

Triangulating corpus linguistics and clinical psychology in a study of narratives of voice-hearers

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Overview

- Voice hearing
- Voices as persons in clinical psychology
- ‘Minimal’ vs ‘complex’ personification in 40 interviews with voice-hearers
- A corpus linguistic approach to the personification of voices:
 - Triangulating a qualitative operationalization of the binary minimal/complex distinction
 - Providing further insights into the minimal/complex distinction
 - Capturing degrees of personification

Voice-hearing

- Hearing voices that others cannot hear
- Auditory Verbal Hallucinations (AVHs)

- Hallucinations are a primary diagnostic criterion for various psychotic disorders (notably, schizophrenia) and are present in a range of mental health difficulties.
- AVHs also occur as a positive and meaningful experience for voice-hearers, in the absence of any need for clinical care.

Voice-hearing and ‘person-ness’

- Growing literature conceptualising voices as ‘hallucinated social identities’ or ‘internalised social actors’, with clinical implication (Bell 2013: 1)
- Forthcoming qualitative study in *Medical Humanities* showing the relevance of linguistic approaches to characterisation for an understanding of how voice-hearers talk about their voices as persons (Semino et al. 2020)

Original research

Person-ness of voices in lived experience accounts of psychosis: combining literary linguistics and clinical psychology

Elena Semino,¹ Zsófia Demjén,² Luke Collins¹

Data: 40 interviews with voice-hearers

40 semi-structured interviews with voice-hearers enrolled in an 'Early Intervention in Psychosis' in the North East of England

- 205 941 tokens

Interviews conducted by colleagues from the Hearing the Voice team captured:

- the terms they would use to describe their experiences
- the qualities of the voice-hearing experience
- the content of the voice-hearing experience
- the voices as having their own character or personality
- the onset of voice-hearing
- changes in the experience over time
- participants' beliefs about/understanding of the experience

A binary approach to the 'personification' of voices in the interviews

The Hearing the Voice team coded each interview according to a number of categories, including a binary distinction between 'minimal' and 'complex' personification (Alderson-Day et al. 2020):

Minimal personification: The voice has few person-like qualities; is attributed to a person or described as being "like a person" but without further elaboration. Person-like characteristics tend to remain stable over time and follow a single theme (e.g. the voice is 'mean' or a 'nasty man').

→ 24/40 interviews



Just like an angry old man [...] a bit old

Complex personification: The voice is described as having more than one kind of person-like quality; may include elaborate descriptions of intentional states (the voice wants/thinks/feels), agency (the voice will 'make something happen'), or identity (the voice 'comes' from somewhere or has a specific and idiosyncratic ontological status).

Complexity is not a simple function of the frequency, quantity or topic of speech, but will typically involve a voice being attributed multiple, qualitatively different person-like qualities (e.g. voice has an identity and multiple mental states) which may vary over time.

→ 16 interviews

She'll be sitting there going, now I'm here for you and all that kind of thing, it's like [...] she's done nasty stuff in the past, why would I trust her type of thing? It could just be as like she's trying to manipulate us a little bit

Our aims

We applied a corpus linguistic approach to the data to:

1. Test the validity of the MINIMAL/COMPLEX binary coding from a linguistic perspective
 2. Explore if/which (categories of) words appear more often in the reports of MINIMAL/COMPLEX cases
 3. Go beyond the MINIMAL/COMPLEX binary coding to consider degrees and types of personification in the data.
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- Contribute to the conceptualisation and identification of ‘complexity’ in voice-hearing
 - Address some pertinent methodological challenges for corpus linguistics

References to voices: annotation

*they_PP|AVH were_VBD particular_JJ voices_NNS|AVH
and_CC they_PP|AVH were_VBD the_DT main_JJ
ones_NNS|AVH that_IN/that I_PP would_MD hear._VV
I_PP would_MD hear_VV other_JJ stuff,_NN|AVH but
the_DT main_JJ ones_NNS|AVH were_VBD the_DT
seven,_CD|AVH*

'Voice' tags

Index	File	▼ Left	Node	Right
6,375	Olivia_t1_POS_AVH5.bt	screaming sounds like it's outside. So the	noises	are outside. I he{ } like{ } I remember like
3,489	Jade_t1_POS_AVH3.bt	are are really taking effect. So the	voices	are in, in a distance, eh, and
6,405	Olivia_t1_POS_AVH5.bt	but{ } with{ } they're all different, so the	mole,	like I've had that since I was
4,157	Kate_t1_POS_AVH9.bt	never forget that smell. I've smelt the	smell	of his house before. When I've walked
4,004	Kate_t1_POS_AVH10.bt	I don't when I can smell the	smell	of me granddad's allotment, and he shouted,
1,597	Eric_t1_POS_AVH1.bt	as the like pernicious one, she's the	one	who would be if I feel down,
1,599	Eric_t1_POS_AVH1.bt	be if I feel down, she's the	one	that would sort of be in the
4,595	Leah_t1_POS_AVH15.bt	up in CITY. I was sent, the	gypsy	sent us on various tasks when I
7,961	Will_t1_POS_AVH1.bt	years it's worse, that I've seen the	people	as well. So it's progressed into that,
8,871	Zara_t1_POS_AVH3.bt	sitting room. But I've always seen the	shadow	when I see the dining room pass
996	Dan_t1_POS_AVH2.bt	the voices where I've actually seen the	person,	and I know, and it's the three
3,041	Ian_t1_POS_AVH2.bt	less with medication. I'm still seeing the	shadows	every now and then. So they're like
7,956	Will_t1_POS_AVH1.bt	know, but then I started seeing the	person	as well, and then I could{ } like
992	Dan_t1_POS_AVH2.bt	happened, where I was just seeing the	person.	But the majority of the time, the
9,012	Zara_t1_POS_AVH9.bt	I do believe when I'm seeing the	shadows,	that it is Mr Bertram because I
8,823	Zara_t1_POS_AVH13.bt	then you hear, then you see the	shadow,	as though he's gone to the toilet,
6,395	Olivia_t1_POS_AVH5.bt	could hear was him. You see the	ones	that I've had visual hallucinations with them,
1,986	Eric_t1_POS_AVH4.bt	lot more than I would see the	purple,	but she tends to just sort of,
734	Dan_t1_POS_AVH1.bt	I know, I will sometimes see the	person	talking to me and I think that
1,931	Eric_t1_POS_AVH27.bt	with the different direction I'll see the	colours	coalesce sometimes, so Oh sorry. But the
6,048	Olivia_t1_POS_AVH19.bt	he's talking. Erm{ } and I'll see the	expressions.	Like he 's{ } because it's [NAME] and
807	Dan_t1_POS_AVH13.bt	of the time when I see the	colours	and things like that, when I'm in
732	Dan_t1_POS_AVH1.bt	really depends. And sometimes I see the	person,	that if it's a voice that I
1,121	Dan_t1_POS_AVH3.bt	out, it's like so I see the	person	but the voice isn't coming from their
8,874	Zara_t1_POS_AVH3.bt	and then you see{ } I see the	shadow	again go back into the sitting room,
8,986	Zara_t1_POS_AVH8.bt	all the time, when he screams, the	voices	scream as well. Which, that spooks us
7,422	Sean_t1_POS_AVH3.bt	my mind, who couldn't stop saying the	word	upstairs. And when I shouted up, the
350	Bill_t1_POS_AVH2.bt	understand like, like what it's saying. The	internals	are more inhuman. Just the ones that
6,369	Olivia_t1_POS_AVH4.bt	outside{ }{ } the inside{ } I would say the	voices	are mainly happening on the inside of
1 110	Dan_t1_POS_AVH27.bt	at least distressing but I'd say the	mainriv	extremely distressing I'd say it's about the

Our approach to complexity of personhood

We identified four language components of interest:

1. Voice tags (types and tokens)
→ *how the voices are referred to*
2. Adjective collocates of Voice tags (types and tokens)
→ *what qualities/characteristics the voices have*
3. Verb collocates of Voice tags (types and tokens)
→ *what the voices do*
4. The length of (participant contributions to) the interview (tokens)

“the voice is described as having more than one kind of person-like quality”

Agency and “intentional states”

Length

Participant responses ranged from 1,138-14,475 tokens

- Since all participants were asked the same base questions the length of their response(s) is pertinent to our investigation of ‘complexity’

In order to minimise the influence of text length on our other language components:

- Each interview text was split into 500-word chunks
- **Voice tag types**, **verb collocate types** and **adjective collocate types** were counted for each chunk
- We calculated the average across those chunks
- For each participant we have a relatively frequency value (expressed as x per 100 words)*

*Accounting for ‘remainder’ chunks that were smaller than 500 tokens

Key questions and analytical steps

1. Does the frequency of our language components support the conceptualisation of a MINIMAL group and a COMPLEX group?

- a. Statistical tests to establish the validity of a MINIMAL/COMPLEX categorisation
- b. Generated rank lists based on frequency counts for our language components to observe the distribution of individual MINIMAL and COMPLEX cases

2. What do the types used by MINIMAL and COMPLEX participants tell us about 'complexity' of personhood?

- c. Thematic grouping of individual types to look at the range of participants using particular terms relevant to 'complexity' according to the MINIMAL and COMPLEX groupings

Key questions and analytical steps

3. **How does our linguistic approach augment the MINIMAL/COMPLEX binary?**
Can we establish a 'complexity scale'?
- d. Investigating individual case studies to look at relative positions within/across complexity groupings and use of terms associated with either MINIMAL or COMPLEX participants

Statistical tests

Independent samples t-test comparing MINIMAL and COMPLEX participants

Language component	MINIMAL Mean	COMPLEX Mean	t-test	p-value	Effect size (Cohen's <i>d</i>)	MINIMAL Confidence Intervals	COMPLEX Confidence Intervals
Voice tag types	1.321	1.824	$t(33.39) = -3.72$	<.001	1.19	1.139–1.503	1.606–2.043
Adjective collocate types	0.814	1.174	$t(25.27) = -3.20$	<.01	1.10	0.695–0.932	0.967–1.380
Verb collocate types	2.165	2.853	$t(28.67) = -3.57$	<.01	1.19	1.938–2.393	2.516–3.189
Length (tokens)	3843.63	7170.31	$t(18.14) = -3.19$	<.01	1.20	3181.74–4505.51	5051.80–9288.83

Participant Voice tags (types)		Participant Adj. collocates (types)		Participant Verb collocates (types)		Participant Tokens	
1.	Leah_C 2.63	1.	Nina_C 1.78	1.	Jade_C 3.96	1.	Olivia_C 14475
2.	Jade_C 2.55	2.	Xander_C 1.76	2.	Page_C 3.71	2.	Dan_C 13852
3.	Carl_M 2.48	3.	Jane_C 1.61	3.	Leah_C 3.54	3.	Eric_C 13477
4.	Olivia_C 2.17	4.	Page_C 1.52	4.	Jane_C 3.31	4.	Hugh_C 10441
5.	Zara_C 2.14	5.	Grace_C 1.48	5.	Xander_C 3.28	5.	Leah_C 9647
6.	Neil_M 2.09	6.	Carl_M 1.38	6.	Carl_M 3.22	6.	Jade_C 7047
7.	Sean_M 2.03	7.	Neil_M 1.31	7.	Zara_C 3.00	7.	Page_C 6583
8.	Kath_C 1.97	8.	Kath_C 1.30	8.	Emma_C 2.96	8.	Zara_C 6334
9.	Xander_C 1.95	9.	Leah_C 1.24	9.	Orla_C 2.93	9.	Ryan_M 6222
10.	Emma_C 1.86	10.	Orla_C 1.23	10.	Nina_C 2.92	10.	Kate_M 5588
11.	Page_C 1.85	11.	Jade_C 1.18	11.	Grace_C 2.87	11.	Anthony_M 5553
12.	Nina_C 1.82	12.	Olivia_C 1.16	12.	Iris_M 2.86	12.	Mike_M 5435
13.	Gail_M 1.79	13.	Chris_M 1.08	13.	Liam_M 2.83	13.	Toby_M 5203
14.	Grace_C 1.79	14.	Bill_M 1.07	14.	Sean_M 2.74	14.	Alex_M 5047
15.	Kate_M 1.57	15.	Harry_M 1.06	15.	Olivia_C 2.72	15.	Xander_C 4977
16.	Jane_C 1.56	16.	Will_M 1.03	16.	Neil_M 2.71	16.	Yan_M 4931
17.	Will_M 1.54	17.	Iris_M 1.01	17.	Yan_M 2.59	17.	Kath_C 4783
18.	Hugh_C 1.46	18.	Ulrik_M 0.98	18.	Matt_M 2.50	18.	Violet_C 4782
19.	Dan_C 1.43	19.	Liam_M 0.97	19.	Mike_M 2.45	19.	Emma_C 4688
20.	Orla_C 1.42	20.	Fran_M 0.94	20.	Gail_M 2.37	20.	Dawn_M 4681
21.	Toby_M 1.38	21.	Ryan_M 0.93	21.	Kath_C 2.36	21.	Sean_M 4676
22.	Eric_C 1.37	22.	Dan_C 0.82	22.	Bill_M 2.28	22.	Will_M 4515
23.	Fred_M 1.34	23.	Emma_C 0.82	23.	Ryan_M 2.23	23.	Harry_M 4396
24.	Anthony_M 1.33	24.	Eric_C 0.80	24.	Hugh_C 2.20	24.	Fran_M 4260
25.	Liam_M 1.32	25.	Sean_M 0.78	25.	Alex_M 2.19	25.	Neil_M 4238
26.	Ian_M 1.25	26.	Gail_M 0.77	26.	Harry_M 2.15	26.	Fred_M 4180
27.	Matt_M 1.23	27.	Zara_C 0.77	27.	Chris_M 2.13	27.	Nina_C 4111
28.	Yan_M 1.23	28.	Violet_C 0.76	28.	Eric_C 2.09	28.	Iris_M 4029
29.	Violet_C 1.22	29.	Toby_M 0.74	29.	Ian_M 2.08	29.	Jane_C 3988
30.	Mike_M 1.18	30.	Yan_M 0.73	30.	Will_M 2.08	30.	Brad_M 3862
31.	Brad_M 1.17	31.	Mike_M 0.71	31.	Ulrik_M 1.95	31.	Bill_M 3762
32.	Iris_M 1.17	32.	Alex_M 0.60	32.	Toby_M 1.94	32.	Orla_C 3418
33.	Bill_M 1.12	33.	Anthony_M 0.59	33.	Dan_C 1.91	33.	Chris_M 2666
34.	Harry_M 1.11	34.	Ian_M 0.59	34.	Violet_C 1.88	34.	Gail_M 2143
35.	Ulrik_M 1.06	35.	Fred_M 0.58	35.	Fran_M 1.73	35.	Grace_C 2122
36.	Alex_M 1.02	36.	Hugh_C 0.55	36.	Kate_M 1.62	36.	Liam_M 1943
37.	Ryan_M 0.99	37.	Matt_M 0.54	37.	Dawn_M 1.57	37.	Ian_M 1296
38.	Chris_M 0.98	38.	Brad_M 0.45	38.	Anthony_M 1.50	38.	Carl_M 1259
39.	Fran_M 0.85	39.	Dawn_M 0.36	39.	Brad_M 1.14	39.	Matt_M 1224
40.	Dawn_M 0.47	40.	Kate_M 0.33	40.	Fred_M 1.11	40.	Ulrik_M 1138

What do the types used by MINIMAL and COMPLEX participants tell us about ‘complexity’ of personhood?

Voice tags

Persons:		<i>bloke, girl, guy, lady, man, people, person</i>
Names:		<i>David, Gabriel, Loki, May, Roxy</i>
Functional terms:		<i>bully, criminals, gypsy, policemen</i>
Social relationships:		<i>boyfriend, dad, ex-girlfriend, mum</i>
Pronouns:		1st person; 2nd person; 3rd person
Demonstrative:		<i>this, those, which, who</i>
Number:		<i>all, few, four, majority, more, one</i>
Undetermined:		<i>anything, something, stuff, things</i>
Body parts:		<i>leg, eyes, face, hands, mouth</i>
Non-humans:	Supernatural:	<i>angel, demon, devil, phoenix, spirit</i>
	Animals:	<i>bear, flies, mole, penguin, racoon</i>
	Objects:	<i>bed, bubbles, cars, door, keys</i>
Speech acts/communication:		<i>accusations, chatting, comments, mumbling, talking</i>
Message content:		<i>contents, messages, phrases, sentences, words</i>
Noises:		<i>banging, click, knocking, scratching, tap</i>
Visual elements:		<i>colours, flashing, image, shadow, shapes</i>
Actions:		<i>bouncing, shaking, sitting, vibrating</i>
Felt:		<i>brushes, sensation, touch</i>
Taste and smell:		<i>daffodils, manure, popcorn, violets</i>
Scenario:		<i>operation, plots, scenario, situation</i>
Cognition:		<i>memory, opinions, thoughts</i>

Proportionately more of the COMPLEX participants used:

- Names
 - Social relationship terms
 - first and second person pronouns
- in reference to their voices.

Collocation

- Collocates were generated according to lemma, and filtered by part-of-speech.
- We determined a collocation span based on optimising precision and recall for types that were attributed to the 'voice' as Subject:
 - Adjective collocates: 3 tokens either side of the Voice tag
 - Verb collocates: 3 tokens to the right of the Voice tag
- We included all collocates to explore the range of attributes/processes **i.e. we did not use association measures that indicate strength, exclusivity etc.**

Adjective collocates

Demographics:

Gender & sexual identity: *feminine, gay, lesbian, male*

Age: *child, old, young*

Ethnicity/region: *american, english, scouse*

Personality traits, mood and demeanour:

Personality traits: *confident, friendly, impulsive, mischievous, nasty*

Demeanour: *cheery, daft, fake, forceful, gentle, grouchy*

Emotional states: *angry, annoyed, calm, happy, sad*

Beliefs and perspective:

evil, homophobic, hypochondriac, religious

Ability:

capable, clever, powerful, useless, worthless

Non-human:

demonic, inhuman

Perceptible qualities:

clear, faint, invisible, prominent, tangible

Auditory:

deep, loud, low, quiet, squeaky

Visual:

angular, black, dark, shadow, speckle

Identifiable:

consistent, distinct, familiar, particular

Location:

above, close, distant, external

Time and duration:

brief, continuous, frequent, rare

Adjective collocates

Proportionately more of the COMPLEX participants used adjectives:

- indicating gender
- Indicating contrasting person-like qualities
 - Good/**bad**, nice/**nasty**, positive/**negative**, comforting/**aggressive**
- 'different' to suggest a variety of traits.

Verb collocates

Communicative actions & noises:	Speech acts:	<i>criticise, question, suggest, warn</i>
	Speech sounds:	<i>say, tell, scream, whisper</i>
	Dialogue/turn-taking:	<i>argue, respond, discuss</i>
	Non-speech noises:	<i>knock, laugh, cry</i>
Perceptual and cognitive verbs:	Perceptual:	<i>see, listen, find, ignore, recognise</i>
	Cognitive:	<i>know, think, understand</i>
Action:		<i>do, try, make, use, change, take, give, control, hurt, play</i>
Movement:		<i>walk, move, leave, follow</i>
Occurrence:		<i>start, happen, stop, come, appear, disappear</i>
Relational:		<i>be, got, like, have, seem</i>
Modal:		<i>can, would, might, will, must, 'll</i>

















Verb collocates

Proportionately more of the COMPLEX participants used:

- verbs indicating dialogue/turn-taking e.g. ‘respond’
- ‘want’ to indicate intentional states
- ‘make’ and ‘stop’ to indicate the capacity to control the voice hearer
 - MINIMAL ‘making a racket’; COMPLEX ‘make me..’, ‘make me feel..’
 - MINIMAL ‘the voices stop’; COMPLEX ‘stop me from..’

How does our linguistic approach augment the MINIMAL/COMPLEX binary?

- Can we establish a ‘complexity scale’?

Participant Voice tags		Participant Adj. collocates		Participant Verb collocates		Participant Tokens	
	1. Leah_C 2.63	1. Nina_C 1.78	1. Jade_C 3.96	1. Olivia_C 14475			
	2. Jade_C 2.55	2. Xander_C 1.76	2. Page_C 3.71	2. Dan_C 13852			
	3. Carl_M 2.48	3. Jane_C 1.61		3. Leah_C 13477			
	4. Olivia_C 2.17	4. Page_C 1.52	4. Jane_C 3.31	4. Hugh_C 10441			
	5. Zara_C 2.14	5. Grace_C 1.48	5. Xander_C 3.28		5. Leah_C 9647		
	6. Neil_M 2.09			6. Jade_C 7047			
	7. Sean_M 2.03	7. Carl_M 1.38	7. Zara_C 3.00	7. Page_C 6583			
	8. Kath_C 1.97	7. Neil_M 1.31	8. Emma_C 2.96	8. Zara_C 6334			
	9. Xander_C 1.95		9. Orla_C 2.93	9. Ryan_M 6222			
	10. Emma_C 1.86	8. Kath_C 1.30	10. Nina_C 2.92	10. Kate_M 5588			
	11. Page_C 1.85	9. Leah_C 1.24	11. Grace_C 2.87	11. Anthony_M 5553			
	12. Nina_C 1.82	10. Orla_C 1.23	12. Iris_M 2.86	12. Mike_M 5435			
	13. Gail_M 1.79	11. Jade_C 1.18	13. Liam_M 2.83	13. Toby_M 5203			
	14. Grace_C 1.79	12. Olivia_C 1.16	14. Sean_M 2.74	14. Alex_M 5047			
	15. Kate_M 1.57	13. Chris_M 1.08	15. Olivia_C 2.72	15. Xander_C 4977			
	16. Jane_C 1.56	14. Bill_M 1.07	16. Neil_M 2.71	16. Yan_M 4931			
	17. Will_M 1.54	15. Harry_M 1.06	17. Yan_M 2.59	17. Kath_C 4783			
	18. Hugh_C 1.46	16. Will_M 1.03	18. Matt_M 2.50		18. Violet_C 4782		
	19. Dan_C 1.43	17. Iris_M 1.01	19. Mike_M 2.45	19. Emma_C 4688			
	20. Orla_C 1.42	18. Ulrik_M 0.98	20. Gail_M 2.37	20. Dawn_M 4681			
	21. Toby_M 1.38	19. Liam_M 0.97	21. Kath_C 2.36	21. Sean_M 4676			
	22. Eric_C 1.37	20. Fran_M 0.94	22. Bill_M 2.28	22. Will_M 4515			
	23. Fred_M 1.34	21. Ryan_M 0.93	23. Ryan_M 2.23	23. Harry_M 4396			
	24. Anthony_M 1.33	22. Dan_C 0.82	24. Hugh_C 2.20	24. Fran_M 4260			
	25. Liam_M 1.32	23. Emma_C 0.82	25. Alex_M 2.19	25. Neil_M 4238			
	26. Ian_M 1.25	24. Eric_C 0.80	26. Harry_M 2.15	26. Fred_M 4180			
	27. Matt_M 1.23	25. Sean_M 0.78	27. Chris_M 2.13	27. Nina_C 4111			
	28. Yan_M 1.23	26. Gail_M 0.77	28. Eric_C 2.09	28. Iris_M 4029			
		27. Zara_C 0.77	29. Ian_M 2.08	29. Jane_C 3988			
	29. Violet_C 1.22	28. Violet_C 0.76	30. Will_M 2.08		30. Brad_M 3862		
	30. Mike_M 1.18	29. Toby_M 0.74	31. Ulrik_M 1.95	31. Bill_M 3762			
	31. Brad_M 1.17	30. Yan_M 0.73	32. Toby_M 1.94	32. Orla_C 3418			
	32. Iris_M 1.17	31. Mike_M 0.71	33. Dan_C 1.91	33. Chris_M 2666			
	33. Bill_M 1.12	32. Alex_M 0.60		34. Gail_M 2143			
	34. Harry_M 1.11	33. Anthony_M 0.59	34. Violet_C 1.88	35. Grace_C 2122			
	35. Ulrik_M 1.06	34. Ian_M 0.59	35. Fran_M 1.73	36. Liam_M 1943			
	36. Alex_M 1.02	35. Fred_M 0.58	36. Kate_M 1.62	37. Ian_M 1296			
	37. Ryan_M 0.99	36. Hugh_C 0.55	37. Dawn_M 1.57		38. Carl_M 1259		
	38. Chris_M 0.98		38. Anthony_M 1.50	39. Matt_M 1224			
	39. Fran_M 0.85		39. Brad_M 1.14	40. Ulrik_M 1138			
	40. Dawn_M 0.47	38. Brad_M 0.45	40. Fred_M 1.11				
		39. Dawn_M 0.36					
		40. Kate_M 0.33					

The top and bottom of the scales

- Leah (complex):
 - ‘and then I was down the quayside and I was sat on the quayside, I was thinking, I'm going to have to sleep on this bench tonight. And I got rattled for it, the voices rattled for it, no, you're not sleeping here, move, get up and walk, get up and move now. And they moved us off the quayside, and told us that somebody had been raped there and they got us moved off there. Told us to move up towards [NAME] Station.’
- Brad (minimal):
 - ‘it could be angry or it could be a disappointed voice or like. Stuff like that like.’

The middle of the scale

- Violet (complex):
 - ‘it depends, they can shout, they can talk like we do, like now. Or they can whisper’
 - ‘Yeah, it was quite upsetting. It was really upsetting because I didn't want to be the person that Michael [one of the voices] wanted us to be’
- Carl (minimal):
 - ‘Just like an angry old man [...] a bit old’
 - ‘because it's me, they know what to say, do you know, to annoy me ‘



Corpus methods and the ‘psychosis continuum’ with respect to voice hearing

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A linguistic approach to the psychosis continuum: (dis)similarities and (dis)continuities in how clinical and non-clinical voice-hearers talk about their voices

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ABSTRACT

Introduction: “Continuum” approaches to psychosis have generated reports of similarities and differences in voice-hearing in clinical and non-clinical populations at the cohort level, but not typically examined overlap or *degrees* of difference between groups.

Methods: We used a computer-aided linguistic approach to explore reports of voice-hearing by a clinical group (Early Intervention in Psychosis service-users; $N=40$) and a non-clinical group (spiritualists; $N=27$). We identify semantic categories of terms statistically overused by one group compared with the other, and by each group compared to a control sample of non-voice-hearing interview data (log likelihood (LL) value $6.63+; p < .01$; effect size measure: log ratio $1.0+$). We consider whether individual values support a continuum model.

Results: Notwithstanding significant cohort-level differences, there was considerable continuity in language use. Reports of negative affect were prominent in both groups ($p < .01$, log ratio: $1.12+$). Challenges of cognitive control were also evident in both cohorts, with references to “disengagement” accentuated in service-users ($p < .01$, log ratio: $1.14+$).

Conclusion: A corpus linguistic approach to voice-hearing provides new evidence of differences between clinical and non-clinical groups. Variability at the individual level provides substantial evidence of continuity with implications for cognitive mechanisms underlying voice-hearing.

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KEYWORDS

Psychosis; continuum; corpus linguistics; auditory verbal hallucinations; voice-hearing

Summary

- We found a statistically significant difference in the mean values for MINIMAL and COMPLEX participants
 - This indicates that, with respect to our language components, this is a valid categorisation
- We identified quantitative and qualitative differences in the types used by the respective complexity groupings
 - Capacity for dialogue and affecting the voice-hearer, assuming the point of view of the voice, social relationships, contrasting personality traits, names and gender associated with COMPLEX cases
- Our approach reveals degrees of ‘complexity’ and heterogeneity within the MINIMAL and COMPLEX groupings
 - We can begin to identify sub-groups, going beyond the binary classification

Thank you

