



The contribution of patients' presurgery perceptions of surgeon attributes to the experience of trust and pain during third molar surgery

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Abstract

Background: Patients' feeling of trust in their surgeon may modulate the experience of pain during surgery. However, factors that contribute to patients' experience of trust during surgery remain underexamined. The current study examined the contribution of patients' impressions of surgeons' warmth and competence to their experience of trust and pain during wisdom tooth extractions.

Methods: Patients ($N = 135$, 47% female) scheduled for a wisdom tooth extraction reported their current distress and impressions of their surgeon's warmth and competence after a brief introduction to their surgeon immediately before surgery. Immediately after their surgery, patients reported their experience of trust (feeling safe and in good hands) and pain during surgery. Path analyses modeled perceptions of surgeon warmth, competence, and their interaction as predictors of patients' experiences of trust and pain during surgery.

Results: Higher perceived surgeon competence, but not warmth, predicted the experience of higher trust and lower pain during surgery. Perceived competence interacted with perceived warmth such that the competence–trust relationship was only significant at moderate to high levels of perceived surgeon warmth and failed to reach significance at lower levels of perceived surgeon warmth.

Conclusion: These results indicate that patients feel greater trust in surgeons who are perceived as higher in competence and warmth, underscoring the importance of impression management in surgical care.

Keywords: Trust, Pain, Third molar surgery, Social perception, Surgeon warmth, Surgeon competence

1. Introduction

Patients' experience of trust is a key component of the patient–physician relationship and may contribute to a variety of treatment outcomes, including pain.²¹ Trust in physicians, which patients describe as a feeling of being safe and in good hands,³⁶ is associated with less worry and treatment anxiety,^{1,7,30} reduced physiological arousal,³⁴ enhanced placebo effects,²⁹ reduced anticipation of pain and less negative treatment expectations,^{27,35} less reported pain and distress during

medical procedures,^{7,31} and less postoperative pain.¹⁹ Yet, very little is known about predictors of patients' experience of trust during surgical procedures.^{21,32}

Qualitative and quantitative studies indicate that patients' experience of trust in physicians is related to perceptions of physician warmth or attributes indicating intentions to care for others, and perceptions of physician competence or attributes indicating the ability to care for others.^{6,7,12,17,32,36} However, studies of physician attributes that contribute to patient trust have tended to measure perceptions of physician attributes and feelings of trust only after patients have experienced treatment outcomes. Hence, it is not clear from existing studies whether impressions of physicians formed before treatment predict patients' experience of trust and pain during treatment, or whether the experience of pain during surgery influences the experience of trust which in turn shapes impressions of physician warmth and competence. It is also possible that patients' perceptions of surgeon attributes, experience of trust during medical procedures, and experience of pain are all predicted by a third factor that is outside of physician control such as patient attributes (eg, dental anxiety, previous treatment experiences, age, or sex).⁵ The current research begins to disentangle the role of social perceptions of surgeon attributes in the experience of trust and procedural pain by measuring patients' impressions of surgeon attributes immediately before surgery and measuring patients' experience of trust and pain during surgery immediately after the treatment.

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In addition, the current study explored the relative contribution of perceptions of surgeon warmth and competence to patients' experience of trust and pain during third molar surgery. When choosing a partner for tasks involving collaboration and resource-sharing, people prefer partners who are high in warmth over those who are high in competence but low in warmth.⁸ Understandably, therefore, patients highly value empathy (ie, care and concern) in interactions with oncologists, with whom they engage in continuous shared decision making over a prolonged period of care.²⁵ By contrast, surgical care is not typically continuous, and decisions that are made during a surgical procedure are the sole responsibility of the surgeon (ie, it is not a shared decision-making process). Hence, it was predicted that in the context of surgery, perceived surgeon competence would contribute more strongly to patients' experience of trust and pain than perceived surgeon warmth.

2. Method

2.1. Ethical considerations

Ethical approval to conduct this study was obtained from the VU Human Research Ethics Committee and the research committee for Onze Lieve Vrouwe Gasthuis (OLVG). A number of ethical considerations were taken into account in the design of this study. Only patients who were older than 18 years, able to read and comprehend the consent form (written in Dutch), and scheduled for a single wisdom tooth extraction were eligible to participate in the research. A research assistant invited eligible patients to consider information and consent forms while they waited for their appointment. Patients were informed that the aim of the study was to examine "patients' perceptions of surgeons and experience of surgery," and that the procedure involved completing a very brief (1 minute) confidential online survey before surgery and another brief confidential online survey immediately after the surgery. The surveys that we asked patients to complete were necessarily very brief to minimize patient burden and ensure that patient flow was not disrupted. All patients who were invited to participate provided consent, and no one withdrew from the study after consenting to participate.

Two surgeons from each of the 2 participating hospitals (2 male and 2 female) were recruited to participate in the research and were informed that the study investigated patients' perceptions of surgeons and experience of surgery. Participating surgeons were not aware of the measures that were being used in the study or the specific surgeon attributes that were being evaluated by patients. Importantly, participating surgeons were informed that patients' perceptions of surgeon attributes would only be reported in relation to patients' experience of surgery, and not in relation to surgeon characteristics (age, sex, or hospital affiliation).

2.2. Clinical context

The study was conducted with patients in the oral and maxillofacial surgery units of 2 research hospitals in Amsterdam, the Netherlands. The patients selected for inclusion in the study were scheduled for third molar extractions (wisdom tooth removals). Dentists typically refer patients to specialist oral and maxillofacial surgeons for more complex extractions (eg, with impaction of the third molar). Patients were scheduled for surgery with the next available surgeon at the oral and maxillofacial surgery unit of the hospital to which they were referred. Therefore, patients did not know who their surgeon would be and had no previous

interpersonal contact with their surgeon before their third molar extraction.

Wisdom teeth are typically extracted under local anesthetic. Nevertheless, the experience of wisdom tooth extraction is often associated with the experience of some pain and discomfort.^{15,39} The sensations associated with drilling (pressure), extracting (pulling), suctioning, the strain of holding one's oral cavity open for an extended period, and the awareness of actual or potential tissue damage occurring during surgery can be mildly to extremely unpleasant and distressing for patients.^{15,18}

2.3. Participants

One hundred thirty-five Dutch-speaking adults scheduled for a wisdom tooth extraction participated in the study (46.7% female, mean age = 33.6 and age range = 18–80 years). Participating surgeons had equivalent qualifications, experience (in terms of number of third molar extractions performed over their career), and technical expertise (evaluated by the chair of the oral and maxillofacial surgery unit based on number of cases treated [T.F.J.]).

2.4. Design and procedure

A time-lagged cross-sectional design was used to test the relationship between patients' presurgery impressions of their treating surgeon's warmth and competence and patients' experience of trust and pain during surgery. After the typical procedure for a wisdom tooth extraction in the Netherlands, patients were scheduled for a 5-minute presurgery consultation during which their treating surgeon reviewed patients' x-rays and/or explained the surgical procedure, and administered local anesthesia (lidocaine) to the mandibular foramen using the infiltration method. None of the patients in this study received any form of sedation (oral, nasal, or venous) or general anesthesia in advance of their procedure. After the surgeon left the consultation room, a research assistant provided participants with a tablet computer to complete a very brief confidential online survey measuring their impressions of the treating surgeon and their current affective state. After completing the survey, a nurse transferred patients to the operating room for surgery, scheduled for 20 minutes. After surgery, participants were taken to a postsurgery recovery room where they used a tablet computer to complete a confidential online survey measuring their experience of trust and pain during surgery followed by additional questionnaires for unrelated research projects.

2.5. Measures

2.5.1. Perceptions of surgeon warmth and competence

Participants used an 11-point sliding scale ranging from 0 (not at all) to 10 (extremely) to indicate their impressions of their treating surgeon on 9 attributes that have previously been found to capture perceptions of warmth or intentions to care for others (warm, friendly, well-intentioned, good-natured) and competence or ability to care for others (competent, confident, skilled, intelligent, and capable), albeit in nonclinical contexts.^{9,10} The order in which each of these attributes were presented for evaluation was randomized by the online survey platform.

2.5.2. Presurgery distress

Patients' presurgery distress was assessed to be included in analyses as a covariate, given the potential for patients' presurgery distress or anxiety to contribute to perceptions of

surgeon attributes and patients' experience of surgery. Participants were asked to indicate the extent to which they currently felt distressed, anxious, insecure, and calm (reversed) using an 11-point sliding scale ranging from 0 (not at all) to 10 (extremely). The order in which these items were presented to participants was randomized.

2.5.3. Experience of trust and pain during surgery

The experience of trust has previously been described as the feeling of being safe and in good hands.¹ Existing measures of patient trust in physicians tend to capture patients' evaluations of a physician's credibility and reliability within an ongoing relationship or process of care as opposed to the feeling of trust (or hope) that comes from the belief in the physician's ability to affect health outcomes positively.^{3,21} Reflecting the limitations of available measures and the need to prioritize the brevity of measures to minimize patient burden and interruptions to patient flow, we prioritized face validity over construct validity, participants were asked to indicate the extent to which they felt safe and in good hands during surgery using an 11-point sliding scale (0 = not at all, 10 = extremely). Pain during surgery was also measured with 2 items: Participants were asked to indicate the extent to which they experienced pain and discomfort during surgery (0 = not at all, 10 = worst imaginable).

2.6. Statistical analysis

Descriptive statistics for demographic variables and key study variables (perceptions of surgeon warmth and competence; experiences of trust and pain) were examined, as well as Pearson product-moment correlations between perceptions of surgeon warmth and competence, and experiences of trust and pain. We also examined whether perceptions of surgeon warmth and competence, and experiences of trust and pain were associated with patient age (using correlations) and patient sex (using an independent-samples *t* test). The internal consistencies of items measuring impressions of surgeon warmth and competence and experiences of trust and pain were examined using Cronbach's α . All analyses described above were conducted in SPSS v24.

For the primary analysis, we used path analysis in Mplus v6, using the robust maximum likelihood estimator, to test 2 path models. Model 1 included mean impressions of surgeon warmth (mean of 4 items) and competence (mean of 5 items) as predictors of patients' experience of trust (mean of 2 items) and pain (mean of 2 items). In model 2, the product interaction of impressions of surgeon warmth and competence was added as a predictor. Because the presence of the interaction changes the interpretation of the individual predictors (ie, perceived surgeon warmth and competence), we used model 1 to interpret the relationship between these individual predictors and the experience of trust and pain, and we used model 2 to interpret the interactions.

To probe any significant interactions, we analysed simple slopes by examining the statistical significance of the competence–trust relation for different values of warmth (low = -1 SD , moderate = mean, high = $+1\text{ SD}$).³³ Participant age and sex and presurgery distress (mean of 4 items) were to be included as covariates if they exhibited significant associations with the experience of trust or pain. Using the common criterion of 10 participants per estimate, we determined that a sample size of 130 was adequate to test the interaction model with up to 2 covariates (10 paths, 2 residual variances, 1 covariance = 13 estimates).

3. Results

3.1. Descriptive statistics

Participants reported a mean age of 33.6 ($SD = 13.8$, range 18–80) and 63 were female (46.7%). Mean reported presurgery distress was 4.0 ($SD = 2.3$, range = 0–9.25). Descriptive statistics and Cronbach α for perceptions of surgeon warmth and competence and experiences of trust and pain are shown in **Table 1**. The experience of trust and pain both narrowly failed to meet the conventional criterion of adequacy of Cronbach α (0.70), but this is partly attributable to the small number of items (2) representing each construct. Correlations between these same variables are shown in **Table 1**. Experience of pain ($t_{133} = 1.51$, $P = 0.13$), trust ($t_{133} = 0.18$, $P = 0.86$), perceived warmth ($t_{133} = -0.079$, $P = 0.937$), and perceive competence ($t_{133} = 1.43$, $P = 0.255$) did not differ significantly by participant sex. The experience of trust ($r = 0.10$, $P = 0.25$), pain ($r = 0.04$, $P = 0.64$), and perceived warmth ($r = 0.134$, $P = 0.121$) were not significantly correlated with patient age, and the relation between patient age and perceived competence was marginal ($r = 0.173$, $P = 0.045$). The experience of trust ($r = -0.14$, $P = 0.10$), pain ($r = 0.13$, $P = 0.14$), perceived warmth ($r = -0.02$, $P = 0.822$), and perceived competence ($r = -0.124$, $P = 0.153$) were not significantly correlated with presurgery distress. All these estimates are weak. As such, patient sex, age, and presurgery distress were not included as covariates in the main analyses.

3.2. Path models

Given the high correlation between perceived warmth and competence ($r = 0.78$, $P < 0.001$), we examined the variance inflation factor to determine whether including both as predictors in the path model may result in problems arising from multicollinearity. The observed value of 2.53 is below generally accepted thresholds,²⁰ suggesting no problem of multicollinearity. Two independent observations were found to be further than 3 SDs from the mean and were classified as extreme values. As such, path models were analysed first with all observations included, and second with extreme values excluded.

The path model is shown graphically in **Figure 1**, and the results of model 1 and 2 (extreme values included and excluded) are presented in **Table 2**. In model 1 (perceived warmth and competence predicting the experience of trust and pain), higher perceived competence significantly predicted the experience of higher trust and lower pain, whereas perceived warmth neither predicted the experience of trust nor pain (**Table 2**). When extreme values were excluded, perceived competence was no longer a significant predictor of pain. In model 2, the interaction between warmth and competence was significant for the experience of trust but not pain, such that the relationship between perceived surgeon competence and patients' experience of trust was stronger for higher levels of perceived surgeon warmth. Excluding extreme values did not change the results of model 2 substantially (**Table 2**). The correlation between the experience of trust and pain was neither significant in model 1 ($r = -0.14$, $P = 0.12$) nor model 2 ($r = -0.12$, $P = 0.21$), and excluding extreme values did not change these results (model 1: $r = -0.13$, $P = 0.16$; model 2: $r = -0.11$, $P = 0.25$).

Simple slopes analyses revealed that the association between perceived surgeon competence and the experience of trust was significant when perceptions of warmth were high (ie, 1 SD above the mean, $t_{133} = 3.81$, $P < 0.001$) or moderate (ie, at the mean, $t_{133} = 3.03$, $P = 0.003$), but not low (ie, 1 SD below the mean $t_{133} = 1.85$, $P = 0.067$). The specific predicted value of perceived

Table 1**Descriptive statistics and correlations for key study variables (all observations included).**

	Mean (SD)	Range	Cronbach α	Correlations			
				1	2	3	4
1. Experience of trust	8.03 (1.55)	4–10	0.69	1			
2. Experience of pain	2.72 (2.32)	0–9	0.64	-0.19 (0.03)	1		
3. Perceived warmth	8.32 (1.24)	3.75–10	0.91	0.39 (<0.001)	-0.04 (0.67)	1	
4. Perceived competence	8.33 (1.23)	3.6–10	0.94	0.48 (<0.001)	-0.15 (0.09)	0.78 (<0.001)	1

Values reported are Pearson correlations (and P values).

warmth for which the competence–trust association became significant was 7.21. That is, the model predicts that when impressions of surgeon warmth are higher than 7.21, greater perceived surgeon competence may be associated with greater reported trust during surgery. When extreme values were excluded, the results of these analyses were not substantially changed: the experience of trust was significant when perceptions of warmth were high ($t_{133} = 2.84, P = 0.005$) or moderate ($t_{133} = 2.14, P = 0.043$), but not low ($t_{133} = 1.25, P = 0.212$), although the specific predicted value of perceived warmth for which the competence–trust association became significant when outliers were excluded was 8.08.

Figure 2 shows a graphical representation of the significant perceived warmth–competence interaction for experience of trust (all observations included), where the association between perceived competence and trust is illustrated separately for 3 categories of perceived warmth based on the mean (8.32 ± 1 SD ($SD = 1.24$): low (≤ 7.5), moderate (> 7.5 and < 9), and high perceived warmth scores (≥ 9).

4. Discussion

Previous research has found that patients' experience of trust is associated with better treatment outcomes including less procedural pain and reduced postoperative pain.^{7,19,21,31} However, very few studies (if any) have examined the basis on which patients experience trust in surgeons after only brief interactions immediately before surgery. The current study examined the extent to which patients' impressions of surgeons' warmth and competence (evaluated after a brief interaction before third molar surgery) predicted their experience of trust and pain during surgery, with the aim of gaining further insight into factors that might improve patient trust and reduce pain during surgery.

Consistent with previous research, analyses revealed that both perceptions of physician warmth and competence were

correlated with patients' experience of trust. However, as hypothesized, perceptions of physician competence were more predictive of patients' experience of trust than perceived physician warmth. Further analysis revealed that perceptions of surgeon competence interacted with perceptions of surgeon warmth to predict the experience of trust such that the relationship between perceived surgeon competence and the experience of trust was only significant at moderate to high levels of perceived surgeon warmth. Hence, perceived surgeon warmth may not be sufficient to predict the experience of trust during surgery, but a moderate–high level of perceived warmth may be necessary for the relationship between perceived surgeon competence and trust to emerge. Although previous research has tended to emphasize the role of perceived physician warmth (ie, caring, compassion, similarity, and rapport) to patients' experience of trust over perceived physician competence,^{26,31} the current research suggests that, in certain clinical contexts, perceptions of physician competence may be equally important for patients' experience of trust during surgery.

We observed a weak correlation between patients' experience of trust and pain during third molar surgery and the association between perceived surgeon competence and pain seems to have been driven by 2 patients whose perceptions of their surgeon were statistically considered extreme within the current sample. In summary, pain was only weakly related to patients' evaluation of their surgeons. Nonetheless, the 2 extreme observations were plausible values of perceived surgeon warmth and competence and suggest that, consistent with previous research, when surgeons are perceived to be particularly low in warmth or competence, patients may report greater pain and distress. This interpretation is speculative from the present data because of the small number of such patients in this sample. A more focused examination is warranted in future research.

4.1. Strengths and limitations

The primary strength of the current study is its external validity, having been conducted with real patients interacting with their surgeon immediately before a real (not hypothetical or experimental) procedure. Moreover, to the best of our knowledge, this is the only study that has measured patients' perceptions of their surgeon before surgery, before experiencing procedural pain and discomfort, which may negatively bias the perception of surgeon attributes.²² Using a time-lagged cross-sectional design, the current study indicates that patients' presurgery perceptions of surgeon warmth and competence predict patients' experience of trust but not necessarily pain during surgery.

However, it is important to note that the observational (nonexperimental) nature of the current study prohibits an examination of causal processes. Evidence for the impact of patient perceptions of surgeon warmth and competence on patients' experience of trust requires either that patient

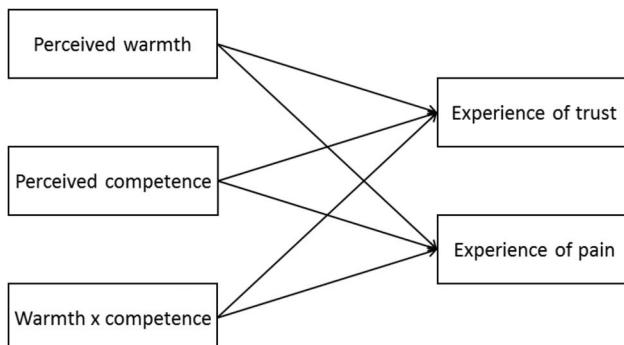
**Figure 1.** Models tested in path analysis.

Table 2

Results of the path analysis for perceived surgeon warmth and competence (model 1) and their interaction (model 2).

	Mean (SD)	Range	Cronbach α	Correlations			
				1	2	3	4
1. Experience of trust	8.03 (1.55)	4–10	0.69	1			
2. Experience of pain	2.72 (2.32)	0–9	0.64	−0.19 (0.03)	1		
3. Perceived warmth	8.32 (1.24)	3.75–10	0.91	0.39 (<0.001)	−0.04 (0.67)	1	
4. Perceived competence	8.33 (1.23)	3.6–10	0.94	0.48 (<0.001)	−0.15 (0.09)	0.78 (<0.001)	1

Values reported are Pearson correlations (and P values).

perceptions of surgeon attributes are experimentally manipulated, or that physician behaviours conveying warmth and competence are experimentally manipulated. Moreover, as suggested above, the surgical context of this study was specific (ie, third molar surgery), and further research is required to determine whether the present results generalise to other surgical procedures.

4.2. Clinical implications

In light of previous research demonstrating the role of patients' trust in surgeons for postsurgical outcomes including postsurgical pain management¹⁴ and patient-initiated litigation,² our findings highlight the importance of surgeons being perceived as both high in warmth and competence in patient–physician interactions before surgery. Extant research suggests that perceptions of physician competence is associated with wearing appropriately professional attire (scrubs or white coat),^{13,23,28}

providing patients with technical information,³⁷ and displaying confidence (but not arrogance) through vocal tone.² Physician behaviours associated with perceived warmth include the appropriate use of eye contact, touch (hand shake),³⁷ active listening,²⁶ patient-centered communication (eg, asking about the patients' experience of illness),¹⁶ and use of empathetic statements.³⁸ However, further experimental research is needed to establish whether the deliberate display of these behaviours increases patients' experience of trust during surgery.

4.3. Future research directions

These findings raise several questions for exploration in future research. First and foremost, it will be important for future research to clarify contextual factors that influence the relative importance of perceived physician competence and warmth to patients' experience of trust. We speculate greater surgeon competence may have elicited a greater feeling of being safe and

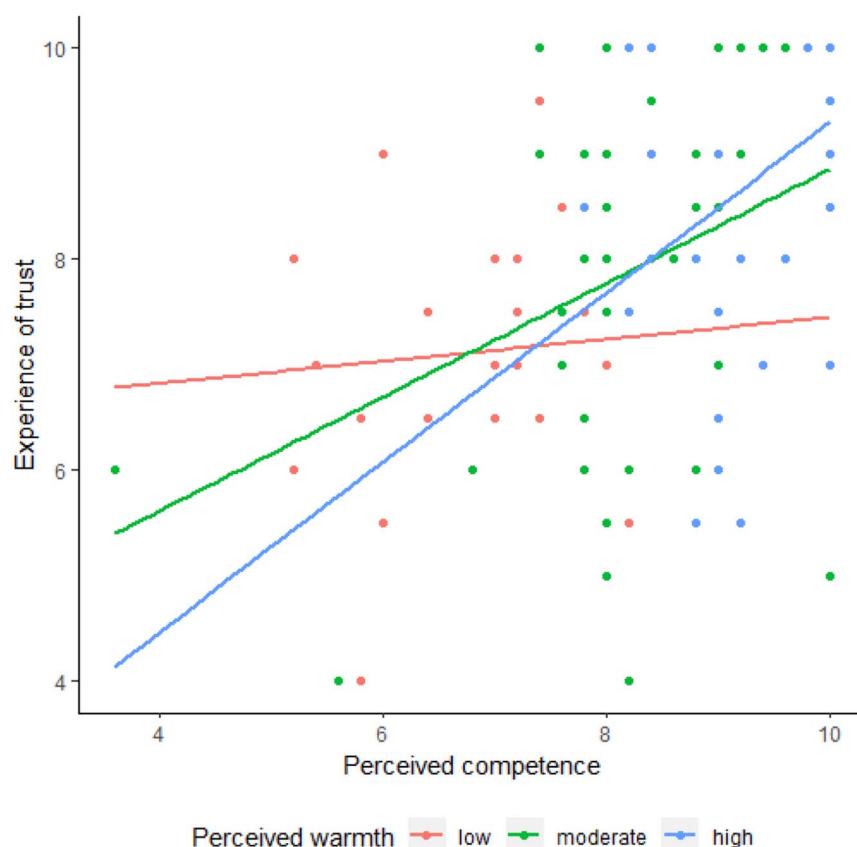


Figure 2. Graphical representation of the interaction between perceived surgeon competence and perceived surgeon warmth on patients' experience of trust during third molar surgery (all observations included).

in good hands relative to perceptions of greater surgeon warmth in this study for several reasons that will be tested in future research.

First, patients undergoing a wisdom tooth extraction do not typically have repeat procedures with their surgeon, and the patient–physician relationship is relatively short-lived. Under these circumstances, patients’ desire for a supportive or nurturing surgeon may be secondary to their desire to be protected from pain and other potential harms related to surgery. Along these lines, we would not expect patients to value warmth as highly as competence in an anesthetist who is delivering an epidural under time pressure. It may be interesting to observe the extent to which women’s experience of trust in their anesthetist when receiving an epidural during labor is related to the perceived warmth vs competence of the physician.

Second, in the current study, patients’ perceptions of surgeon warmth and competence were measured immediately before surgery, at a time when surgeon competence (or lack of competence) is more consequential for one’s safety and security than perceived surgeon warmth. It is plausible that the timing of this measurement is crucial to our findings, and that patients may be less sensitive to physician behaviors conveying competence several days or a week before surgery. Indeed, it is also plausible that when surgery is scheduled some time in the distant future, patients’ expectations (as opposed to experience) of trust and pain during surgery are more closely associated with perceived surgeon warmth than perceived surgeon competence. Consistent with this, research has found that physician warmth (reassurance, kindness, patience, and supportiveness) is associated with less treatment anxiety and more positive treatment expectations when measured in the period leading up to surgery (but not necessarily immediately before surgery).¹¹

Third, it has been speculated that patients’ preferences for surgeon warmth are related to the level of perceived risk of morbidity and mortality associated with the surgery, and the perceived complexity of the surgery. Dusch et al.¹² found that patients who participated in an experiment preferred a surgeon who was described as confident and independent over a surgeon described supportive and nurturing for lung cancer surgery but preferred the surgeon described as supportive and nurturing for breast cancer surgery. The authors point out that lung cancer mortality is significantly higher than breast cancer, and that the general public perceive cancer of the breast as being easier to remove than cancer from “a vital organ” and suggest that patients prioritize confidence and technical competence over nurturing and warmth for medical procedures that are seen as being more technically complex and threatening.¹²

Finally, people’s expectations predict their evaluations and experiences,⁴⁰ and it is well documented that people generally expect surgeons to exhibit higher competence than warmth, but not necessarily low warmth.^{4,24} Consistent with these reported patient expectations of surgeons, the current study found that when patients perceived surgeons to be higher in competence, they experienced greater trust when surgeons were perceived as moderate to high (but not low) in warmth. These results are suggestive that patients may be predicted to experience greater trust during medical procedures to the extent that their physician is perceived to exhibit attributes that are consistent with their expectations. Understanding individual patients’ expectations of surgeon attributes and how these expectations can be managed through patient–provider communication may be an important avenue for future research.

4.4. Conclusions

Patients’ presurgery perceptions of surgeon competence and warmth interacted to predict patients’ subsequent experience of trust during third molar surgery. Further research is needed to explore factors that shape patients’ perceptions of surgeon attributes and whether these perceptions can be shaped or changed by physician behavior to improve patients’ experience of trust and possibly even pain during surgical procedures. In addition, it is important to explore whether the relationship between patients’ experience of trust and pain emerges in other surgical contexts.

Disclosures

The authors have no conflict of interest to declare.

This study was approved by the Vrije Universiteit Human Research Ethics Committee of the Department of Experimental and Applied Psychology and the Medical Research Ethics Committee of the Onze Lieve Vrouwe Gasthuis (OLVG).

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