

# The suprasegmental aspects in the verbal responses of the Rorschach inkblot test: a case study

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## ABSTRACT

The present study is a first step in examining the prosodic aspects of the verbal responses to the Rorschach inkblot test. The results suggest a possible relation between the prosodic features in the responses and the psychological-emotional states of two subjects. For both subjects, the mean F0 of the first sentences for three cards (II, V, X) was significantly higher than their normal values. Moreover, in the subject who was confident in giving her responses, the mean duration of the positive emotion words, was significantly higher than those for the negative emotion words. We also observed a prominent pitch range for the card, which she chose as her favourite one. The results of these primary experiments support an interest for a new method of analysis of the Rorschach discourse based on phonetic knowledge and paralinguistic information conveyed by the speech signal.

## 1. INTRODUCTION

The present study is a first step in examining the prosodic aspects of the verbal responses of the Rorschach Inkblot test. The Rorschach Inkblot test is one of the most popular projective methods in clinical psychology, in revealing the psychological function mode of subjects. In this test, the analysis of the verbal responses of subjects in reacting to 10 inkblot cards has an important function in arriving at a diagnosis. Each set of 10 Rorschach inkblot cards has specific colors, which contribute to the reaction of subjects (Cards I, IV, V, VI, VII: black and white, Cards II, III: black, white and red, Cards VIII, IX, X: multicolored). Traditionally, the verbal responses to the Rorschach test were analyzed by psychologists only from the semantic aspects in comparison with the latent meaning of each Rorschach card. Some authors have mentioned the importance of verbal dynamics in these discourses ([10]): « The verbalization, particularly, the specificities of language: the speaking style and the structure, also reveal forcefully the manner of “ being ” of subject »<sup>1</sup>. However, the prosodic aspects of Rorschach responses have never been explored. Recent researches in phonetic sciences have confirmed the close relationship between emotion and prosody ([6], [7], [11]). In several

languages ([2], [4], [5], [12]), fundamental frequency (F0), duration, vocal intensity and also voice quality are designated as important acoustic features of the expression of emotions ([1], [2], [3], [8], [13]). In particular, the variation of F0 seems to be an important and universal cue: higher mean F0 with a greater variation for joy or anger and lower mean with a smaller variation for sadness ([12]).

The primary results of this study in examining F0 and duration of Rorschach responses contribute in developing a new method of analysis of this test involving phonetic knowledge, in particular on the expression of emotions.

## 2. EXPERIMENT 1

### 2.1. Method

#### Subjects:

The verbal responses of two French female subjects (standard French speakers, aged 50 (S1) and 45 (S2)) were analyzed: S1 was cautious in giving her responses, and made comments instead of giving her responses. S2 was confident in giving her responses and reacted differently to each Rorschach card.

#### Procedure:

The test sessions were recorded with high quality recording tools (DAT). F0 and syllable duration for the first sentences in reaction to three Rorschach cards (II, V, X) were analyzed. The latent meanings of these cards are briefly, « anxious », « self-image » and « separation ». In the psychological approach of the Rorschach test, the moment where the subject encounters a new card is considered a very important phase. The first sentences for each card would represent the subject's primary reaction to the new situation.

The following sentences were obtained:

« S1 »

II : Alors, il y a une similitude avec, avec celle d'avant.

(So, there is a similarity with, with the one before)

V : Encore un animal, d'abord, je vois de dos.

(An animal again, first, I see from its back).

X : Alors oui, d'une planche à l'autre, là, on a l'impression qu'il y a énormément de, d'éléments.

(Well, yes, from one card to another, we have an impression that there are so many, elements).

<sup>1</sup> « La verbalisation, plus exactement les particularités du langage, son style, sa structure sont également très révélateurs de la manière d'être du sujet », RAUCHE DE TRAUBENBERG (1970), p.23

« S2 »

II : Ouais, on dirait deux personnes face à face, qui jouent avec leurs mains.

(Yeah, I would say that there are two people face to face playing with their hands)

V : Ca, une sorte de, de petit papillon fatigué.

(This, a kind of, of little, tired butterfly)

X : On dirait le monde des insectes.

(I would say a world of insects)

## 2.2. Acoustic analysis

For both subjects, mean F0 and syllable duration were calculated from 60s of spontaneous speech (non test conditions):

	Base Line	
	F0 (Hz)	Syllable duration (ms)
S1	186,33 (± 10,21)	207,91 (± 36,86)
S2	205,07 (± 19,53)	229,60 (± 56,61)

(± = Standard Deviation)

**F0:** Mean F0 was calculated from F0 values measured in the middle of each vowel in the six selected sentences (Figure 1). F0 was constant for S1 over three sentences, but decreased for S2.

F0 (Hz)	BL	II	V	X
S1	186,33	188,93 (± 24,16)	192,17 (± 24,28)	192,47 (± 29,19)
S2	205,07	236,18 (± 21,31)	225,09 (± 32,61)	213,44 (± 13,83)

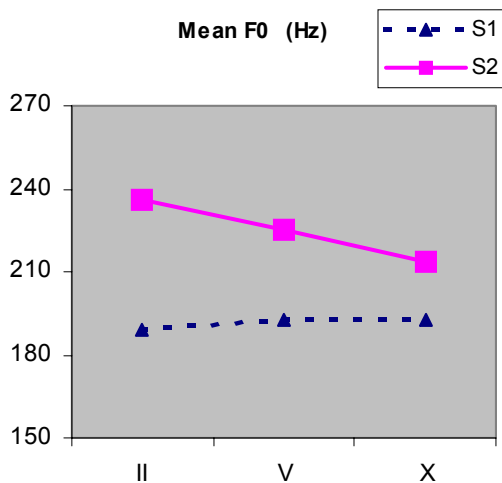


Figure 1: Mean F0 (Hz) for the first sentences (cards II, V, X)

**Pitch Range:** Pitch ranges are also calculated for each subject with their minimum/maximum F0 values (Figure 2): for S1, the pitch ranges are relatively constant over three cards. On the contrary, S2 exposed a various pitch range: in particular, a prominent pitch range was observed for Card V (132 Hz).

(Hz)	II	V	X
S1	101	76	82
S2	75	132	43

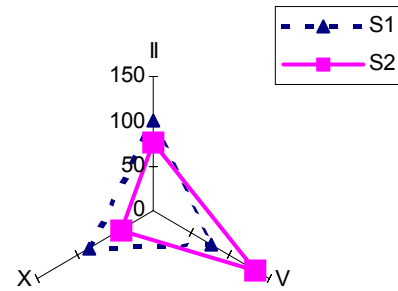


Figure 2: Pitch Range for cards II, V, X (Hz)

**Duration:** The mean syllable durations were also calculated (Figure 3). We observed that, for three cards, the mean syllable duration for S2 were longer than those for S1.

Duration (ms)	BL	II	V	X
S1	207,91	167,93	202,17	161,77
S2	229,60	186,44	258,67	232,00

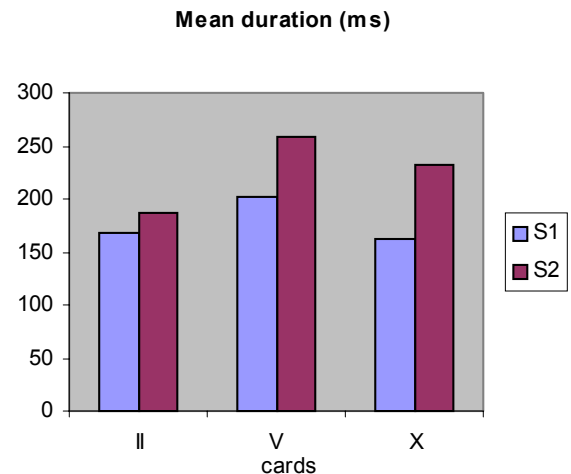


Figure 3: Mean F0 for Cards II, V, X (ms)

## 2.3. Results and discussion

The results of one sample t-test revealed that the F0 of S1 and S2 were significantly higher than the mean values in non test conditions ( $p=.02$  for S1,  $p=.04$  for S2). The mean syllable durations of S1 and S2 were not significantly different from the mean values in non test conditions ( $p=.06$  for S1,  $p=.44$  for S2). These results suggest that in the emotional speech of the Rorschach test situation, the subjects (who were cautious or confident) would speak with a higher F0 than in their normal speech. Having a higher F0 when confident is in contradiction with the phylogenetic frequency code ([9]), which associated higher F0 values with the feeling of being dominated, and lower F0 values, with the feeling of being dominant. It may be suggested that subjects, when tested, tend to speak with a higher pitch. The pitch ranges also could be

indicators of the psychological states of these subjects: S2 showed various pitch ranges (from 43Hz to 132Hz). Particularly, a prominent pitch range (132Hz) was observed for Card V, which she chose as her favourite one. S1 who was cautious in her responses showed a more narrow pitch range varying from 76Hz to 101Hz. More involvement is generally associated with a larger pitch range, which is confirmed by our observation. These preliminary results of the prosodic analysis of the Rorschach responses suggest a possible relation between acoustic features and the psychological states of a subject, in particular for the variation of F0. Further investigation will be necessary to justify our hypothesis.

### 3. EXPERIMENT 2

#### 3.1. Method

In this experiment, we analysed the acoustical features (F0 and segmental duration) of the words used for the expression of emotions: Positive Emotion words (PE) or Negative Emotion words (NE). In this study, the former referred to pleasure and the latter referred to anxiety. 35 emotion words were found in the responses of two subjects<sup>2-3</sup> for the Cards I to X. Except PE5 for S2 (« divinité » (divinity)), all items were adjectives, mostly found at the end of a sentence.

#### 3.2. Acoustic analysis

Mean F0 and mean segment duration were measured for each word in order to obtain mean F0 and duration by subject for two emotional categories (Figure 4-5).

##### « S1 »

10 Positives Emotions words and 10 Negative Emotion words were analysed for S1. Mean F0 for Positive Emotion words was slightly higher than that for Negative Emotion words.

	PE	NE
F0	202,10 (±18,81)	190,42 (±16,32)
Duration	116,15 (±31,41)	103,66 (±27,68)

##### 2 « S1 »

PE: 1.débonnaire (good-natured), 2.légère (light), 3.bucolique (bucolic), 4.gaie(cheerful), 5.joli(jolly), 6.légère(light), 7.marrants(funny), 8.beau(lovely), 9.gracieux(graceful), 10.douce(mild)  
 NE: 1.inquiétant(worrying), 2.gênée(embarrassed), 3.inquiétant (worrying), 4.piquant (prickly), 5.intrusif (intrusive), 6. moins agréable (unpleasant), 7.compliqué (complex), 8-9.bizarre(bizarre), 10.gênée (embarrassed)

##### 3 « S2 »

PE: 1.agréable(agreeable), 2.élégante(elegant), 3.fine(fine), 4.légère(gentle), 5.divinité(divinity)  
 NE : 1-2.inquiétant(worrying), 3. déformé(distorted), 4.repoussant(repulsive), 5.effrayant(terrifying), 6.grotesque(grotesque), 7.fatigué(tired), 8.laid(ugly), 9-10.difficile(difficult)

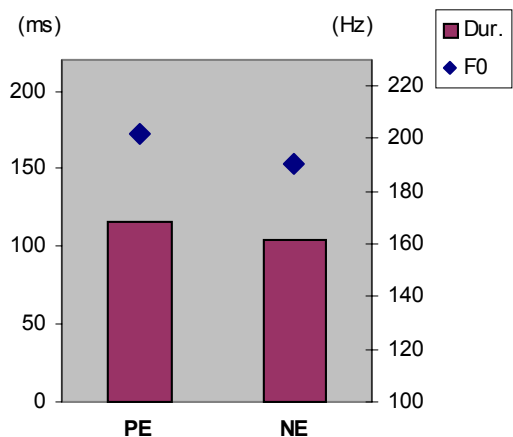


Figure 4: Mean F0 (Hz) and segment duration (ms)

##### « S2 »

5 Positive Emotion words and 10 Negative Emotion words were analysed for S2. Mean duration for Positive Emotion words was longer than those for Negative Emotion words.

	PE	NE
F0	204,26 (±13,90)	203,81 (±16,17)
Duration	144,09 (±64,28)	94,93 (±22,02)

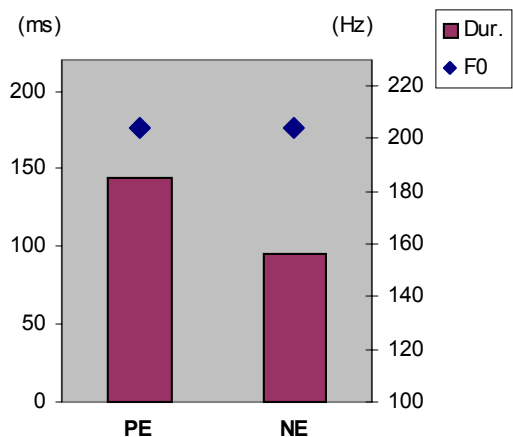


Figure 5: Mean F0 (Hz) and segment duration (ms)

#### 3.3. Results and discussion

The results of independent t-test showed no significant difference in mean F0 between the two emotional categories for either subject. These results suggest that there is no systematic rise or fall of F0 for the positive or negative emotional words. Emotion is not the only factor that affects F0: the position of the word relative to the pauses has a very strong effect. Words before a pause may have a much lower or higher F0, depending on the intention of the speaker; higher F0 generally indicates continuation, and lower F0 indicates an ending. Much more data are needed to test the relative effect of emotion and position. In contrast, a significant difference in segment duration between the two emotional categories was observed for S2 (p=.04): The positive emotional words presented a significantly longer segment duration

than the negative emotional words. These results suggest an influence of the segmental duration for the key words in the subject who was confident in the test situation, but not for the subject who was cautious in her responses.

#### 4. GENERAL DISCUSSION

The results of our case study revealed a larger prosodic variation for the subject who was confident in giving her responses (S2) than for the subject who was cautious in the test situation (S1). S1 also manifested a small variation of prosodic features, but these were not prominent in statistics. The variation of F0 and duration in emotional speech has been confirmed in several researches. The results of our study exposed an acoustical similarity in expression of emotions and suggest a possible relation between the prosodic features and the psychological-emotional state of the subject in the Rorschach responses. The large prosodic varieties in spontaneous speech as well as the diversity of the psychological approach of subjects made this kind of investigation difficult. However, it seems worthwhile to continue the investigation with additional data. It also shows the interest of interdisciplinary research between Phonetic Sciences and Clinical Psychology in exploring the expression of emotions.

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