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The embodied non-standard 1SG as a potential marker for reflective function impairment in Anorexia Nervosa sufferers.

Sophia Burnett
AGORA research centre
CY Cergy Paris Université
sophia.burnett@cyu.fr
sophiaburnett.github.io

Anorexia Nervosa is a grave eating disorder characterised in part by a compromised reflective function—the ability to envision mental states in one’s self and in others. This paper proposes a hybridised referential framework composed of a personal and a social triadic function to better illustrate the representational repercussions of reflective function impairment and concretism on self-representation.

This introspection was confronted to empirical investigation of the non-standard first person subject pronoun (<i>) usage, the results of which provide preliminary evidence for its potential significance as a marker for Anorexia Nervosa (AN). A corpus of 27K units (words or glyphs) was analyzed with TXM for general statistical analyses, concordances, cooccurrences and colocations, with a control corpus of the same size. Contrary to traditional clinical trials, the findings emphasize the advantages of leveraging digitally mediated data namely collection speed and reduced observer effects. The freedom of expression afforded by social media platforms lends a double, ‘Janusean’ subject pronoun to AN sufferers, and give us insight into Self “othering” in diachronic auto-description.

1 Introduction

“People see me and think I am vulnerable. When I get better, people will think I am strong, and they will attack me and put heavy demands on me.” Anon. patient—
Skårderud, 2007a.

The phenomenon of English NS1sg is particularly online; however, since much communication today is digitally mediated, it reflects linguistic variation. The term 'variation' is associated with change, which is central to the psychopathology of anorexia nervosa (AN): change as a goal and as a cognitive artifact for the perception of self via interoception. This paper proposes that NS1sg may be employed by the author as a concrete representation of their diminished somatic form in which body and glyph, sufferer and representation, are reduced. The lowercase <i>, perhaps more than other non-standard minuscules, is a much-needed addition to the online inventory. In spoken language, a person can (to a certain extent) wrap the pronoun in entirely personalized phonetic intentions to accompany the word on its journey to its destination in the discursive environment. In doing so, they can shed some of the Lacanian/Freudian anxiety caused by the uncertainty as to whether objects can be considered to have their own existence once they are placed in a discursive environment or system of representation. (Levi, 2021, p.34).

For a person suffering with the dangerous psychopathology anorexia nervosa, the novel variant <i> may embody a more meaningful representation of their physical self than the standard form <I> does. Per Johnson & Rohrer (2007), our embodiment is essential to who we are, to what meaning is, and to our ability to draw rational inferences and to be creative. The smaller sign may be a concrete representation of their diminished somatic form. I suggest that if the sufferer identifies with the non-standard form on this concrete level, not only would the use of the majuscule be a form of misrepresentation, but it would also be an anxiogenic betrayal of their somatic Self. Such studies are important since as Skårderud (2007a, p.164) notes in reference to Buhl (2002), concretism is often a barrier to recovery from Anorexia Nervosa.

The corpus contains intradiscursive switching, which suggests that the two forms of the personal pronoun provide the author with a novel form of temporal anaphora (cf. Partee, 1984; Hinrich, 1986), allowing individuals to refer to their former selves as either 'heavier' (1SG) or 'lighter' (NS1sg); this may not be the same Self as they refer to in the same message using a different form. Ochs and Capps (1996, p.23) remind us that scholars have always highlighted temporality and point of view as being two basic dimensions of narrative, and that temporality in particular is a cornerstone of Labov and Waletzky's (1967) linguistic definition of narrative as two or more temporally conjoined clauses.

There is a scalar element in this phenomenon, and it is situated in the sufferer's ability to access theory of mind functions in a healthy manner. Some former sufferers are able to refer to their former selves and present selves within the same narrative, but as two distinguishable people, by employing the I/i dichotomy; deploying both temporality and point of view.

A person with healthy reflective function might use the minuscule to convey to a third party—anyone reading their public message—that they are feeling lessened. This is done with perlocutionary goals in mind; to nudge the reader's mental image of the author towards that of a person who is feeling 'low', 'down', even 'diminished', to treat them perhaps with more care. This nudging of the shared mental image is important because just as no two persons' mental image of 'tree' will be the same, 'I' is even more complex a task and benefits greatly from the perlocutionary, metapragmatic assistance given by the author.

The deployment of the novel glyph by a person with reflective function impairment is done so with no pragmatic aim, no desire for phatic communication. Hence I posit that the author in such a situation has an amodal iconic relationship with their referent.

The theory herein of the NS1sg as a marker for AN is supported by prominent medical psychiatric research in clinical trials by Skårderud (2007a, b, and c) whose qualitative research with clinically diagnosed individuals revealed similar phenomena of what he and others since (e.g., Cuteri, Minori, Gagliardi, Tamburini, Malaspina, Gualandi, & Parmeggiani, 2021, *passim*) call *Concrete Metaphors*, which are

unmediated bodily revelations. Skårderud did not look precisely at the pronoun, but his theory and analyses of certain language usage compound what is advanced herein, in terms of the deployment of the NS1sg by persons with AN; his patients spoke, for example that the reduction of themselves was necessary, that otherwise they were 'taking up space', or felt like a 'burden'. These notions of 'heaviness', 'burden', are linked to self-esteem—and it is important to note that it was via the study of depression in online forums that led to this work on the lexical markers for anorexia nervosa.

Skårderud (2017a) revealed that the central psychopathological feature in anorexia nervosa, is what he called impaired Mentalisation. As he found, Mentalisation involves both a self-reflective and an interpersonal component that ideally provides the individual with a well-developed capacity to distinguish inner from outer reality, physical experience from mind and intrapersonal mental and emotional processes from interpersonal communications. The term mentalization (with a 'z', same significance) was first used by Fonagy, Steele, Moran, & Higgitt, (1991). Fonagy's work was informed by that of the Ecole Psychosomatique de Paris. The term reflective function is generally acknowledged today as the more scientific form.

Theory of Mind has informed language and communication functions in neurological pathological conditions for decades; Ochs, Kremer-Sadlik, Sirota, & Solomon (2004, p.147-183) in their anthropological work on autism citing Baron-Cohen (1985, 86) stated similar difficulties in individuals with autism, which one would now refer to as Autism Spectrum Disorder (ASD). Only a minority of children and adults with ASD successfully navigated the first-order theory of mind task. This task necessitates the evaluated individual to attribute beliefs to another person that diverge from their own beliefs. In mild cases they could not demonstrate proficiency in completing the second-order theory of mind task, which assesses the subject's capacity to attribute beliefs to one person regarding the beliefs of another person, involving the understanding of embedded mental representations.

Transposed to linguistic terms this involves both the Sign-Signified-Referent triad, but also what du Bois (2007, *passim*) calls the Stance Triangle (Fig. 1). This stance triangle relies on healthy reflective function as it is a standard mental framework for many people communicating *in situ* and online, and simply means that they are cognisant of objective and subjective points of view on an object; of how they perceive

it, and of how they convey their perceiving of it. These ‘mind readings’ allow (in its simplest form) two people to position themselves in relation to an object, and to adopt the stance they want the other person to acknowledge.

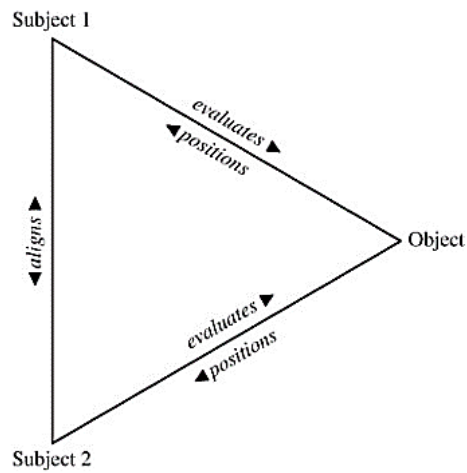


Figure 1 Du Bois' Stance Triangle (2007, p. 163).

Stance is the discursive creation of a relationship between a language user and some discursive figure, and to other language users in relation to that figure. This discursive figure can be an interlocutor, a figure represented in the discourse, the animator, ideas represented in the discourse, or other texts. (Kiesling, Pavalanathan, Fitzpatrick, Han, and Eisenstein, 2018. p.687)

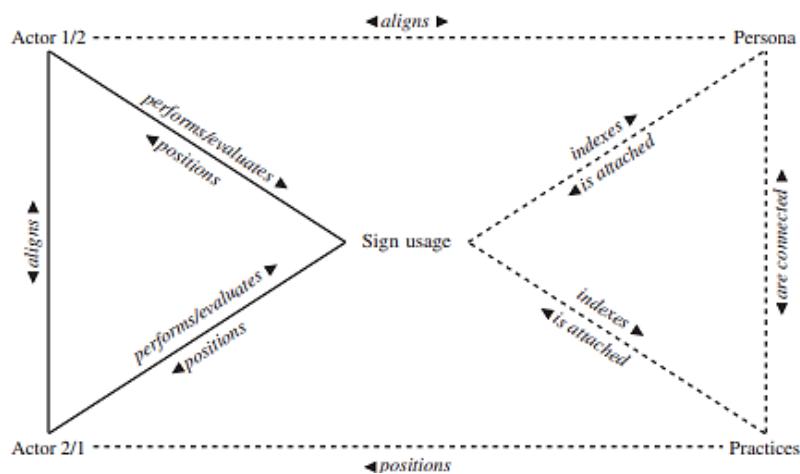


Figure 2 Spitzmüller (2015, p.131) Metapragmatic stance taking.

Spitzmüller (2013b; 2015, p.131) takes du Bois' Stance Triangle and accurately apposes it to Agha's own register triangle (2006, p.235), which conveys that material things indicate and are attached to social persona, and vice versa; and they are similarly attached to practices. Persona and practices are connected. Spitzmüller articulates these propositions of stance and register around sign usage (Fig. 2), which is the locus of this thesis. For the needs of this paper however, I shall focus on a different layer of triangulation with du Bois, and that is the object-referent-signified triad, and how embodiment in the object/sign < i > may be a marker of reflective function impairment.

Loss of reflective function. When the reflective function is impaired, it causes reduction in 'space' (the mentally mapped extensions) between the sign, signified, and referent, thus 'collapsing' personal referentiality. This is all the more impactful when the person uses the pronominal sign as a concrete metaphor, as it 'collapses' the stance triangle that contains themselves (author), the sign (object) itself, plus the Other (reader) which normally allows the person to position themselves in the world. The personal and social models become unmediated and are 'flattened'. From the sufferer's standpoint, there has been a melding of Signified and Sign. This is because in this particular instance of the referential triangle, there is dissonance in the label 'sign' or 'object', since while <i> is a sign (object), it is also a first person (subject). This then means that the 'shared mental image' of the signified ceases to be shared, and the Author-Referent is isolated in their Self-construction. The very idea of a 'signified' or in the case of CMC, a shared mental image of the referent becomes pointless: there is none.¹ The sufferer's embodied sign can no longer share the same valence of interpretation with the reader. The schema for contingency of this collapse I propose in Fig. 3.

It is also plausible that the loss of RF and triadic collapse, levelling as it were the values of all things 'Self' to the same minuscule, is reassuring for AN sufferers who perhaps feel more in control of how they are seen. For if one cannot make that mentalizing leap, then by imposing the non-standard form, they at least recognize themselves in their written discourse. There is also the possibility that the notion of purity which is sought after in the body and mind of those with AN, is recognised in the

¹ It is important to keep in mind the necessarily public/social nature of both stance and Computer Mediated Communications.

< i > as a more simplistic form. Hypothesis: The NS1sg is a consciously or unconsciously preferred form of self-representation of persons suffering from Anorexia Nervosa and could therefore be a lexical biomarker for the affliction.

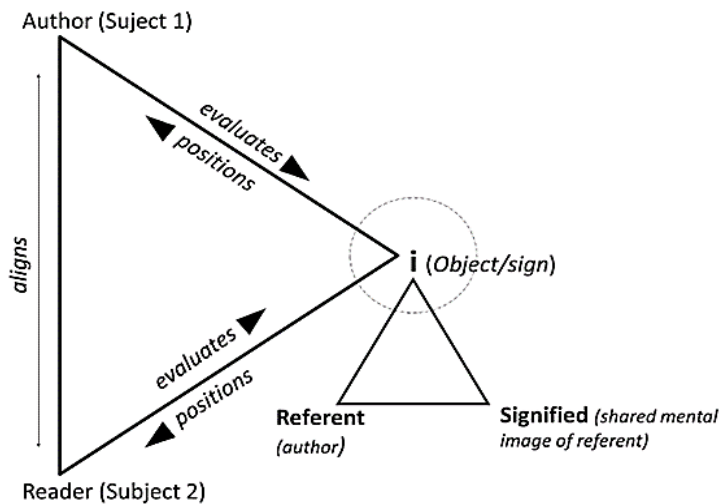


Figure 3 The contingent < i > in Reflective Function impairment.

Predictions:

- I. The NS1sg is more prevalent in discourse published by persons suffering from Anorexia Nervosa.
- II. The 1SG (I) is used in collocation with present tense (am/'m), by those perceiving themselves as being recovered or at least not underweight.
- III. The NS1sg (i) is used in higher collocation with present tense (am/'m) by self-expressed current anorexics.
- IV. There exists a form of temporal polysemic anaphora; NS1sg or 1SG used to refer to a different version of oneself in the past. E.g.: i was heavy; I was scared/thin.

2 Methods

To quote Proferes, Jones, Gilbert, Fiesler, Zimmer (2021), “researchers have used social media data for a wide range of purposes—from predicting postpartum depression from Facebook posts (De Choudhury et al., 2014) to trying to predict movements in the stock market based on the sentiment of Tweets (Mittal & Goel, 2010)”. The study design took

advantage of the ease of accessibility and high number of publicly posted messages on a support group on Reddit, which is a social news and discussion website with over 430 million active users who can join communities, called subreddits (*/r/*), focused on specific topics. The subreddit identified for this study was *r/AnorexiaNervosa*. It is a mediated space where current or former sufferers of the affliction can talk about issues they are facing. It has 48.3K members.

The *r/AnorexiaNervosa* corpus was built from 27K units (words or glyphs) in a Search, Screening, and Appraisal flow similar to the ROSES flow diagram for Reddit corpus construction Haddaway et al. (2018), then analysed with TXM for general statistical analyses, concordances, cooccurrences and collocations. *r/Makeup* was used as a control corpus for hypothesis I. Samples of the corpus were analysed qualitatively.

2.1 Ethical considerations

This research is usage-based not user-based, and therefore information about each individual was automatically deleted from the working files, which are uniquely text. Both corpora were anonymized (metadata from results excluded UID², timestamp, etc.) following The British Sociological Association guidelines for working with public digital data³, wherein anonymity and data storage are presented as the key ethical concerns. This means no names, no handles, no profile pictures, no geographic locators, no dates. Samples used as examples were cleaned of idiosyncratic material that could identify the author.

2.2 Transparency and Openness

This analysis was conducted as part of a dissertation at CY Cergy Paris, AGORA research centre. For European (GDPR) legal requirements, the full raw data .csv will be conserved by the author for 5 years. The anonymized corpus will be made available in Dataverse to researchers upon demand. Equal data were retrieved from both subreddits on 10/05/23, at a half hour interval. The date range specified for recency of posts was one year, meaning that the texts extracted could be >1 minute or < 12 months.

² Unique Identifier

³ https://www.britisoc.co.uk/media/24309/bsa_statement_of_ethical_practice_annexe.pdf

3 Results

3.1 Results of prediction I

A one-tailed z-score of 1.9243 showed significance at $\alpha .05$, $p = .02043$. We can reject the null hypothesis (there is equal occurrence of NS1sg in both corpora) and validate prediction 1: The NS1sg is more prevalent in discourse published by persons suffering from Anorexia Nervosa.



Figure 4 Textometry analysis with TXM from 1SG and NS1sg occurrences in r/AnorexiaNervosa, and r/Makeup.

Corpus line 59 is exemplary as NS1sg, allowing the user to graphically embody the polysemy of the pronoun—providing them with a device to refer repeatedly to themselves, without the unwanted sensation of “taking up too much space”. I posit that the reduced salience of the NS1sg provides an attenuation in long texts—particularly those beginning with a NS1sg—since having apprehended the incipit minuscule, the reader’s eye-tracking will move more quickly over the subsequent pronouns which will be processed more like content words than pronouns. This in turn may lead to the reader ‘piggybacking’ the pronoun resulting in the more abstract endophasic use of asyndeton and an overrepresentation of predication (cf. Bergounioux, 2001, *ibid*) that could serve the suffering author’s representational needs.

Line 59: “ i've had ana for over a year now and i am severely underweight and i can't eat anything but i have been avoiding the doctors so they don't force me into the hospital so

i can go in my own time if i need to but i really think it's time could someone please tell me what the requirements are to be admitted for an eating disorder?"

Line 157: "it's 4am. i haven't been able to get a proper night of sleep in years.i have no goals outside of my eating disorder. i just want to get thinner.i have no hobbies, either. unless you count the endless scrolling through of menus online and feasting my eyes upon the aisles at the grocery store.i have no friends. the ones i had i drove away, or i just couldn't stop comparing myself to them to the point where every time i hung out with them, i just got even more depressed.i am constantly fighting with my family about food. i always feel left out because i can't get myself to eat anything with them. they haven't asked if i want to eat with them in years.i am constantly wanting to eat all my favorite foods but i just am too scared. so i stick to the same foods every single day.the sad part is, i [redacted].my life was supposed to begin. but i think it was long over by the time i [redacted].my eating disorder has taken everything from me. there is nothing left for me.i used to be a promising young girl with some semblance of a future.i have tried and failed recovery many times. the food just isn't worth the weight gain for me.now i'm stuck in a body that is technically " healthy " but with a mind that is sicker than it's ever been.i have nothing now.i have given up everything, but there is still nothing about myself that i can tolerate.(...) please recover while you still can."

Herein is frequent use of the NS1sg. This isn't non-standardised grammatically, as there is correct punctuation such as quote marks; there are spaces missing after full stops (perhaps to modify a smartphone's automatic capitalisation). And otherwise, it displays standard orthography. Given the stated demographic, statistically it's likelier that this was written on a phone, and so therefore the automatic capitalisation of the 1SG (in full text also, not just incipit) has been redefined—other incipit words are lacking their capitalisation. The NS1sg has been chosen, consciously or unconsciously.

3.2 Results of prediction II

The 1SG (I) is indeed used in collocation with present tense (am/'m), by those perceiving themselves as being recovered or at least not underweight.

Table 1 Cooccurrences from the concordancier “I” + “am”/“I’m”, in the corpus r/AnorexiaNervosa.

CO-OCCURRENT	FREQUENCY	MEAN DISTANCE	CO-OCCURRENT	FREQUENCY	MEAN DISTANCE
sorry	3	0.3	so	230	2.6
doing	22	0.4	just	223	3.4
scared	22	0.4	in	217	4.5
struggling	12	0.7	this	179	4.4
wondering	6	0.8	with	167	4.8
content	4	1	not	156	2.6
tired	21	1	am	97	7.2
happy	14	1.4	still	56	3.7
failing	5	1.5	recovery	46	2.3
recovery	46	2.3	always	37	4.8
not	156	2.6	relapse	26	4
thinks	6	3.2	scared	22	0.4
just	223	3.4	doing	22	0.4
ready	5	3.5	tired	21	1
done	10	3.7	meals	18	4.2
still	56	3.7	mom	16	6
relapse	26	4	happy	14	1.4
meals	18	4.2	struggling	12	0.7
always	37	4.8	done	10	3.7

As we can see in Table 1, the salient forms on the left, filtered for mean distance (smallest to greatest) are predominantly negative, with *sorry*, *scared*, *struggling*, *tired*, falling all in the first ten lines. It is useful then to filter by frequency (on the right) to see that *sorry* has slipped out of the saliences, but that the negation “not”, and the adverbs “still” and “always” feature in the main saliences. The transformative quality of these two words obliges us to look at their cooccurrences and define the quality of the saliences on the left in context to verify, for example between *not scared* vs. *still scared*, or *not struggling* vs. *always struggling*.

Table 2 “I’m” + “not” co occurrences.

CO OCCURRENT	FREQUENCY	MEAN DISTANCE
sure	17	0.2
enough	31	1
underweight	17	2.7
trying	35	3.4
work	16	3.5
wanting	13	3.7
convince	3	4
say	28	4.8
skinny	8	5

Table 3 Concordancier extract of “underweight” + cooccurrence of “not”, grey highlighting annotates as considered potentially biologically underweight based on close reading.

LEFT	PIVOT	RIGHT	ANNOTATION
etc “”, why am I not	underweight	? Is it because when you're in relapse your cognitive abilities	Physically recovered, saying mind is not cured of AN; frustrated
m not just only a little	underweight	either, I know we can't say BMI's	Underweight but still menstruating; considers they are still 'too' strong for an AN. (Reflexivity, Poss. Pro-Ana)
struggling with the disorder who's not visibly	underweight	, but falls into the normal “ BMI range	BMI 'normal', poss. frustration and Pro-Ana
I feel this awful while I'm still	underweight	. Could anybody tell me their experiences with the weight-related part of	Recovering but conflicted about increasing weight.
Weight “Hello Everyone. I have been	underweight	now since Summer of 2022 and ever since then I have since	Underweight.
to not get to the level of being	underweight	, partly because when I am healthy enough I enjoy physical activities	Underweight
for days and start to tip back towards	underweight	but then I catch myself and start eating more. Then I	Recovering
healthy weight. “ Does undereating and being	underweight	effect mood? I panic multiple times a day and am sad	Eat/purge cycle
die: (Is it because I am	underweight	and hungry lmao got triggered by a video in class!!	Underweight, anxious
the same treatment options as someone who's	underweight	. I feel guilty about all the time I've wasted and	Confused
. I'm still not “ considered	underweight	, yet I'm still wondering if the muscle pain	New AN

I don't understand that that bmi is	underweight	. The mBio this seems really high and I don't like	Ritualised.Poss. Pro-Ana.
. I'm underweight but that kind of	underweight	where everyone just thinks you look like "healthy model" skinny	Dysmorphia. Poss. RF distrubtion.
fiancés two sisters are both extremely slim and	underweight	(genetically). There is going to be a photographer.	Underweight but feeling overweight. Anxious.

“Not” cooccurs with important and salient lexicon; *underweight* and *skinny*. With a frequency of 17 and a mean distance of 2.7 it was important to look at the corpus, which did reveal a semantic field that tended strongly toward denial of being underweight.

3.3 Results of prediction III

A one-tailed z-score of -7.6368 showed significance at $\alpha .01$, $p = <.0001$. We can reject the null hypothesis (there is equal use of NS1sg for self-representation by current sufferers and healed sufferers) and validate prediction 1: The NS1sg is used in higher collocation with present tense (am/'m) by self-expressed current anorexics.

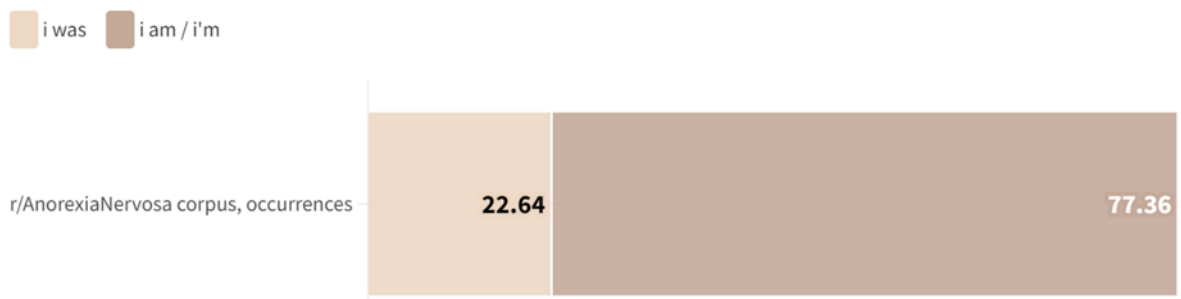


Figure 5 Majority use of NS1sg in collocation with present tense by the currently afflicted.

This hypothesis is corroborated (Fig.5), with a majority collocating with the present tense, and a minority of NS1sg collocating with <was>. And of the was cooccurrences, only four of the twelve instances referred to a distant past: the rest were recent past, i.e., recounting the day's events.

3.4 Results of Prediction IV.

The corpus contains temporal polysemic anaphora, NS1sg or 1SG used to refer to a different version of one's self in the past (cf. Line 55).

Line 55: I have been severely depressed as well off and on and I have been having a lot of fatigue and nausea when I refuse to eat and feeling like I never slept for months when I wake up in the morning except for (...)

The author first uses the present perfect twice with the 1SG, the effect of the tense being to give a passive effect to the authorial voice. Then they use the NS1sg for in when + simple present which implies habit or routine. The version of themselves who refuses to eat (anorexia) is lower-case. The other ailments stated are caused by the person who refuses to eat.

4 Discussion

The AN corpus exhibited notably higher lexical density compared to an equal number of lines extracted from a control group, potentially due to the succinct nature of makeup advice in the control group, lacking emotional dimensions that typically entail more content words. However given the discrepancy, it could be useful to look at lexical density in future research, perhaps even in a study with modified lexical density statistics, as this could be symptomatic of some internal functioning.

Noteworthy is that the AN corpus featured specialized clinical lexicon, indicating two possible explanations. Firstly, individuals with Anorexia Nervosa may extensively research their condition online, where abundant information is available. Secondly, participants in online support groups may include individuals receiving offline clinical psychological support, who introduce medical terminology to the group, subsequently adopted by others.

5 Conclusion

The NS1sg shows potential as a marker for Anorexia Nervosa. The results show the scientific advantage of using public forums to extract texts, rather than clinical trials wherein the samples are small, the collection process long, and the observer effect

strong. CMC, in particular social media lends sufferers a freedom of expression not easily available in clinical trials. What's more, internet has 'gifted' them a Janusean 1SG. However, it is important to note that Anorexia Nervosa is a medical condition, and while these findings are significant, they come from computer-mediated communication, wherein some authors may be self-diagnosing. Offline clinical trials, similar to those undertaken by Skårderud, asking medically diagnosed participants to express themselves in written form in the first person, could validate the embodied anaphoric hypothesis.

Embodiment in social media is confronted to the polysemy of the I/i, creating a complex contingency. As such there are surely further layers; and given the results from Anonymous (2023), there are clearly also diagnostic overlays with sufferers of depression, meaning that any further inquiry needs to be more fine-grained.

6 Further work

Although I am confident in this theoretical proposal, one cannot categorically state that <i> is a marker for Reflective Function impairment based on a sole quantitative study. Also, the high correlation for apparent AN sufferers cannot—given the data source—confirm concretism. Further social media research would be required, ideally linked to identifiable and traceable participants, which is scientifically challenging and a huge ethical barrier. Similar offline clinical trials would be welcome, however since the non-standard form offline is considered more transgressive (Anonymized), the study design ought imitate an online writing experience (using unconnected tablets, for example

This paper explored the hypothesis that the embodied non-standard 1SG is a marker of Reflective Function impairment. Analysing a Reddit corpus, significant quantitative (NS1sg occurrences) and qualitative (i.e. 'anaphoric' collocations) evidence was found, supporting the thesis that individuals with anorexia nervosa use the non-standard sign in an embodied sign-signifier-referent diminution, symptomatic of impaired reflective function.

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