Vocal analysis of emotions during the recall of Self-Defining Memories (SDM) among antisocial population

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INTRODUCTION

SDM are autobiographical memories with the particularity of establishing a sense of identity ("Self") and to persist over time due to their emotional charge. They refer to specific moments in the individual's life which have generated a "life lesson" that will change its perception of Self and life. SDM can be classified based on four features: a) specificity (specific or generic), b) valence (positive, negative, mixed, or neutral), c) integration (integrated or non-integrated) and d) theme (threatening life events, pleasant life events, interpersonal relationships, goal achieving or substance abuse). Antisocial Personality Disorder (ASPD) implies a deficit in the emotional sphere such as high impulsivity and aggressivity and a disregard for others' psychological/physical integrity. While most studies on ASPD forensic inpatients have addressed impulsivity, empathy or emotion decoding domains, few have addressed emergence of emotions despite the key role of Self and negative affect regulation on antisocial behavior. To our knowledge, no study has analysed acoustic parameters of SDM. In contrast to less ecological experimental design, these memories allow the emergence of emotions in a natural context.

Objective: Analyse acoustic parameters of vocal cues from naturalistic expressed emotions during the recall of SDM among antisocial forensic inpatients.

METHOD

Participants

17 Belgian male inpatients from the High-Security Forensic Hospital (Tournai) with ASPD diagnosis (SCID-II) participated on a voluntary basis. The mean age was 46.18 (SD = 13.77) and the mean length of hospitalization was 10.55 years (SD = 7.93). The mean I.Q. score (WAIS-IV) was 75.87 (SD = 14.47) and the mean Social Desirability score (MC-SDS) was 16.94 (SD = 5.39).
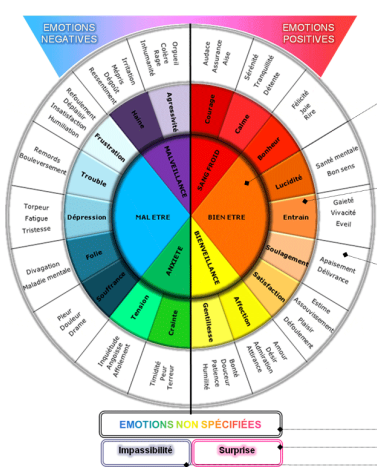
Instruments and Procedure

IRI Empathy

CERQ Emotion Regulation

SDM Task Recall 5 SDM *(recorded speech and video)*

EMOTAIX Text Analysis 3 valences + 2 unspecified emotions 6 meta-categories → Emotional & Nonemotional utterances

Praat Acoustic parameters (MeanF0, MedianF0, SDF0, MinF0, MaxF0, SpeechRate)

Data analysis

First, we presented the descriptive statistics about SDM (N = 83) recalled by ASPD inpatients. In absence of normality of distribution (Kolmogorov-Smirnov test), we performed non-parametric comparison group analyzes (Wilcoxon *W*) on vocal cues between emotional and unemotional utterances. Finally, we performed non-parametric correlation (Spearman ρ) between acoustic parameters and IRI/CERQ scores.

RESULTS

Table 1 – SDM descriptive statistics (%)

	Prevalence (%)
SDM Classification features	
Valence	
Positive	19.28
Negative	25.30
Mixed	22.89
Neutral	32.53
Specificity	
Generic	44.58
Specific	55.42
Integration	
Integrated	10.84
Non-integrated	89.16
Theme	
Moral choice	1.20
Susbtance abuse	2.41
Pleasant life event	4.82
Goal reaching	7.23
Other	25.30
Interpersonal relationships	28.92
Threatening life event	28.92

Table 2 – Acoustic parameters descriptive statistics (Hz) of SDM

Acoustic parameters	EMO (n = 78)		nonEMO (n = 83)		W (r)
	M	SD	M	SD	
MeanF0	108.71	13.87	108.50	12.83	
SDF0	13.81	4.53	12.41	3.87	3.09 (.34)*
MedianF0	106.66	14.47	106.38	12.96	
MinF0	84.08	4.83	86.60	5.55	-5.70 (.64)**
MaxF0	149.21	25.24	141.63	22.34	4.12 (.46)**
SpeechRate	3.64	0.61	3.61	0.78	

Note: EMO = Emotional utterances; nonEMO = Nonemotional utterances; *W* = Wilcoxon signed-rank; *r* = effect size; **p* < .05; ***p* < .001

Table 3 – Correlation (ρ) between acoustic parameters and Self-Questionnaires

Acoustic parameters	n	CERQ		IRI			
		AS	NAS	PT	EC	PD	F
MeanF0							
EMO	78	.416**	-.398**	-.554**	.106	.042	.072
nonEMO	83	.343**	-.393**	-.502**	-.026	.023	.109
SDF0							
EMO	78	.352**	-.116	-.438**	.057	.008	.073
nonEMO	83	.339**	-.075	-.409**	.077	-.044	.630
MedianF0							
EMO	78	.374**	-.386**	-.506**	-.150	.069	.085
nonEMO	83	.322*	-.432**	-.487**	-.036	.027	.143
MinF0							
EMO	78	.320**	-.215	-.119	-.150	.084	.032
nonEMO	83	.238**	-.415**	-.298**	-.069	.058	.174
MaxF0							
EMO	78	.387**	-.263**	-.505**	.090	.114	-.025
nonEMO	83	.310**	-.213	-.464**	.069	.065	-.037
SpeechRate							
EMO	78	.072	.058	-.174	.195	-.125	-.092
nonEMO	83	.157	.188	-.240*	-.022	-.272*	-.160

Note: EMO = Emotional utterances; nonEMO = Nonemotional utterances; AS = Adaptative strategies; NAS = Non adaptive strategies; PT = Perspective-taking ; EC = Empathic concern; PD = Personal distress; F = Fantasy; **p* < .05; ***p* < .001

DISCUSSION

- Prevalence results (Table 1) concerning the highest recalled SDM **valence** (neutral) suggest an emotional detachment as previously found in literature. However, prevalence and acoustic parameters results (Table 2) support the hypothesis that ASPD are less emotionally impaired as expected. Results about **non-integrated** SDM support Baumeister's theory that impairment creates and maintains a coherence of Self in individuals with ASPD. Unexpectedly, they recalled **specific** SDM, exhibiting the ability to plan and remain focus on the recalling of a memory. However, ASPD forensic inpatients showed difficulty in retrieving very specific single events and rather recalled memories comprising multiples events. Finally, the two main SDM **themes** recalled were partially expected considering the antisocial population. Indeed, literature supports that antisocial offenders experienced more and greater childhood adversity experiences than general population.

- Literature supports that **emotional utterances are more activating** at the prosodic level. Results highlight a significant variability of the speech, but not of the amplitude, between EMO and nonEMO utterances. Previous research suggested that ASPD forensic inpatients mainly expressed anger at the level of facial expression during the SDM recall task, whatever the valence SDM. This overexpression of anger may be associated to the high prevalence of threatening life-events recalled, and potentially to childhood adversity experiences.

- **Correlational results** (Table 3) suggest that the use of adaptative strategies contributes to the emotional vocal expression and this whether the lexical content is emotional or nonemotional. This result highlights the interest of the multi-level analysis of emotions. With regard to empathy, there was a negative correlation between perspective-taking (PT) abilities and level of activation of emotion. This result may be explained by the nature of the task (cognitive empathy) asking to shift from one's own point of view to other's point of view. This result is congruent with the definition of the cognitive/affective dimension of the mentalization process. Perspective taking does not imply connection and sharing with emotions. However, the integration of emotional and cognitive aspects is necessary to understand mental states. This result may illustrate the callous empathy dimension of individuals with psychopathic traits.

Future perspectives

- Undertake an in-depth analysis of the SDMs themes (ex: life-threatening event-others, life-threatening event-accident/illness, life-threatening event-physical, life-threatening event-unclassifiable)
- Assess the Psychopathic Personality Disorder (PPD) in order to describe and compare both the classification features of recalled SDM and the acoustic parameters between PPD and ASPD
- Conduct a correlational analysis between emotional regulation strategies (adapted and non adapted) and acoustic parameters both among ASPD and PPD populations
- Implementing a bottom-up approach, starting from the acoustic parameters distribution in order to identify emotionally charged utterances among each SDM
- Implementing a multi-level analysis (facial and vocal expressions of emotions, physiological activity, empathic abilities, self-regulatory strategies, mentalization) of SDM among antisocial populations

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