patients can impede this aim, facilitating poorer patient outcomes (Coran et al., 2013). The present work explored discordance in the context of type 2 diabetes by identifying actual discordance in physicians and U.S. adults' beliefs regarding the causes and controllability of type 2 diabetes. Moreover, this study examined additional factors that can undermine communication: whether physicians perceive discordance between their own and patients' beliefs, and the extent to which these perceptions are accurate. Thus, in addition to identifying actual discordance in physician-patient beliefs, which has been the primary focus of extant literature, this work also offers significant theoretical and practical value by assessing novel factors (e.g., overestimations of discordance)

that can negatively affect physicians' approaches to communication.

Across study measures, physicians perceived that their own beliefs regarding the causes and controllability of type 2 diabetes were strongly discordant from patients' beliefs. Although comparisons between physicians' and the national sample's responses affirmed that discordance actually exists, analyses also revealed that physicians' perceptions of patient beliefs were largely inaccurate in direction or degree. Regarding the perceived causes of developing type 2 diabetes, physicians expected that their patients would underestimate the role of lifestyle factors and overestimate the role of genetics. However, in direct contrast to physicians' expectations, U.S. adults were (a) more likely to attribute diabetes to lifestyle factors (versus genes), and (b) less likely to attribute diabetes to genetics. Therefore, although physicians believed that people would be more likely to attribute diabetes to genes (versus lifestyle factors), the opposite pattern emerged.

Study findings also assessed belief discordance for two specific lifestyle factors: diet and exercise. Although U.S. adults were less likely to attribute diabetes to diet and exercise than physicians, the extent to which physicians accurately perceived this discordance was mixed. Specifically, results showed that physicians overestimated discordance for exercise, such that the national sample was more likely to attribute diabetes to exercise than physicians expected. However, physicians accurately perceived the degree of discordance for diet.

Analyses regarding the controllability of type 2 diabetes revealed similar patterns of discordance. In particular, U.S. adults were less likely to believe that diabetes is controllable (relative to physicians). Examining physicians' perceptions of patient beliefs revealed that although physicians accurately perceived the direction of people's beliefs, they largely overestimated discordance. Thus, relative to physicians' expectations, U.S. adults reported

having greater control over developing diabetes, were less likely to endorse the inevitability of familial diabetes, and were less likely to believe that someone with diabetes will have the condition forever. Taken together, the instances of perceived discordance observed across measures demonstrate that where physicians *think* their patients are is not reflective of where patients *actually* are, and this inaccuracy has implications for the quality of subsequent communication.

The research questions tested in this manuscript are theoretically important. The current work identifies a barrier to communication, inaccurate perceptions of patients' beliefs, that contributes to our understanding of the dynamics between the message source and recipient. Although the message source may seek to communicate a specific message to target audiences (e.g., physicians encouraging patients to eat healthy foods and exercise regularly to prevent the development of type 2 diabetes), these efforts may fail to achieve their intended effects when the source's perception of audience characteristics (e.g., their beliefs) is inaccurate (Hall, 1999).

Study findings showing the inaccuracy of physicians' perceptions also demonstrate the importance of studying physician perceptions in the context of health communication and disease prevention. Within prior research, perceptions have consistently been identified as a predictor of subsequent behavior (Hall et al., 2009; Kelly & Haidet, 2007; Van Ryn et al., 2006). For instance, physicians engage in greater patient-centered communication with patients whom they perceive to be better communicators or more likely to adhere to recommendations (Street et al., 2007). Moreover, physicians' perceptions of their patients' education levels and physical activity preferences can directly impact their treatment recommendations (e.g., offering surgery to patients with coronary artery disease; Van Ryn et al., 2006). Because physicians' perceptions

have important implications for patient outcomes, these perceptions can be particularly problematic when they do not reflect patients' actual beliefs or behaviors.

This work also has several practical implications. Specifically, the present research identifies two possible points of intervention, physicians' perceptions and patients' beliefs, for improving health communication and diabetes prevention. For example, study findings revealed that physicians overestimated discordance between their own and patients' beliefs across survey items. In the context of physician-patient communication, one direct implication of these presumptions is that physicians may expend more time than is necessary focusing on small gaps in health beliefs, which may detract from their ability to discuss health beliefs where there are more substantive gaps (e.g., the role of diet in developing diabetes). Furthermore, overestimating discordance may discourage physicians from initiating conversations with patients if physicians expect that they will be unable to bridge gaps in beliefs, particularly when time is limited. Finally, overestimating discordance can elicit reactive audience effects, which may result in more negative physician-patient relationships, increased stress, and worse adherence to treatment recommendations (Coran et al., 2013; Jagosh et al., 2011).

Moreover, findings showing that physicians overestimate discordance in health beliefs suggest that one route through which physicians can improve communication is by shifting their approach to patient encounters. Specifically, recognizing that patients' beliefs are more similar than anticipated presents an opportunity for physicians to leverage communication to build rapport and trust with patients (e.g., by acknowledging patients' expertise). This shift may be particularly effective given that lack of agreement (e.g., about the nature and treatment of illness) is often a source of frustration for physicians during clinical encounters (Vanderford et al., 2009).

Furthermore, this work has implications for the strategies that physicians use to discuss

health beliefs with patients. Our findings regarding U.S. adults' beliefs about the role of lifestyle factors suggests that physicians should be more specific in their framing of the causes of diabetes (e.g., explaining what constitutes lifestyle factors) to ensure that patients understand the role of specific health behaviors (e.g., diet and exercise) in developing diabetes. Moreover, physicians should engage in behavior that encourages active patient participation because patient participation may be one way to (a) reduce actual discordance in physician-patient beliefs, and (b) change physicians' perceptions of patient beliefs (Street & Haidet, 2011).

Additionally, this work suggests that physicians should take care to evaluate or discuss beliefs with each patient to enhance communication. Despite recommendations for physicians to inquire about patients' health beliefs during clinical encounters (Hashim, 2017), findings from our MTurk sample revealed that this practice may be uncommon. In particular, although 82.2% of the MTurk sample reported that their primary care physician(s) "Sometimes", "Often", or "Very often" gives them information about health diseases or conditions, 60.4% reported that their physician "Never" or "Rarely" asks about their health beliefs (see online supplement for additional details). These findings are further supported by research showing that although family physicians spend approximately 20% of acute and chronic illness visits on health education, only 1.2% of the visit is spent assessing patients' health knowledge (Yawn et al., 2003). Thus, this work also identifies opportunities for physician training; because efforts to individuate patients (e.g., by motivational interviewing) are often challenging due to time constraints (Velasquez et al., 2000), physician training should identify efficient methods for assessing patient beliefs when time is limited.

Limitations and Future Directions

Although the effect sizes, consistent with other research, were small-to-medium in

magnitude, small effect sizes can have important practical and clinical significance (Prentice & Miller, 1992). For instance, discordant health beliefs that lead to miscommunication among physicians and patients can directly hinder communication and prevention efforts, especially over time (Roter, 2000). Another limitation of this work is a low physician response rate (2.7%). Although we were unable to determine how many physicians actually saw the survey invitation, this response rate is somewhat comparable to other response rates that have been obtained when surveying health professionals online (Braithwaite et al., 2003; Ernst et al., 2018). It is possible that the physicians who self-selected into the study may have been those who felt the most confident in their knowledge and ability to manage their patients' diabetes. In support of this idea, previous research suggests that the individuals who self-select into research studies and/or behavior interventions tend to have more favorable characteristics (e.g., better health, more knowledge or confidence in the relevant domain) than individuals who do not enroll (Ludy et al., 2018; van Heuvelen et al., 2013). Consistent with these findings, the physicians included in our sample reported high confidence in their knowledge and ability to communicate with high-risk, non-diabetic patients ($M = 4.22$, $SD = 0.58$ on a 5-point Likert scale). As such, it is possible that the actual and perceived discordance in health beliefs observed in this study is actually underestimated (relative to the discordance that may be observed for a sample of physicians who lack confidence in their knowledge and communication abilities).

Another limitation is that the national sample is not matched or directly connected to the physician sample. However, both the physician and patient samples are nationally distributed, decreasing concerns that the effects are localized. In addition, multiple efforts were made to increase the comparability between the physician and national sample, such as using survey items for the physician sample that directly matched the survey items used for the national

sample. Moreover, we attempted to exclude physicians whose patient population was lower than 90% White, Black, or Latinx. However, because the pattern of means was identical after this exclusion, we retained the full physician sample. Furthermore, we acknowledge the 5-6 year time lag in data collection between the physician and national sample surveys. To alleviate concerns about making direct comparisons across samples, we collected additional data using the online MTurk sample. This more recent data collection generally replicated the findings reported for the national sample and offered additional support for our conclusions.

Finally, a limitation of this work is that the survey items asked physicians to report their perceptions of a generalized patient profile, rather than a specific patient. However, assessing physicians' perceptions of the "generalized patient" is critical for understanding health communication efforts because these perceptions are often the starting point for communication. In fact, individuation of a specific patient's beliefs may only occur when physicians (a) are motivated to do so, and (b) have sufficient mental resources (c.f., Fiske & Neuberg, 1989; Pendry & Macrae, 1994). Because clinical encounters often involve time constraints and competing clinical demands (e.g., building rapport, identifying and treating complex illnesses, and coordinating follow-up care), these challenges can diminish physicians' mental capacity and likelihood of listening to patients, increasing reliance on stereotypes (Fiscella & Epstein, 2008; Moskowitz et al., 2012). Consequently, these constraints can increase the utilization of broad (versus more personalized) clinical approaches, which has implications for patient individuation and subsequent interaction quality (Frank & Zeckhauser, 2007; Moskowitz et al., 2012). Thus, assessing beliefs about the generalized patient may reflect the most informative comparison, particularly for understanding how physician perceptions influence health communication.

Future research should test whether the observed discordance in beliefs might be larger or

smaller as a function of source and/or audience characteristics. In particular, future work should aim to replicate the present findings, which focus on physician beliefs, among physician populations who diverge in training and sub-specialty (e.g., endocrinologists) and patient populations who have already been diagnosed with diabetes. Investigating discordance in health beliefs among other populations can offer additional insight into (a) the size of these gaps, and (b) the implications of these gaps for patient populations who may have different needs (e.g., self-management of diabetes). Moreover, future research should test the extent to which levels of concordance and discordance may be influenced by individual-level factors (e.g., patients' socioeconomic status or whether the patient has other comorbid conditions).

Additionally, study findings regarding the perceived causes of type 2 diabetes suggest that what constitutes a lifestyle factor may be a point of miscommunication between physicians and U.S. adults. Specifically, U.S. adults' notion of what constitutes "lifestyle factors" may extend beyond diet and exercise. Therefore, future research should assess people's beliefs about additional lifestyle factors that may contribute to the development of type 2 diabetes.

Finally, future research should test how physicians' beliefs about the perceived causes and controllability of type 2 diabetes translate into communication efforts with patients. In particular, future work should examine how health beliefs regarding the causes and controllability of type 2 diabetes are expressed within clinical settings to investigate the bi-directional exchange of information during clinical encounters (e.g., how communication efforts may shape both physicians and patients' health beliefs simultaneously). For example, physicians who underestimate patients' likelihood of attributing type 2 diabetes to lifestyle factors may overcommunicate information about lifestyle factors, arousing defensiveness in patients. As a result, patients' beliefs may shift in opposition to physicians' remarks (e.g., weakening beliefs

that diabetes is caused by lifestyle factors). Patients' negative responses, in turn, may strengthen physicians' initial beliefs about the role of lifestyle factors in developing type 2 diabetes (e.g., diabetes is driven primarily by patients' unwillingness to consider lifestyle factors). This cyclical process can have a compounding effect, producing large discrepancies between physicians and patients' beliefs over time.

Conclusion

Although physicians perceive discordance between their own and patients' health beliefs regarding the causes and controllability of type 2 diabetes, their beliefs are in greater concordance than physicians expected. Because extensive research identifies the implications of discordance for health communication and behavior, physicians who presume discordance, particularly when these perceptions are overestimated, may further inhibit efforts to prevent the development of chronic diseases, such as diabetes. Given the instances of actual and perceived belief discordance identified in this study, efforts should be made to increase the alignment between physicians and patients' beliefs to enhance patient education and improve patient care.

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Table 1*Reported demographics for the physician and national sample*

PHYSICIAN DEMOGRAPHICS					
Race	%	Gender	%	Age	Years
European American/White	89.5	Male	52.8	Range	29-82
African American/Black	1.3	Female	46.7	Mean	47.87
Asian American	5.2	Not reported	0.4	SD	14.07
Latino/a	0.4				
Other Race not Listed	2.2				
Multiracial	1.3				
Patient Insurance	Mean %	Patient Race	Mean %	Patients Cared for with Type 2 Diabetes (per month)	Mean %
Medicaid	23.3	White	57.6	< 25	24.0
Medicare	30.7	Black	15.0	26-50	38.4
Private	33.4	Latino	15.3	51-100	23.1
Uninsured	8.4	Asian	6.2	>100	13.5
Other	7.2	Other	3.9	Not Reported	0.9
Practice Setting	%	Practice Region	%	Practice Environment	%
Single Specialty Group	28.4	West	23.1	Rural	29.3
Hospital Employer	21.4	South	17.5	Suburban	51.5
Multi-Specialty	14.0	Midwest	31.9	Urban	15.7
University or Academic	12.7	Northeast	24.9	Inner City	3.1
Solo Practice	14.0	Other	2.6	Not Reported	0.4
Military or Government	3.9				
Other	5.7				
NATIONAL SAMPLE DEMOGRAPHICS					
Education Level	%	Gender	%	Age	Years
Completed 8 th grade or less	2.6	Male	49.6	Range	18-75
Grades 9-11	6.0	Female	50.4	Mean	45.13
Grade 12 or GED	35.9			SD	15.83
Some college, no degree	15.3				
Associate's or technical degree	8.5				
Bachelor's degree or equivalent	19.4				
Master's degree	9.3				
Doctorate or professional degree	3.0				

Note. Although physicians were told that their estimates for patient insurance and patient race should add up to 100%, the cumulative percentages do not equal 100% because some physicians underestimated and/or overestimated the percentage values. Demographics reported for the national sample includes sampling weights.

Table 2

Study means: Comparing physicians' beliefs, physicians' perceptions of patients' beliefs, and the national sample's beliefs

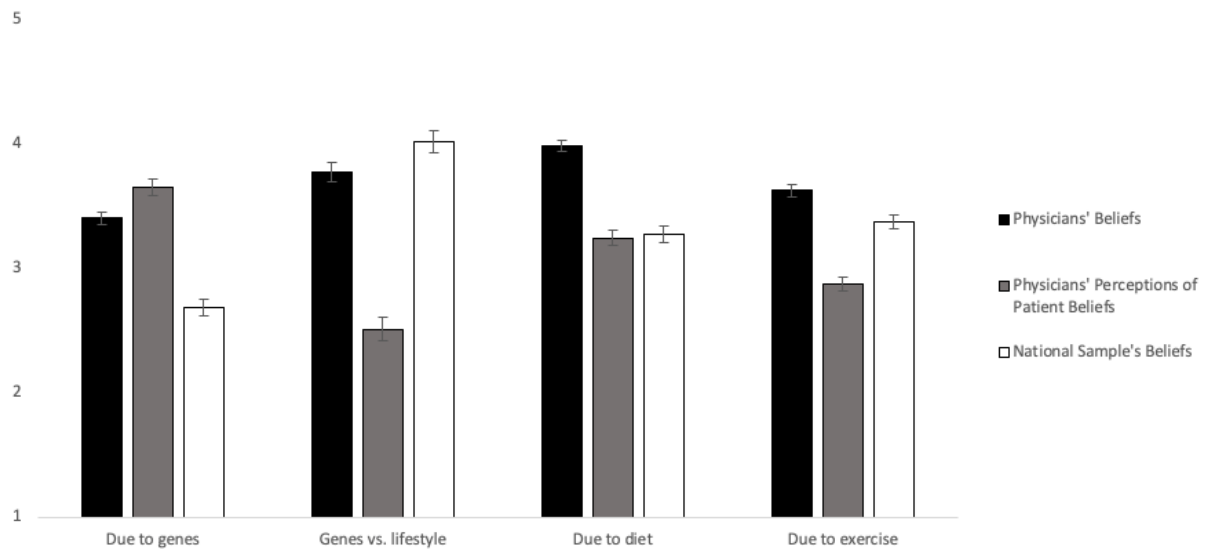
Survey Items	Item Scale	Physicians' Beliefs Mean (SD)	Physicians' Perceptions of Patient Beliefs Mean (SD)	National Sample's Beliefs Mean (SD)
Perceived Causes				
In general, how much is a person's chance of getting type 2 diabetes due to his/her genes or genetic make-up?	1, Not at all, to 5, Almost all/All	3.40 _a (0.80)	3.65 _b (1.03)	2.68 _c (1.14)
In general, is type 2 diabetes due more to a person's genes or more to their lifestyle and health habits?	1, A lot more to genes, to 5, A lot more to lifestyle and health habits	3.77 _a (1.16)	2.51 _b (1.35)	4.01 _c (1.46)
In general, how much is a person's chance of getting type 2 diabetes due to what he/she eats?	1, Not at all, to 5, Almost all/All	3.98 _a (0.70)	3.24 _b (0.89)	3.27 _b (1.06)
In general, how much is a person's chance of getting type 2 diabetes due to how much he/she exercises?	1, Not at all, to 5, Almost all/All	3.62 _a (0.76)	2.87 _b (0.91)	3.37 _c (0.95)
Perceived Controllability				
If type 2 diabetes runs in a person's family, there's not much he/she can do to avoid getting it.	1, Strongly disagree, to 4, Strongly agree	1.67 _a (0.57)	2.84 _b (0.62)	2.08 _c (0.96)

A person with type 2 diabetes will have this illness for the rest of his/her life	1, Strongly disagree, to 4, Strongly agree	2.57 _a (0.81)	3.03 _b (0.57)	2.83 _c (0.97)
In general, how much can a person control whether or not he/she gets type 2 diabetes?	1, Not at all, to 5, Almost Completely/Completely	3.92 _a (0.69)	3.04 _b (0.92)	3.48 _c (1.05)

Note. Significant differences are denoted by subscripts. The listed survey items measured physicians' beliefs.

Figure 1

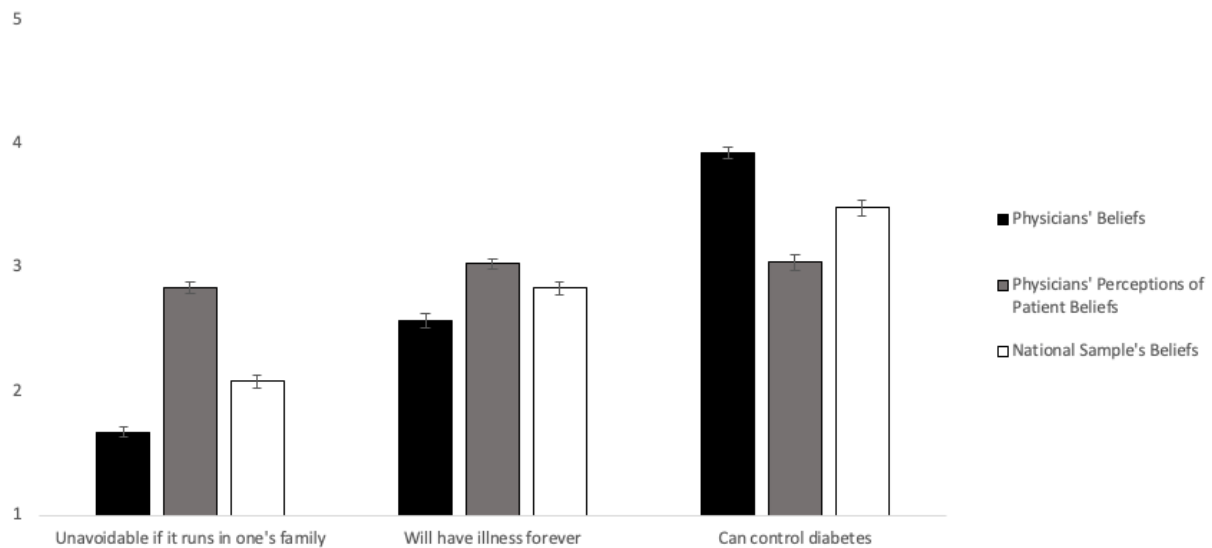
Study results: Physicians and the national sample's beliefs regarding the perceived causes of type 2 diabetes



Note. Error bars represent ± 2 SE. “Genes vs. lifestyle” is reported on a scale ranging from 1, A lot more to genes, to 5, A lot more to lifestyle and health habits. “Due to genes”, “due to diet”, and “due to exercise” are reported on a scale ranging from 1, Not at all, to 5, Almost all/All.

Figure 2

Study results: Physicians and the national sample's beliefs regarding the perceived controllability of type 2 diabetes



Note. Error bars represent ± 2 SE. “Unavoidable if it runs in one’s family” and “Will have illness forever” are reported on a scale ranging from 1, Strongly disagree, to 4, Strongly agree. “Can control diabetes” is reported on a scale ranging from 1, Not at all, to 5, Almost completely/Completely.