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Illness affects millions of Americans each year, and the disclosure of health conditions can facilitate access to social support, in addition to other physical and physiological benefits. This article tests the Disclosure Decision-Making Model (DD-MM; Greene, 2009) to predict factors that influence the likelihood of disclosing (and past disclosure of) nonvisible physical or mental health-related information. One hundred eighty-seven ($n = 187$) people were recruited for a study to report on both disclosing and not disclosing a nonvisible health condition. Measured variables included information assessment, relational quality, anticipated reactions (support, relational consequences), confidence in response, disclosure efficacy, and disclosure (likelihood of disclosure and depth of disclosure). Structural equation modeling results supported many of the proposed hypotheses, with a great deal of similarity across models. Specifically, assessing information predicted efficacy, and to some extent relational outcomes. Closeness was related to response overall and to efficacy in one model. Response predicted outcome overall and likelihood of disclosure in one model. Finally, efficacy predicted likelihood of disclosure and depth of disclosure. The article discusses the implications of the findings for understanding information, relationship assessments, and efficacy in disclosing health diagnoses.

People with nonvisible health conditions such as early-stage cancer must make decisions about sharing their health diagnosis with others. Such sharing has been linked to social support and physical and mental well-being (see Frattaroli, 2006). Individuals face a number of challenges (e.g., physical or emotional) when they are initially diagnosed with an illness and as

they continue to manage that illness. People may experience a range of emotions, including uncertainty, fear, helplessness, and/or anxiety (see Braitman et al., 2008; Epstein & Street, 2007). A prominent issue includes the decision of whether or not to disclose this information to others.

Individuals manage personal or private health information through a variety of strategies (see Derlega, Metts, Petronio, & Margulis, 1993; Petronio, 2002). One strategy that has received considerable research attention is disclosure. Scholars have recently focused attention on

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developing models that identify factors influencing disclosure decisions. These models (e.g., Cycle of Concealment Model, Afifi & Steuber, 2010; Disclosure Decision-Making Model, Greene, 2009; Revelation Risk Model, Afifi & Steuber, 2009) endeavor to outline the process of coming to the decision to disclose or conceal private information or secrets to particular recipients.

Much of the research on privacy and disclosure is grounded in dialectical approaches that have emerged in relationship research (see Baxter & Braithwaite, 2008). The specific application of information management as self-disclosure often emphasizes boundaries or the tension between sharing and withholding. This boundary concept was initially described by Derlega and Chaikin (1977), and Derlega has developed a line of quantitative research emphasizing, among other concepts, the self, other, and relationship reasons for and against disclosure in the context of HIV. Petronio (2002) developed a framework (Communication Privacy Management, CPM) that integrates dialectics and boundaries and describes a number of constructs that operate in privacy management processes. The CPM framework has been utilized extensively in numerous qualitative studies to frame research findings and has significant heuristic value grounded in prior quantitative research (e.g., gender and disclosure). Other researchers have provided model testing based on related yet narrower phenomena including secrets (see Kelly, 2002; or Vangelisti & Caughlin, 1997; Vangelisti, Caughlin, & Timmerman, 2001) and self-disclosure (see Afifi and coworkers already cited, or Caughlin & Afifi, 2004; Caughlin, Afifi, Carpenter-Theune, & Miller, 2005), including health disclosure (see Greene, 2009, and Greene and coworkers, cited later; or Derlega and coworkers' work, already cited). The DD-MM emerged from this general area as a model that is narrow in scope and focuses on the health disclosure decision process, a subprocess of the more global information management area. The DD-MM (Greene, 2009) is particularly relevant to health diagnosis disclosures because it fully explicates the assessment of the health information component of decision making.

Disclosure research has moved beyond theorizing to testing relations between and among variables. In general, health disclosure decision making involves coping with dialectical dilemmas of balancing risks with rewards (e.g., Greene, Derlega, & Mathews, 2006; Petronio, 2002). The assessment of these risks may also involve a compromise between individuals' needs and their concerns for self-, other-, and relationship-protection issues (see Afifi & Steuber, 2009; Greene, Derlega, Yep, & Petronio, 2003). Because disclosure can contribute to disclosers' feelings of vulnerability (Afifi & Olson, 2005; see also, Petronio, 2002), individuals make deliberate choices about how, when, and with whom they choose to share their diagnoses (e.g., Petronio, Reeder, Hecht, & Mon't Ros-Mendoza, 1996).

The DD-MM (Greene, 2009) is located at the crux of health communication and interpersonal communication

research in secrets, privacy, avoidance, uncertainty, and information management. What is similar about this research is recognition of the dialectical nature of the process of sharing information, yet the DD-MM model specifically tested seeks to examine what factors are quantitatively weighed in this disclosure decision process (where potential disclosers assess information and recipients for possible sharing, as well as their own efficacy for disclosing the information). The DD-MM further separates itself as a model with uncertainty at the core, uncertainty related to specific predictors of disclosure decisions. This article tests the DD-MM in two different ways. Study I tests the DD-MM as conceptualized within the process of sharing information not disclosed to a specific person. Study II assesses the same diagnosis where participants report retrospectively about disclosing the information to a different person.

DISCLOSURE DECISION-MAKING MODEL (DD-MM)

The DD-MM (Greene, 2009) explicates the process of coming to a disclosure enactment based on three assessments, including both direct and indirect effects. The model is grounded in uncertainty (cf. Babrow, 2001; Brashers, 2001) and how people balance potential risks related to different aspects of the disclosure decision (see Derlega et al., 1993; Petronio, 2002). As one component, individuals assess their diagnosis or the information under consideration for disclosure. People also evaluate several aspects related to the person to whom they might disclose and their perceived disclosure efficacy to share the information. The DD-MM argues that people base their decision of whether or not to disclose the information on evaluation of these three factors. To date, there is one study testing the DD-MM with general disclosure but not with health information (see also Checton & Greene, in press). Greene et al. (2009) surveyed 283 couples about information they had not yet shared with the person they brought to the study. Greene et al. (2009) tested four key predictions of the DD-MM and found basic support for the model. We review model components next.

Assessing information (the diagnosis). One aspect in the process of coming to a disclosure decision is an assessment of the health diagnosis or the information; that is, what is disclosed matters, consistent with many prior disclosure/privacy theories and frameworks (e.g., Derlega et al., 1993; Kelly, 2002; Petronio, 2002) but often limited in prior measurement to information valence. In the DD-MM this assessment was developed specifically for health information and consists of consideration of five potentially overlapping factors: stigma, prognosis, symptoms, preparation, and relevance. Other disclosure models assess information

as key (e.g., CPM, RRM) but do not measure beyond valence (and also are not health specific). The present study is the first to measure the five information assessment factors, and this is crucial to test the model and assess the significance of the model contribution. The information is conceptualized as a single construct with five subfactors, but this structure is unconfirmed to date; the factors could plausibly form a second-order factor or two (or more) correlated latent constructs. In previous tests of the DD-MM (Greene et al., 2009), more general information valence positively predicted receivers' anticipated reactions. Negative diagnosis assessment is expected to decrease perceived efficacy and intention to disclose, but these relations will be mediated by assessments of receiver reactions.

The first of the five information components is the *stigma* associated with the diagnosis, widely discussed within the context of illness and the most studied of the information components (see Derlega, Winstead, Greene, Serovich, & Elwood, 2004; Herek, Capitanio, & Widaman, 2002). Perceptions of stigma likely decrease intentions to disclose, although these effects may be mediated by anticipated reactions and efficacy. Additionally, the discloser evaluates the disease *prognosis*, including consideration of the outcome of the disease (e.g., treatable, chronic vs. terminal) and prognosis uncertainty. *Symptoms* (especially visibility of symptoms and disease progression) of the disease are also evaluated as part of information assessment. Another consideration is disclosers' *preparation* for the diagnosis. Illness diagnoses may be somewhat anticipated (e.g., if there is a family history of illness, such as breast cancer) or may be completely unexpected (the result of a routine medical exam). Finally, information assessment involves consideration of the *relevance* of the diagnosis to others (e.g., whether others are directly or indirectly affected by the diagnosis). When people believe that the diagnosis is relevant to others they are more likely to disclose their health diagnosis, especially if the disease can be transmitted or is genetically linked (see Greene, 2009). These five components of the information form a more complex and robust conceptualization of health information, and this article presents both data and measures to contribute to the field. Besides the information, disclosers also consider aspects of the receiver in deciding to disclose.

Assessing the Receiver

Another part of the disclosure decision-making process is analyzing the potential receiver. The discloser evaluates the quality of the relationship with and anticipated reactions of a specific disclosure target. In general, better relational quality is associated with more positive perceptions of anticipated response (see Afifi & Olson, 2005; Greene et al., 2009; Petronio, 2002; Vangelisti, Caughlin, & Timmerman, 2001). Receiver assessment is a component of several disclosure decision-making models; however, few models

operationalize anticipated reactions (specifically, not separating anticipated response and outcome).

Relationship quality. People generally choose to disclose to those with whom they feel "close" and whom they can trust (see Greene, 2009; Petronio, 2002). Relational quality has been a component of most disclosure and privacy theorizing. Greene et al. (2009) determined that people feel more confident in their abilities to disclose personal/private information to people when they feel close and expect more positive responses from these people. Finally, better relational quality and more positive anticipated responses are related to increased disclosure intentions or willingness to disclose (e.g., Afifi & Steuber, 2009; Caughlin & Afifi, 2004; Vangelisti & Caughlin, 1997).

Anticipated reaction. Another aspect of receiver assessment is anticipated reactions or consideration of what would happen if someone did disclose a diagnosis (see Caughlin, Afifi, Carpenter-Theune, & Miller, 2005; Greene & Faulkner, 2002; Vangelisti et al., 2001; see also disclosure ramifications in Petronio, 2002). Anticipated reaction has been operationalized in a number of ways, for example, in terms of valence, but also through a variety of motivations (or goals) for disclosure (see Derlega et al., 2004; Greene et al., 2006). Greene et al. (2009) introduced a conceptualization separating anticipated reactions in two dimensions that are reported in prior literature: anticipated response (e.g., provision of support) and anticipated outcome (e.g., relational consequences). One primary distinction between response and outcome is temporal (see Magsamen-Conrad, 2010). That is, after the personal/private information is shared, there is a more immediate response from the recipient (e.g., emotional reaction). This response may be defined as an immediate reply to the disclosure/discloser as communicated in words and/or actions. Anticipated response may be comprised of a number of subtypes (Magsamen-Conrad, 2010). For the present study of health disclosure, we initially focus on anticipated supportive responses because of the prevalence in the illness literature. *Outcome*, compared to response, is conceptualized as the end result or consequence of the disclosure and may have an aspect of finality (e.g., relationship dissolution). Because response and outcome are related to the same information (between the same discloser and recipient), it is expected that perceptions of anticipated response will influence perceptions of anticipated outcomes (and not the reverse).

Confidence in response. The DD-MM identifies an additional receiver-oriented variable that may affect an individual's decision to disclose. The variable *confidence in response* (see Greene, 2009, p. 239) reflects the degree to which the discloser is certain that the intended target (the receiver) will respond to the disclosed information in the way that the discloser anticipates. This variable may

be related to anticipated reactions (e.g., if the anticipated response or outcome is expected to be “negative,” how sure must disclosers be before refusing to disclose?). At this time, it is unclear how confidence in response affects the disclosure process because this variable has not been included in prior disclosure or health models. However, we propose that after individuals consider how the receiver might react (both response and outcome) they also consider how confident or certain they are in that reaction. Being able to accurately anticipate another’s response (either good or bad) with some degree of certainty may result in people feeling more prepared (less uncertain) about the other’s reaction. When confident in response, individuals may feel they are better able to prepare themselves and thus feel more efficacious about disclosing.

Disclosure Efficacy

The third DD-MM assessment is efficacy for sharing diagnosis (disclosure efficacy rather than communication efficacy). Other disclosure models have included various forms of efficacy (e.g., Afifi, Olsen, & Armstrong, 2005; Afifi & Steuber, 2009), and the DD-MM describes how both confidence and skills are necessary to disclose health information. People may also resort to “alternative” methods of disclosure (e.g., through computer-mediated communication [CMC] or using a third party) if they do not feel that they have the skills necessary to successfully disclose the information and produce the desired result. Disclosure models have confirmed that people who felt that they had more confidence in their ability to share the diagnosis were also more likely to disclose that information (Afifi & Steuber, 2009; Greene et al., 2009).

Hypothesized Model for Undisclosed Information

Based on the preceding rationale, two models are hypothesized (undisclosed and disclosed). The first model (see Figure 1) examines health information that has not yet been shared, the undisclosed model. When people negatively assess the health condition, they will anticipate more negative responses (H1a) and outcomes (H1b) and have less disclosure efficacy (H1c). Additionally, when people perceive themselves in a close relationship, they will also anticipate more positive responses (H2a), have more confidence in receiver reactions (H2b), and have more disclosure efficacy (H2c). A person’s perceptions that the receiver will respond positively to the disclosure (e.g., offer support) should result in perceptions of more positive relationship outcomes (e.g., “closer” relationship; H3a) as well as an increased likelihood that the discloser will disclose this diagnosis to this receiver (H3b). When individuals anticipate more positive relational outcomes, they will be more confident in their ability to anticipate disclosure target’s responses (H4). Finally, increased disclosure efficacy will predict disclosure intentions (H6) such that when individuals have more confidence in their ability to disclose the information they are more likely to share.

Hypothesized Model for Disclosed Information

In order to replicate and test model stability across health decisions, this article also assesses predictors in the DD-MM based on retrospective reports of health diagnoses already disclosed. Despite this retrospective limitation, health diagnosis disclosure decisions are expected to function in similar ways, with the exceptions that (a) some variables must be operationalized differently, (b) some variables are no

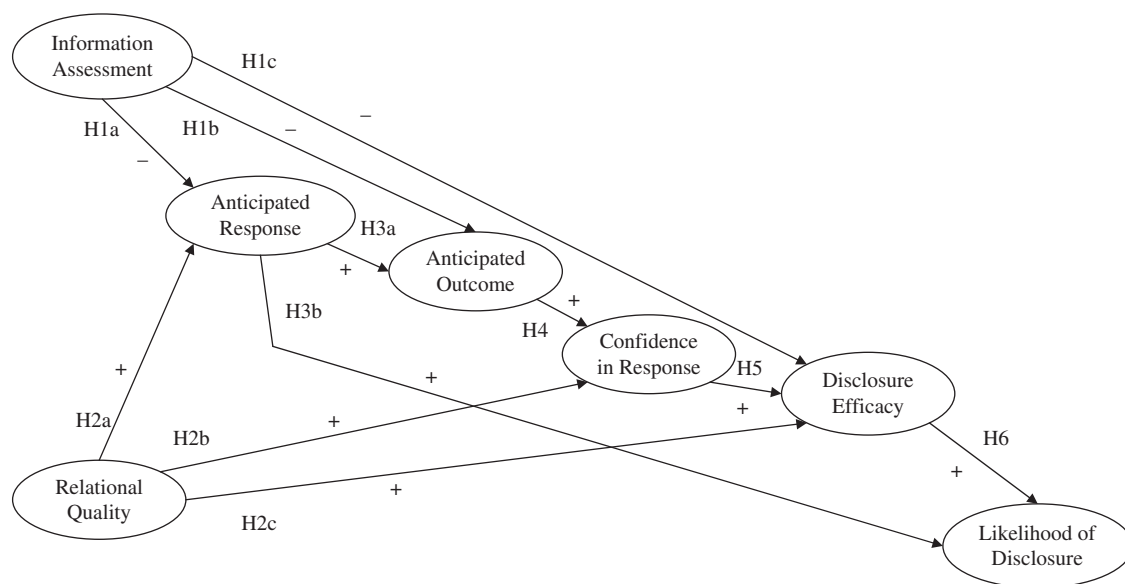


FIGURE 1 Theoretical model—undisclosed.

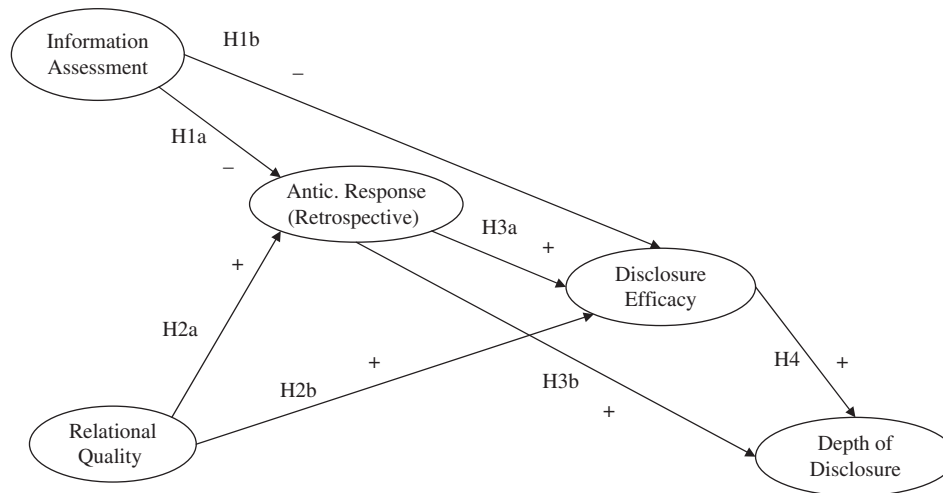


FIGURE 2 Theoretical model—disclosed.

longer applicable (e.g., confidence in response), and (c) one variable was not assessed to simplify recall instructions (retrospective reports of anticipated outcomes). Based on the preceding rationale, the following disclosed model is hypothesized (see Figure 2). First, the health information assessment directly predicts both retrospective report of anticipated response (H1a) and disclosure efficacy (H1b). Relational quality predicts retrospective report of anticipated response (H2a) and disclosure efficacy (H2b). Retrospective report of anticipated response positively predicts efficacy (H3a) and disclosure depth (H3b). Finally, increased disclosure efficacy predicts disclosure depth (H4) such that when individuals have more disclosure efficacy they will report deeper disclosure of their health information.

METHOD

Procedure

Participants provided self-report data about a nonvisible health condition. For minimal extra credit, students from communication courses at a large university in the northeastern United States recruited individuals who met study criteria. Conceptually, researchers sampled for serious/significant “nonvisible” illnesses for which patients were currently under treatment. Researchers distributed an announcement listing qualifying health conditions.¹

¹Examples of conditions listed on the announcement as qualifying included STIs, eating disorders, cancers (except skin cancer), and lupus. Examples of conditions that were listed on the announcement as not qualifying included allergies, high blood pressure/hypertension, migraines, broken bones, and ulcers. To qualify, a person must have a current, diagnosed, qualifying condition and be under treatment (and/or in recovery in the case of addiction). Participants were screened privately by a researcher to ensure that they met all criteria.

Participants were individually screened by a researcher upon arrival and, if the condition qualified, completed a survey about the health diagnosis and managing that information. Participants reported on one person to whom they had shared and another to whom they had not disclosed the health diagnosis.

Participants

The final sample consisted of 183 ($n = 183$) male ($n = 65$) and female ($n = 118$) individuals ranging in age from 18 to 82 years of age ($M = 23.48$ years, $SD = 10.88$ years). Approximately three-quarters of the participants were Caucasian (74%); others were Asian (7%), bi-/multiracial (4%), African-American (4%), Hispanic (3%), South Asian (2%), Middle Eastern/Arab (2%), and other (4%). Participants reported knowing the person to whom they had disclosed their health condition for an average of 9.5 years ($SD = 10.00$, range = less than 1 month to 62 years), 9.4 years ($SD = 12.23$, range = less than 1 month to 63 years) for the person not told. Participants reported the status of these relationships as friend (51%), dating partner/spouse (27%), family member (18%), and other (4%).

Measures

Variables measured for both the disclosed and the undisclosed scenario included *information assessment*, *relational quality*, and *efficacy*. Variables measured in the undisclosed scenario included *anticipated reaction* (response and outcome), *confidence in response*, and *likelihood of disclosure*. Disclosed scenario variables included *retrospective report of anticipated response* and *disclosure depth*. Data were screened for normality and outliers, and there were no transformations necessary or multivariate outliers removed. Confirmatory factor analyses (CFAs) were

conducted on multi-item scales to ensure that they met the criteria of face validity, internal consistency, and parallelism. After confirming the dimensionality of scales,² composite scores were created by averaging responses to individual items. Due to the limited prior measurement for most constructs in this area, we conducted extensive analyses to ensure adequate psychometrics.

Information assessment. Five information assessment subfactors were each measured with five Likert-type items developed based on prior research, with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Items were averaged to form scales with a higher score indicating more of that particular subscale (e.g., more stigma, preparation). Some items were removed due to low/cross loadings to improve model fit statistics and reliability. *Stigma* was ultimately measured with five items (e.g., “Some people think my health condition is my fault,” $M = 3.11$, $SD = 1.00$), *prognosis* with three items (e.g., “My prognosis is good with my health condition” (R), $M = 2.28$, $SD = .66$), *symptoms* with three items (e.g., “It would be difficult for others to notice my health condition” (R), $M = 2.05$, $SD = 1.02$), *preparation* by three items (e.g., “I had a sense that I was going to be diagnosed with my health condition,” $M = 3.04$, $SD = 1.12$), and *relevance* with four items (e.g., “I worry about spreading my health condition to others,” $M = 1.75$, $SD = 1.08$). The best overall information assessment fit was obtained from two correlated latent factors ($r = .20$). Stigma and prognosis loaded together, $\chi^2(19) = 43.51$, $p = .01$, CFI = .92, RMSEA = .08, labeled *information severity* (α for the eight-item latent factor *information severity* = .70); symptoms, preparation, and relevance loaded on another factor, $\chi^2(32) = 75.0$, $p = .001$, CFI = .96, RMSEA = .08, labeled *information relevancy* (α for the nine-item latent factor *information relevancy* = .69).

Relational quality. Participants’ perceptions of the closeness of the relationship with the target were measured by four 7-point Likert items adapted from Vangelisti and Caughlin (1997), with responses ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item was “I am close to this person.” A CFA revealed that four items loaded onto one latent construct, $\chi^2(2) = 2.35$, $p = .31$, CFI = .99,

RMSEA = .03 (undisclosed); $\chi^2(2) = 4.22$, $p = .12$, CFI = .99, RMSEA = .08 (disclosed). The items had good reliability ($M = 4.79$, $SD = 1.39$, $\alpha = .82$; undisclosed; $M = 6.31$, $SD = .79$, $\alpha = .76$; disclosed). A higher score indicated better relational quality.

Disclosure efficacy. Participants’ perceptions of their ability to disclose this personal information to this person was measured with two items adapted from Caughlin et al. (2005) and Derlega et al. (2004) with responses ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item included “I have trouble finding the right words when I share my health information” (R). Scores were averaged to form one scale with a higher score indicating more disclosure efficacy ($M = 3.63$, $SD = .94$).

Anticipated reaction. Participants’ expectations of how the person to whom they had not disclosed the health information might respond were measured with two latent variables: anticipated response (focus on *supportive anticipated responses*) and anticipated outcome. Participants’ expectations of a supportive response to potential future disclosure of the health information (to the specific partner) were measured with four items adapted from Derlega et al. (2002), Greene and Faulkner (2002), and Kelly and McKillop (1996) with responses ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item included “This person would offer emotional support.” A CFA revealed that the four items loaded onto one latent construct, $\chi^2(8) = 6.51$, $p = .58$, CFI = .99, RMSEA = .01. The items had good reliability ($M = 4.57$, $SD = 1.25$, $\alpha = .80$). Higher scores indicated greater anticipated supportive response.

Anticipated outcome measures participants’ perceptions of possible relational outcomes of disclosure to this person. Anticipated outcomes were measured with three Likert-type items developed based on Greene (2009), Caughlin et al. (2005), and Afifi and Caughlin (2006), with responses ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item included “I am concerned about how this person will feel about me after hearing the health information.” A CFA revealed that the three items loaded onto one latent construct, $\chi^2(13) = 29.5$, $p = .01$, CFI = .97, RMSEA = .08. The items had good reliability ($\alpha = .74$). Higher scores indicated anticipation of more positive relational outcomes.

Confidence in response. The degree to which participants were sure about how the person would respond was measured with four Likert-type items developed based on Greene (2009) with responses ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item included “I am confident I know how this person would respond.” A CFA revealed that the four items loaded onto one latent construct, $\chi^2(13) = 15.2$, $p = .23$, CFI = .99, RMSEA = .03. The items had good reliability ($M = 4.70$, $SD = 1.25$, $\alpha = .79$). Higher scores indicated more confidence in response.

²A series of CFAs were performed to investigate the dimensionality, reliability, and validity of measures. Two single CFAs (disclosed/undisclosed) were conducted with items measuring all variables. Examination of these CFAs revealed that items did not cross load (i.e., across variables), increasing confidence in measurement. Specifically, for the undisclosed model with all latent variables correlated (with the exception of second order latent variables that cannot be correlated) the model fit based on two of the three criteria, $\chi^2(596) = 1010.2$, CFI = .87, RMSEA = .06. The largest modification indices primarily suggested correlations between individual items within scales for example, two items on the anticipated response scale. These are not unexpected and do not undermine the overall measurement structure proposed. Additional individual and global CFA information is available from the authors.

Likelihood of future disclosure. Participants' likelihood of sharing the diagnosis in the near future was measured with two items adapted from Vangelisti et al. (2001) and Caughlin et al. (2005), with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). An item included "I am likely to reveal this information to this person in the near future." Scores were averaged, with a higher score indicating more likelihood of disclosing ($M = 2.80$, $SD = 1.13$, $\alpha = .86$).

Retrospective report of anticipated response. For the disclosed model only, perceptions of recipient *retrospective report of anticipated response* (support) were measured by four 5-point Likert items adapted from Derlega et al. (2002), with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A CFA revealed that the four items loaded onto one latent construct, $\chi^2(7) = 10.96$, $p = .08$, CFI = .99, RMSEA = .06. The items had good reliability ($M = 4.11$, $SD = .93$; $\alpha = .78$). A sample item included "This person could be of help." Scores were averaged to form one scale, with a higher score indicating more anticipated support.

Disclosure depth. For the disclosed model only, perceptions of the *depth* of the *disclosure* were measured by

three 7-point Likert items adapted from Laurenceau, Barrett, and Rovine (2005), with responses ranging from 1 (*not at all*) to 7 (*very much*). A CFA revealed that the three items loaded onto one latent construct, $\chi^2(13) = 12.8$, $p = .93$, CFI = .99, RMSEA = .01. The items had good reliability ($M = 5.68$, $SD = 1.32$; $\alpha = .91$). A sample item included "How much did you disclose your feelings to this person?" Scores were summed to form one scale, with a higher score indicating more depth of disclosure.

RESULTS

Tables 1 and 2 present the zero-order correlation matrices for variables in the models. We tested hypotheses using maximum likelihood structural equation modeling (AMOS 18.0). The first step requires calculation of the error variance to account for measurement error in the variables. Three goodness-of-fit indices estimate the fit of models. The χ^2/df adjusts the χ^2 statistic for sample size. The CFI calculates the ratio of the noncentrality parameter estimate of the hypothesized model to the noncentrality parameter estimate of a baseline model. The RMSEA accounts for errors of approximation in the population. We determined that the

TABLE 1
Zero Order Correlation Matrix for All Undisclosed Variables

	1	2	3	4	5	6	7	8	9	10	11
1. Stigma	—										
2. Prognosis	.294 ^b	—									
3. Symptoms	.194 ^a	.030	—								
4. Preparation	.035	-.007	.275 ^b	—							
5. Relevance	.237 ^b	.148 ^a	-.062	-.361 ^a	—						
6. Closeness	.199 ^a	.131 ^a	-.115	-.017	.035	—					
7. Efficacy	-.557 ^b	-.416 ^b	-.080	-.025	-.283 ^b	-.213 ^a	—				
8. Anticipated response	.003	.084	-.001	.048	-.010	.508 ^b	-.112	—			
9. Anticipated outcome	-.438 ^b	-.112	-.189 ^a	-.221	-.292 ^b	.135 ^a	.312 ^b	.298 ^b	—		
10. Confidence response	-.142 ^a	-.011	.001	-.057	-.138 ^a	.263 ^b	.242 ^b	.157 ^a	.210 ^b	—	
11. Likelihood of disclosure	-.185 ^a	-.124	.038	-.076	.035	.308 ^b	.134 ^a	.284 ^b	.262 ^b	.124	—

^aSignificant at $p \leq .01$, one-tailed.

^bSignificant at $p \leq .001$, one-tailed.

TABLE 2
Zero-Order Correlation Matrix for All Disclosed Variables

	1	2	3	4	5	6	7	8	9
1. Stigma	—								
2. Prognosis	.294 ^b	—							
3. Symptoms	.194 ^a	.030	—						
4. Preparation	.035	-.007	.275 ^b	—					
5. Relevance	.237 ^b	.148 ^a	-.062	-.361 ^a	—				
6. Closeness	.044	-.025	.122	-.106	-.007	—			
7. Efficacy	-.557 ^b	-.416 ^b	-.080	-.025	-.283 ^b	-.039	—		
8. Anticipated response (retrospective)	.116	.159 ^a	-.023	-.044	-.036	.406 ^b	-.101	—	
9. Depth of disclosure	.148 ^a	-.014	-.107	-.014	-.026	.400 ^b	.001	.376 ^b	—

^aSignificant at $p \leq .01$, one-tailed.

^bSignificant at $p \leq .001$, one-tailed.

model fit the data if χ^2/df was less than 3, CFI was greater than .90, and RMSEA was less than .08.

Structural Equation Model Results—Undisclosed Model

Initial results indicated that the hypothesized undisclosed model adequately fit the data, $\chi^2(39) = 75.4$, $p = .06$, CFI = .90, RMSEA = .07. Because assessing information formed two separate latent variables and to make the model more parsimonious, these variables were correlated and all proposed paths (H1a, b, c) were originated from *information severity* (instead of from both information severity and information relevancy). Then we examined the modification indices, especially related to information relevancy and discovered that the largest recommended path was between information relevancy and anticipated outcome. Adding this path resulted in a model that better fit the data $\chi^2(38) = 51.0$, $p = .08$, CFI = .96, RMSEA = .04 (see Figure 3).

The model results are consistent with many of the proposed hypotheses. However, H1a is not supported; information severity does not significantly predict anticipated response. H1b is supported; both information severity and information relevancy negatively predict anticipated outcomes. That is, when information is perceived as more severe and more relevant (e.g., more visible symptoms) participants perceive more negative anticipated outcomes. H1c is also supported; information severity predicts efficacy, and the more severe the information, the less disclosure efficacy participants reported. H2a and H2b are supported,

as relational quality positively predicts both anticipated response and confidence in response. Relational quality also predicts efficacy, but this path is opposite the hypothesized direction (H2c not supported). Anticipated response positively predicts anticipated outcome (H3a supported) and likelihood of disclosure (H3b supported). Anticipated outcome positively predicts confidence in response (H4 supported), which then predicts efficacy (H5 supported). Finally, H6 was also supported, with disclosure efficacy positively predicting likelihood of future disclosure.

Structural Equation Model Results—Disclosed Model

Because assessing information formed two separate latent variables, we correlated these variables and originated all proposed paths (H1a, b, c) from *information severity*. Initial results indicated that our model adequately fit the data $\chi^2(24) = 39.5$, $p = .14$, CFI = .93, RMSEA = .06 (see Figure 4). Modification indices did not recommend any added paths from information relevancy. The model results are consistent with many hypotheses. H1a is supported as information severity directly predicts anticipated response. However, information severity does not predict disclosure efficacy (H1b was not supported). Relational quality positively predicts anticipated response (H2a supported) but not efficacy (H2b not supported). Anticipated response positively predicts depth of disclosure (H3b supported) but not efficacy (H3a not supported). Finally, efficacy did not significantly predict disclosure depth (H4 not supported).

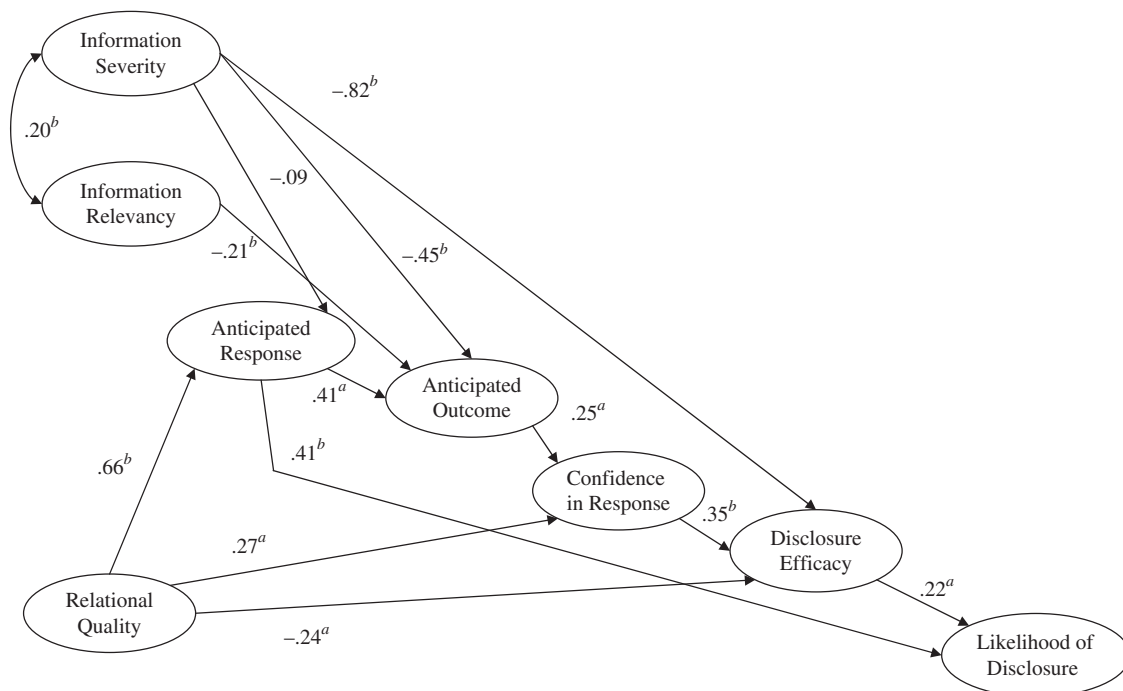


FIGURE 3 Results for DD-MM undisclosed information model paths, with significance indicated by $^a p < .01$, $^b p < .001$.

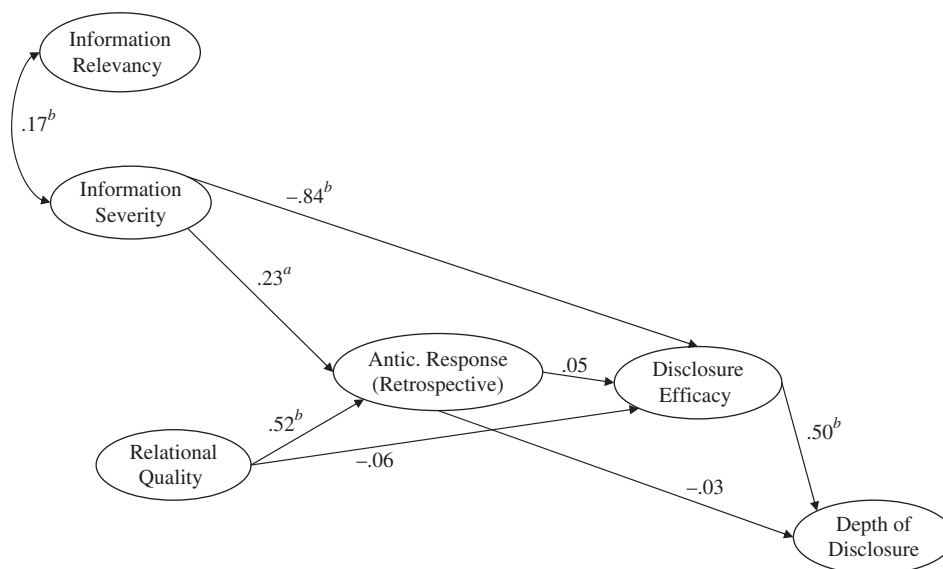


FIGURE 4 Results for DD-MM disclosed information model paths, with significance indicated by ^a $p < .01$, ^b $p < .001$.

DISCUSSION

This study expands our understanding of health diagnosis disclosure decisions by explicating variables that influence these significant decisions. Prior research in this area began with studies of “who was told” a specific health diagnosis (e.g., breast cancer), followed later by studies of goals, reasons, or motivations for disclosing a specific diagnosis or a secret. Studies of health disclosure often have limited variance, resulting from sampling based on single-disease studies. We need additional studies with broader representations, similar to the present study focusing on more general nonvisible health conditions. The selection of nonvisible health conditions allows for exploration of information management because the diagnosis must be intentionally shared, rather than focusing on conditions that are readily visible to others and not relevant for self-disclosure per se (although management of pain, stigma or treatment of such health conditions would be a valuable area of study, this is very different from nonvisible diagnosis disclosure). The present study extends research by examining variables that form the basis of disclosure decision making that cut across a variety of conditions. We begin the discussion by examining similarities between disclosed and undisclosed models and implications, then turning to differences between models, implications, and future research.

Similarities Between Models

There is a great deal of similarity between the present disclosed and undisclosed diagnosis disclosure models. This similarity is crucial to identify variables that are common in the processes to share or conceal, unable to be detected

in most other studies due to the design or solitary focus on either disclosure or concealment. There were three major consistent findings across both models, and most paths were in predicted directions, providing additional support for DD-MM conceptualization of health disclosure decision making. None of the variables were excluded in either final model. That is, all variables explain sufficient variance in the health diagnosis decision process to remain in models, leading to greater confidence in conceptualization proposed by the DD-MM.

As anticipated, the health information assessment factors in both models were positively correlated such that higher perceived information severity was related to more perceived information relevancy. The present study included a more sophisticated multifactor assessment of the health diagnosis, an improvement over prior research focusing on valence (e.g., Afifi & Steuber, 2009; Caughlin et al., 2005; Greene et al., 2009) or stigma alone. This approach is markedly different from CPM-grounded or other framework studies exploring disclosure of inherently “negatively valenced” issues such as HIV, infertility, or infidelity. Not all of the information assessment predictions were supported in the present study, and this needs further exploration. Additionally, we need further studies of the stability of the five-dimension DD-MM proposed health information assessment structure, as this is the first study to present and test the measurement structure. It will be crucial to study whether the two-factor solution reported here for nonvisible health conditions is replicated. The findings reinforce the need for increased attention to measurement of information or how people perceive their health diagnoses in decisions to disclose or conceal; the overly simplistic “positive/negative” evaluation that dominates the literature is insufficient, at least for health contexts.

Perceived information severity predicted decreased disclosure efficacy. It may be especially difficult to tell others if a disease is progressing badly or is stigmatized. People might not want to share “depressing” and/or identity threatening news with others and choose instead to protect others or themselves (e.g., Derlega, Winstead, Wong, & Greenspan, 1987; Goldsmith, 2009). This points to considering not simply valence of diagnosis assessment but also how other information factors influence a patient’s confidence to share.

Relational quality predicted anticipated response, as expected. For the disclosed model, greater closeness predicted more retrospective reports of perceived partner support in response to the diagnosis disclosure. For the undisclosed model, better relational quality predicted more supportive anticipated responses. These findings are consistent with the DD-MM initial test (Greene et al., 2009), and DD-MM patterns of disclosure decisions (Checton & Greene, *in press*), as well as other general disclosure literature (see Afifi & Olson, 2005; Afifi & Steuber, 2010; Kelly & McKillop, 1996) and disclosure frameworks (e.g., Derlega et al., 1993; Petronio, 2002).

Anticipated response was related to disclosure in both models. More supportive anticipated responses predicted future disclosure (undisclosed) or more depth of disclosure (disclosed), consistent with the general disclosure DD-MM test reported (Greene et al., 2009). In individuals with chronic heart conditions, perceived partner support predicted communication efficacy, which then predicted depth of disclosure about the heart condition (Checton & Greene, *in press*).

Thus, there was a great deal of similarity across models, and that is key in reporting the first health test of a new model. The next section explores the differences between the models.

Differences Between Models

Beyond the similarity across the models, there were also differences between the disclosed and undisclosed models. The first difference involves information assessment and cannot be compared to the unidimensional information valence findings in the prior DD-MM test (Greene et al., 2009) and most prior disclosure studies (e.g., Afifi & Steuber, 2009; Afifi & Steuber, 2010; Reis & Shaver, 1988). The associations between diagnosis assessment and anticipated response were different across models. For the disclosed model, patients’ perceptions of more diagnosis information severity predicted less anticipated support. Thus, if people view the health condition as severe and symptomatic, then they expect sharing to have a more negative impact on their receiving support. This association was not significant in the disclosed model. It may be that we expect the worst before disclosing and may in a self-protective way overestimate unpleasant responses from sharing when we anticipate

disclosing; yet, once we share we may realize retrospectively that the outcome was more positive than expected (or at least not as negative as feared). We attribute this difference to the perceived severity of the information. This finding is somewhat consistent with prior research on secret disclosure. In a longitudinal study, Caughlin et al. (2005) found that although there was no difference in retrospective reports of what disclosers expected at time 1 (reported at time 2), analyses indicated people generally reported less negative consequences at time 2 (after sharing) than initially anticipated (see p. 57). Additionally, in retrospective accounts of female adolescents’ HIV disclosure, Greene and Faulkner (2002) also found that outcomes were not as negative as anticipated (with the exception of some vivid negative outcomes of HIV disclosure, both anticipated and not). We should continue to examine why people expect and prepare for the worst outcomes when contemplating disclosure and how this affects access to support and potentially increases stress.

In the undisclosed model, the path from relational quality to efficacy was significant. However, in the disclosed model it was not significant, although the path also could not be removed for the model to fit. We postulate that these differences may be a product of examining efficacy at a level of information sharing efficacy. This is a limitation of the study and may be addressed in future research with efficacy measures directly related to the specific disclosure episode. Conceptually, efficacy may be best tapped prospectively because when we look back at efficacy in a past disclosure event, the fact that a person has disclosed (successfully or not) must influence retrospective perceptions of disclosure efficacy.

Additionally, the design of the studies included some variation in measurement. Specifically, anticipated outcome and confidence in response were measured in the undisclosed model but not in the disclosed model. The very nature of the retrospective disclosure report for the disclosed model in the present study made it impractical to measure a parallel variable, “Before you disclosed, how sure were you of how [this person] would respond?” We also did not measure retrospective reports of anticipated confidence in response or anticipated outcomes to decrease burden on participants. The instructions necessary for retrospective accounts of notions held before the disclosure after the disclosure has already been enacted are cumbersome. In addition, the concepts of anticipated response, outcome, and confidence in response are closely related and therefore can increase participants’ confusion, more so if assessed retrospectively. Thus, we chose to focus on only one retrospective account of an anticipated variable. We chose the variable “response” because it is the variable most frequently discussed in the literature. Future research could employ longitudinal designs where retrospective accounts are not central and thus not vulnerable to recall biases.

Overall Implications

This study offers encouraging validation of a parsimonious disclosure decision-making model for health diagnoses. Although the DD-MM is not the only model that explains disclosure decisions, it is parsimonious (cf. Disclosure Process Model, Chaudoir & Fisher, 2010) and is presently the only disclosure decision-making model specifically focused on health-related disclosure (cf. RRM and CCM, which are non-health models). Beyond this, the DD-MM offers testable hypotheses in contrast to other frameworks (e.g., Greene et al., 2006; Omarzu, 2000; Petronio, 2002). While some DD-MM scales currently are only moderately reliable, researchers continue to work to improve measurement available for health disclosure research. Further, the DD-MM explicated and tested the most sophisticated appraisal of information to date, moving theory and research from the focus on valence or riskiness of information.

The present results provide implications for patients and health care workers in three main ways. First, the information matters such that patients are assessing their diagnoses in a multifaceted way. Patients may need to talk with health care providers or close others about how they view their condition/disease, and this may be a facet of how patients cope (cf. research on helplessness/hopelessness and “fighting spirit”; e.g. Watson, Greer, Young, Burgess, & Robertson, 1988). Overall, how patients frame the information is a foundational component of how they process disclosure decisions, view others’ potential responses, and perceive their efficacy for sharing. This finding advances the literature from simply understanding that disclosure is a risky process full of vulnerability to identifying potential sources of vulnerability that cut across a variety of health conditions.

Second, the relational variables remain in the models, but anticipated response/outcome are more central than oft-used relational quality or studies tapping recipient “role.” Anticipated relational outcomes predicted greater confidence in response, which, in turn, predicted greater disclosure efficacy. If potential recipients are expected to be supportive (e.g., watching children, listening, or helping search for information), then the discloser would expect a positive effect of disclosure on the relationship. Patients do examine what reaction they are likely to receive prior to sharing and if unsure about potential responses or outcomes, weigh this factor into decisions. Patients may also be encouraged to consider incremental disclosure to “test the waters” or see what kind of response they might receive (see Petronio et al., 1996; also Greene et al., 2003). Patients may share a small piece of information to assess the receiver’s response before we are willing to fully share.

Finally, efficacy is a specific target for conversations with patients. People may want to practice disclosure by writing or speaking aloud to feel more confident in their ability to share (see resources in Greene et al., 2003). Alternately, if people do not feel that they can share such a difficult

message face-to-face (e.g., “I have about 9 months to live”), they may choose to share online (see Greene & Magsamen-Conrad, 2010), write a message (e.g., a letter), or seek a third party to assist with sharing the information (see Greene et al., 2003; Miller & Rubin, 2007).

Limitations

The present results should be interpreted with some limitations in mind. First, the data presented here are cross-sectional, limiting some conclusions. Thus, the disclosed model is retrospective, and the undisclosed model is projected. An even better study would track people with health conditions across time and include dyadic perspectives, at least for the disclosed model. The current sample did vary but still overrepresented Caucasians and females; nonetheless, this study sampled outside an undergraduate context, unlike many disclosure studies. As with most studies, there were unmeasured variables. For example, we focused on a subset of anticipated reactions, and the disclosed model focused on disclosure depth, one feature of disclosure enactment. There are further variables to consider, as health decision making is complex. It is difficult to measure abstractly while generalizing across diseases and disease stages yet provide sufficient specificity to apply findings to health settings.

This study also presented initial operationalization of some scales with moderate reliability, and these should be examined in future research. For some of the scales utilized in the present study, there was very little prior quantitative research (part of the justification for the present study). Researchers such as Derlega, Greene, Caughlin, and Afifi have measured some related variables in prior research; however, the DD-MM posits conceptual separation of some variables previously combined by researchers such as reasons for and against disclosure. One contribution of the current project is to follow precise conceptualizations with confirmatory factor analyses. This will require confirmation across multiple data sets with varying samples, but initially we provide significantly more information and precise operationalization than some prior research.

The current emphasis on nonvisible health conditions creates some variability in types of diseases. For example, participants reported on conditions ranging from cancer to bulimia, from sexually transmitted infections (STIs) to bipolar disorder. There are many differences across diseases that may influence disclosure, but we wanted to move beyond single-disease examinations in the present study and used the five-part information assessment to capture perceptions of disease variance. Finally, this study focuses on sharing only the diagnosis with others and does not address the ongoing nature of disclosure and disclosing updates such as changes in treatment (see Checton & Greene, in press, for study of patterns of health disclosure with a chronic condition).

Future Research

Studies of disclosure are critical to understanding how patients manage information regarding their illness and relationships. There is very limited prior research comparing these decision processes to examine consistency across decisions, not just if people disclose (or keep secrets or avoid). We examine paths for disclosed and not yet disclosed models, as disclosure is a process and assessment of previous disclosures are likely to impact subsequent disclosures (see, Greene, 2009; Greene et al., 2006, also Afifi & Steuber, 2010). Future research could also explore feedback, reciprocity, regret, and nondisclosure reassessment; studies of these phenomena would also add to the information management literature. The present study adds data testing the DD-MM in a health context. The associations proposed in the DD-MM are complex. We tested different causal orders (although not longitudinally in this study) and different aspects of the potentially complex associations (e.g., curvilinear). The best fitting models supported the conceptualization proposed by the DD-MM.

Based on the present data, in addition to relational outcome, anticipated response and actual response/responsiveness are crucial features of health disclosure decisions. The response variable, although present in many models of disclosure (e.g., DD-MM, CCM, RRM), has not been conceptualized or measured consistently across models. Anticipated response may include subfactors, as Magsamen-Conrad (2010) identified four types: support, emotional reaction, avoidance, and reciprocity. Only support is measured in the current study; therefore, future research should endeavor to assess how other subtypes of anticipated response affect the disclosure decision-making process. For information that has been disclosed, response—if measured—has been assessed through expectancy violations (see Afifi & Steuber, 2010; Magsamen-Conrad et al., 2010) and/or responsiveness (see Laurenceau et al., 2005; Manne et al., 2004). Magsamen-Conrad et al. (2010) determined that both response violation expectations and responsiveness play an important role in disclosers' assessment of the effect disclosing had on their relationship. Future research should continue to investigate both of these variables, especially in longitudinal studies.

Disclosing a health diagnosis is a crucial decision for people with nonvisible health conditions. Although the current study focused mainly on ongoing relationships, there are also implications for new dating relationships and how to share (or not) with new people. Additionally, disclosing to health care providers can also affect care, so we need to study a variety of relationship contexts or degrees of personal relationships. Relational quality alone does not drive health diagnosis disclosure decisions, and these findings may not generalize across all types of disclosure. Relational quality (and confidence in response) may also share variance with other variables. Many studies

relying on relational quality as a key construct may miss important contributions of related—yet different—variables such as anticipated response and outcome or confidence in response. Anticipated response most strongly predicts likelihood of disclosure and depth of disclosure, rather than prior research emphasis on relational quality. This suggests that people's prior experiences both with the recipient and with disclosing the same information may be driving the expectation process. These findings theoretically support frameworks suggesting that disclosers examine receivers' potential responses before choosing to disclose (e.g., Derlega et al., 1993; Petronio, 2002). There is less research with depth of disclosure, and future studies should expand proxies for disclosure and variables beyond intention and disclose/conceal. This study contributes significantly to the body of health disclosure research, and there are many additional questions worthy of continued attention.

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