

Resonance and dissonance asymmetry in effective physician–patient relationships

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This paper examines the proposed asymmetry that should occur between resonance and dissonance in physician–patient relationships in favour of resonance to facilitate an effective relationship. Resonance is represented by the positive emotional attractor, which comprises patients' conscious preferred future or ideal self, and dissonance is expressed by the negative emotional attractor and consists of the gaps between patients' ideal and real self or their fears, problems, and shortfalls. Intentional change theory is reviewed to optimise the physician–patient relationship. Concepts from complexity theory and recent research on emotions are used to explain positive and negative emotional attractors. The role of resonance and dissonance in physician–patient relationships is discussed along with how behaviour can be changed with positive and negative emotional attractors. This paper focuses on the quality and effectiveness of physician–patient relationships for physicians who create high versus low positive emotional attractor/negative emotional attractor ratios. Two theoretical propositions are offered and the research and practice implications are explained.

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Introduction

A paradox exists in understanding effective physician–patient relationships given the important role emotions play in these relationships and the dearth of attention emotions receive in medical education.¹ As Peabody explained, 'The significance of the intimate personal relationship between physician and patient cannot be too strongly emphasized, for in an extraordinarily large number of cases, both diagnosis and treatment are directly dependent on it.'² Effective physician–patient relationships are also associated with many important patient outcomes such as improved asthma control,³ medication adherence,⁴ and treatment satisfaction,⁵ as well as reduced inpatient hospital and emergency room utilisation.⁶ Yet emotions are largely absent from medical education discourse⁷ and efforts to advance the measurement of emotions in clinical encounters are in need of improvement.⁸

As a result, emotions in the physician–patient encounter have drawn significant interest as an area requiring further research.^{8–14} This interest is influenced by the important role emotions play in patient health and wellbeing. For instance, positive emotions are associated with numerous patient benefits such as decreased mortality,¹⁵ reduced risk of cardiovascular disease,¹⁶ and lower levels of inflammation.¹⁷

In contrast, negative emotions are associated with lower health-related quality of life,¹⁸ weaker intentions to engage in health behaviour change,¹⁹ and impaired memory.²⁰ Patients even choose their physicians on the basis of how they want to feel, thereby emphasising the role of ideal affect in health-related decision making.²¹

Building on this work, this paper proposes an imbalance or asymmetry between resonance (i.e. harmony) and dissonance (i.e. discordance) in physician–patient relationships. Resonance is represented by the positive emotional attractor (PEA), which comprises patients' hopes, dreams, possibilities, and strengths or, in effect, their ideal self. Dissonance is expressed by the negative emotional attractor (NEA) and consists of the gaps between patients' ideal and real self or their fears, problems, and shortfalls.²² This paper explains that the asymmetrical relationship should favour resonance over dissonance to facilitate an effective physician–patient relationship. Specifically, this paper examines the positive and negative emotional attractors created by physicians and their respective influence on effective communication during diagnostic encounters with patients. Simply stated, this paper contends that physicians who focus more on a patient's positive future and connecting it to what is working well now will be more effective in this effort and will have a better relationship with the patient than those who focus

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Table 1 Physician–patient discordance examples

Area of discordance	Findings
Needs, beliefs, and expectations about asthma ³	Physicians and patients held differing perspectives regarding ‘patients’ needs, beliefs, and expectations about asthma’
Beliefs about the need for medical treatment ²⁵	Discrepancies between doctors and patients in their beliefs about the need for medical treatment regarding a set of 35 symptoms
Perceptions of angina experiences and delivery of care ¹¹²	Physician and patient perceptions of angina differ
Severity of patient rheumatoid arthritis ¹¹³	Most of the patients with rheumatoid arthritis thought their disease was more severe than their physicians believed it to be
Patient recall of physician instructions – medication, diet, etc. ^{75,114}	Patients only recall about half of the information given to them by their physicians
Perception of new and relevant information ¹¹¹	Patients believe that they have not received any new and relevant information concerning their expected recovery and pain whereas physicians believe that they have adequately informed their patients by explaining the type of disease and its stage
Patient reticence to ask questions ^{75,115}	Patients tend not to directly ask for information from their physicians. Patients requesting information from physicians only comprised 6% of the time spent in the encounter
Patient redirection ¹¹⁶	Patients received only 23.1 seconds to describe their concerns before being ‘redirected’ and only 28% of patients were able to complete their statements of concerns
Whether an instrumental or affective approach is taken by physicians during encounters as well as a disagreement about their relative importance ^{117,118}	Due to a lack of common definitions of the terms
Use of ‘medical language’ (ML) and ‘everyday language’ (EL) during encounters ¹¹⁹	Patients did not perceive physicians’ reported switching from ML to EL while communicating with them and physicians did not perceive patients reported switching from EL to ML
Occurrence of humour in the medical encounter ¹²⁰	Physicians reported using some humour in 38% of encounters while patients believed that physicians used humour in 60% of encounters

more on the negative reality of a patient’s present condition. To begin, this paper offers Boyatzis’ Intentional Change Theory (ICT)²³ as a new theoretical paradigm to optimise the patient-centric evolution in healthcare service delivery. I review the relevant literature supporting intentional change and conceptual definitions for the major components of ICT as they relate to the physician–patient encounter are given. Concepts from complexity theory and recent research on emotions are used to explain PEA and NEA, and the role of resonance and dissonance in physician–patient relationships along with how behaviour can be changed with PEA and NEA is discussed. To develop theoretical propositions, this paper draws upon prior positivity to negativity ratio research. Finally, the implications for future research and practice are explained.

Intentional change theory

Unfortunately, much discordance has been documented in the physician–patient relationship, as shown in Table 1.²⁴ For instance, a review of the literature concerning patient-centred outcomes for asthma patients found ‘discordance between physicians and patients regarding patients’ needs, beliefs, and expectations about asthma’.³ More generally, Peay and

Peay²⁵ found discrepancies between doctors and patients in their beliefs about the need for medical treatment regarding a set of 35 symptoms. As a result of such discordance and the challenges of finding an optimal model to understand the physician–patient interaction, patient-centric approaches to healthcare service delivery have received greater emphasis;²⁶ ICT is a possible solution.

ICT, as shown in Figure 1 and applied to the physician–patient relationship, outlines change as a conscious process that moves patients from their real self or current situation to their ideal self or preferred future. ICT is a patient-directed path to the changes and learning that the patient desires. The ICT process model is iterative in that it may take more than one passage through the cycle to reach the sustained, desired change the patient seeks. Each of ICT’s five discoveries result in patients learning something new about themselves and becomes a discontinuity in their self-awareness. So, rather than a confirmation, these five discoveries occur as surprises and create an urgency for their resolution by the patient.

Intentional change theory – discovery 1

The ‘ideal self’ is the first discovery and represents the patient’s preferred future, not only with respect to their

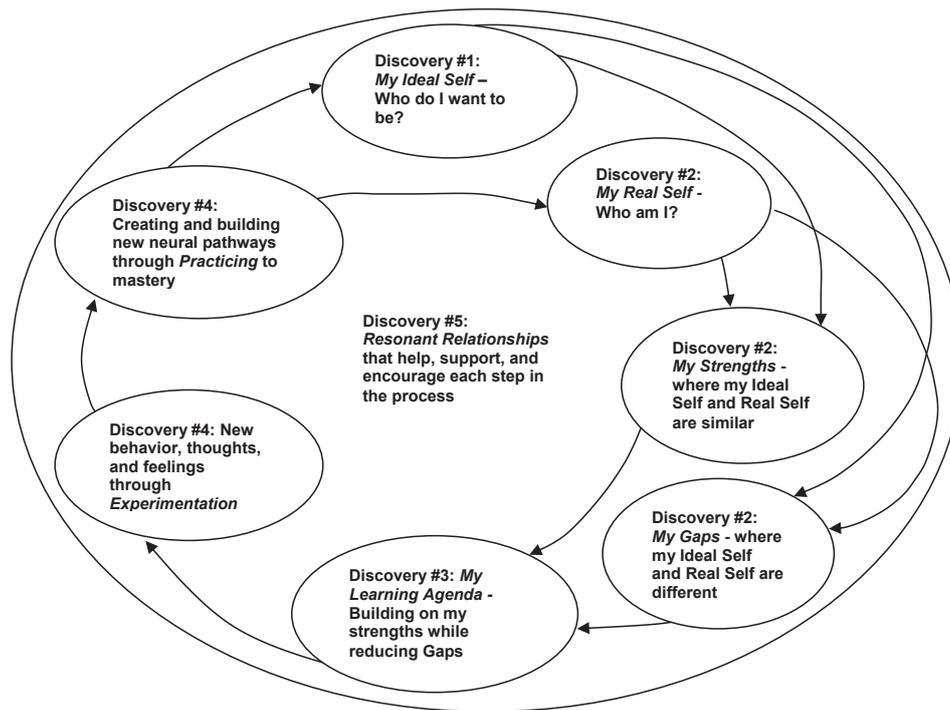


Figure 1 Boyatzis' Intentional Change Theory. Reprinted with permission of the copyright holder⁴²

health status but also regarding their relationships, finances, spirituality, and any other meaningful aspects of their life. The ideal self serves as the reason for change by enlisting the patient's positive emotions and serves as a sense of calling or recognition of the patient's greatest potential contribution.²⁷ Research is emerging on visioning one's ideal self and suggests it is helpful for raising and maintaining positive mood²⁸ and that sustainable change in happiness can be achieved.²⁹

Describing one's ideal self becomes important for patients when interacting with physicians during diagnostic encounters. If patients have a good idea of what they are trying to achieve in terms of their desired health and energy levels, then physicians will be better able to respond in support of that image. Likewise, it is imperative that physicians provide patients with the opportunity to explain their wishes. In contrast, if physicians tell patients how their health and vitality should be different from what it is now, those physicians are imparting their views of the patients' ideal selves. However, there may not be a match between the physician and the patient's respective versions. The degree to which there is a match will likely determine the extent of adherence to other aspects of the patient's treatment regime.

Intentional change theory – discovery 2

The patient's real self is the second discovery. With this, change and learning results from resolving the discontinuity between the patient's ideal self (who the patient wants to be) and the patient's real self (who the patient is). Patients' behaviours and values that are presently consistent with their ideal self are strengths, and gaps represent discrepancies with the ideal self. Taylor³⁰ describes the real self as a person's self-knowledge about their ability coupled

with the assessment of one's ability by observers in one's multiple life contexts with whom the person interacts.

The physician–patient relationship provides opportunity for the physician's involvement in the appraisal of the patient's health status to enhance the patient's self-assessment. Gaining a medically informed and broader perspective of the patient's circumstances also supports the contention that patients need to be partners with physicians in the management of their care to effectively increase patient adherence.³¹ Patients' participation in the management of their disease is associated with better outcomes, increased patient satisfaction, and greater adherence to treatment regimens.³²

Intentional change theory – discovery 3

Establishing a learning agenda represents discovery three. Patients uncover what they need to learn to reach their ideal self. This is accomplished by working with their strengths and reducing their gaps. The resulting learning goals are different from performance goals.³³ When patients try to develop their competence, such as reading about methods to improve their self-management, they are pursuing learning goals. When patients attempt to demonstrate competence, such as consistently taking their medication, they are pursuing performance goals.

There is much for patients to learn about what can move them closer towards their unique ideal self especially regarding health behaviour change. Using a partnership or 'mutual participation' model of the physician–patient relationship where the physician 'helps the patient to help himself',³⁴ momentum can be gained towards learning new behaviours necessary to improve the patient's health status. These new behaviours could relate to any aspect of the patient's health regime, such as learning how to prepare

Table 2 Resonance vs. dissonance characteristics

Characteristic	Resonance	Dissonance
Attractor condition created	Positive emotional attractor	Negative emotional attractor
Physician emphasis	Patient's ideal self – hopes, dreams, possibilities, strengths	Patient's real self – fears, problems, shortfalls, gaps between ideal and real self
Type of goals pursued by patient	Learning goals by developing competence	Performance goals by demonstrating competence
Autonomic nervous system aroused	Parasympathetic nervous system	Sympathetic nervous system
Patient reaction	Calmness, relaxed, slower breathing, lowered blood pressure, enhanced cognitive function	Tense, anxious, accelerated breathing, elevated blood pressure, ready for action

more nutritious meals, lead a more physically active lifestyle, or the importance of adhering to medication protocols.

Intentional change theory – discovery 4

Discovery four involves experimentation and practice of new behaviours, thoughts, and feelings. Patients may want to test new self-management practices in pursuit of their ideal self. For instance, they may want to participate in worksite health promotion programmes sponsored by their employers.³⁵ However, again, patients' participation must be voluntary and intrinsically rewarding as the objective is not change per se but rather moving closer to their ideal self by achieving their learning goals. To best do this, it is important to find space in one's daily routine to experiment and practice with new behaviours in psychologically safe contexts.³⁶

Intentional change theory – discovery 5

Developing trusting relationships that help, support, and encourage patients at each step in the intentional change process comprises discovery 5. While this may occur at any time in the process, it is optimised if trusting relationships are formed early, for instance, while developing one's ideal self. Involvement of patients' spouses, friends, and spiritual advisors as well as physicians is key in the development of their ideal self. People who patients trust can help them increase their level of awareness, identify strengths and gaps, and serve as a sounding board for their learning agenda. These trusting relationships can create a lasting effect on individuals that support their advancement through the intentional change process.

In summary, ICT is a change model grounded in the patient's conscious and preferred future self-image. The model follows five discoveries or steps: (1) describing the patient's ideal self; (2) identifying the patient's real self with its strengths and gaps; (3) establishing a learning agenda; (4) practicing and experimenting with new thoughts and behaviours; and (5) building trusting and resonant relationships with physicians and others who will help move patients from their real to ideal selves.

Role of resonance and dissonance

ICT contends that emotions play an instrumental role in the process of sustained, desired change and extends the

concept of attractors from complexity theory³⁷ to emotions. Resonance as an attractor or a positive emotional connection will compel patients toward the change. Conversely, dissonance as an attractor or the creation of negative emotions will repel patients from the change. Patients are drawn towards one of these attractors or general patterns that tend to repeat themselves. Levenson³⁸ notes that these emotional patterns position people in their environment by pulling them towards some people and ideas and pushing others away.

ICT conceives of these conditions as the PEA and NEA.²² The characteristics of these are shown in Table 2. By accessing patients' hopes, dreams, possibilities, and strengths or in effect their ideal self, the PEA condition is created. The NEA condition occurs when patients examine the gaps between their ideal and real self including fears, problems, and shortfalls.

Researchers investigating the physician–patient relationship are also using complexity theory to explain their findings. For instance, Aita et al.³⁹ examined a random sample of 1,500 physician–patient encounters with 44 physicians in 18 family practices for a qualitative study of the content and expression of clinical discourse in the exam room. With the understanding of how attractors influence healthcare and outcomes, the researchers noted:

Individual physicians function within personal professional value systems as well as within practice systems. In our sample of physicians' practices, a key attractor was their ability to actualise patient-centered values. Patients, existing with their own individual systems, respond to these patient-centered, physician system attractors, fostering or inhibiting their future occurrence.³⁹

The paper's practice implication of actualised patient-centred values for medical education includes learning objectives and curricula that can encourage patient awareness and clinical problem-solving.

A patient's visit with a physician could result in a 'wake-up' call to reprioritise his or her lifestyle to better engage an ideal self pathway. This is also an introspective opportunity

to review the patient's real self with a new maturity, sense of awareness, and perspective. The change initiatives taken by patients such as a better diet and increased physical activity can be intrinsically rewarding and continue to motivate patients toward their ideal self. In fact, Guertin et al.⁴⁰ recently found that cardiovascular disease patients who were intrinsically motivated 'were more likely to feel competent in changing their lifestyle and to engage in moderate and strenuous (vs. mild) exercise and HE [healthy eating] behaviours, which had beneficial effects on individuals' physiological and psychological health.'

These sustained, desired individual changes tend to be discontinuous and therefore an important part of complex systems.³⁷ If the changes emerge as monumental or catastrophic in nature, the patient's level of self-awareness through self-monitoring and self-management is likely lower than a patient who more subtly experiences necessary changes with a higher level of self-awareness.

Either PEA or NEA can start the intentional change process as each has self-organising properties. Both search for homeostasis and therefore tend to change the status quo. When the PEA pulls a patient toward his or her ideal self, it arouses the patient's parasympathetic nervous system.⁴¹ With this activated the patient becomes calmer and feels more relaxed by slowing breathing and lowering blood pressure with the bonus of enhancing cognitive functioning and generally relaxing and calming the patient.⁴² The PEA acts as a destabilising force by trying to create a new equilibrium as it pulls the person toward his or her ideal self and thereby the PEA also becomes the energy for a new self-organising system. Studies of many different cognitive and behavioural variables have found significant positive associations with the PEA state such as judgment and decision making,⁴³ good health,⁴⁴ and increased protection against functional and physical decline associated with frailty.⁴⁵ Results from a study by Richman et al.⁴⁶ even suggest that positive emotion may play a protective role in the development of disease as the researchers found a decreased likelihood of having or developing hypertension and diabetes mellitus in patients with higher levels of hope and curiosity.

Igniting the NEA, those deficits, errors, and struggles experienced in our real self,³⁰ activates the sympathetic nervous system.⁴² With sympathetic nervous system activation, a patient becomes more tense and anxious, which can inhibit the sustained, desired change the patient seeks. Although the production of cortisol helps patients deal with stress, the NEA triggered cortisol can actually stop neurogenesis by over stimulating older neurons.⁴¹

Researchers who have studied negative emotions tend to conclude that benefit derives from putting the person in an 'action readiness' state such as fear, which provides a readiness to protect oneself by moving away from danger.⁴⁷ Therefore given the right context, negative emotions do have utility, as simply stated by Nesse,⁴⁸ 'Anxiety is welcome when it aids escape from a pack of wild dogs, but it can become

a clumsy intruder at delicate moments in courtship'.⁴⁸ However, prolonging this anxious and defensive condition leads to fatigue, irritability, and ultimately depression, all of which direct an individual to disengage from intentional change.⁴⁹ Not surprisingly, overly anxious patients were found to not openly express their worries to physicians during medical encounters.⁵⁰

Consequently, positive and negative emotions have a differential impact on human thought and behaviour, with positive emotion enhancing cognition and performance and negative emotion (although important in limited situations) generally having adverse effects on thought and behaviour.

Proposed asymmetry between resonance and dissonance

An increasing number of research studies has examined the relationship between positive and negative emotion from the dialectical perspective wherein an optimal ratio of positive to negative emotion is determined. This research is far from decisive and pieces of it have been strongly challenged.⁵¹ Despite the controversy, there is much research that remains which suggests an asymmetrical balance between positive and negative emotion in favour of positive emotion to varying degrees.

At the lower end of the positive to negative emotion ratio continuum is very early work by Bales et al.^{52,53} who suggest that this ratio could be something greater than 1:1 for positive to negative emotions. The researchers coded small pieces of verbal and non-behaviour by group members into one of 12 categories, six for social-emotional behaviour and six for task behaviour. The social-emotional categories were further divided into three positive reactions 'shows solidarity,' 'shows tension release,' and 'shows agreement' and three negative reactions 'shows disagreement,' 'shows tension,' and 'shows antagonism.' The six categories of task behaviour include 'gives suggestion,' 'gives opinion,' and 'gives information' grouped into *problem-solving attempts* and 'asks for information,' 'asks for opinion,' and 'asks for suggestion' grouped into *questions*. In reviewing Bales work, Hare⁵⁴ notes that the rates of both positive and negative reactions increase from the beginning to the end of a group meeting, with positive reactions increasing more rapidly in the final segment of a meeting which is similar to his findings for meeting-to-meeting trends where groups gradually spend less time in task behaviour and more time in positive social-emotional behaviour.

A subsequent cluster of studies that attempted to establish a higher point in the ratio continuum for positive to negative emotions starts with Losada's⁵⁵ study of 60 strategic business unit management teams from a large information processing corporation. Losada found that high performance teams showed expansive emotional spaces and balance between inquiry-advocacy and other-self, while low performance teams showed a low ratio with restricted emotional space and an unbalanced inquiry-advocacy and

other-self orientation. Losada applied the term ‘emotional space’ (derived from Echeverria⁵⁶) to the ratio of positivity to negativity where higher ratios suggest expansive emotional space supportive of a large range of emotions and lower ratios suggest constrained emotional spaces.

The nonlinear dynamic model used by Losada in his 1999 study was applied in a subsequent study by Losada and Heaphy,⁵⁷ in which the researchers coded the verbal communication of the same teams in Losada’s earlier study in terms of approving vs. disapproving statements to determine a positivity to negativity (P/N) ratio. High performance teams elicited a P/N ratio of 5.625 whereas medium performance team’s P/N ratio was 1.875, and the low performance team’s P/N ratio was only 0.375. Another interesting finding from this study is that there appears to be an upper limit of positivity given that when a P/N ratio of 100 was used in the study’s nonlinear dynamics model, a limit cycle of positivity was created which diminished innovation. The notion of a boundary for positivity is consistent with the findings from a study by Vastfjall and Garling⁵⁸ who discovered a significant increase in negative emotions preferred by study participants in appropriate contexts.

Further P/N ratio research by Fredrickson and Losada concerning mental health includes a study⁵⁹ that used two independent samples of university students who, each evening for 28 consecutive days, logged on to a secure website to indicate the extent to which they had felt each of 20 emotions in the past 24 hours. Positive emotions included amusement, awe, compassion, contentment, gratitude, hope, interest, joy, love, pride, and sexual desire. Negative emotions included anger, contempt, disgust, embarrassment, fear, guilt, sadness, and shame. The results showed a mean P/N ratio above 2.9 for individuals classified as flourishing and below that threshold for those not flourishing. Using the Lorenz model⁶⁰ to bifurcate the complex dynamics of flourishing from the limit cycle of languishing in Losada and Heaphy’s study,⁵⁷ Fredrickson and Losada⁵⁹ also found a P/N ratio of 2.9.

Brown et al.⁵¹ critically contested the existence of a 2.9 P/N ratio and claimed numerous mathematical errors in Fredrickson and Losada’s study. Losada chose not to defend his nonlinear dynamic model that was used in the previous research.^{55,57,59} A correction⁶¹ was subsequently issued withdrawing the model used in Fredrickson and Losada’s study.⁵⁹ However, Fredrickson⁶² did respond to the Brown et al. critique. Although Fredrickson did not attempt to defend Losada’s mathematics, she did draw upon recent empirical research to justify continued research in the nonlinear effects of P/N ratios and suggested the more general statement regarding P/N ratios that ‘higher is better, within bounds’.⁶²

There is more evidence of high P/N ratios in yet other research. Shrira et al.,⁶³ in a study of gastric cancer patients and another study of hospital personnel exposed to missile attacks, found that maladaptive functioning sharply decreased as the positivity ratio increased, levelling off at about a P/N ratio of 3. In another study where patients were

undergoing depression suppression training, those classified as optimally functioning had a mean P/N ratio of 4.3.⁶⁴ Research at the dyadic level with married couples shows that the best predictor of stable marriages is a 5:1 P/N ratio of their respective interactions.⁶⁵

These high P/N ratios seem to be necessary to clearly distinguish effective from ineffective behaviour for several reasons. First, there is a mild positive affect that characterises the typical assessment of one’s life experience resulting in most people being generally happy with their life.^{66,67} In addition to offsetting the mild positive affect bias, high ratios are also needed to overcome the strength of negative emotions. Research supports the contention that negative emotions are stronger than positive emotions from an evolutionarily adaptive perspective that makes negative emotions more pronounced and longer lasting than positive emotions.^{68,69}

Another reason for high P/N ratios is that we have a larger repertoire of negative emotions from which to choose. Nesse⁴⁸ suggests that there are twice as many negative emotions as positive ones. This 2:1 ratio of available negative to positive emotions is also confirmed by Ekman’s⁷⁰ research over 45 years which finds that there are only six emotions that have universal facial expressions, namely: happiness, surprise, fear, sadness, anger, and disgust combined with contempt. From this list, only happiness and surprise are positive emotions and the remaining four are negative. Finally, intentional change is needed to create the force necessary to move one towards the ideal self with more energy required from the PEA given that the two attractors become a ‘limit cycle’ for the individual.³⁷

Given the foregoing research on P/N ratios, I offer the following propositions:

Proposition 1: Physicians who create high PEA/NEA ratios with patients will be perceived by patients as more effective in helping them reach their ideal self than physicians who create low ratios.

Proposition 2: The quality of the physician–patient relationship perceived by patients will be higher for physicians who create high PEA/NEA ratios than physicians who create low ratios.

Discussion

The propositions here indicate that both instrumental and affective or curing and caring behaviours are important for effective physician–patient relationships, which are consistent with the very early literature on the physician’s mandate/role.⁷¹ This holistic or balanced view has continued with Bird⁷² suggesting that talking with patients is a skill to be studied and developed and refers to it as the ‘talking technic’,⁷³ where the purpose of talking with patients is to go beyond immediate symptoms and to find out about the individual as a person, including her or his strengths, weaknesses, and life experiences, all of which will buoy patients for whatever

challenges they may face. In a similar way, more current literature⁷⁴ refers to research on doctor–patient interactions as ‘conversation analytic’ studies, with a growing agenda focusing on improving communication between the parties.

However, the contention in this paper is that PEA will serve as a stronger pull for patients than NEA. Some research^{75,76} suggests that patients want both behaviours from their physicians. Roter and Hall⁷⁵ found that physician information given to the patient during the medical encounter best predicted patient satisfaction, while social and partnership-building conversation, positive nonverbal behaviour, positive talk, and technical and interpersonal competence were also positively related to satisfaction. Other research^{77,78} suggests that it is the affective behaviour that patients most desire from their physicians. Cousin et al.,⁷⁸ for example, found that physicians with a high caring communication style better predicted patient satisfaction than physicians with a low caring communication style.

Focus on the optimal balance between PEA and NEA from the coactivation perspective envisions affect as a bivariate space rather than a polar dimension and therefore allows for reciprocal and additional modes of activation.⁷⁹ Concurrently then, a stimulus could increase positive emotions and reduce negative emotions. The need to examine both PEA and NEA separately as ‘two systems contributing differentially to the various intrapersonal and interpersonal functions that emotions serve’³⁸ was appropriately summed up by Isen: ‘The finding that positive affect produces a certain effect does not necessarily imply that negative affect will give rise to its opposite, as is often assumed’.⁸⁰

Fredrickson’s work on the ‘broaden and build’ theory^{81,82} has been particularly influential in this regard and posits that the experience of positive emotions broadens people’s momentary thought–action repertoires, which in turn serve to build their enduring personal resources, ranging from physical and intellectual resources to social and psychological resources. Fredrickson and her colleagues’ contributions to the literature on the beneficial impact of positive emotions include increasing the speed of recovery from cardiovascular detriments of negative emotion;^{83,84} resilience after a crisis;⁸⁵ coping;⁸⁶ emotional wellbeing;⁸⁷ and life satisfaction,⁸⁸ as well as being influential in other research such as functional status in coronary artery disease patients such that positive emotions were associated with less decline in functional status following hospitalisation for coronary artery disease.⁸⁹

More recently, Fredrickson et al.⁹⁰ examined the biological basis for wellbeing of 80 healthy adults by studying their differential expression of basal gene profiles as either hedonic wellbeing, which was viewed as the total of a person’s positive affective experiences, or eudaimonic wellbeing, where one attempts to find meaning and purpose in their life which is very similar to the PEA condition. The researchers found the more favourable gene expression profiles in terms of numerous indicators such

as proinflammatory genes, reduced expression of genes, antibody synthesis, and antiviral responses to be associated with eudaimonic wellbeing. Brown et al.⁹¹ strongly criticise the mathematics supporting the claims made in this study; however, Cole and Fredrickson⁹² have subsequently claimed errors in this critique.

Unfortunately, not all patients experience a preponderance of positive emotions in their encounters with physicians. For patients who do not have resonant relationships with their physicians, encounters may result in additional stress for both parties. If the physician creates an overall negative emotional tone during encounters, or is not connected with their concerns, then dissonant or even toxic relationships can result.⁹³ Boyatzis, Smith and Blaize⁴¹ indicate that caring relationships are the key to arousal of the parasympathetic nervous system and cite attachment studies associating compassion with lower blood pressure, enhanced immunity, and overall better health,^{94–97} which reverses the effects of the stress response and arousal of the sympathetic nervous system.^{96–99} Establishing caring relationships can operate like a remedy to help physicians reduce patient stress resulting from discordance that patients may experience with physicians during clinical encounters.

Most recently, the field of affective neuroscience has begun examining the neural correlates of PEA and NEA.^{100–105} Although not conclusive and not without substantive critique¹⁰⁶ as well as more hopeful and balanced caution¹⁰⁷ the results are promising. For instance, Jack et al.¹⁰⁸ used functional magnetic resonance imaging, to determine differential activation caused by coaching to the PEA vs. the NEA. They found that PEA-coached participants showed more brain activity in several regions such as the left lateral prefrontal cortex and parasympathetic nervous system activation consistent with visioning, social engagement, and a motivation promotion focus. NEA-coached participants showed more brain activity in the right lateral prefrontal cortex and sympathetic nervous system activation consistent with avoidance motivation and negative affect.

Conclusions and implications for future research and practice

This paper proposes an asymmetrical relationship between resonance as represented by the PEA and dissonance as represented by the NEA in physician–patient relationships. Asymmetrical relationships should favour resonance over dissonance to facilitate effective physician–patient relationships. There are several implications for further research and practice resulting from this paper.

Although it was stated that PEA is more important than NEA for developing effective physician–patient relationships, this paper did not suggest how much more important PEA is than NEA. Existing research on the PEA/NEA ratio suggests that the optimal range falls somewhere between 2.0^{48,70} and 5.0⁶⁵ while other research suggests that there may be a limit to the utility of positive emotions.¹⁰⁹ Future research

could examine if physician–patient relationships are unique contexts falling outside this range.

Knowing the optimal ratio for clinical encounters would provide guidance for physicians when interacting with patients. This could manifest in the physician simply spending more time with patients exploring their complete description of symptoms and reasons for visiting with the physician in an uninterrupted manner which research has shown to increase patient satisfaction.¹¹⁰ Further, it would provide physicians with a sense of how much PEA they need to compensate for the NEA that they expect to deliver or discover that they need to deliver during the encounter. Knowing the PEA/NEA tipping point would also help ensure that an overabundance of PEA is also not generated, which may only yield marginal utility for improved patient outcomes.

There are numerous areas of discordance that occur between physicians and patients during encounters that can lead to NEA for patients.^{75,111} Therefore, if physicians can determine discordant events, they could then switch their approaches to ones more consistent with PEA. If researchers could determine that the beginning of the physician–patient encounter holds the most discordance due to the anxiety of anticipating the medical encounter then a higher PEA/NEA ratio may be appropriate at that time, for example. Given that ICT's first discovery is the ideal self, it seems appropriate to create a higher PEA/NEA ratio at the beginning of the encounter during which time the patient's ideal self can be examined. ①

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