How oncologists’ communication impacts patients’ information recall and emotional stress

A video-vignettes approach

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APPENDIX A

The value of physicians’ affect-oriented communication for patients’ recall of information

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ABSTRACT

Objective
The aim of this paper is to discuss experimental research investigating the effect of physicians’ affect-oriented communication on patients’ recall of information provided during medical consultations, with a special focus on the mediating role of emotional stress in that relation.

Methods & results
A search of experimental research literature was conducted, resulting in six research articles experimentally investigating the relations of interest, all using a video-vignettes design. A summary of results is provided and discussed.

Conclusions
The research reviewed in this paper provides evidence for the causal and mostly positive influence of several forms of affect-oriented communication on patients’ recall of medical information. Results indicate that reducing emotional stress may not be the underlying mechanism through which physicians’ communication influences patients’ recall.

Practice implications
The obtained insights will help educators to teach evidence-based medical communication skills and to scientifically validate the importance of these skills for patients’ recall of information. Advancing physicians’ communication skills with evidence-based training will contribute to the professionalism that is the hallmark of good quality of care.
INTRODUCTION

Receiving medical information from their physician is important for patients for several reasons. It can reduce their uncertainty by helping them to foresee procedures, symptoms and side effects of disease and treatment, thereby improving psychological functioning and adaptation to illness [1, 2]. Information also supports patients’ coping as it enables them to take action when possible and adapt when intervention is impossible, thereby enhancing control [3]. Moreover, information about available treatment options and their implications allows patients to be involved in decision making [3, 4]. Medical information also supports adherence to treatment regimens [5, 6] and beneficial health behaviors [7, 8]. Furthermore, patients generally want to receive detailed medical information [9-11], especially about the prognosis, the disease itself, the treatment and side-effects [12].

Unfortunately, patients’ recall of, i.e., their ability to remember, medical information provided by their physicians is generally poor. Percentages of forgotten information vary from 40 to 80% [4, 7]. Most research is done within the cancer care domain, and shows that approximately half of the provided information is not remembered by patients [13, 14]. Especially information about treatment options, goals, side effects and procedures is not well remembered, when compared to information about the cancer diagnosis [14, 15]. For example, among patients newly diagnosed with lung cancer, 92% accurately recalled the information about their diagnosis, compared to 49% who correctly recalled the goal of proposed treatment [15]. In view of the loss of considerable amounts of information, it is not surprising that cancer patients report unfulfilled information needs [9, 12].

Uncovering the mechanisms that lead to limited recall of medical information may provide insights that help to improve recall and inform physicians about communication behaviors that can optimize information transfer to patients.

This paper focusses on one of the possible mechanisms that may underlie limited information recall in patients, i.e., the relationship between emotional stress and memory performance. Emotional stress is defined as the increase in self-reported negative feelings and/or physiological arousal caused by an emotional stimulus (definition by authors). Although the relationship between emotional stress and memory performance is complex [16, 17], evidence from mostly animal studies suggests an inverted U-shaped relationship, in which memory increases with increasing stress levels to an optimal point, and beyond this point memory performance decreases with higher stress levels [18]. Highly stressful situations hence induce poor memory [19]. This fits with the finding that, in patients, receiving a bad diagnosis and/or poor prognosis - which likely leads to high levels of emotional stress - leads to a worse overall recall of information [14]. The fact that the bad news itself is relatively well-remembered in these situations as compared to other, additional information, can be explained by the attention-narrowing hypothesis. This hypothesis states that individuals in stressful situations will focus on the most threatening or so-called ‘central’ information, at the cost of additional or so-
called ‘peripheral’ information, to which they will pay relatively less attention [20]. Consequently, if physicians would be able to reduce patients’ emotional stress during consultations, they might improve patients’ information recall. This will particularly concern additional, yet very relevant, information about for example treatment procedures and side effects.

This paper aims to summarize and critically discuss findings from empirical studies that investigated the causal relationship between physicians’ communication during consultations and patients’ recall of information, with a special focus on the mediating role of emotion reduction in this relation (see Fig. 1). To this end, we discuss experimental studies that tested the effects of physicians’ affect-oriented communication, i.e., communication behaviors expressing care for, and affective engagement with the patient.

**Figure 1.** The hypothesized model

*Notes.* Without accounting for emotional stress, affect-oriented communication is expected to positively impact information recall, which is called the total effect. The indirect effect is the mediation effect, calculated by combining path a with path b. Path a: affect-oriented communication is expected to reduce emotional stress. Path b: emotional stress is expected to negatively influence information recall. The direct effect is calculated by predicting information recall based on communication while controlling for emotional stress. Emotional stress is a indicated as a (partial) mediator of the effect of affect-oriented communication on information recall if the direct effect is smaller than the total effect, and path a and b are demonstrated [45].
METHODS

Following the scoping study methodology [21], databases (Pubmed, PsychInfo and Google scholar) were thoroughly searched to identify publications on the relationship between physicians’ communication and patients’ information recall, employing combinations and variations of the keywords: 1) affective/affect-oriented communication, physician/oncologist communication/behavior, physician-patient relations; and 2) (patient/information) memory/recall. This was combined with reference lists reviewing of relevant articles to identify any further relevant literature, and the inclusion of findings of a recent study conducted by the authors [22]. Research articles based on original data collected within an experimental study design were selected. This process yielded 13 research articles describing 12 experimental studies investigating the impact of physicians’ communication on patients’ information recall. These articles could be roughly divided into two categories, with one exception [23]. Firstly, articles investigating the effect of cognition-oriented communication behaviors, i.e., structuring [24], categorizing [25], organizing [26], forecasting and framing [27], and providing argumentative support [28, 29]. Secondly, articles testing the effect of affect-oriented communication behaviors [22, 30-34]. This second category will be the focus of this paper, leaving six articles included for review.

These were all video-vignette studies investigating physician-patient communication within the oncology context. A video vignette is a video recording of a situation in which actors mimic a scripted doctor-patient consultation [35, 36]. In such video-vignette design, participants are called analogue patients. They can be either disease-naïve participants (i.e., individuals without a disease history) or (former) patients, instructed to watch the video vignette while imagining themselves in the video patients’ situation [37]. The medical content, the environment, and the (interaction between) characters are exactly identical across video-vignette conditions, except for specific communication elements of interest. These elements, e.g., the physician’s response to emotions, are manipulated to vary across video-vignette versions, which allows systematic testing of the effects of these specific communication behaviors. Most studies reviewed for this paper compared one enhanced communication condition to one standard communication condition.

RESULTS

The (total) effect of affect-oriented communication on information recall

Study characteristics, including the specific behaviors manipulated to create enhanced affect-oriented communication conditions, and relevant results are summarized in Table 1. In chronological order, Fogarty et al. [34], manipulated physicians’ communication to include more compassionate behaviors. Contrary to expectations, they showed a significant albeit small negative influence of enhanced compassion on analogue patients’ recall. The publications of Sep et al. [30], and van Osch
et al. [31] were based on data from one video-vignettes study and results showed that affect-oriented communication improved recall of information. The impact of non-verbal behaviors, on recognition and free recall of information was tested by Hillen et al. by means of respectively multiple-choice and open-ended questions [33]. Analogue patients’ recognition, yet not free recall, was found to be higher if the oncologist had more consistent eye contact with the video patient. Body posture and smiling did not influence free recall nor recognition. In recent work from Medendorp et al., a trust-conveying communication style improved free recall of information, yet not recognition [32]. Lastly, the authors tested the influence of two specific types of affect-oriented communication: emotion-oriented silence and speech [22]. Emotion-oriented communication comprises behaviors enacted in response to patients’ negative emotional expressions with the intention to alleviate those emotions. Both emotion-oriented silence and speech had a positive impact on analogue patients’ recognition, yet not free recall, of information.

Reducing emotional stress as an underlying mechanism through which affect-oriented communication impacts information recall

If emotional stress is a mediator of the relationship between communication and recall, physicians’ affect-oriented communication is assumed to influence emotional stress levels (Fig. 1, path a). The emotional stress elicited by medical consultations is commonly assessed using self-report questionnaires completed after (watching) the (video-vignette) consultation. Clearly such a retrospective and subjective assessment is susceptible to biases. To increase our understanding of how physicians’ communication may contribute to patients’ information recall, insight is needed in the immediate impact of physicians’ communication on patients’ emotional responses. To this end, registration of psychophysiological arousal responses [38] was sometimes (additionally) used to provide a more objective and direct measure of negative emotions.

Most of the identified video-vignette studies investigated the impact of affect-oriented communication on analogue patients’ emotional stress in addition to information recall, and were able to demonstrate an effect. Results are shown in Table 1. However, this was not consistent. For example, an effect on skin conductance level was found by Sep et al. [30], but not by Medendorp et al. [32]. Moreover, Visser et al. were not able to demonstrate an effect of communication on various self-reported and psychophysiological measures [22]. Still, if an effect was found, this was most often a positive, tempering effect of affect-oriented communication.

In addition, emotional stress levels should be related to analogue patients’ information recall for emotional stress to be a mediator (Fig. 1, path b). A recent video-vignette study specifically aimed at investigating this association did not provide evidence for such a relationship [39]. Sep et al., did find a relationship between analogue patients’ skin conductance level and information recall, but did not test the hypothetical mediation effect [30]. The mediation analyses performed in two of the other reviewed studies did not provide significant results [22, 32].
### Table 1. Characteristics and results of identified experimental studies investigating the impact of physicians’ affect-oriented communication on analogue patients’ recall of information and emotional stress

<table>
<thead>
<tr>
<th>First author, Year</th>
<th>Study objectives</th>
<th>Sample; Video-vignette conditions</th>
<th>Manipulated behaviors</th>
<th>Results regarding information recall</th>
<th>Results regarding emotional stress</th>
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<tr>
<td>Fogarty, 1984</td>
<td>To assess the effects of physician compassion on analogue patients’ anxiety, information recall, treatment decisions, and assessment of physician characteristics.</td>
<td>123 healthy female breast cancer survivors and 87 women without cancer; Two video-vignette conditions: standard vs. enhanced compassion.</td>
<td>Enhanced compassion: additional compassionate behaviors were shown by the physician, i.e., the verbal acknowledgment of psychologic concerns, expression of partnership and support, validation of patient’s emotional state and the difficulty of making a decision with uncertainty, provision of reassurance, and non-verbally by the touch of the patient’s hand.</td>
<td>Enhanced compassion resulted in lower free recall scores (M = 28.4 vs M = 30.4 on a scale from 0 to 54).</td>
<td>Self-report: enhanced compassion resulted in less anxiety.</td>
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<td>Sep, 2014</td>
<td>To investigate whether physicians’ affective communication during a bad news consultation will decrease analogue patients’ physiological arousal and improve recall.</td>
<td>50 healthy women, i.e., women who never had cancer; Two conditions: standard vs. affective communication.</td>
<td>Affective communication: additional verbal empathic remarks were made by the physician, specifically providing reassurance and ongoing support.</td>
<td>Affective communication resulted in higher memory (a combination of free recall and recognition of information).</td>
<td>Physiological arousal: skin conductance levels decreased more in the affective communication condition. In the affective condition, variance in skin conductance level explained 21.1% of the variance in recall scores. No mediation analysis was performed.</td>
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<tr>
<td>van Osch, 2014</td>
<td>To explore whether physicians’ affective communication in decreases analogue patients’ anxiety and uncertainty, and improves information recall.</td>
<td>Based on the same video-vignette study as Sep, 2014</td>
<td>Affective communication resulted in higher recognition of contextual-detail information and higher free recall of prognostic information.</td>
<td>Affective communication resulted in less anxiety and uncertainty. Neither anxiety nor uncertainty moderated the relationship between affective communication and memory. No mediation analysis was performed.</td>
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Table 1. Continued

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<tr>
<th>First author, Year</th>
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<td>Hillen, 2016</td>
<td>To test the influence of three non-verbal behaviors, i.e. eye contact, body posture and smiling, on analogue patients' free recall and recognition of information and perceived friendliness of the oncologist.</td>
<td>132 breast cancer patients/survivors and 62 healthy women; Eight conditions: all possible combinations of 3 variations in non-verbal behavior with 2 levels each.</td>
<td>Eye contact: consistent vs inconsistent; Body posture: forward leaning and frontal vs. varying, and; Smiling: occasional vs. no smiling.</td>
<td>Eye contact did not influence free recall, but consistent eye contact did enhance recognition scores. Body posture and smiling did not influence free recall or recognition of information.</td>
<td>Not investigated.</td>
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<tr>
<td>Medendorp, 2017</td>
<td>To investigate whether oncologists' use of trust-conveying communication enhances analogue patients' memory, and if this relationship is mediated by a reduction in psychophysiological arousal.</td>
<td>97 cancer-naive individuals, i.e., university students who never had cancer or attended an oncological consultation; Two conditions: standard vs. trust-conveying communication.</td>
<td>Trust-conveying communication: additional verbal phrases in which the physician conveyed his competence, caring for the patient and honesty about treatment risks and results.</td>
<td>Trust-conveying communication resulted in higher free recall of information, but recognition did not differ.</td>
<td>Physiological arousal: a smaller increase in heart rate was found in the trust-conveying condition. No effects on electrodermal activity parameters (skin conductance level and -responses) were found. The impact of communication on recall was not mediated by heart rate.</td>
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<tr>
<td>Visser, submitted</td>
<td>To investigate and compare the impact of oncologists' emotion-oriented silence and emotion-oriented speech on analogue patients' recall of information, and the hypothetical mediation by the tempering of emotional stress.</td>
<td>217 cancer-naive individuals, i.e., university students who never had cancer or attended an oncological consultation; Three conditions: standard vs. emotion-oriented silence vs. emotion-oriented speech.</td>
<td>Emotion-oriented silence: the physician responded with attentive silence to patient's emotions; Emotion-oriented speech: the physician responded by acknowledging and exploring patient's emotions, and by providing empathic and supportive statements.</td>
<td>Both emotion-oriented silence and speech resulted in higher recognition of information. No effect was found on free recall.</td>
<td>Self-report: no effects of communication were found. Physiological arousal: no effects of communication were found on four individual parameters (heart rate, heart rate variability, skin conductance level and -responses). No mediation effects were shown.</td>
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**DISCUSSION**

**Discussion**

Findings from the six experimental studies that were discussed in this paper firmly underscore that physicians’ affect-oriented communication can impact patients’ information recall, most frequently in a positive way. The findings however question the assumption that reducing emotional stress is the underlying mechanism through which affect-oriented communication influences information recall. This is an important finding, as in medical communication research and medical (communication) education these relationships are often assumed to exist [4, 30, 31, 40]. Other mechanisms might be at play. As emotion-oriented silence was demonstrated to impact memory as well, and to a similar extent, as emotion-oriented speech [22], an alternative explanation could be that both these approaches provide patients with extra time to adequately process and store the provided medical information into their memory. This hypothesis warrants further testing.

**Methodological reflections**

Previous research indicates that analogue patients in a video-vignettes design can be validly used as a proxy to actual patients to evaluate physician’s communication behavior [41, 42]. However, the validity of using a video-vignettes design to investigate emotional stress as an underlying mechanism through which physicians’ communication influences information recall can be called into question. Although watching the video vignettes evoked statistically significant emotional stress responses in analogue patients [32, 39], the levels of evoked emotional stress were likely not as high as patients’ emotional stress levels in clinical reality, especially when considering physiological arousal. To our knowledge, no studies have addressed patients’ emotional stress levels during actual consultations. Therefore, a normative comparison cannot be made, and generalizability of the results to actual patient samples is limited. Replication of findings in more clinically relevant, heterogeneous samples is warranted. Still, as the results repeatedly show a causal impact of affect-oriented communication on analogue patients’ information recall, either free recall and/or recognition, these effects are considered to be robust.

Some remarks can be made regarding the assessment of emotional stress. Self-report and psychophysiological recordings show some, yet limited, overlap [39]. Therefore combining them provides added value. Although time consuming to collect and analyze, these studies show it is feasible to gather psychophysiological arousal data in (large) samples of analogue patients. It is however relatively complex to interpret the psychophysiological arousal results, when compared to self-report. For example, different emotions could be associated with different patterns of peripheral physiological responses [43].
Future research directions

As suggested, research investigating the association between physicians’ communication, patients’ emotional stress and patients’ recall of medical information in actual clinical consultations is warranted. Such research can validate the use of the video-vignettes design for investigating outcomes for which analogue patients’ emotional engagement is particularly relevant. Moreover, future research should focus on alternative mechanisms that might explain the impact of physicians’ affect-oriented communication on patients’ information recall. Furthermore, research should be directed at identifying those factors that complicate the translation of positive research findings into clinical practice [44]. For example, individual differences between patients might moderate the relation between communication and recall. Hence, a one-size-fits-all approach might not work. Indeed, patients’ degree of health literacy seems to moderate the impact of physicians’ communication on patients’ information recall [22].

Conclusion

In conclusion, the research reviewed in this paper provides evidence for the causal and mostly positive influence of several forms of affect-oriented communication on patients’ free recall and recognition of medical information. Although affect-oriented communication was frequently shown to reduce emotional stress, results indicate that this may not be the underlying mechanism through which physicians’ communication influences patients’ information recall.

Practice implications

Showing evidence that affect-oriented communication strategies can improve not only patients’ emotional wellbeing, but also patients’ ability to recall highly relevant information may motivate physicians to adopt such strategies. Additionally, providing educators with the obtained insights will help them to demonstrate trainees the skills to deal with patients’ emotions and to scientifically validate the importance of these skills for patients’ information recall. Advancing communication skills with evidence-based training will be helpful to enhance the professionalism that is the hallmark of good quality of care.

AUTHOR DISCLOSURES

Conflict of interest

None.

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