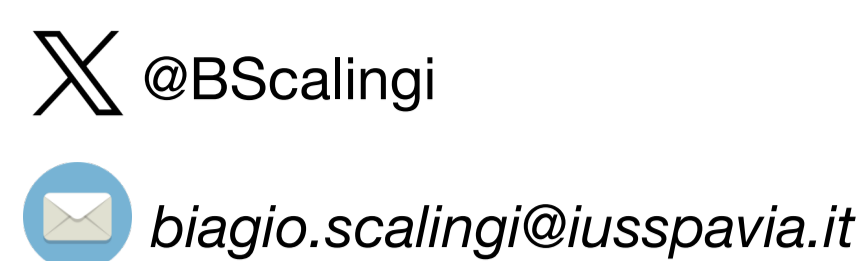
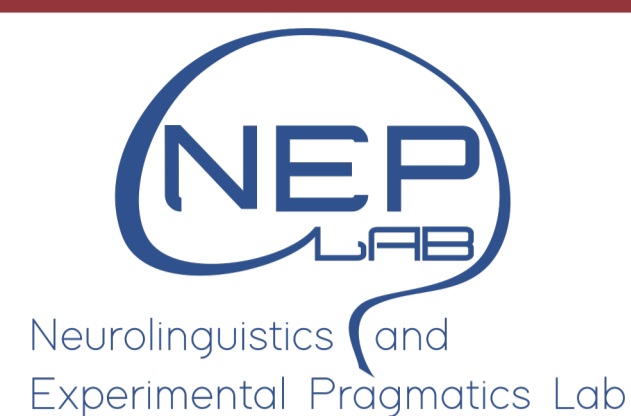


# Language and Metaphor Production in Psychosis: a Window into Subjective Experience



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## Background

- Analyzing language allows for a better understanding of patients' experiences when discussing critical events<sup>[1]</sup>.
- Natural Language Processing (NLP) allows to detect aspects that may elude qualitative analysis<sup>[2]</sup>.
- Metaphor analysis proves particularly useful with patients experiencing emotionally intense situations<sup>[3]</sup>.
- NLP and metaphor analysis might provide important insights for psychotherapeutic and psychiatric treatments.

## Physical Restraint (Submitted)

### Physical restraint in psychiatric settings:

#### A novel characterization of the patient's experience via a linguistic, sentiment, and metaphor analysis

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#### Aim and Method

- Physical Restraint (PR): restricting an individual's physical movement to ensure safety<sup>[4]</sup>.
- Aim: Investigating how patients express PR.
- 99 participants (37 F; Mean age=37; Standard deviation=15): with major psychiatric disorders including psychoses.
- Quantitative scale<sup>[5]</sup> + Narrative task ("How would you describe the PR event you experienced during this hospitalization?").
- Analysis: multilevel linguistic analysis (Fig.1).
- Comparison with online corpus of patients with bipolar disorder discussing about their treatment and condition.

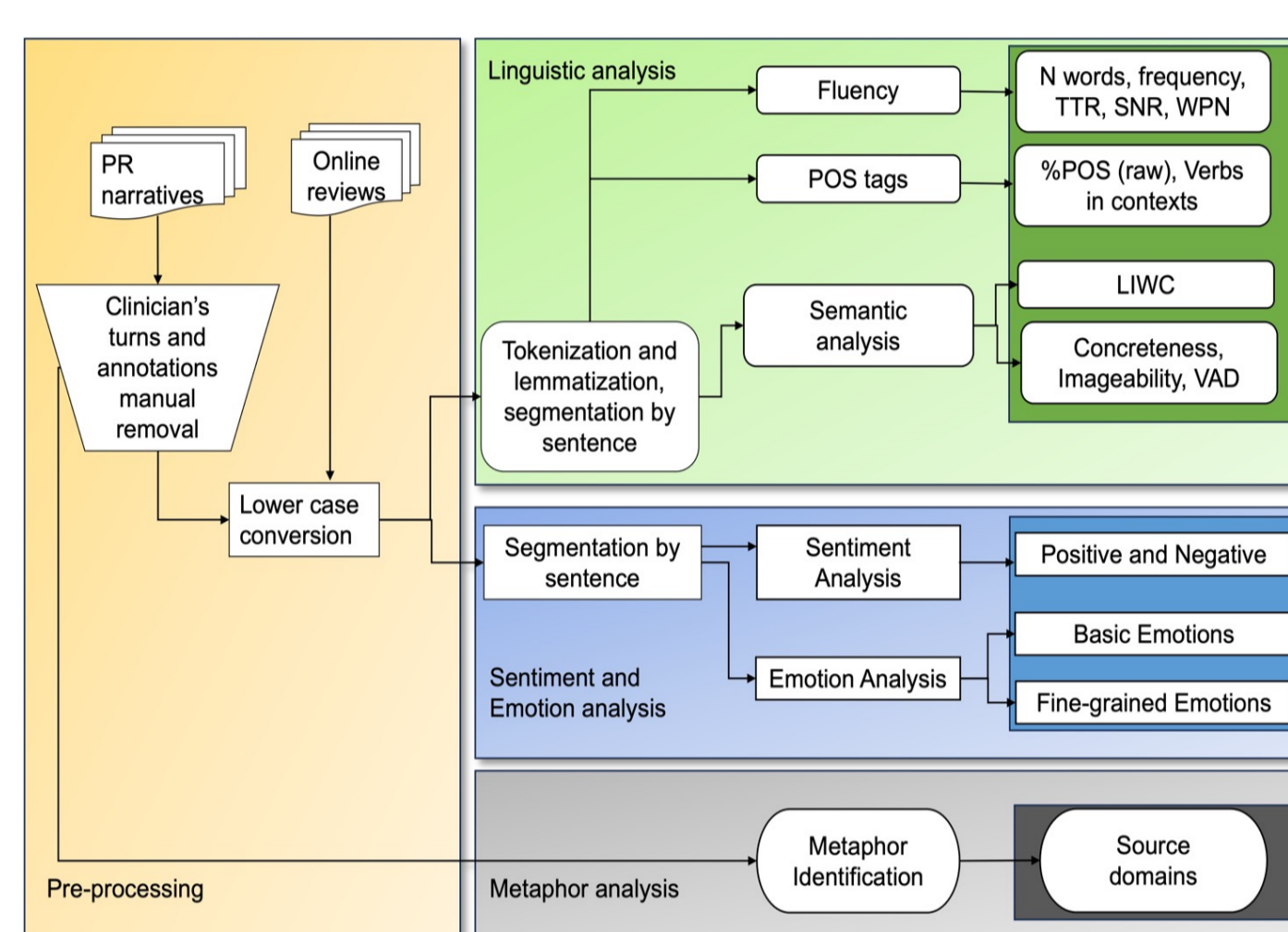


Fig.1 Multi-level language analysis

#### Results

- Linguistic analysis: ↓ narratives and ↓ Type-Token Ratio ( $p < .001$ ).  
↓ nouns and ↑ verbs ( $p < .001$ ).  
↑ first-person singular pronouns  
↓ valence and dominance ( $p < .001$ )  
↑ arousal ( $p < .001$ )  
↑ words related to affective ( $p < .001$ )  
↑ cognitive processes ( $p = .011$ ).
- Sentiment and Emotion analysis: ↑ negative sentiment ( $p < .001$ )  
↑ sadness ( $p < .001$ ; Fig.2).
- Metaphor analysis: ↑ metaphors ( $p < .01$ ), mainly war/prison and animals (Fig.3)
- Quantitative scale: ↑ PR experience associated with lower verbosity, less anger, and higher Type-Token Ratio.

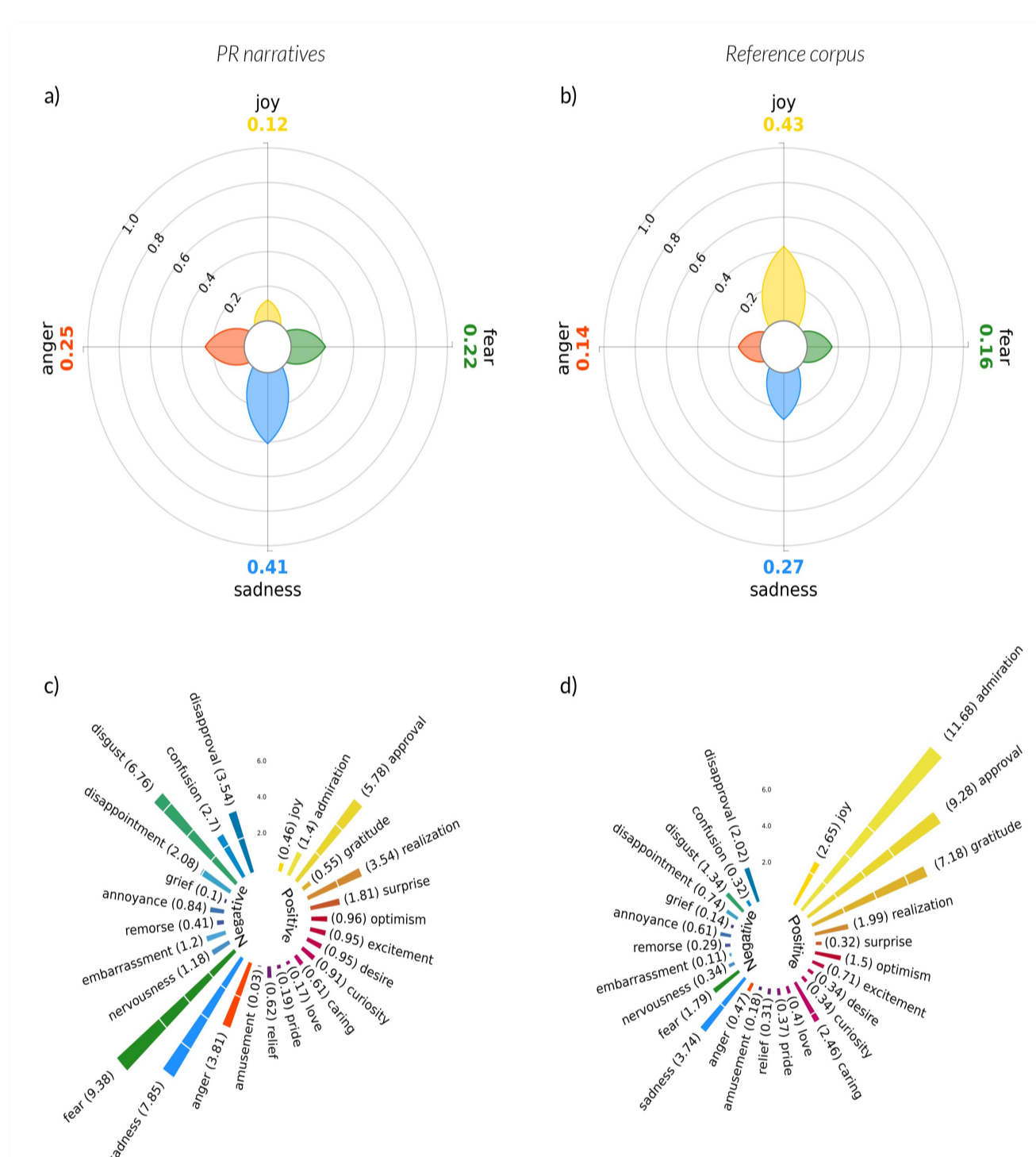


Fig.2 Sentiment analysis



Image generated via the Stable Diffusion v1-5 latent text-to-image diffusion model (Rombach et al., 2022) using the verbal prompt 'My head has shattered into a thousand pieces,' English translation of a metaphor used by a patient from Nichini et al. (submitted).

Analysis	Type	PR narratives	Reference corpus	Example (from PR narratives)
Evaluation	Negative	96.30% (N = 52)	54.76% (N = 23)	Però non riesco a stare in gabbia come un uccello con le ali spezzate. (But I cannot stay in a cage like a bird with broken wings.) Non saprei che dire se non che è un angelo e il resto lo voglio dimenticare.
	Positive	3.70% (N = 2)	45.24% (N = 19)	(I wouldn't know what to say except that (she) [the clinician] is an angel and the rest, I want to forget it.) Che cosa è, una crocifissione coricata.
Creativity	Creative	53.70% (N = 29)	26.19% (N = 11)	(What is it, a crucifixion lying down.) Mi sentivo in un incubo e volevo scappare. (I felt like I was in a nightmare, and I wanted to run away.) Ho pensato che mi usassero come carne macinata.
	Non-creative	46.30% (N = 25)	73.81% (N = 31)	Mi sento io Cristo di Pasqua. (I feel like the Easter Christ.) Ciò legarmi come un sacco di patate era necessario.
Source Domains	Animal Kingdom	20.40% (N = 11)	7.14% (N = 3)	
	Religion/History	18.50% (N = 10)	21.43% (N = 9)	
	Object	18.50% (N = 10)	33.33% (N = 14)	
	War/Prison	14.80% (N = 8)	4.76% (N = 2)	
	Death	11.11% (N = 6)	2.38% (N = 1)	
	Mental state	9.25% (N = 5)	11.90% (N = 5)	
	Infancy	7.40% (N = 4)	2.38% (N = 1)	
	Body	-	7.14% (N = 3)	
Journey	-	4.76% (N = 2)		
Person	-	4.76% (N = 2)		

Fig.3 Metaphor Analysis

#### Conclusions

- Results align with literature on PTSD<sup>[6]</sup>, suggesting PR as a traumatic experience.
- Increased sadness could have positive implications<sup>[7]</sup>.
- A greater use of metaphors reflects the initial processing of the traumatic experience<sup>[8]</sup>.
- Importance to reduce PR duration and reinforce the social component for better patient management.

## Delusion (Work in progress)

### The Evolution of Delusion Narratives in Psychiatry: A Linguistic Analysis

#### Introduction

- Most studies in delusion literature do not explore its evolution over time.
- Aims:  
i) Description of delusion content across syntactic, semantic, and metaphorical levels.  
ii) Identification of any changes over time in linguistic measures related to delusion symptomatology.

#### Design

- Sample: 60 patients.
- Inclusion criteria: item 1 of A criterion for schizophrenia spectrum disorders<sup>[9]</sup> or delusion symptomatology.
- Exclusion criteria: Delusion related to acute substance intoxication or alcohol abuse.
- T1: Narrative task ("Can you tell me the story of X (theme of delusion)?") + metaphor prompts + control question<sup>[10]</sup> + psychopathology scales<sup>[11]</sup> + delusion scale<sup>[12]</sup>.
- T2 (15 ± 5 days): Narrative task ("Can you tell me the story of X (theme of delusion)?") + metaphor prompts + control question + psychopathology scales + delusion scale + cognitive tests<sup>[13,14]</sup>.
- Comparison of linguistic indices overtime.

#### Expected results

- Increasing delusion severity is expected to correlate with scarce usage of negation operators<sup>[15]</sup> reflecting strong certainty about the delusion theme. Greater metaphor production<sup>[3]</sup> is supposed to be related to delusion traumatic nature.
- Compared to T1 delusion content, T2 delusion content may have fewer emotional terms<sup>[16]</sup> and more pauses<sup>[17]</sup>, indicating a lessening of the emotional load and more hesitancy around the delusion theme.

## Schizophrenia (Work in progress)

### Metaphor production in schizophrenia:

#### A neglected yet relevant domain between language, creativity, and psychopathology

- Documented impairment in metaphor comprehension<sup>[18]</sup>, but limited evidence regarding production.
- Scopus research using keywords such as "metaphor production", "schizophrenia", and "psychosis", along with consulting books and sources by authors, led to the identification of 8 studies.
- Quantitatively, evidence suggests no impairment in production.
- Qualitatively, metaphors produced by patients appear strongly negative and embodied.
- Metaphors are often described as bizarre and poetic as in autism spectrum disorder<sup>[19]</sup>.  
However, the poetic aspect appears to reflect patients' focus on their internal world rather than directed to the outside<sup>[20]</sup>.
- More attention should be devoted to metaphor in psychotherapy and in psychiatry.

Study	N (Patients)	Task	Identification Method	Quantitative comparison (patients vs. controls)	Qualitative considerations	Example
Billow et al., 1997	36	Schedule for Affective Disorders and Schizophrenia (Spitzer & Endicott, 1977); Diagnostic Interview for Borderlines (Gunderson, 1979)	Expressive categories (Spitzer & Endicott, 1977)	=	Autistic-Bizarre/Tangential	"Sometimes I feel like the South Bronx"
Rhodes & Jakes, 2004	15	Semi-structured interview on delusions	Complex pattern code (Miles & Huberman, 1994)	NA	Embodied metaphors	"It is like hell on earth. I am living in hell"
Elvén et al., 2011	21	Description of an emotional event	NA	=	Metaphors produced only for negative emotions	NA
Denjari et al., 2015	10	Psychotic Symptoms Rating Scale (Haddock et al., 1999); Cognitive Assessment of Voices Interview (Chadwick & Birchwood, 1994); self-report ratings of voice-related distress and pleasantness of voices	Metaphor Identification Procedure (MIP; Pragglejaz, 2007)	NA	Violence metaphors were predominant in those reporting higher level of voice-related distress	"Someone's sat next to ya, shoving ya, prodding ya, slapping ya, pulling your hair"
Littlemore & Turner, 2019	11	Description of illness symptoms	Identification of embodied metaphors	NA	Embodied and divided self metaphors	"I guess that sort of describes it, like almost like getting run over by a train"
Despot et al., 2021	5	Frog, where are you? (Mayer, 2003); Clinical Language Disorder Rating Scale (Chen et al. 1996)	Metaphor Identification Procedure (MIP; Pragglejaz, 2007)	=	Comprehensible metaphors	"And in all that, I don't know what was going on, and then it just eats away at me. It's some leftover thing that I've been dragging along behind me"
Shafiq et al., 2022	15	The Pear Film (Chafe, 1980)	Identification of Structure of Evaluative Components	↓	Lower use of both novel and conventional metaphors	NA
Nichini et al., (submitted)*	35	Description of physical restraint experience	Metaphors at the sentence level (Fuoli et al., 2022)	↑	More negative and more creative metaphors	"It's a laying-down crucifixion"

Fig.4 Metaphor Production in Schizophrenia

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