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"Explicitly implicit": examining the importance of physician nonverbal involvement during error disclosures[1]

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Summary

QUESTIONS UNDER STUDY/PRINCIPLES: Medical errors are prevalent, but physicians commonly lack the training and skills to disclose them to their patients. Existing research has yielded a set of verbal messages physicians should communicate during error disclosures. However, considering the emotional message contents, patients likely derive much of the meaning from physicians' nonverbal behaviours. The purpose of this study was to test the causal effects of physicians' nonverbal communication on error disclosure outcomes.

METHODS: At a university hospital in the Southeastern United States, 318 patients were randomly assigned to three treatment groups. The first group watched a video vignette of a verbally and nonverbally competent error disclosure by a person acting as a physician. The second group was exposed to a verbally competent but nonverbally incompetent error disclosure. The third group read an error disclosure transcript. Then, all patients responded to measures of closeness, trust, forgiveness, satisfaction, distress, empathy, and avoidance.

RESULTS: The results evidenced that holding the verbal message content constant, physician nonverbal involvement was significantly associated with higher patient ratings of closeness, trust, empathy, satisfaction, and forgiveness, and with lower ratings of patient emotional distress and avoidance. These associations were not affected by patient predispositions such as sex, ethnicity, religion and previous experiences with medical errors.

CONCLUSION: The findings of this study imply that nonverbal communication has a significant impact on error disclosure outcomes and thus should be considered as an important component of future research and disclosure training efforts.

Key words: *medical error disclosure; doctor-patient communication; nonverbal communication*

Introduction

Medical errors account for 78% of all fatal adverse events in hospital care in the United States [1]. At least 98,000 patients die and more than 1.3 million patients are injured in hospitals every year as the result of human factors, costing the nation an estimated USD 17–29 billion [2]. This count equates to fatalities that would be incurred by three jumbo jets crashing every two days [3]. Studies in Switzerland [4], Australia [5], the United Kingdom [6], and Denmark [7] have attributed similar significance to the occurrence of preventable adverse events, implying that medical errors are an international epidemic.

Institutional efforts to prevent human errors are prevalent. However, errors will continue to happen no matter how well-designed a system is [3]. Human errors in medicine encompass rule-based and knowledge-based mistakes, as well as skill-based slips and lapses [8] that can occur during anamnesis, diagnosis, planning of a treatment, treatment execution, and during the post-execution of the treatment plan [9]. Furthermore, they reflect inevitable flaws that come with being human and are promoted by the error-prone, multi-faceted nature of complex medical systems. Existing research on this topic has predominantly emerged out of the field of medicine. However, given the importance of communicative processes that underlie medical practice, contributions by the communication discipline promise potential for error prevention and disclosure.

An obvious contributive value by the discipline of communication to the study of medical errors lies in the inherent nature of human interaction as a source of medical failure. Particularly, communication scholars may assess and provide the verbal and nonverbal skills needed to prevent misunderstandings and facilitate effective information exchange in physician-patient and medical team interactions throughout the five stages of medical care [9]. An equally important area of contribution lies in the competent disclosure of medical errors, which is uncommon and tremendously impacts patients' and physicians' lives. Most litigations could be avoided by timely disclosure of what went wrong and an apology. Instead, 80% of malpractice

cases are filed because of a breakdown in communication in the doctor-patient relationship [10]. This study provides findings about the value of nonverbal communication skills in physicians' disclosure of medical errors to patients, which is an important research domain that has not been integrated systematically into the existing literature so far.

Conceptualising medical errors

Adverse medical events are attributed to preventable and unpreventable causes. For example, they encompass complications (if they were *predictable*) or accidents (if they were *unpredictable*). A majority of adverse events, however, are preventable and caused by human error. The most common conceptualisation defines medical errors as the "failure of a planned action to be completed as intended (i.e., error of execution) or the use of a wrong plan to achieve an aim (i.e., error of planning)" [8]. According to this definition, errors may occur during the planning or execution of a treatment plan. A recent investigation extended the scope of this definition, suggesting that human errors may occur during five cognitive stages in medical care: Anamnesis, diagnosis, treatment planning, treatment execution, and post-execution [9].

Medical errors can occur at the sharp end of medical practice and be *active* (i.e., if "associated with front-line operators of a complex system"), or they can be caused by systemic variables and be *latent* (i.e., if "spawned by those whose activities are removed from the direct control interface in both time and space") [8]. Active aberrant behaviours encompass both *unintentional* (i.e., slips or lapses) and *intentional* actions (i.e., mistakes). Furthermore, they can reflect *skill-based* (i.e., inattention or over-attention), *rule-based* (i.e., application of a bad rule or misapplication of a good rule), and *knowledge-based* (i.e., "hit-and-miss" mistakes in unfamiliar territories) human failures [8] that occur throughout the five cognitive stages of medical care [9].

Medical error disclosure

Contrary to ethical and legal expectations, health care providers often choose not to disclose medical errors to their patients [11]. Multiple reasons warrant this phenomenon. For one, problematic societal expectations of human infallibility in medical care make failures difficult to disclose. Second, admitting a mistake is psychologically difficult for physicians who commit their lives to doing no harm [12]. Third, physicians often face a trialectic in that they have a desire to disclose, but are fearful of the consequences and unsure of the effective strategies to do so [13]. Fourth, healthcare institutions, insurance companies, and attorneys share a common concern about potential medical litigations and thus worry about supporting error disclosures.

In the midst of this contextual surrounding, physicians are fearful of having to face a lawsuit and potential job loss, of having to face their own "failure" in front of their coworkers and families, and of having to cope with a dual anxiety regarding their patients' and their own welfare [3]. It is easy to imagine that the overwhelming emotions that are associated with these experiences make errors difficult to confess and disclose. In addition, physicians often experience dialectical pressures from ethicists and patient advocates who promote full disclosure while risk managers and malpractice insurers urge restraint [14].

In an effort to address this problem, recent changes in the healthcare environment promote the disclosure of preventable adverse events to patients and their families. The American Medical Association, for example, now states in its principles of medical ethics that physicians shall "be honest in all professional interactions" [15]. Similarly, the U.S. Joint commission requires providers to inform patients and their families about unanticipated outcomes in their care. Insurance carriers recommended providers to explain the facts that lead to the event, but not to use any words that imply negligence (e.g., error, mistake, wrong, accident). In an attempt to encourage disclosure and protect the health care provider for doing so, over 34 U.S. states have now adopted "I'm sorry" laws, which do not allow plaintiffs to admit a physician's apology as evidence of negligence. Although preliminary evidence has associated disclosures with declined legal cases and payments [13], more research is needed to fill the gap in information about the causal impact of error disclosures on malpractice claims [12].

Despite these institutional and legal protections, physicians are still reluctant to disclose medical errors to their patients [14, 16–18], and physicians who choose to disclose often fail to meet their patients' expectations [19]. In fact, there is a substantial gap between what patients want to hear and what physicians are telling them. For example, patients want to hear an explicit statement that there was an error, details about what went wrong and why, specific implications for their medical care, a sincere apology that recognises their suffering, and assurances that a lesson had been learned [16, 20–24]. Physicians, on the other hand, are often unsure how much information to disclose and what strategies to use [12].

Error disclosures involve emotionally charged conversations that require advanced communication skills, but physicians often lack the training to conduct these difficult conversations [25, 26]. Studies have evidenced that physicians can improve their communication skills through education and practice [27]. However, more knowledge is needed to identify the components that constitute skillful error disclosure. To this date, research has predominantly focused on the verbal contents of effective disclosures, but studies have largely neglected the importance of nonverbal disclosure skills. Because they involve a substantial amount of emotional content, the importance of nonverbal communication skills during error disclosures are of utmost importance. However, investigations to this date have only treated nonverbal communication peripherally, utilising instructional terms such as "sincerity" and "empathy" to describe effective disclosures but leaving the behaviours that express such relational messages in the sensitive context of error disclosures unclear. The current study aims to fill this gap by measuring the causal effects of physician nonverbal involvement on error disclosure outcomes. The study design will be discussed after a brief overview of the current knowledge on nonverbal communication.

Nonverbal communication

Nonverbal communication encompasses "behaviours other than words themselves that form a socially shared coding system: that is, they are typically sent with intent, typically interpreted as intentional, used with regularity among members of a speech community, and have consensually recognisable interpretations" [28]. Nonverbal cues facilitate the production and comprehension of verbal messages. Particularly, they can add semantic redundancy and elaboration, clarify syntactic relationships, synchronise different information channels, and heighten attention to verbal message contents [28]. Nonverbal behaviours also have the capability to disrupt the comprehension process by distracting attention away from the verbal message contents toward the nonverbal behaviors themselves, making them message bearers in their own right [28, 29].

Adults generally place more reliance on nonverbal cues than on verbal cues in determining social meaning [29–32]. This particularly applies to incongruent messages; nonverbal behaviour is less susceptible to censorship than verbal cues and thus a more reliable indicator of what is being communicated. Nonverbal communication also carries a disproportionate amount of relational message content [28] and serves as the primary vehicle for expressing emotions. Thus, it is an important form of communication in the context of medicine and particularly in the disclosure of medical errors.

Nonverbal communication in provider-patient interactions

Studies have shown that nonverbal communication plays an important role in the delivery of competent medical care. For example, nonverbal behaviour may be more important than verbal messages in the communication of empathy [33–36]. Furthermore, physician nonverbal communication predicts patient satisfaction [37–39] and patient compliance and adherence [40]. Nonverbal behaviour also shapes patients' visit communication (e.g., patient self-disclosure), ratings of physician rapport and dominance, patients' understanding and recall of visit information [41], and patients' evaluations of the quality of physicians and their medical care [37].

Effective nonverbal communication between physicians and patients may also facilitate the physical healing of patients [42]. For example, studies have shown that physicians' nonverbal behaviours can influence patient's health outcomes, such as course of recovery, anxiety, need for postoperative pain medication, and earlier hospital discharge [43]. Physicians also benefit from nonverbal communication skills. For example, physicians who communicate with their patients effectively suffer fewer malpractice litigations [44]. Thus, successful medical treatment involves physicians' competent management of the nonverbal communication channel.

Nonverbal communication skills

Communication skills are goal-driven, repeatable behaviours that contribute to an impression of appropriateness and effectiveness [45, 46]. In the medical context, effectiveness is often assessed based on the successful attainment of two major goals: (1) information exchange and (2) relational development [47]. Both of these dimensions incorporate dyadic involvement. For example, doctors need information from patients to determine an accurate diagnosis and effective treatment plan. Similarly, patients require information from physicians to understand their medical problems and the rationale and procedures for their treatments. Beyond the seeking and giving of information, the verification of provided information is also an important skill on this dimension.

The relational development (or socio-emotional/affective communication) dimension encompasses affiliative expressions of care, warmth, trust. It is the primary dimension to predict patient satisfaction and compliance, trust, respect, and loyalty [47]. Patients evaluate physicians' relational competence based on their open, friendly communication, their displayed concern and interest for the patients' problems, and their displayed informational support and confirmation [48]. Thus, the relational communication dimension is of utmost importance to an effective and, especially, appropriate disclosure of medical errors.

Rationale and hypotheses

Considering its centrality to interpersonal relationships, nonverbal communication has received surprisingly little attention in medical literature. Particular the error disclosure literature lacks an assessment of the important role nonverbal communication skills play in the effective and appropriate disclosure of medical mistakes. Based on the finding to this date, it can be expected that patients rely heavily on the physician's nonverbal behaviours in making inferences about the implications of an error, the physicians' clinical competence, and their continued trust in medical care. Thus, continuing to focus our investigations on the verbal messages physicians should communicate to patients during an error disclosure is a faux pas in itself. In an effort to add empirical evidence to this understudied topic domain, the current investigation systematically assesses the causal impacts of physicians' nonverbal communication styles on a variety of error disclosure outcomes. Particularly, the following hypotheses will be tested:

H_1: Patients' mean ratings of closeness, trust, satisfaction, empathy, and forgiveness will be significantly lower in response to a nonverbally incompetent error disclosure than in response to a nonverbally competent error disclosure, keeping the verbal disclosure content constant.

H_2: Patients' mean ratings of emotional distress and avoidance will be significantly higher in response to a nonverbally incompetent error disclosure than in response to a nonverbally competent error disclosure, keeping the verbal content constant.

Method

Sample and procedures

In preparation for an online experiment, a written transcript of a physician's disclosure of a hypothetical error to a standardised patient from a previous study [49] was optimised according to Gallagher's [50] criteria of effective er-

ror disclosures. A physician and an error disclosure scholar cross-checked the altered transcript for validity. Then, two professional physician actors (female and male) and a filming crew were hired to create two 4-minute video vignettes of the hypothetical error disclosure to a patient. The physician actor's verbal disclosure content (from the written transcript) and the patient's passive role were held constant across the conditions. Both vignettes were filmed in one take to prevent unnecessary cognitive distractions.

The physician actor varied his nonverbal communication style in the two videos, displaying competent (i.e., effective and appropriate) nonverbal behaviours in the first vignette, and incompetent (i.e., ineffective and inappropriate) nonverbal behaviours in the second video vignette. The nonverbal behaviours were systematically varied reflecting Guerrero's [51] ratings of nonverbal involvement, which encompass nonverbal displays of (1) immediacy (i.e., appropriate touch, proxemic distancing, forward lean, body orientation, prolonged gaze), (2) expressiveness (i.e., kinesic and vocal animation), (3) altercentrism (i.e., attentiveness and interest, affirmative head nods), (4) smooth interaction management (i.e., speech fluency, response latencies, turn-taking and interruptions), (5) composure (i.e., vocal and bodily relaxation, lack of random movement), and (6) positive affect (i.e., appropriate smiling, facial and vocal pleasantness). The patient actor's role was kept passive to minimise her influence on the survey participants' ratings. Both actors were trained by the principal investigator for one week prior to filming the vignettes. The videos were shot in a hospital room with the patient lying in bed and the physician disclosing that a surgical sponge was retained in the patient's abdomen. The final vignettes were uploaded to the internet for the data collection (see fig. 1 for screenshots; the videos and transcript are available upon request from the author).

Figure 1

Screenshots of the error disclosure video vignettes. (1.) Competent error disclosure; (2.) incompetent error disclosure.

One thousand study announcement flyers were distributed to all outpatient clinics of a large Southeastern teaching hospital. With the assistance of the medical school staff, thirty volunteering physicians were recruited to distribute the flyers to patients at the end of their medical consultations over a period of two months, encouraging their patients to participate in the online survey. Volunteering patients detached the bottom portion of the flyer and submitted it into a drop box that was deposited at the nurses' station. The principal investigator randomly assigned the participating patients to three experimental conditions (i.e., incompetent nonverbal style, competent nonverbal style, transcript-only) and then emailed them invitations with the respective survey link.

Upon entering the survey, all patients were pre-tested on their general psychological closeness to physicians, general trust in physicians, and trait forgiveness. Then, they were asked to imagine that they are the patient in an upcoming error disclosure and were exposed to the treatment conditions. After the treatment, all patients responded to the same post-test measures of psychological closeness, trust, and forgiveness of the physician and also rated their anticipated satisfaction, emotional distress, empathy, and avoidance of the physician in response to his disclosure. Upon completion of the survey, patients were invited to enter a separate website to submit their mailing information in order to receive a $10 coffee card as an incentive for their participation. The software IBM SPSS statistics 19.0 was used to analyse the data.

Measures

Measures of closeness, trust, forgiveness, satisfaction, distress, empathy, and avoidance were employed to check for patients' predispositions and to assess their responses to the different disclosure treatments. All measures implemented in this study were adapted from previously existing research instruments. In limited cases, the scaling was slightly modified to optimise questionnaire uniformity or adapted to the doctor-patient relationship. Other than that, the instruments were used as published by their original authors.

Closeness

The *Inclusion of Other in the Self* (IOS) scale [52] was used to measure patients' pre-test ratings of their relationship with physicians in general, and also to assess their post-test closeness to the physician who disclosed the error in the vignette. The scale consists of one item that asks participants to select a correct pictorial representation of the relationship, with overlapping circles indicating closeness and tangential circles reflecting separateness. Patients chose one among five pictorial representations.

Trust

The *General interpersonal Trust in Physicians* scale [53] was implemented to operationalise patient trust in physicians in general (pre-test). The wording was slightly altered to measure patients' trust in the particular physician in response to the disclosure (post-test). The scale consists of

12 items, and patients responded on a 5-point Likert scale. The measure was reliable in both assessments, with Cronbach's alpha ranging between 0.80–0.89 in the pre-test and 0.88–0.94 in the post-test.

Forgiveness

Patients' predispositional (pre-test) forgiveness was operationalised using Berry et al.'s [54] 10-item *Trait Forgiveness Scale*. Patients' forgiveness of the physician in response to the disclosure (post-test) was assessed by a 5-item *episodic forgiveness measure* that was previously used by McCullough and colleagues [55]. Patients responded to a 5-point Likert scale. Both measures were reliable, with Cronbach's alpha ranging from 0.81 to 0.84 for trait forgiveness (pre-test), and from 0.76 to 0.88 for episodic forgiveness (post-test).

Satisfaction

The satisfaction of patients after the disclosure was operationalised using Hausknecht's [56] *Satisfaction with the Medical Doctor* scale. The original measure contains 3 items. A fourth item, "I would recommend this doctor to a friend", was added. Patients responded on a 5-point Likert scale. Factor analysis suggested a clear unidimensional factor solution (KMO = 0.86). The measure was highly reliable with Cronbach's alpha ranging from 0.92 to 0.93.

Emotional distress

Patients' emotional distress in response to the disclosure was measured using three items from Coke, Batson, and McDavis' [57] *Index of Empathic Concern*. The scale assessed the extent to which patients felt upset, troubled, and alarmed on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The scale was highly reliable across the three treatment groups (Cronbach's $\alpha = 0.92$ for each group).

Empathy

Patients' affective empathy for the physician was operationalised with 5 items from Coke, Batson, and McDavis' [57] *Index of Empathic Concern*. Specifically, patients indicated on a 5-point Likert scale to what extent they felt softhearted, empathic, warm, concerned, and compassionate for the physician after the disclosure. Cronbach's alpha ranged from 0.83–0.86 across the three treatment groups, evidencing a reliable scale.

Avoidance

Patient's avoidance of the physician in response to the disclosure was assessed using the six avoidance items from McCullough et al.'s [58] *Transgression-Related Interpersonal Motivations Inventory*. Patients responded to the items on a 5-point Likert scale. The measure was highly reliable, with Cronbach's alpha ranging from 0.94 to 0.96 across the treatment groups.

Manipulation check items

Nineteen additional items were included in the online survey to validate the manipulation immediately following each treatment. The items cross-validated the verbal and nonverbal messages in each treatment group. Specifically, patients were asked to indicate the degree to which they perceived that an error has occurred, the physician was responsible and at fault, and the error could have been prevented. Furthermore, they were asked to rate the degree to which the error caused harm and whether the physician apologised and attempted to explain the error to the patient. Items to cross-validate the nonverbal manipulation tested patients' perceptions of the physician's involvement, coldness, rapport, and composure.

Results

Manipulation check

Multiple one-way analyses of variance (ANOVA) were conducted to compare patients' responses to the manipulation check items across treatment groups. Patients agreed across treatment groups that the physician made a harmful medical error, that the physician was responsible and at fault for the error, and that the incident was unintentional and preventable. The patients also accurately distinguished the nonverbal manipulations in the competent versus incompetent disclosure treatment groups, F (2, 315) = 207.30, $MSE = 0.487$, $p < 0.01$, partial $\eta^2 = 0.57$, $\mu_c = 4.02$, $SD_c = 0.64$, $\mu_{ic} = 2.34$, $SD_{ic} = 0.86$. These results evidence a successful manipulation of the treatment groups.

Respondent demographics

A total of 318 patients (18% male, 82% female) participated in the online experiment. The patients ranged from 18 to 80 years in age ($M = 46.25$, $SD = 14.42$). Of these patients, 36% reported that they had experienced a medical error, 21% indicated that they had been harmed by a medical error, 9% responded that they had filed a complaint, and 1% had pursued a medical malpractice suit against a doctor or health care provider. Almost half of the sample (41%) had worked in a doctor's office, hospital, or pharmacy at some point in their life. A majority of the patients (84%) held a 2-year college degree or higher and associated with a combination of multiple ethnic backgrounds (86%).

Between-group comparisons

Three one-way analyses of covariance (ANCOVAs) and four one-way analyses of variance (ANOVAs) were conducted to test the research hypotheses. The independent variable, treatment, included three levels: transcript, nonverbal competence, nonverbal incompetence. The dependent variables were closeness, trust, and forgiveness (ANCOVAs), and emotional distress, satisfaction, empathy, and avoidance (ANOVAs).

Treatment effects on closeness, forgiveness, and trust

Preliminary analyses evaluating the homogeneity-of-slopes assumption indicated that in the sample, the mean differences in closeness and forgiveness between the treatment groups did not vary as a function of the pretreatment measures of patients' trait forgiveness and general closeness to physicians, F_{close} (2, 312) = 1.04, $MSE = 0.98$, $p = 0.35$, partial $\eta^2 < 0.01$; $F_{forgive}$ (2, 312) = 0.53, $MSE = 0.34$, $p = 0.59$, partial $\eta^2 < 0.01$). Therefore, two analyses of covariance were conducted to examine the treatment effects on patient closeness and forgiveness.

Both ANCOVAs were significant, for patient post-disclosure ratings of closeness, F (2, 314) = 22.71, MSE = 0.98, p <0.01, and forgiveness, F (2, 314) = 8.44, MSE = 0.34, p <0.01. The strength of the relationship between the treatment factor and patient closeness, controlling for patients' closeness to physicians in general, was large, as assessed by a partial η^2, with the treatment factor accounting for 13% of the variance in patients' closeness to the physician. The relationship between the treatment factor and forgiveness was medium, with treatment accounting for 5% of the variance in patient forgiveness in response to the error disclosure, holding constant patients' general tendency to forgive. Based on Fisher's least significant difference (LSD) test, all except the pairwise differences between the transcript and competent treatment groups were statistically significant. The means and standard deviations are displayed in table 1.

The preliminary analysis to evaluate homogeneity-of-slopes assumption between the covariate that assessed patients' general trust in physicians and patients' trust after the disclosure revealed a significant interaction effect, indicating that in the sample, the mean differences in post-disclosure trust between the treatment groups varied largely as a function of patients' general trust in physicians, F (2, 312) = 22.13, MSE = 0.33, p <0.01, partial η^2 <0.12. Because of these results, simple main effects tests were conducted instead of an ANCOVA. The tests assessed differences among the treatment groups at low (1 *SD* below the mean), medium (mean), and high (1 *SD* above the mean) values on the covariate. A p-value of 0.017 (0.05/3) was required for significance of these tests. If any one simple main effect test was significant, pairwise comparisons were evaluated at the same level (i.e., 0.017) as the simple main effects test, following the LSD procedure.

The simple main effects tests were significant for all levels of the covariate, F_{low} (2, 312) = 7.06, MSE = 0.33, p <0.01, partial η^2 = 0.04; F_{medium} (2, 312) =20.94, MSE = 0.33, p <0.01, partial η^2 = 0.12; F_{high} (2, 312) = 35.82, MSE = 0.33, p <0.01, partial η^2 = 0.19. The analyses revealed no significant post-disclosure trust mean differences between the competent and incompetent treatment groups in the low level of the general trust covariate. All other pairwise comparisons were statistically significant, suggesting that all levels of the treatment factor had a significant effect on patients' post-disclosure trust among patients who had initially reported medium and high general trust in physicians. The analyses revealed no statistically significant effect of the competent versus incompetent disclosure treatment levels on post-disclosure trust means among patients who do not trust physicians in general. Thus, hypothesis 1 received substantial support for patient closeness and forgiveness, and partial support for patient trust. The means, standard deviations, and statistical significance among the patients' post-disclosure trust ratings are presented in table 2.

Treatment effects on distress, satisfaction, empathy, and avoidance

Four one-way ANOVAs were conducted to evaluate the effects of the treatment factor on patients' (a) emotional distress, (b) satisfaction with the doctor-patient relationship, (c) empathy for the physician, and (d) avoidance of the physician. All ANOVAs were statistically significant. The treatment factor, as assessed by partial η^2, accounted for 8% of the variance in patient's emotional distress (F (2, 315) = 12.98, MSE = 0.86, p <0.01), 15% of the variance in relational satisfaction (F (2, 315) = 27.06, MSE = 0.78, p <0.01), 18% of the variance in patients' empathy for the physician (F (2, 315) = 34.13, MSE = 0.66, p <0.01), and 5% of the variance in patients' avoidance of the physician (F (2, 315) = 8.90, MSE = 0.77, p <0.01).

Follow-up tests were conducted to evaluate the pairwise treatment differences among the distress, satisfaction, empathy and avoidance means. The four Levene's tests were non-significant. Therefore, the post-hoc comparisons were conducted with the use of the Tukey test, which assumes equal variances. The analyses revealed significant mean differences between the incompetent and competent disclosure groups, and between the incompetent and transcript-only disclosure groups. However, no significant differences were found in the means between the transcript and competent disclosure groups for any variables. Thus, hypothesis 1 received substantial support for the remaining two variables, satisfaction and empathy, and also hypothesis 2 was confirmed. The means and standard errors for the three disclosure treatment groups are reported in table 3.

Post-hoc analyses

Additional exploratory ANCOVAs were conducted to test for potential effects of patients' sex, ethnicity, religion, and previous error experiences on the relationships stated above. The analyses evidenced no significant impacts, suggesting that the reported treatment effects on patient trust, closeness, forgiveness, empathy, satisfaction, distress, and avoidance are robust to these patient predispositions.

Discussion

A majority of patient fatalities are caused by medical errors. Studies to this date have examined the effects of non-disclosure on patient outcomes and evidenced a disclosure gap between what physicians say and what patients want to hear. The past two decades of research in this field have yielded a list of criteria that reflect effective error disclosures. However, such studies have mostly relied on correl-

Table 1: Means, standard deviations, and pairwise comparisons: post-treatment patient forgiveness and closeness.

Treatment	Forgiveness		Closeness	
	M	*SD*	*M*	*SD*
a) NV incompetence	3.41_{bc}	0.59	1.79_{bc}	1.16
b) NV competence	3.64_{a}	0.69	2.43_{a}	1.14
c) Transcript	3.72_{a}	0.62	2.68_{a}	1.18

Note: Subscripts indicate significant pairwise comparisons at p <0.01, controlling for the pre-test measures. Higher scores indicate higher patient ratings of forgiveness and closeness.

ational data and largely neglected the nonverbal components that constitute effective and appropriate disclosures. In an attempt to fill this gap, this study tested the causal effects of different physician nonverbal disclosure styles on patient ratings of seven psychological outcome variables.

In this study, physician nonverbal involvement was associated with higher patient ratings of closeness, trust, forgiveness, empathy, and satisfaction. As predicted, physicians' detached and uninvolved nonverbal behaviours led to significantly higher patient ratings of emotional distress and avoidance of the physician. These associations did not affect patient predispositions such as sex, ethnicity, religion or prior experiences with medical errors. Also, most of the associations revealed a large effect. . These findings imply that nonverbal communication has a significant impact on error disclosure outcomes above and beyond what physicians *say* during this difficult encounter. Thus, concentrating only on the verbal messages when disclosing an error to a patient would be another faux pas in a chain of mistakes, right after committing an error and failing to disclose it. Based on the results of this investigation, physicians are advised to combine effective verbal disclosure messages [50] with nonverbal displays of immediacy (e.g., appropriate touching and physical distancing, direct body orientation, prolonged gazes), expressiveness (i.e., appropriate physical and vocal animation), altercentrism (e.g., displays of attentiveness and interest in the patient, use of affirming head nods), and positive affect (e.g., appropriate smiling, vocal and facial pleasantness), and to engage in skillful nonverbal interaction management (e.g., allowing the patient to speak without interruptions) in order to facilitate positive error disclosure outcomes.

Interestingly, the analyses revealed no significant differences between the competent nonverbal and transcript treatment groups. This finding implies a successful validation of Gallagher's effective error disclosure criteria [50], which were implemented in the creation of the verbal disclosure content. On a different note, this finding may question the utility of nonverbal interaction skills compared to written correspondence. However, this interpretation would be problematic. Existing research emphasises the importance of direct interaction with patients in the disclosure of medical errors. Considering that patients often report pessimistic and unmet disclosure expectations [20–24], the verbally effective transcript in this study may have positively raised patients' expectations and inflated their ratings. The nonverbal disclosure content in the transcript group was up to the patient's imagination, which was likely biased by the effective verbal disclosure content. Future research is needed to further investigate this finding.

Additional suggestions for future research and also limitations of this study need to be discussed. First, the outcome measures that were used in this study reflect "soft" variables rather than measurable health outcomes. However, they carry implications for important long-term outcomes. For example, patients' dissatisfaction, decreased closeness and avoidance of physicians in response to nonverbally ineffective and inappropriate error disclosures may be predictive of costly non-adherence and doctor-switching. Lowered trust, empathy, and forgiveness may imply larger likelihoods of patient complaints or even malpractice litigations. Past research has linked emotional distress and forgiveness to direct psychological and physical health measures. Therefore, this study implies important findings for medical practice and also for future research investigations that are needed to empirically validate these deductions.

Second, the current study tested the validity of its results against some patient predispositions. One of them was the sex of the patient. Future investigations need to elaborate the role of dyadic sex variations in the context of nonverbal error disclosure styles. It can be expected, for example, that certain nonverbal intimacy behaviours (such as touching the patient) may be perceived as more or less appropriate if they are expressed by a female versus male physician and, also, whether they are expressed to a male versus female patient. Furthermore, the findings in this study rely on an U.S.-American sample and thus need to be replicated in other (e.g., European and Asian) cultures. Investigations of these contextual constraints promise additional important implications for future research and error disclosure training.

Third, additional investigations are needed to elaborate the more nuanced effects of physicians' nonverbal behavioural variations during error disclosures on individual (i.e., patient, physician), relational (i.e., doctor-patient relationship), and institutional outcomes. In line with existing theoretical frameworks such as expectancy violations theory or communication accommodation theory, for example,

Table 2: Means, standard errors, and pairwise comparisons: post-treatment patient trust, controlling for general trust in physicians.

Treatment	General Trust in Physicians					
	Low		*Medium*		*High*	
	M	*SE*	*M*	*SE*	*M*	*SE*
a) NV Incompetence	2.45_{c}	0.13	2.74_{bc}	0.07	3.03_{bc}	0.07
b) NV Competence	2.65_{c}	0.12	3.14_{ac}	0.07	3.62_{ac}	0.07
c) Transcript	1.39_{ab}	0.31	1.43_{ab}	0.31	1.47_{ab}	0.30

Note: Subscripts indicate significant pairwise comparisons at p <0.017. Higher scores indicate higher patient trust.

Table 3: Means, standard errors, and pairwise domparisons: patient distress, satisfaction, empathy, and avoidance.

Treatment	Distress		Satisfaction		Empathy		Avoidance	
	M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
a) NV Incompetence	4.42_{bc}	0.09	2.26_{bc}	0.09	2.15_{bc}	0.08	2.81_{bc}	0.08
b) NV Competence	3.82_{a}	0.09	2.96_{a}	0.09	2.82_{a}	0.08	2.44_{a}	0.08
c) Transcript	3.09_{a}	0.09	3.10_{a}	0.09	3.04_{a}	0.08	2.33_{a}	0.09

Note: Subscripts indicate significant pairwise differences according to the Tukey test. Higher scores indicate higher patient ratings of distress, satisfaction, empathy and avoidance.

studies may examine the role of nonverbal physician behaviours on patients' behavioural adjustments or, vice versa, physicians' nonverbal adjustments in response to unexpected patient responses during error disclosures. In addition, it might be interesting to assess potential interaction effects between verbal and nonverbal disclosure competence on individual or relational outcomes to determine whether competent nonverbal communication may compensate for verbal incompetence during error disclosures.

A final limitation of this study is the artificiality of its research design. Although patients were asked to imagine that they were the patient in the error disclosure, the video portrayed an actor rather than a real physician and patients indicated their anticipated rather than actual responses. However, no other study design could have tested the proposed research hypotheses for two reasons. First, hardly any "lay" physician would have been able to vary his/her nonverbal behaviours as effectively as a professional actor for the purpose of this study. Second, displaying an actual physician disclosing a medical error to a large sample of actual patients would have carried significant ethical and legal implications; for example, the videos may have elicited negative patient associations with an "error-prone" medical institution. These restraints and also the large effect sizes that were found in this study warrant the artificiality of its experimental design. Furthermore, studies like this are needed in the preliminary stages of this relatively new research area to justify grant funding that can increase the possibility of future "real-world" data collections.

Conclusion

Existing research has arrived at a set of effective verbal error disclosure components, but no study so far has tested the effects of nonverbal behaviours on disclosure outcomes. The current study pursued such an investigation and evidenced that physicians' nonverbal disclosure messages significantly impact patient trust, closeness, empathy, forgiveness, avoidance, distress, and satisfaction. These results open the floodgates to a research area that has only been touched superficially up to this point. The nonverbal dimension of medical error disclosures and the findings of this study need to be further investigated, validated, and integrated into medical training programs. After all, patients' comprehension of the emotional disclosure content and numerous other positive outcomes for patients, physicians, provider-patient relationships and medical institutions depend on the successful implementation of these findings into medical practice.

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Figures (large format)

Figure 1

Screenshots of the error disclosure video vignettes. (1.) Competent error disclosure; (2.) incompetent error disclosure.