

# The medical consultation viewed as a value chain: A neurobehavioral approach to emotion regulation in doctor–patient interaction<sup>☆</sup>

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## ARTICLE INFO

### Article history:

Received 25 July 2008

Received in revised form 25 November 2008

Accepted 5 December 2008

### Keywords:

Physician patient relations  
General practice  
Value chain  
Neurobiology  
Neuropsychology  
Communication skills training

## ABSTRACT

**Objective:** To present a model of the medical consultation as a value chain, and to apply a neurobehavioral perspective to analyze each element in the chain with relevance for emotion regulation. **Methods:** Current knowledge on four elements in medical consultations and neuroscientific evidence on corresponding basic processes are selectively reviewed.

**Results:** The four elements of communication behaviours presented as steps in a value chain model are: (1) establishing rapport, (2) patient disclosure of emotional cues and concerns, (3) the doctor's expression of empathy, and (4) positive reappraisal of concerns.

**Conclusion:** The metaphor of the value chain, with emphasis on goal orientation, helps to understand the impact of each communicative element on the outcome of the consultation. Added value at each step is proposed in terms of effects on outcome indicators; in this case patients affect regulation. Neurobehavioral mechanisms are suggested to explain the association between communication behaviour and affect regulation outcome.

**Practice implications:** The value chain metaphor and the emphasis on behaviour–outcome–mechanisms associations may be of interest as conceptualizations for communications skills training.

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## 1. Introduction

In this article we discuss the medical consultation from two viewpoints, which at first glance are completely unrelated. We propose a view of the medical consultation as a value chain, a concept primarily applied in economics. Moreover, we will apply a neuroscience perspective to analyze brain mechanisms underlying core processes of affect regulation, viewed as a sequence of steps. We find the combination of these two approaches fruitful for two purposes: (1) to specify components or steps in the doctor–patient relationship with proposed impact on outcome that may be tested empirically, and (2) to gain insight in potential mechanisms in terms of brain–behaviour relationships.

The notion of value chain was originally introduced by the economist Michael Porter to describe how organisations could organize production management in order to be more competitive [1]. A value chain is a specific consecutive order of operations and activities where the end product is built up step by step by every single operation. Every operation makes the end product more complete; every operation builds on the prior operation and produces added value to the end product.

In this article we use the metaphor of value chain in an analysis of affect regulation in medical consultations by focusing on trainable communicative behaviours of doctors that could be included in a pre- or post-graduation curriculum. Consequently the doctor's communication in the consultation that impacts the patients' affect regulation becomes an activity that creates the added value. We find the value chain terminology helpful because it highlights how all communication creates an effect. The larger the variation in communicative tools one holds, the larger the variation in communicative effects one can create. The better control over one's communicative tools, the larger the chance to create an effect in accordance with the intention of the interaction.

When the patients' emotion regulation is considered the product of the consultation, the answer to what kind of, or how much, value that is created in any given consultation lies in the quality of the emotion regulation on an individual level. To create

<sup>☆</sup> This paper is in part based on a presentation by A. Finset on the AACH conference in Charleston October 2007, named "Theoretical bases of communication in health care research: A neuropsychological approach". The second author of the present paper, T.A. Mjaaland, conceived the idea of viewing the consultation as a value chain, and we have chosen to present the neurobehavioral perspective within that conceptual framework.

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this product, the doctor and the patient may go through a chain of events where, ideally, value is added through the interaction between the doctor and the patient on every step. That means every step is sufficient and that one cannot omit completely any steps in the value creation.

There are at least three qualities of the value chain concept that makes it fruitful in an analysis of clinical communication research. (1) The consultation is conceptualized as a series or sequences of discrete activities that doctors can be trained in their performance of or manipulation with. (2) There is an emphasis on the effects of each separate activity on the value creation. (3) The value chain conceptualization highlights the goal orientation and purposefulness of the consultation. Patients meet doctors for a reason. This reason is incredibly important to understand in order for the doctor to choose the proper actions. We will contend why these qualities have merit in the discussion section of the present paper.

Helping or assisting patients in affect regulation is a prominent feature of a doctor's tasks, in particular in general practice. Allowing patients to show and express negative emotions such as pain, anger, grief, etc., as well as contributing to identify and promote positive affects such as optimism or surprise, are common tasks for many doctors. Others, who adhere more strictly to a biomedical model, may be more reluctant. Affect regulation is defined by Gross as the processes by which we influence emotions we have, when we have them, and how we experience and express them [2]. This makes affect regulation a key success factor in life, evidenced by the large number of diagnoses where emotion dysregulation plays a key role [3], and by the effect of promotion of positive emotions [4,5].

Gross presents a process model of emotion regulation [3]. The model claims that the timing of the use of emotion regulation strategies is of great importance. Antecedent-focused strategies are being used before the emotional activation and represent the focus in cognitive restructuring as in cognitive-behavioural therapies [6], whereas response-focused strategies are applied after the emotional response tendencies have been generated.

There is much evidence of an association between emotion regulation and somatic health, for instance cardiovascular disease [7], but emotional problems, although frequent, tend to be under reported in medical consultations [8]. Promotion of efficient emotion regulation is potentially an important strategy in the doctor's toolbox.

Fig. 1 represents a model of the consultation in context. Trait and state of patient and doctor as well as relevant aspects of the situation are background variables. The middle, large box of the model represents the actual communicative interchange between doctor and patient.

The model includes the proposed effects of the doctor–patient interaction on patient health. The consultation outcome discussed in the present paper is emotion regulation. Other potential outcomes may include adherence to medication and medical regimens, information on illness and treatment options, and

motivation to change health behaviour. The outcomes are thought to be important in their own right, such as the emotion relief, or the outcomes might be considered intermediate in the sense that they are thought to mediate an effect of communication behaviour on the ultimate outcome in terms of actual effects on health. In Porters terms the consultation outcome would be called a product. We shall use the two terms product and outcome interchangeably.

In this paper we propose a neurobehaviourally based theory suggesting brain mechanisms which may explain the association between communicative behaviour and outcomes. A neurobehavioural perspective may provide insight in basic processes involved in affect regulation and point to potential mechanisms related to the product of a consultation.

## 2. Methods: approach to the analysis

Our starting point in this paper is the observed communication behaviour at certain steps in the consultation. For each of these steps or activities along the value chain we will suggest underlying neurobehavioral processes that may explain the association to outcomes. This does not mean that we take a reductionistic view, reducing communication behaviour to physiological mechanisms. What communication is all about is to convey messages. A full understanding of what goes on in the consultation must include an analysis of the subjective meaning of the messages both from a first person experiential perspective of both sender and receiver. One should also be able to explore the communication in a third person perspective, as when a doctor must refuse unnecessary treatment wanted by the patient. In this paper, however, our emphasis is on doctor behaviour in specific stages in the consultation and the proposed neurobehavioral mechanisms.

The four steps or elements discussed here are chosen a priori based on our knowledge of the research literature on doctor–patient communication and on clinical teaching experience. The selection of steps may obviously be discussed. For each step in the chain we briefly review current knowledge, including potential brain–behaviour relationships, and discuss the role of that step in relation to affect regulation. The review is highly selective and based in part on systematic searches in science literature databases.

In Fig. 2 we have taken the consultation box of Fig. 1 out to illustrate the steps discussed in the paper.

## 3. Results: analysis of four elements in a value chain

### 3.1. The doctor's communicative behaviour in establishing rapport

Rapport denotes the general nature of an interpersonal relationship, a term often applied to doctor–patient relations. Linda Tickle-Degnen and Robert Rosenthal suggest three essential components of rapport: a mutual attentiveness between the parties, a quality of reciprocity and balance in the ongoing interaction and a general positivity in the relationship [9]. Formal instruments for the assessment of rapport are typically not applied,

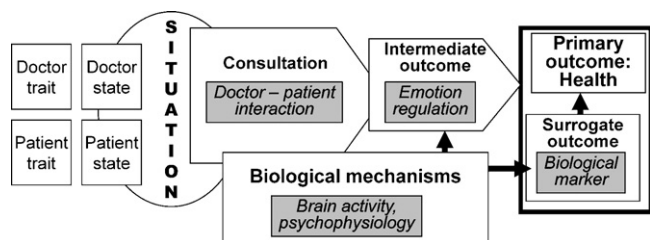


Fig. 1. Model of medical consultation in context.

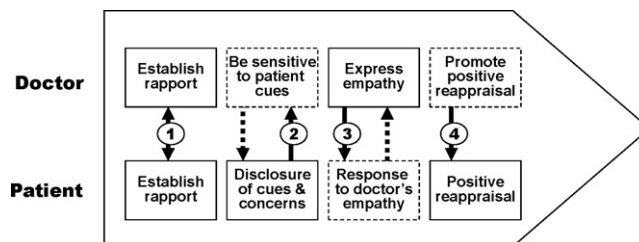


Fig. 2. The consultation seen as a value chain. Four activities mentioned in text are numbered.

but criteria of rapport have been used in observational studies with acceptable reliability [10]. Few studies have investigated the impact of the quality of rapport on the outcome of consultations. In a recent review Mauksch et al. point to rapport building as one of three domains that in particular may enhance communication efficiency [11], but the empirical base is meagre. Rapport depends strongly on nonverbal cues [9], and nonverbal communication is found to be a good predictor of several outcome measures such as patient satisfaction [12–14], adherence and clinical outcome [15]. Most of these studies do, however, not refer explicitly to rapport.

Rapport is associated with behavioural reciprocity and synchrony. There is ample evidence that individuals in interpersonal interaction tend to mimic and imitate one another's posture and movements in an intricate dance of mirrored movements [16,17]. There is also evidence of physiological synchrony in interaction between mothers and infants (with more synchrony in harmonious mother–infant interactions) [18], between spouses [19], and in a few studies also between doctor and patient [20], most often investigating concordance between doctor and patient heart rate during psychotherapy [21,22]. A high level of synchrony has been considered an indicator of high degree of rapport [20]. Moreover, there is evidence that the nonverbal, perceptual-motor imitation and mimicry characteristic of rapport facilitates the smoothness and mutual positivity in the interaction [23], thus linking two of the three criteria of rapport, i.e. reciprocity and positivity.

It is obviously difficult to investigate neurobehavioural mechanisms of rapport, since the very quality of mutuality is difficult to simulate in brain imaging experiments. In relation to mutual attentiveness, a core quality of rapport, anterior cingulate cortex (ACC) and dorsomedial prefrontal cortex (DMPFC) should be expected to be implied [24]. Moreover, an important component in the mutual attentiveness is the perception of the other person's direct gaze. Recent evidence indicates that perception of direct gaze elicits early processes related to emotional processing and to the perception of mental states to others (theory of mind) [25].

Nonverbal signals also include vocalizations, often with an emotional quality. Warren et al. reported recently how perception of nonverbal emotional vocalizations automatically modulated activity in a network of premotor cortical regions, differentially determined by the emotional valence of the nonverbal stimuli, indicating a distinct auditory-motor mirror network [26]. The mirror network concept refers to so called mirror neurons which fire not only when the animal is in action, but also when it observes others carrying out the same actions. Mirror neurons were found in premotor and parietal areas in the macaque brain, but later found also in humans [27]. Warren et al. suggest that valence specific auditory-motor mirror systems may be involved at least in the perceptual motor coordination component of rapport.

### 3.2. Doctor communicative behaviour facilitating the patient's disclosure of concerns

Many patients are reluctant to express their emotional concerns or reactions explicitly in the medical consultation. They will often give a hint indicating an emotional concern, a cue to underlying affect. There is a large research literature on patient cues in medical consultations, recently reviewed by Zimmermann et al. [8]. In most consultations there are few emotional cues, in most studies the mean number of cues per consultation range between a mean of 1 and 5. Many cues are nonverbal, in fact one of the few studies that specifically counted nonverbal cues found that more than half of the cues to emotions were nonverbally conveyed [28].

A number of different coding systems have been designed to tap cues and concerns [8]. However, few studies have looked explicitly at the effect of patient expressions of cues and concerns on affect regulation, although some studies report positive relationship

between patient talk on psychosocial topics and patient satisfaction [29]. There is also experimental evidence from non-clinical settings that an expression of an immediate emotion could have a positive effect on affect regulation. Gross et al. had students watch video segments supposed to elicit negative emotions. Those who were asked to repress their emotional response to the videos adhered to the instructions in the sense that they showed less facial and verbal emotion than subjects who had not been instructed to repress emotional expression. However, the repressors displayed more psychophysiological activation, indicating a more stressful experience than those who had been permitted to express the emotional response [30].

What neurobehavioral mechanisms are involved in disclosure of emotions in medical consultations? To our knowledge no studies have explored this explicitly. However, a number of studies have investigated the effect of labelling emotionally evocative images in experimental brain imaging studies. For instance, Hariri et al. exposed their subjects to threatening and fearful non-face stimuli derived from the International Affective Picture System (IAPS) [31]. Under one condition they were given the stimuli without specific instructions. Under another condition they were told to verbalize the emotion that was elicited from seeing the pictures. Brain imaging data revealed that whereas just seeing the stimuli was associated with a bilateral amygdala response, cognitive evaluation of these same stimuli, with a verbal labelling of the emotion, was associated with attenuation of this amygdala response and a correlated increase in response of the right prefrontal cortex and the anterior cingulate cortex, indicating that higher centres in the frontal cortex overruled the more primitive affective ones. Moreover, this pattern was reflected in changes in skin conductance similar to the experiments by Gross et al. referred to above [30]. Similar findings have been reported in other studies [32–34]. A common finding in these studies is increased activity in right ventrolateral prefrontal cortex (VLPFC). For review, see [35]. The findings could indicate that by letting the patient express cues and concerns the doctor helps the patient to regulation of emotional processing in the brain, by a down regulation of negative emotions and a corresponding relief of stress, confirmed also by the changes in skin conductance reported in some of the studies.

### 3.3. Doctor's expression of empathy

How does the doctor respond to the cues or the concerns of the patient? Suchman et al. have described cues and concerns as empathic opportunities, i.e. opportunities for the doctor to express empathy [36]. The emotional concern ("I am worried") invites the doctor to reply with an empathic statement ("I see how this is hard on you"). Empathy encompasses three different elements: the perception of the emotion in the other (cognitive empathy), the elicitation of one's own emotions (emotional empathy), and the response back to the patient (behavioural expression of empathy) [37].

Some of the coding systems on patient cues and concerns also include categories for provider responses to emotion [8]. A number of questionnaires on empathic behaviour have also been applied [38,39].

What is the effect on the patient of the doctor's expression of empathy? A number of studies have indicated positive effects of conveying empathy [40,41]. For instance, Zachariae reported in a large study of oncology patients that higher scores of physician attentiveness and empathy were associated with greater patient satisfaction, increased self-efficacy, and reduced emotional distress following the consultation [42].

There is, however, little research on the effects of the more elaborate discussion of emotional topics in the consultation.

Research in similar areas indicate the positive health effects of patient disclosure of emotion and active support in interpersonal contexts, for instance studies of expressive writing [43], and experiments indicating that interpersonal support may buffer stress reactions in the laboratory [44,45].

Empathy has recently been studied extensively in neurobiological research. A number of studies indicate that the brain activation patterns of the observer's perception of emotions in others [cognitive empathy] and the actual emotional experience of the observer [emotional empathy] may be differentiated. The ability to discern a specific emotion in another person is a special case of one of the most studied processes in social neuroscience, theory of mind, the ability to attribute mental states to others. In a number of studies the dorsomedial prefrontal cortex (DMPFC) has been found to be crucial for the capability to infer the other person's cognition, both in terms of thoughts, intentions and emotion [46].

The emotional aspect of empathy, or the contagion effect, when the observer shares the emotional experience of the observed person, is associated with activity in other areas of the frontal brain known to be crucial for emotional processing and often suggested as the main focus for subjective experience in emotional processing, such as the ventromedial prefrontal cortex (VMPFC) [47–49].

#### 3.4. Doctors contribution to patients positive reappraisal

In responding to cues and concerns the emphasis of the doctor will often be to legitimize and subsequently resolve the negative emotions of the patient. However, an unbalanced emphasis on negative emotions is challenged by the last years' development in the growing field of positive psychology [50]. According to positive psychology the individual's personal resources are considered psychological assets from which the person can gain considerable payoff if properly nurtured. In this perspective a fruitful strategy to achieve affect regulation would be positive reappraisal of patient concerns aiming to focus on personal resources, possible solutions and potentials for coping.

In solution-focused therapy [51,52] in particular the focus is on what is well functioning for the patient and what kind of cognitive, behavioural or emotional resources the person is able to mobilize. Knowledge of identification and utilisation of individual resources and coping skills are central in this approach, and coping strategies rather than illness represent the main focus. The viewpoint is supported with a growing number of studies that shows good results of "positive psychotherapy" [53].

However, in the literature on physician patient relations there is little emphasis on the reappraisals of concerns, positive emotions and coping. Papers on basic communication skills tend to specify taking the patient perspective, but will most often put more emphasis into empathic responses to negative emotions than positive reappraisal of the patients' emotional concerns. There are suggestions in the literature that a larger emphasis on positive emotions and patient coping could reduce the workload of the general practitioner, but little relevant empirical evidence exists. There is little research on the potential impact on outcome of more attention to positive reappraisal in medical consultations in spite of increasing documentation of positive health effects of positive affect in general, including emerging data on underlying mechanisms [54,55].

The lack of emphasis on positive reappraisal in the clinical communication literature may be related to the fact that interaction analysis systems tend not to specify statements on reappraisal, personal resources or coping. Typically there are broad categories of psychosocial and lifestyle related questions and information giving, but no specification of the actual content with

relevance for affect regulation. Mjaaland and Finset have therefore developed a set of additional codes to supplement the Roter's Interaction Analysis System [56].

In the social neuroscience literature both positive emotions per se and positive reappraisal of negative emotions have been investigated in a number of studies. Positive and negative emotions tend to be processed in the same broadly defined areas of the brain, but with distinction with respect to subsections [57]. In a number of studies positive reappraisal paradigms yielded data indicating a role for lateral prefrontal cortex (LPFC), most often ventrolateral prefrontal cortex (VLPFC) in positive reappraisal [58–60]. Similarly, when Kim and Hamann asked subjects to view positive and negative pictures while attempting to increase or decrease their emotional responses, they found similar activation patterns. Interestingly, when regulating positive emotions, up-regulation resulted in an increase in left and right ventral striatum activity [61]. Wager et al. have recently identified two separate pathways from VLPFC downstream: one through nucleus accumbens and the ventral striatum, associated with greater positive reappraisal success, and another through ventral amygdala, predicting reduced reappraisal success [62].

Taken together, these studies indicate that a positive appraisal of emotion is associated with ventrolateral prefrontal activation, with downstream projections to lower centres. These findings are strikingly similar to those referred to above on affective labelling. VLPFC, in particular right VLPFC, appears to have a crucial role in weighting valence of emotional experience and exert control on emotion. For review, see [35].

Interestingly, studies on the placebo effect have given similar results. Like affect labelling and positive reappraisal placebo effects are associated with VLPFC activation with projections to ventral striatum, an area very important for the activation of natural opioids acting in pain modulation mechanisms [63–65]. The neurobiology of placebo effects is complex, and other brain areas are also involved [35,63].

## 4. Discussion and conclusions

### 4.1. Discussion

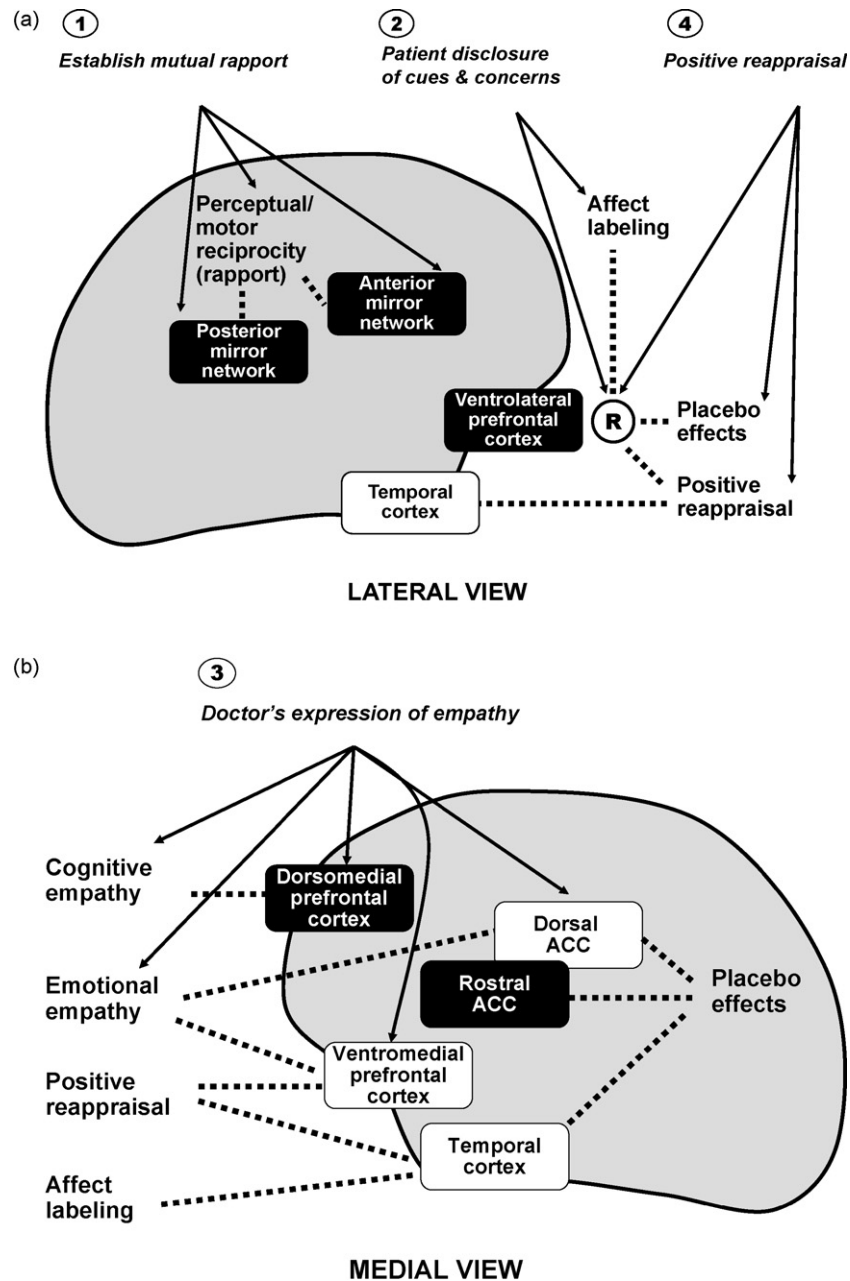
#### 4.1.1. The neurobehavioural evidence

For each of four steps in a proposed model of the medical consultation viewed as a value chain we have applied a neurobehavioral perspective to understand potential mechanisms that could be responsible for the association between communication behaviour from the doctor and affect regulation in the patient. The brain-behaviour relationships which are described on each step in the paper are summarized in Fig. 3a and b. The summary draws on Lieberman's summary of core processes in social neuroscience [35]. Lieberman makes a distinction between spontaneous processes characterized by parallel processing (open boxes in Fig. 3) and the phylogenetically newer intentional processes, typically linguistic and serial processing. Whereas spontaneous processing is important in emotional experience, intentional processing is important for emotional control. This is precisely at the core of the value creation: Both the spontaneous and the intentional processing can be manipulated positively by the doctor in favour of the intended outcome of the consultation.

The findings summarized in Fig. 3a and b may seem quite diverse. However, we will draw three tentative conclusions.

- (1) Rapport. We suggest that the basic quality of the relationship, the rapport, is subserved by mutual activation in a perceptual-motor network. The role of fronto-parietal and fronto-temporal mirror networks in interpersonal interaction is disputed. Suggestions in the popular press that the characteristics of





**Fig. 3.** Brain areas with relevance for affect regulation. The digits refer to the four numbered processes specified in Fig. 2. Brain areas associated with parallel processing are indicated with open boxes, brain areas associated with serial processing with filled boxes (see Ref. [35]). (a) Lateral view; (b) medial view.

rapport in general are based on mirror neuron activity [66] should be viewed with caution, but the findings such as those by Warren et al. suggest that the mirroring of social cues in specific mirror networks, associated with positive valence, is linked to enhanced rapport [26]. Listening to positive vocal expressions automatically engaged preparations for responsive gestures. However, a problem in assigning a role for mirror networks in rapport is the fact that most research on human mirror neurons concerns explicit intentions to imitate specific behaviours, whereas the role of mirror neurons in automated mimicry is less known [35].

However, Keysers and Gazzola suggest that the basic characteristic of mirror neuron networks, the sensory-motor reciprocity may be seen also outside of the classical frontoparietal mirror networks, in what he denotes as shared circuits [67]. With the strong characteristic of reciprocity of rapport, it

is reasonable to believe that rapport may be subserved by such shared circuits, beyond the specific auditory circuit described.

In future studies of emotional regulation in medical consultations rapport should be explicitly studied. Psychophysiological indicators of rapport, with assessment of both doctor and patient, should be applied, and paradigms for the study of rapport phenomena in brain imaging studies should be developed. We hypothesize that a good rapport will facilitate successful emotional regulation in later steps in the model, but will not in and of itself resolve emotional regulation.

- (2) Emotional disclosure, reappraisal and placebo effects. Both the disclosure of cues and concerns (in the sense that they may be seen as a labelling of emotions) and positive emotional reappraisal are characterized by activity in the ventrolateral prefrontal cortex, in particular in the right hemisphere [35]. This area of the frontal lobes is involved in emotion regulation,

both in terms of down-regulation of areas such as amygdala and anterior insula (to reduce psychological distress) [59], in promoting positive emotional valence and increased self-control by activation the “self-control circuitry” [68], and promote downstream modulation of the natural opioid system [63]. It is interesting that both naming of affect, positive reappraisal and even placebo effect mechanism all seem to share an association with activation of the right ventrolateral prefrontal region. The findings suggest that when doctors help patients to express their concerns, to reappraise these concerns, to identify personal resources and ways to cope, and to create positive expectations, the result may be an activation of pathways with positive impact on health. The patient should be guided to formulate reappraisals and expectations him- or herself. When it comes to the doctor’s formulation of expectations the effect will only work if the patient actually believes what the doctor says. Information with a negative emotional valence will activate other pathways. We therefore propose, in accordance with the value chain model, that doctors should first elicit patient concerns, then acknowledge and legitimize concerns before a positive reappraisal may take place. Positive reappraisal is only effective when timing is good. Otherwise it may well be counterproductive. We suggest that shortcutting the first part of the process in terms of premature reassurance may leave the patient with a feeling of not being taken seriously [69] and thereby elicit the “wrong” pathways from VLPFC.

The processes of affect labelling and reappraisal are also associated with other brain areas characterized by parallel processing [35]. A certain experiential contact with emotions may be necessary for positive reappraisal, but it is important not too get stuck in negative emotions. An antecedent strategy of emotional regulation functions better than response focused strategies [70].

The finding that placebo mechanisms are related to the same prefrontal areas as positive reappraisal is interesting. The emphasis on positive emotions may be one step in a longer chain of events, with activation of mechanisms associated with placebo effects as one of the end products.

- (3) Empathy. There is a parallel between the patient’s balance between emotional experience and the attempts to gain control over distressing concerns and negative emotions and the activation of both spontaneous and intentional processes on the part of the doctor, empathic behaviour seems to rest on two different mechanisms. The *doctor* must be able to take the patient’s perspective and identify cues to respond to. This ability is associated with activation of dorsomedial prefrontal cortex, an area implied in Theory of Mind tasks subserved by the dorsomedial prefrontal cortex [46]. A key ability is attentional control of emotion, subserved by the dorsomedial prefrontal cortex [57].

But a true empathic response should also include access to one’s own feelings. In the emotional empathy we see an activation of the a more medial area of the brain closer to the “emotional brain”, namely the ventromedial prefrontal cortex, an area implicated in the retrieval of emotional knowledge [59].

Lieberman questions whether mirror neurons are active in empathy, since a role for mirror neurons in non-motor activities has yet not been shown [35]. However, in contrast to most laboratory studies, empathy in medical consultations occurs in the context of an ongoing interaction characterised by some degree of rapport. We suggest that in the medical consultation empathy is facilitated by rapport. An empathic statement is often associated with strong subjective feelings in

both individuals involved. Suchman and coworkers have described similar moments in doctor–patient relations as “connexions”, where the doctor feels an intense emotion and sense of sharing with the patient [71].

Physiological changes during interpersonal interaction have been reported in many studies, in particular how social support may buffer cardiovascular reactivity [44]. Eisenberg et al. have reported neural pathways linking social interaction to attenuated stress responses. Greater social support was associated with diminished activity in dorsal anterior cingulate cortex (dACC) and dorsomedial prefrontal cortex (DMPFC) [72] typically associated with affective experience. The findings indicate that an important effect of social interaction and support may be to reduce negative affectivity. The explosion of social neuroscience will probably influence the clinical communication field profoundly in the years to come [73,74].

#### 4.1.2. The value chain concept

A value chain is a meaningful description for a number of reasons:

- (1) The consultation is conceptualized as a series or in terms of sequences. Communication is not like simple mathematics where the order of the factors is indifferent. On the contrary, there is normally an order of events: Empathy is shown before the delicate issues are elaborated. Reassurance should appear after the patient feels listened to. The prescription is written after the examination, etc. If one, for some reason does not manage to establish rapport quickly, it is likely that the rest of the consultation will suffer under this and the production will be less optimal compared to a patient by whom one has good relations.
- (2) The value chain concept puts forward effect of production as fundamental part of professional communication. What the doctor and patient then do impacts the value creation. A change the communication and may lead to changes in the value creation. One example: A patient visits her doctor with the sole intention to have a prescription. Her doctor, however, sees that the effect of her medication would increase if the patient also altered her dietary habits. By choosing the right communication, the doctor then informs her of this and even in such a way that the patient actually goes home and changes the diet. In this case the value creation in the consultation has a greater health effect for the patient than with a doctor that only gave her the desired medication.
- (3) The value chain concept includes goal-orientation and purposefulness as a bearing principle. Doctor and patient meet in order to reach a more or less defined goal. Everything that takes place can be explained in what one is trying to achieve. One example: A doctor and a patient with diabetes both agree they want to reduce the level of blood sugar in the patient. One approach from the doctor could be to point at the screen and tell the patient in the consultations that “we would ideally see this number a little lower”. A presumably more value creating communication would be if the doctor managed to address what the patient actually does in the daily life that is in concordance with a decrease in the blood sugar level, such as exercise or dietary routines. Then begin to reinforce this kind of patient behaviour and motivate to further progression.
- (4) The determination in the consultation: What is said and done creates a history that will create and alter expectations and impact later communication. This again, emphasizes the importance of choosing the proper means towards reaching a goal. One could for instance argue that there is no point in using empathic behaviour in and for itself, but empathy has the

effect of creating a good atmosphere which is important as a basis for trust and openness from the patient.

#### 4.2. Conclusion

We argue that the metaphor of the value chain is a fruitful terminology to understand the medical consultation. With its emphasis on purposefulness and goal orientation it clarifies the strategic aspect of communication: to define a goal first and then choose the means to get there afterwards. Consequently, the answer to the questions of communicative success, production or goal achievement lies in the effect created by the communication.

We have presented fragments of an analysis of phenomena in the area of affect regulation, and have suggested neurobehavioral mechanisms which may be associated with these phenomena. When further developed and refined, we believe that the model may be applied to specify hypotheses and empirically test out the associations between communication behaviour, outcome and underlying mechanisms.

#### 4.3. Practice implications

The value chain metaphor implies that goal definition in clinical practice is crucial followed by selection of the communicative tools one will use in order to achieve the goal. The emphasis on behaviour–outcome associations may be of interest as conceptualizations for communications skills training, with potential training modules on creating rapport, responding to cues and concerns and promoting positive reappraisal.

#### Conflict of interest

The authors have no actual or potential conflicts of interest including any financial, personal or other relationships with other people or organizations within 3 years of beginning the submitted work that could inappropriately influence, or be perceived to influence, our work.

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