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### The sound of change: A study of the psychotherapeutic process embodied in vocal expression. Laura Rice's ideas revisited

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EMPIRICAL PAPER

## The sound of change: A study of the psychotherapeutic process embodied in vocal expression. Laura Rice's ideas revisited

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### Abstract

**Objective:** The purposes of this article were to compare the characteristics of the vocal quality of therapists and patients in change and stuck episodes, and to depict patient-therapist interaction sequences of vocal properties, in order to analyze micro-regulatory processes within the psychotherapeutic interaction. **Method:** Application of the Vocal Quality Patterns coding system to a study of a sample of change and stuck episodes, taken from six psychotherapies. **Results:** The results made it possible to show that the 15 psychotherapeutic change process are embodied in the modes of vocal expression of their participants, and that the way in which these different modes are coordinated within the interaction makes it possible to observe regulatory micro-sequences that participate in the therapeutic change process.

**Keywords:** process research; alliance

Some three decades ago, Laura Rice (d. 2004) developed a highly original process-rating measure that assessed Client Vocal Quality (CVQ). The ideas behind this method stressed the value of close observations of psychotherapy process and the creation of meaningful coding categories based on those observations, the importance of the style of patients' expressions rather than their content, and the relevance of the way in which these non-verbal expressions account for the activation of recurring cognitive-affective schemas of the patients. These general ideas, along with the CVQ rating system, were presented in three inspirational papers. In the first of them, Rice and Wagstaff (1967) focused on clients' vocal quality and expressive style as indicators of psychotherapy productivity; they also defined four subclasses of qualitatively different kinds of voice patterns that varied among clients and throughout the sessions, which allowed them to differentiate good and bad sessions in agreement with the therapists' assessment. In the second one,

Rice and Kerr (1986) depicted the development process of the Client and Therapist Voice Quality system (CVQ and TVQ), the studies of reliability and validity of both systems and its applications in psychotherapy process research. In the third one, Wiseman and Rice (1989) observed significant effects regarding the influence of the therapist's vocal quality over the patient's vocal quality.

Following the pioneering ideas of Rice and colleagues, we developed a new coding system of Vocal Quality Patterns (VQP) applicable to psychotherapeutic dialogue, a single tool for patients and therapists, designed to fit the Chilean cultural context and possibly a Hispanic one; this system was presented in a previous work (see Tomicic, Martínez, Chacón, Guzmán, & Reinoso, 2011). This study presents the system's application to the analysis of relevant episodes in psychotherapy. Our purpose was to observe the process of change embodied in the expressive vocal styles of the participants, and to uncover regulatory sequences between them.

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### The Relevance of the Voice in Human Communication

The human voice has the property of giving quality to the speech by the so-called suprasegmental or prosodic parameters (Knapp, 1988; Martinez, 2003; Nespors & Vogel, 1994). According to psychoacoustic studies (Sapaly, 2005) the production and perception of voices depend on the psychophysiological state of the individual, as well as prosodic features of a particular language. Both factors allow the distinguishing of the basic properties of intensity, pitch, and timbre of the voice (Sapaly, 2005). Thus, the perception of voices relies on the interplay between objective acoustic properties and the subjective condition of the listeners, determined in part by their psychophysiological characteristics.

According to Andersen (1999), voice parameters such as rhythm, tempo, resonance, control, and accent are key factors for the interpretation of speech. He points out that, in general terms, non-verbal communication stands out in information transmission because it is the main carrier of communication at a relational and interpersonal level. In the author's view, vocal nonverbal contextual codes are the most important ones, since they reinforce or modify what is said verbally. For example, Campanelli, Ibern, Sarracino, Degni, and Mariani (2007) have referenced the autonomous semantic properties of nonverbal vocal communication, identifying four functions of nonverbal or paralinguistic vocal cues: (a) hypercoding (nonverbal vocal parameters can clarify and specify the meaning of verbal units), (b) opposition (voice acoustic characteristics contrast with the meaning of verbal units and a new meaning emerges from this opposition), (c) modification of the meaning conveyed through the verbal code (for example, the illocutionary force of speech acts), and (d) intensification and deintensification of the meaning of verbal units.

In everyday communicative interactions, voice prosody plays a key role, giving an account of implicit meanings and aspects occurring during mutual communication (Campbell, 2004a, 2004b). Without recognition of the prosody accompanying speech content, it is almost impossible to recognize differences between stated contents (Sarko, Roth & Martin, 2010) as well as it being very difficult to identify the implicit elements defining the type of ongoing interaction. Specifically, changes in the voice allow attributions about the speaker's emotional states, and additionally emotions affect the sonority of the messages (Bänzinger & Scherer, 2005; Malloch, 1999; Papoušek, 2007; Scherer, 1982). However, this association between speech prosody and emotions has not been described as a one on

one correspondence but as a connection between vocal qualities and types of emotions. It has been observed that the association between emotions and sound of speech is established as part of a gradual process of relationship consolidation and interaction between individuals (Gobl & Chasaide, 2003). In turn, the ability to recognize emotions from the prosody may be affected by the presence of psychological disorders in the individual. For example, in a study of individuals with eating behavior disorders, they showed a significant deterioration in the ability to recognize facial and vocal emotions, mostly in the case of negative emotions (Kucharska-Pietura, Nikolaou, Masiak, & Treasure, 2004). Thus, identification of the vocal qualities may be very important for the recognition of changes in the interlocutor's affective states (Gobl & Chasaide, 2003), a necessary condition for stable, meaningful, and satisfying social relationships (Knapp, 1988).

### The Voice in the Psychotherapeutic Dialog

In psychotherapeutic interaction, the speech acoustic parameters are one of the main sources of information about the meaning of the acts performed in patient-therapist communication (Knoblauch, 2000, 2005). Even more so, the idea has been advanced that the quality of the speaker's voice may influence the emotional state of the listener (Bachorowski & Owren, 2008; Russel, Bachorowski, & Fernandez-Dol, 2003); for instance, a voice that reflected the therapist's relaxedness and confidence could calm the patient's agitated voice and its associated emotions (Bady, 1985). Similarly, in a study on vocal communication Scherer and Bergmann (1990) found that psychotherapy participants infer and cause emotions in each other through the sounds of speech. Knoblauch (2000, 2005) has stated that the vocal quality of patients and therapists can be one of the key aspects for describing change processes in psychotherapy. He contends that, in psychotherapeutic interaction, psychological meanings are exchanged not only through participants' speech, but also through the sounds of their voices.

In an exploratory study, Tomicic, Bauer, Martínez, Reinoso, and Guzmán (2009) researched the importance that psychotherapists ascribe to the nonverbal aspects of their own voices and of their patients in the psychotherapeutic process. One of the study's salient results was that the therapists interviewed not only acknowledged generic voice use as a non-verbal or para-verbal tool, but also its specific functions according to the identification of diverse characteristics of the process and of psychotherapeutic space. The attention paid to voice quality allowed them to differentiate emotions and improve their understanding of their

patients; in addition, they also stated that their voice was a tool to produce changes (e.g., transformation of the session's emotional climate, use of the voice as a change marker during the psychotherapeutic process, and use of the voice for specific interventions).

In a second qualitative study Bauer et al. (2010) explored the importance that patients assign to the non-verbal aspects of their own voices and those of their therapists during their psychotherapies. Specifically, the patients were asked whether therapists respond to the patient's voice and how did they do so; conversely, they were asked whether they responded to the therapist's voice and in what manner. The results showed that interviewed patients describe voice tone in a differentiated way and that they regulate affects and atmospheres through their own voice. They experience their therapist's voice tone fairly consciously and are able to indicate the "ideal therapist's voice." They also said they "hear" therapeutic intentions from the voice tone of their therapists and perceive the regulation of the therapeutic relation through vocal and rhythmic elements like melody, intensity, and tempo.

### The Study of the Voice in Psychotherapeutic Interaction

In the field of psychotherapy, few studies about the voice have been conducted, and existing ones have focused on the analysis of vocal expression of emotions (see Bachorowski & Owren, 1995, 2008, 2009; Moneta, Penna, Loyola, Buchheim, & Kächele, 2008; Scherer, 1982). That is, they have focused on what Campbell (2007) has called speaker-centered speech—a line of study which assumes that different emotional states are linked to different lexical choices, speech styles, and phrasings—while neglecting communication-centered research. This line of study assumes the existence of a prosodic modulation of speech in interaction, i.e., those speakers' emotional states may vary due to changes in the state of the relationship with their conversational partners; furthermore this intentionality of speakers is connected to different lexical choices, speech styles, and phrasings.

This notion by Campbell (2007) is consistent with theoretical and empirical developments derived from the intersubjective approach, which support the link between mutual regulation and the processes that foster change in psychotherapy. Each participant of the therapeutic dyad is believed to be affected both by his/her own self-regulation behaviors, and by those of his/her partner, in a process of mutual regulation (Tronick, 1989). This process is thought to happen moment by moment, mainly at a non-verbal level (Stern, 1998). Mutual regulation is

observed in the coordination sequences of (verbal and nonverbal) behavior between the dyad members, assuming that the regulatory behaviors of one participant can be predicted from those of the other, and vice-versa (Beebe, 2006; Jaffe, Beebe, Feldstein, Crown, & Jasnow, 2001). Regarding its connection to change, Tronick (1998) has suggested that mutual regulation allows for the expansion of consciousness of the dyad's members. Each partner (mother and infant, or therapist and patient) affects the other's "state of consciousness." As each affects the other's self regulation, each partner's inner organization is expanded into a more coherent as well as a more complex state. This happens because regulation with another person in the interaction enables him/her to enrich and transform his/her own functioning (Beebe & Lachman, 1998).

### Laura Rice's Ideas Revisited

Rice and Wagstaff (1967) focused on communication and identified four CVQs in patients: (i) emotional, in which the speech pattern is disrupted or distorted to some extent by emotional overflow; (ii) focused; this category involves inward turning of attentional energy, deployed to tracking inner experience and finding a way to symbolize it in words; (iii) externalizing; this category seems to involve a deployment of attentional energy outward in an effort to produce some effect in the outside world; it has a premonitored quality, suggesting that the content being expressed is not being newly experienced and symbolized; and (iv) limited; this pattern seems to involve a holding back or withdrawal of energy. This pattern suggests a walking-on-eggs quality. The authors established connections between CVQs' presence and the productivity of the sessions as assessed by the therapists (Rice & Kerr, 1986; Rice & Wagstaff, 1967). Subsequently, Wiseman and Rice (1989) described seven vocal quality patterns for therapists, which are different and non-comparable with the CVQs. They are: (i) softened; this pattern is characterized by a lax voice that creates an intimacy and involvement effect; (ii) irregular; this pattern is characterized by irregular intensity stresses with some pitch variation; (iii) natural; this pattern is characterized by neither an overly tense nor relaxed voice; the voice is unstrained and natural; the effect is one of interest; (iv) definite, a pattern characterized by a voice full, measured, assured, generally on the speaker's pitch platform; this category can occasionally sound overbearing and confrontational; (v) restricted; this voice pattern is characterized as adequate to carry the content, but strained; the voice can be slightly tremulous, whiny, droning, or sounding as though the air is escaping before the word is

formed; (vi) patterned; this category is patterned for emphasis, specially using pitch. The category as a whole sounds “singsong”; and (vii) limited; this category is characterized by a low energy or flat stresses in the voice and a monotone pitch; there is just not enough life in this voice (Rice & Kerr, 1986). Wiseman and Rice (1989) found that these vocal qualities of the therapist had significant effects on those of patients. Specifically, they observed that a productive vocal quality of the therapist (irregular TVQ) could predict a change in the patient towards a focused vocal pattern, one that revealed his/her involvement in the experience.

In a previous study Tomicic et al. (2011), following Rice and Wagstaff (1967), developed a VQP coding system for patients and therapists which could be applied to psychotherapeutic dialog in the cultural context of Chile and other Spanish-speaking countries. This work was inspired mainly by the method Rice and colleagues designed to define their categories. Nevertheless, it was not intended to repeat their categories in another language. Instead, a single VQP coding system for both participants was created, allowing a comparison of categories used by each. While certain convergences can be found in both categorical systems, for example between categories CVQ emotional and VQP emotional-expressive, or TVQ definite and VQP affirmative, these similarities account for the capacity of both systems to capture expectable phenomena in the field of sonorous properties of oral communication, such as speech modulation by emotion or certainty. Regarding the language and cultural context of VQP development, experimental studies support the hypothesis that the vocal expression of emotions is characterized by elements that are universally used by speakers and can be decoded with accuracy levels that exceed those expected by chance, regardless of the language of the listener (Scherer, Banse, & Wallbott, 2001; Thompson & Balkwill, 2006). However, evidence has also been reported that emphasizes the comparative advantage of the recognition of emotions expressed through speech prosody by listeners who share the language of the speaker (Pell, Monetta, Paulmann, & Kotz, 2009). Along these lines, Pell et al. (2009) have argued that while the ability to recognize emotions through vocal expression is partially independent of the listener’s language correspondence and implies universal principles, it is also true that this ability is modulated by linguistic and cultural variables. From this perspective the consideration of these variables when developing this coding system helps to achieve VQP reliability and ecological validity on its application.

In the Tomicic et al. (2011) coding system, VQPs were defined as a combination of specific vocal

parameters in the utterances of speakers whose speech gives a specific impression to a listener, regardless of the contents transmitted (Tomicic, Chacón, et al., 2009). Six VQPs were established and characterized: (i) Report, (ii) Connected, (iii) Affirmative, (iv) Reflection, (v) Emotional-Expressive, and (vi) Emotional-Restrained. In addition, in the case of utterances in which VQP coding does not apply, the following categories were created: (vii) Full Pause, (viii) Overlapping, and (ix) Non-Codable (see Table IV).

As mentioned above, the system, which proved to be highly reliable (Tomicic et al., 2011), has at least two relevant differences with respect to those created by Rice and collaborators: (i) it describes VQPs applicable to the Spanish language and (ii) it proposes a single coding system for both patients and therapists, which makes it possible to conduct comparative and sequential studies of the VQPs used by both throughout the psychotherapeutic process.

### **The Study of Interaction in Psychotherapy through Relevant Episodes**

A common and useful way of studying the psychotherapy process is to look at specific moments within the therapy. These moments are special episodes, chosen from a theoretical point of view, and include: Innovative Moments (Gonçalves, Matos, & Santos, 2009), Episodes of Rupture (Safran & Muran, 1996, 2000, 2006), or in the case of this study, Change Episodes (Krause, de la Parra, Aristegui, & Strasser, 2006; Krause et al., 2007) and Stuck Episodes (Fernández et al., 2012; Herrera et al., 2009). These episodes are regarded as “windows” (Elliott, 1984; Timulak, 2007) that make it possible to understand the relationship between the therapeutic exchanges (e.g., verbal and non-verbal behaviors of the participants) and its outcome. The use of these relevant segments allows one to solve the practical problem of managing an excessive amount of information, and, at the same time, assigns a theoretical meaning to such sampling. In this study change and stuck episodes were used as relevant episodes.

A change episode is an interaction segment in a psychotherapeutic session in which a representational-level change is observed in the patient. The method for determining change episodes, derived from this definition, is based on the subjective theories notion of change and operationalized via Generic Change Indicators (see method section) (Krause et al., 2006).

We developed the following questions with respect to these episodes: Are certain specific VQPs more likely to occur in change episodes? Are these VQPs the same for the patient and for the therapist? And, is

it possible to track regulatory exchanges expressed by VQP sequences within patient-therapist interactions?

Meanwhile, stuck episodes represent a temporary halting of the patient's process of change due to the reedition of the problem during the therapeutic session. They characterize this reedition as the persistence of forms of understanding, behavior and emotion that contribute to sustaining the problem and stopping the progression of change as described by change indicators (Fernández et al, 2012; Herrera et al., 2009; Krause et al., 2006).

We developed the following questions with respect to these episodes: Are certain specific VQPs more likely to occur in stuck episodes? Are these VQPs the same for the patient and for the therapist? And, is it possible to track regulatory exchanges expressed by VQP sequences within patient-therapist interactions in these episodes?

Considering both episodes (change and stuck), the hypotheses were: (i) There are differences between change and stuck episodes with respect to the probability of some specific VQPs; (ii) There are differences in the VQPs used by patients and therapists; and (iii) There are differences with respect to regulatory VQP sequences in patient-therapist interactions in change and stuck episodes.

## Method

The study design was transversal in order to determine and compare the characteristics of vocal quality in change and stuck episodes gathered through individual therapies. Furthermore a mixed design was employed, combining qualitative and quantitative methodologies. The former was oriented towards describing and categorizing the patterns of vocal characteristics observed in patient-therapist interactions. The latter was aimed at establishing differences between change and stuck episodes with respect to patient-therapist interaction sequences of vocal properties.

**Participants.** The change and stuck episodes were taken from six successful short-term psychoanalytic therapies. The ages of the six patients ranged from 21 to 42 (average 34.7). Four of them were female and two male. Patients received between 15 and 23 sessions of therapy with a psychodynamic focus in the context of outpatient treatment. The therapists, five males and one female, had between 3 and 15 years of practical professional experience. All the treatments were evaluated by means of an outcome measurement using the Outcome Questionnaire 45.2 (OQ-45.2; Lambert & Burlingame, 1996; von Bergen & de la Parra, 2002) (see Table I).

**Procedures.** Each of the 50-minute sessions of each therapy took place in a one-way-mirror room. All sessions were video and audio recorded for later analyses. Patients and therapists were extensively informed before commencing therapy and consented to video and audio recordings and data collection at all times. All participants provided their written informed consent concerning the use of their data for research purposes.

The unit of analysis was the relevant episode, specifically change and stuck episodes. The method for determining change episodes is based on the subjective theories notion of generic change (Krause, 2005; Krause et al., 2007). Subjective change is operationalized by means of "Generic Change Indicators" (Krause et al., 2006), which make it possible to identify a *change moment* based on its content (see Table II). In turn, a *change episode* is an interaction segment where a *change moment* takes place. In the rating procedure, this moment marks the end of the episode. At this point, a rater establishes the beginning of the episode by tracking back to when the participants start conversing about the content of the change (Krause et al., 2006).

Considering the conceptual meaning of each GCI, the aforementioned hierarchy was organized by Altimir into three levels (see Table II) that reflect more clearly the different phases of the psychotherapeutic

Table I. Characterization of the participants.

Therapy	Patient's sex	Patient's age	Patient's Presenting problem	Therapist's sex	Therapist's years of practice	OQ at beginning	OQ at end	Outcome (RCI)
1	Female	37	Adaptative disorder	Male	10	115	71	44
2	Female	36	Depression by mourning	Male	10	68	48	20
3	Female	40	Depression	Male	15	111	91	20
4	Female	42	Anxiety disorder	Male	15	52	30	22
5	Male	32	Adaptative disorder	Female	10	128	46	82
6	Male	21	Adaptative disorder	Male	3	47	14	33

Note. The diagnostic was reported by each psychotherapist. Outcome: Successful therapies were defined as those that met the criterion to submit a Reliable Change Index (RCI = 15 or more) (von Bergen & de la Parra, 2002).

Table II. Generic Change Indicators (GCI).

Level	Indicators
I. Initial consolidation of the structure of the therapeutic relationship.	1. Acceptance of the existence of a problem
	2. Acceptance of his/her limits and of the need for help.
	3. Acceptance of the therapist as a competent professional.
	4. Expression of hope
	5. Questioning of habitual understanding, behavior and emotions.
	6. Expression of the need for change.
	7. Recognition of his/her own participation in the problems.
II. Increase in permeability towards new understandings.	8. Discovery of new aspects of self.
	9. Manifestations of new behaviors and emotions.
	10. Appearance of feeling of competence.
	11. Establishment of new connections.
	12. Reconceptualization of problems and/or symptoms.
	13. Transformation of valorizations and emotions in relation to self or others.
III. Construction and consolidation of a new understanding.	14. Creation of subjective construct of self through the interconnection of personal aspects and aspects of the surroundings, including problems and symptoms.
	15. Founding of the subjective constructs in own biography.
	16. Autonomous comprehension and use of the context of psychological meaning.
	17. Acknowledgment of help received.
	18. Decreased asymmetry between patient and therapist.
	19. Constructions of a biographically grounded subjective theory of self and others and of the relationship with surroundings.

Note. Taken from Altimir et al. (2010).

change process (Altimir et al., 2010). The first level (Level I) is named “Initial consolidation of the structure of the therapeutic relationship.” because the change indicators that belong to this category reflect the relevance of the establishment of the psychotherapeutic contract and relationship before the start of the process of constructing new explanations about the patient’s problems. The second level (Level II) is considered a medial one, and was named “Increase in permeability.” The change indicators of this cluster refer to several kinds of observed

transformations with respect to patient’s emotions, cognitions, and behaviors. Finally, the change indicators corresponding to the third level (Level III), named “Construction and consolidation of a new understanding,” reflect the patient’s elaboration of a new subjective theory and his or her autonomous use of the psychological context of interpretation.

Stuck episodes coincide with periods of time during the session, in which there is a temporary detention of the patient change process characterized by the lack of new understandings. This involves an argumentative persistence which opposes the construction of new understandings, and does not contribute to the focus of change (Herrera et al., 2009). For its selection, the stuck episode must have a minimum duration of 3 minutes, and a distance of 10 minutes from any episode of change. To delimit the start and the end of the episode, the fragment is selected that better represents the stuck occurrence, therefore those segments in doubt or for which no consensus among coders is achieved are left out (Fernandez et al., 2012).

For the selection and temporal delimitation of the change and stuck episodes six pairs of coders trained by the Chilean Research Program on Psychotherapy and Change analyzed videotapes and transcriptions of the therapeutic sessions and carried out an intersubjective validation procedure.<sup>1</sup>

The sample for this study comprised 31 episodes taken from a universe of 152 episodes from six therapies. Table III presents the total of change and stuck episodes for each therapy together with sampled episodes. As can be seen, from a total of 93 change episodes, 16 were selected; from a total of 59 stuck episodes, 15 were selected. The selection of these episodes was deliberate, to choose change episodes belonging to each of the phases of the psychotherapy process: Initial, medial, and final. Also, the selection was deliberate to match the choice of change episodes from the initial phase with those with a Level I type of change, change episodes from the medial phase with those with a

Table III. Characterization of study sample.

Therapy	Change episodes		Stuck episodes		Total	
	Total	Sample	Total	Sample	Total	Sample
1	10	3	15	3	25	6
2	14	3	7	2	21	5
3	24	3	12	3	36	6
4	20	3	12	2	32	5
5	11	1	4	2	15	3
6	14	3	9	3	23	6
Total	93	16	59	15	152	31

Level II type of change, and change episodes from final phase with those with a Level III type of change. The rationale for this sampling strategy was to represent to some extent the “ideal evolution” of the process of change in psychotherapy. The selection criterion for stuck episodes was that they should occur within the nearest session of the change episode previously selected.

**Data analysis.** Each episode was analyzed by two raters trained in the VQP coding system. They were blind to type and phase of the episode. With the VQP coding system the raters categorized patients’ and therapists’ speech in terms of its aural quality. This system identifies six VQPs: (i) Report, (ii) Connected, (iii) Affirmative, (iv) Reflection, (v) Emotional-

Expressive, and (vi) Emotional-Restrained. Also, for the utterances in which the VQP coding does not apply, the following categories were created: (vii) Full Pause, (viii) Overlapping, and (ix) Non-Codable (see Table IV).

The VQP coding procedure was carried out in four analytic steps for each episode:

1. Listening to the full episode analyzed, so as to become familiar with the timbre of the participants’ voices.
2. Listening from the start of the episode analyzed, reading the text speaking turn by speaking turn, and performing a preliminary segmentation, considering changes or breakdowns in vocal quality as revealed by changes

Table IV. Characterization of Vocal Quality Patterns.

VQP	Characterization
Report	It adds to the speech the quality of <i>something already known</i> , of a disconnected speech of what is being said and/or a certain emotional distance. It sounds as if the speaker was reporting, narrating, or exploring content without any emotional involvement. In this pattern, the central element is the listener’s impression of a disconnected speech. <i>Main Vocal Parameters:</i> INTENSITY: Increased volume and high variations; DURATION: Speed augmented.
Connected	It conveys the quality of being oriented toward the other (the partner in the dialogue) and of being developed while it is uttered. In this pattern, the central element is the listener’s impression of an elaborative speech geared towards the partner in the dialogue. <i>Main Vocal Parameters:</i> TONE: Dynamic-agogic accent, end of phrase half-suspended anti-cadence; INTENSITY: Volume increased sustained-crescendo dynamics and low variations.
Affirmative	It conveys the quality of certainty and conviction. It sounds as if the speaker were teaching or instructing the listener, or as if he/she was very sure of what he/she is saying. In this pattern, the central element is the listener’s impression of a secure and instructive speech. <i>Main Vocal Parameters:</i> TONE: Dynamic-tonic accent and end of phrase suspended; INTENSITY: Dynamics sustained-crescendo; DURATION: Hard vocal attack.
Reflection	It conveys the quality of being directed <i>toward oneself</i> (the speaker). It sounds as if the speaker was connected with her/his internal world or in a dialog with her/himself. In this pattern, the central element is the listener’s impression of an introverted speech. <i>Main Vocal Parameters:</i> TONE: Dynamic-agogic accent and end of phrase half-suspended cadence; INTENSITY: Volume decreased and low variations; DURATION: Speed reduced.
Emotional-Expressive	It conveys affection and/or that the speech has a heavy emotional load. It sounds like the speaker’s emotion (joy, anger, sadness, fear, etc.). In this pattern, the central element is the listener’s impression of an emotionally charged speech, regardless of the type of emotion. <i>Main Vocal Parameters:</i> TIMBRE: Clear / Bright; Clear / Opaque; Dark / Bright; and Dark / Opaque.
Emotional-Restrained	It conveys affection and/or that the speech has a heavy emotional load. However, even though in this case the speaker’s emotion is not audible, what does impress the listener is an effort to contain her/his <i>emotion</i> . In this pattern, the central element is the listener’s impression of suffocation and control to avoid being overwhelmed by emotion. <i>Main Vocal Parameters:</i> DURATION: Speed decreased, not fluid pace, and long pauses.
Exclusion categories for VQPs	
Overlapping	It is an instance of simultaneous speech, which, in VQP coding, makes it impossible to distinguish the vocal characteristics of the participants in a full segment or speaking turn. When coding this conversation phenomenon, the overlapping of the actors is noted.
Full Pause	Short utterances with para-verbal content (hmm, aha, okay). They are usually ways of agreeing, showing attention, disagreeing, or displaying the wish to end a conversation. Their meaning depends mainly on the context and on certain vocal characteristics of the utterance; however, due to their brevity, they are hard to analyze in terms of the vocal parameters that define the VQPs described.
Non-Codable	These are units of analysis which do not meet the phenomenological characteristics and the parameters of the VQPs. It can also apply to the cases in which the recording is not completely audible, due to ambient noises, mispronunciations, or other errors by the speakers. They are neither full pauses nor instances of overlapping.



- in a vocal parameter (for example, speed, volume, or rhythm variations).
3. Listening from the start of the episode analyzed, speaking turn by speaking turn and segment by segment, and performing a preliminary coding, considering the phenomenological description of VQPs.
  4. Listening from the start of the episode analyzed, speaking turn by speaking turn, and confirming or discarding the presence of the VQP coded in step 3, considering the auditory perception of the vocal quality parameters involved, and attempting to reach a consensus when considering more than one VQP per segment.

The VQP coding system's reliability in this sample was assessed using Cohen's kappa (Cohen, 1968) to measure independent raters' agreement. The analysis was performed with SPSS 14.0 and ComKappa (where raters' categories were not exactly the same). We used the 15% of the total sample ( $n = 31$ ). Five episodes (three change episodes and two stuck episodes) from four therapies (II, V, X, and XVI) were randomly chosen. VQP coding in the chosen episodes resulted in  $k = .80$ ,  $p < .05$ .

To compare the frequencies and the probability of occurrence of the different VQPs in change and stuck episodes, and in patients or therapists, we employed the non-parametric chi-square test together with logistic regressions.

To determine regulatory VQP sequences in patient-therapist interactions in both types of episodes, Lag Sequential Analysis (LSA) was applied, using the Generalized Sequential Quierier program (GSEQ 5.0; Bakeman & Quera, 1995). LSA is a statistical methodology which makes it possible to describe behavior sequences in a given interaction, determining the probability of occurrence of a *given behavior* (Lag 0) before the occurrence of a *target behavior* (Lag 1) (Bakeman, Deckner, & Quera, 2005). This does not involve causality; instead, it can be regarded as a prediction relationship.

The analysis produces two types of statistical data. First, descriptive information: Yule's  $Q$  (values between 1 and  $-1$ , which are interpreted as a correlation) and Odds Ratio. Second, inferential information: Pearson's chi-square and the Adjusted Residuals test ( $Z > 1.96$ ), recommended for the analysis of category data and the exploration of sequential relationships, respectively (Paul & Liker, 1982; Bakeman, Adamson, & Strisik, 1995; Bakeman, Quera, McArthur, & Robinson, 1997).

## Results

Regardless of the type of episode, patients and therapists' VQP repertoire displayed significant differences in distribution,  $\chi^2 (8, N = 1353) = 165, 81$ ,  $p = .000$ . In comparison with therapists, patients are more likely to use *report*, *reflection*, and *emotional-expressive* VQPs. In contrast, therapists are more likely to use *full pauses*. Patients and therapists use *affirmative* and *connected* VQPs in similar proportions (see Table V).

Regarding the use of VQPs by patients in comparison with therapists, and irrespective of the type of episode, patients are more likely to use *report* (OR .320), *reflection* (OR .276), and *emotional-expressive* (OR .300) VQPs. Also, It is more probable that patients' verbalizations correspond to *non-codable* compared to therapists' vocal quality (OR .397). In contrast, as Table VI shows, regardless of the type of episode, therapists are more likely to display *affirmative* (OR 1.409) VQP and *full pauses* (OR 3.080).

Considering the episode type variable only, VQP distribution in change and stuck episodes also displayed significant differences,  $\chi^2 (8, N = 1353) = 50.352$ ,  $p = .000$ . In change episodes, in comparison with stuck episodes, *connected* VQP is more prevalent. In contrast, in stuck episodes, *affirmative* VQP and *full pauses* are more frequent. In both episodes, *report*, *reflection*, *emotional-expressive*, and *emotional-restrained* VQPs, as well as the *overlapping* and *non-codable* categories, appear in similar proportions (see Table VII).

With respect to the probability of appearance of VQPs in change episodes in comparison with stuck episodes, regardless of the participant using them, it is more likely for a *connected* VQP (OR .410) to be observed in change episodes, whereas an *affirmative* VQP (OR 1.474) is more likely to appear in stuck episodes (see Table VI).

In order to analyze the effect of the type of episode on the probability of using each VQP, the actors and type of episode variables were regressed on

Table V. VQP repertoire in patients and therapists.

	Patients	Therapists
Report	13.7%	5%
Connected	20%	31.1%
Assertive	26.9%	32.7%
Reflection	7.7%	1.7%
Em-Expressive	8.4%	2.8%
Em-Restricted	0.7%	0.7%
Full Pause	4.8%	16.6%
Overlapping	3.9%	4.7%
Not Coded	13.9%	4.7%
	100%	100%

the probability of using different kinds of VQP. As Table VI shows, no interaction effects were observed between these variables in relation to the occurrence of VQPs.

In order to explore the sequential association between therapists' and patients' VQP categories, a table with all vocal behavior categories of each member of the therapeutic dyad was produced. In it, all VQP categories of therapists and patients are regarded as given behaviors (Lag 0) and target behaviors (Lag 1). The chi-square statistic for this lag table indicated that the degree of association

Table VI. Probability of occurrence of VQPs by actor and episode type.

	B	Wald	Sig	Exp(B)
<b>VQP Account</b>				
Actor: Therapist (1) Patient	−1.141	15.376	.000**	.320
(0) Episode: Stuck (1)	.214	.347	.556	1.239
Change (0)	.073	.030	.863	1.076
Actor × Episode				
<b>VQP Connected</b>				
Actor: Therapist (1) Patient	.517	6.145	.013*	1.677
(0) Episode: Stuck (1)	−.892	24.996	.000**	.410
Change (0)	.150	.320	.571	1.162
Actor × Episode				
<b>VQP Affirmative</b>				
Actor: Therapist (1) Patient	.343	4.206	.040*	1.409
(0) Episode: Stuck (1)	−.892	5.237	.022*	1.474
Change (0)	.150	.294	.587	.878
Actor × Episode				
<b>VQP Reflection</b>				
Actor: Therapist (1) Patient	−1.286	7.631	.006**	.276
(0) Episode: Stuck (1)	.265	.188	.664	1.304
Change (0)	−.532	.623	.430	.588
Actor × Episode				
<b>VQP Emotional-Expressive</b>				
Actor: Therapist (1) Patient	−1.204	8.665	.003**	.300
(0) Episode: Stuck (1)	−.149	.096	.757	.862
Change (0)	.095	.030	.863	1.100
Actor × Episode				
<b>VQP Emotional-Restricted</b>				
Actor: Therapist (1) Patient	−.182	.056	.813	.834
(0) Episode: Stuck (1)	1.184	1.046	.306	3.266
Change (0)	.296	.034	.854	1.344
Actor × Episode				
<b>Full Pause</b>				
Actor: Therapist (1) Patient	1.125	19.815	.000**	3.080
(0) Episode: Stuck (1)	.412	3.700	.054	1.510
Change (0)	.745	2.733	.98	2.106
Actor × Episode				
<b>Overlapping</b>				
Actor: Therapist (1) Patient	.114	.098	.754	1.120
(0) Episode: Stuck (1)	.222	.352	.553	1.249
Change (0)	.165	.093	.761	1.179
Actor × Episode				
<b>Not Coded</b>				
Actor: Therapist (1) Patient	−.924	9.658	.002**	.397
(0) Episode: Stuck (1)	.364	.929	.335	1.438
Change (0)	−.525	1.452	.228	.592
Actor × Episode				

\*\* $p < .01$ ; \* $p < .05$ .

Table VII. VQP distribution in change episodes and stuck episodes.

	Change episodes	Stuck episodes
Report	8.5%	10.8%
Connected	32.4%	17.6%
Assertive	26.4%	33.1%
Reflection	5.3%	4.5%
Em-Expressive	6%	5.5%
Em-Restricted	.3%	1.1%
Full Pause	7.7%	13.1%
Overlapping	3.7%	4.9%
Not Coded	9.7%	9.4%
	100%	100%

between the VQP categories was not determined by chance,  $\chi^2 (289, N = 1353) = 1640.58, p \leq .01$ . Having established the global sequential association between the VQP categories, a more specific examination into pairs of associated categories was performed. As shown in Table VIII, 12 temporal sequences between VQPs were statistically significant. These temporal associations between VQPs are referred to as *regulatory microsequences*. In turn, we classify them as *self-regulation sequences* if the temporal association between the VQPs occurs in the same utterance by the patient or the therapist, or as *mutual regulation sequences* if the temporal association between the VQPs matches the interaction between the members of the therapeutic dyad.

Regarding *self-regulation microsequences*, in the case of patients only the temporal association between *connected* and *report* VQPs was statistically significant, with a moderate degree of association (Yule's  $Q = .35$ ). Regarding therapists, two statistically significant self-regulation microsequences were observed. The first was the temporal association between *report* and *affirmative* VQPs, and the second sequence was an *overlapping* followed by *affirmative* VQP, both with a high degree of association (Yule's  $Q = .67$  and  $.59$ , respectively) (see Table VIII).

The *mutual regulation microsequences* were subdivided depending on whether a given behavior corresponded to a patient or a therapist VQP. When a given behavior corresponded to a patient VQP, five temporal mutual regulation sequences were observed: *Connected* VQP for the patient and *connected* VQP for the therapist, *connected* VQP for the patient and *full pause* for the therapist, *affirmative* VQP for the patient and *connected* VQP for the therapist, *affirmative* VQP for the patient and *full pause* for the therapist, and finally *emotional-expressive* VQP for the patient and *connected* VQP for the therapist. As Table VIII shows, the strength of the

Table VIII. VQP Lag 0 VQP Lag 1 temporal sequences.

Lag 0	→	Lag 1	N	Adjusted residual	p Value	Yule's Q	Odds Ratio
<b>Patient VQP</b>	→	<b>Patient VQP</b>					
Connected	→	Report	17	2.63	~.01	.35	2.09
<b>Therapist VQP</b>	→	<b>Therapist VQP</b>					
Report	→	Affirmative	15	4.98	<.01	.67	5.14
Overlapping	→	Affirmative	12	3.77	<.01	.59	3.82
<b>Patient VQP</b>	→	<b>Therapist VQP</b>					
Connected	→	Connected	40	5.39	<.01	.49	2.95
Connected	→	Full Pause	20	3.03	<.01	.38	2.21
Affirmative	→	Connected	38	2.77	.01	.27	1.74
Affirmative	→	Full Pause	43	7.72	<.01	.65	4.77
E. Expressive	→	Connected	19	4.07	<.01	.51	3.1
<b>Therapist VQP</b>	→	<b>Patient VQP</b>					
Affirmative	→	Affirmative	27	4.02	<.01	.35	2.1
Affirmative	→	Full Pause	23	8.48	<.01	.85	12.63
Full Pause	→	Connected	14	4.33	<.01	.53	2.86
Full Pause	→	Affirmative	21	5.36	<.01	.48	3.21

Note. This table only includes statistically significant VQP sequences.

temporal association of these sequences ranged from low to high levels.

When a given behavior corresponded to a therapist VQP, four temporal mutual regulation sequences were observed: *Affirmative* VQP for the therapist and *affirmative* VQP for the patient, *affirmative* VQP for the therapist and *full pause* for the patient, *full pause* for the therapist and *connected* VQP for the patient, and *full pause* for the therapist and *affirmative* VQP for the patient. As Table VIII shows, the strength of the temporal association of these sequences ranged from moderate to high levels.

In order to compare the proportion of micro-regulatory VQP sequences in change and stuck episodes, the aforementioned sequences were identified in each type of episode and the chi-square

statistic was used to check for an association between each sequence and the type of episode.

As shown in Table IX, only the self-regulation microsequence of *connected* and *report* VQPs observed in patients showed an association with episode type, with a higher proportion in change episodes. Four of the five mutual regulation microsequences in which the given behavior was a patient VQP displayed an association with episode type. The sequences of *connected* VQP for the patient and *connected* VQP for the therapist, *connected* VQP for the patient and *full pause* for the therapist, and *affirmative* VQP for the patient and *connected* VQP for the therapist, were more often found in change episodes. In contrast, the sequence of *affirmative* VQP for the patient and *full pause* for the therapist

Table IX. Comparison of the proportion of VQP Lag 0 VQP Lag 1 temporal sequences in change and stuck episodes.

Lag 0	→	Lag 1	Change episode	Stuck episode	% Difference	95% CI for the difference	Z	p
<b>Patient VQP</b>	→	<b>Patient VQP</b>						
Connected	→	Report	76.5% (13)	23.5% (4)	52.9%	[19.4–47.2%]	-	<.05*
<b>Therapist VQP</b>	→	<b>Therapist VQP</b>						
Report	→	Affirmative	33.3% (5)	66.7% (10)	33.3%	[- 1.9–59.0%]	1.826	.068
Overlapping	→	Affirmative	66.7% (8)	33.3% (4)	33.3%	[- 5.7–60.9%]	-	>.05
<b>Patient VQP</b>	→	<b>Therapist VQP</b>						
Connected	→	Connected	75% (30)	25% (10)	50.0%	[28.5–65.3%]	4.472	.000**
Connected	→	Full Pause	75% (15)	25% (5)	50.0%	[19.1–69.5%]	3.162	.002**
Affirmative	→	Connected	68.4% (26)	31.6% (12)	36.8%	[14.4–54.5%]	3.212	.001**
Affirmative	→	Full Pause	37.2% (16)	62.8% (27)	25.6%	[4.5–43.7%]	2.372	.018*
E. Expressive	→	Connected	63.2% (12)	36.8% (7)	26.3%	[- 8.4–54.0%]	1.622	.105
<b>Therapist VQP</b>	→	<b>Patient VQP</b>						
Affirmative	→	Affirmative	0% (0)	100% (27)	100%	[82.4–100%]	-	<.05*
Affirmative	→	Full Pause	13% (3)	87% (20)	73.9%	[46.9–85.9%]	-	<.05*
Full Pause	→	Connected	7.1% (1)	92.9% (13)	85.7%	[51.3–94.0%]	-	<.05*
Full Pause	→	Affirmative	14.3% (3)	85.7% (18)	71.4%	[42.7–84.6%]	-	<.05*

Note. If 0% is not a value of the interval, then it can be said with 95% confidence that the proportion of a given VQP Lag 0 VQP Lag 1 temporal sequence is different in change and stuck episodes. The Z-ratio calculation was performed only if both samples satisfied the standard binomial requirement: that  $n(p)$  and  $n(1-p)$  must both be equal to or greater than 5. \*\* $p < .01$ ; \* $p < .05$ .

was more frequently found in stuck episodes. The mutual regulation microsequences in which the given behavior was a therapist VQP were mostly present in stuck episodes.

## Discussion

The question addressed in this study was whether it was possible to observe differences between change and stuck episodes with respect to the probability of specific VQPs, the VQP used by patients and therapists, and with respect to regulatory VQP sequences in patient-therapist interactions.

### VQP Differences Between Patients and Therapists

The results did not reveal an interaction effect in the probability of finding a specific VQP considering the type of episode and actor variables. This means that the difference in the probability of encountering a specific VQP in patients or therapists is the same in change and stuck episodes. Thus, patients' tendency to use *report*, *reflection*, and *emotional-expressive* VQPs may be connected to the fact that, in their role, they are expected to present variations in their speech, with a detached vocal quality as in *report* VQP, with moments of more introverted vocal quality as in *reflection* VQP, and others full of feeling, as in *emotional-expressive* VQP. Also, therapists' more frequent use of *affirmative* VQP and *full pause* may be associated with the role characteristics imposed by psychotherapeutic tasks, which are expressed through a convincing and committed speech, as in *affirmative* VQP. *Full pause*, which is usually expressed with para-verbal vocalizations (e.g., mmh, aha) may be linked to the therapist's task of directing the rhythm of conversational exchange in the session.

### VQP Differences Between Stuck and Change Episodes

In addition, the differences observed in specific VQP's probability during change and stuck episodes can be understood given the operational characteristics of each VQP. Therefore, the higher probability of *connected* VQP in change episodes is consistent with the idea that they are interaction segments during the session which display changes in the patient's subjective theory about him/herself, his/her relationship with others, and his/her problems (Krause et al., 2007). This consistency becomes evident when we consider that *connected* VQP suggests to the listeners that speech is prepared as it is uttered, being therefore perceived as capable of

transmitting its potential for innovation and transformation due to its aural quality. The higher probability of *affirmative* VQP in stuck episodes is coherent with the idea that they are interaction segments during the session in which the patient persists in his/her usual forms of understanding, behaving, or feeling, which solidifies his/her problem and halts progress towards therapeutic change (Fernández et al., 2012; Herrera et al., 2009). In this case, consistency becomes apparent when we consider that *affirmative* VQP adds certainty and conviction to speech, and, therefore, is capable of transmitting a lack of openness towards reevaluation.

### Regulatory VQP Microsequences

Regarding VQP regulation sequences, two types were identified: *Self-regulation sequences* (if the temporal association between the VQPs takes place in the same patient or therapist utterance) and *mutual regulation sequences* (if the temporal association between VQPs corresponds to the interactions between the members of the therapeutic dyad). However, this distinction is more complicated to observe when the sequences include *full pauses* and *overlapping*, since these conversational phenomena can be interpreted as regulation strategies with oneself and with somebody else, without necessarily being linked to utterances spoke by one or both members of the dyad. Thus, the VQP sequence composed of the *overlapping* category temporally associated with *affirmative* VQP, both in the therapist, is classified as an instance of self-regulation, but the presence of *overlapping* as given behavior may also suggest its identification as regulation with the patient, for example, in the case of turn-taking.

Another way of distinguishing the VQP sequences observed, regardless of the regulation process ascribable to them, is to focus on the similarities or differences between the specific VQPs that they involve. Hence, it is possible to distinguish *symmetrical sequences*, in which similar VQPs are temporally associated, and *asymmetrical sequences*, in which different VQPs are temporally associated. Given the coding rules in which a different VQP is coded in the same speaking turn only when vocal quality changes, we only encountered symmetrical sequences in patient-therapist mutual regulation VQP sequences. In contrast, it is possible to identify asymmetrical VQP sequences both in self-regulation as well as in mutual regulation sequences.

Bearing these distinctions in mind, some hypotheses can be advanced about the association between the different VQP sequences observed in the data and the type of episode. Thus, that only

patients' self-regulation VQP sequences and not those of therapists are associated with the type of episode may be due to the fact that the latter correspond to a speech that characterizes a general form of therapeutic intervention, whereas the former are linked to a self-regulatory process in a patient open to change.

Similarly, considering the two symmetrical mutual regulation VQP sequences, it is interesting to note that the sequence *connected* VQP in the case of the patient and *connected* VQP for the therapist are associated with change episodes, and that the opposite occurs with the sequence *affirmative* VQP for the therapist and *affirmative* VQP for the patient. This situation could be explained through the interaction effect of two variables present in the makeup of these sequences. A first variable might correspond to the specific VQPs that constitute these symmetrical sequences. Descriptive results have shown that *connected* VQP is associated with change episodes and that *affirmative* VQP is linked to stuck episodes. We observed that in four of the five mutual regulation VQP sequences that include the *affirmative* VQP (as given or target behavior) they appear more often during stuck episodes, and that the sequence that breaks this pattern presents *connected* VQP for the therapist.

A second variable to consider is the actor who initiates the sequence. In the results, it is noteworthy that all the mutual regulation VQP sequences in which the given behavior is a therapist VQP appear more frequently in stuck episodes.

Therefore, both variables (specific VQP and actor who initiates the sequence), through their interaction, may help explain the fact that two symmetrical VQP sequences are associated in opposite ways with respect to the type of episode. That is, in addition to the regulatory nature that the VQPs may have by themselves, these results show the importance of mutual regulation if it is the patient or the therapist who is using a particular VQP and at what point of the therapeutic dialogue.

In sum, as was our purpose, we were able to observe the process of change embodied in the expressive vocal styles of the participants, and to uncover regulatory sequences between them. The results consistently show that it is possible to detect the emergence of regulatory patterns in therapeutic interaction—in this case, in the form of the vocal expression of the participants—and that these patterns are involved in the process of change in psychotherapy. Nevertheless, this study has some limitations, mainly therapy type homogeneity (all the psychotherapies studied were psychodynamically oriented) and sample size (six therapies). For example, one could ask whether therapists from other than psychodynamic approaches would show

different VQPs. Another limitation has to do with the code procedure of the VQPs, which did not completely ensure the independence of the observations, because the same raters coded the vocal quality of both therapists and patients.

For these reasons, the findings presented must be carefully interpreted when weighing their external validity. On the other hand, there might be a legitimate question regarding independence between the coding of sound of the voice and its verbal content. We agree that it's difficult for humans to separate the two dimensions of communication, both for the one who speaks, and for the one who listens. Moreover, it is unquestionable that in the production of speech sounds there is a modulation given by the content. Usually in every conversation a correlation between both dimensions is expected, so much so that when they appear to be in dissonance the existence and the degree of independence become evident. This distinction between the sound of speech and its content could, for example, allow the therapist to mark significant moments in the dialogue with the patient. In this study, coders were trained to focus on the sound dimension of speech, making a conscious effort to leave the content between parentheses.

With this study, the groundbreaking ideas of Rice and her collaborators are confirmed as a current and useful way to explore not only therapeutic interaction but also the manifestations of the self in the vocal expression of the participants. In 1967, Laura Rice and Alice Wagstaff stated that their system was focused on the attempts of patients to express themselves, and that such attempts exerted an influence on the therapist beyond the contents of communication. The results presented not only revisited these notions to understand how vocal expression participates in the patient-therapist relationship and in the regulation between its members during the psychotherapeutic process, but also confirmed and expanded them.

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### Note

<sup>1</sup> Intersubjective validation is a process in which the observations by a researcher or rater are compared with the independent observations of other researchers or raters. The validation of

observations is attained through consensus or agreement between these different perspectives (see Flick, 2009).

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