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Less formal and more rebellious — An experiment on the social meaning of negative concord in American English

Abstract: Negative concord, which is present in some varieties of English, is considered ungrammatical in 'standard' contemporary English, where negative polarity items are used. While negative polarity item constructions have the semantics of single negation, negative concord constructions are considered ambiguous between a single vs. double negation reading. Recent research shows that the perception of negative concord varies depending on the situational context of its use, the properties of the comprehender as well as the methods of data elicitation (ratings vs. self-reports). We conducted a rating study in US English examining the interpretation and grammaticality of negative concord compared to negative polarity items, and the perception of negative concord speakers regarding their social background and persona. The results show that comprehenders – mostly self-reported non-dialect speakers of US English – interpreted negative concord similarly to negative polarity items, but judged negative concord as ungrammatical. Moreover, they associated negative concord use with lower levels in socioeconomic status and education than negative polarity items; in terms of persona, negative concord use was perceived as less formal and as more rebellious than negative polarity items. Additionally, our study shows experimental evidence for inter-individual (e.g., age- or gender-related) variation in the comprehension and perception of negative concord.

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1 Introduction

In this paper, we focus on negative concord (NC) in comparison to negative polarity items (NPI) in US English taking the perspectives of language comprehension and perception. While some languages, e.g. French (Zeijlstra 2004), include NC as an obligatory feature, it is claimed that today's standard English[1] does not allow such constructions and uses NPIs instead, e.g. *any* and *ever*. NPIs require licensing by negative or negative-like contexts (Kadmon and Landman 1993; Krifka 1995; Giannakidou 2012; Blanchette 2015; Horn 2015) and convey a single negation (SN) interpretation of the sentence. NPIs also appear as standard English translations of NC constructions (Blanchette 2013; Blanchette and Lukyanenko 2019a). Therefore, NC and NPIs can represent functional equivalents in some varieties of English (Tagliamonte 2006; van der Auwera 2017), i.e., as variants of a linguistic variable with the same semantic interpretation (Labov 2006: 145–146). While NPIs appear as grammatical to standard and non-standard English speakers, NC constructions are often considered *ungrammatical* by standard English speakers (cf. Horn 2010; Blanchette 2013). Furthermore, the literature discusses differences of so called standard and non-standard English speakers in terms of their ability to generate mental representations of NC structures: standard English speakers are said to lack the appropriate grammar to interpret co-occurring multiple negative elements as a concord expression, i.e., resulting in the SN interpretation (Longobardi 2017; see Ladusaw 1992 for a discussion on the syntactic interpretation of NC in standard English). Instead, the two negative elements cancel each other out, which results in an affirmative or double negation (DN) statement (cf. Horn 2009). English speakers of non-standard varieties, however, use NC to construct sentences with SN interpretation to varying degrees (Smith 2001). For example, NC is used in different British English dialects (see Bailey and Childs, This volume), e.g., the Scottish dialect Buckie, see (1a), and US English dialects, such as African American Vernacular English (see (1b)) where NC is almost an obligatory feature for negation (cf. Smith 2001; see van der Auwera and Van Alsenoy 2016 for a typological discussion) and Appalachian English (see (1c)), where between 52% to 72% of negations are expressed through NC (Wolfram and Christian 1975).

1 As a general disclaimer, the notions of 'standard vs. non-standard languages' are highly controversial. Thus, it is debatable whether language users can be non-dialect speakers, see discussions on dialects/accent (cf. Lippi-Green 2011), and on standard languages (cf. Lippi-Green 1994; Wolfram and Schilling-Estes 2016).

(1) a. Buckie dialect
She ***didna*** *tak* ***nae*** *money fae us.*
'She didn't take any money from us.'
(Smith 2001: 110)

b. African American Vernacular English
He ***didn't*** *see* ***nothing****.*
'He didn't see anything.'
(Pullum 1999: 48)

c. Appalachian English
There ***wasn't nothing*** *for them to get into.*
'There wasn't anything for them to get into.'
(Blanchette and Lukyanenko 2019a: 2)

Despite the difference in standard and non-standard English, a recent rating study has shown that registers, i.e., intra-individual variation based on situational and functional parameters (Lüdeling et al. 2022; Pescuma et al. 2023), influence the appropriateness ratings of NC constructions in US English (Rotter and Liu 2024). In the rating studies, social relation labels suggesting social distance for formal situations, e.g., *boss*, or social closeness for informal situations, e.g., *mother* (Rotter and Liu 2023), were used to manipulate the register. Native speakers of US and British English read sentences and judged the appropriateness level of NC and NPI constructions on a 7-point Likert scale. The results showed a register sensitivity in the US data set: NCs were rated as less appropriate in formal than in informal situations. No such effect was found in the British data set. Overall, NC constructions were perceived as less appropriate than NPI constructions, independently of the register, but the mean score of NC was well above the middle range of the scale (5). Furthermore, the majority of native US English speakers self-reported in the study that they would not use such constructions and rather prefer NPIs (Blanchette and Lukyanenko 2019a; Rotter and Liu 2024). The authors discuss the possibility that the prescriptive forces that have been at play for centuries (cf. Tieken-Boon van Ostade 1982) and the resulting social stigmatization of NC constructions affect their perception.

Social meaning of language variation is a concept from sociolinguistics describing "the set of inferences that can be drawn on the basis of how language is used in a specific interaction" (Hall-Lew et al. 2021: 3), which index social identities, ideologies, attitudes, and stances of the speaker, hearer, and the situation in which the discourse takes place. Unlike semantic meaning, which is the conventional mapping between form and meaning, linguistic variables generate indexical fields, which describes potential social meanings (Eckert 2008, 2019; Beltrama 2020). For instance, the phonological variant *-in* of the variable *ING* used for present pro-

gressive forms is associated with being relaxed, easy going, but also uneducated, lazy, and inarticulate. The use of the variant *-ing* is associated with being educated, formal, effortful, and articulate, but also pretentious (Campbell-Kibler 2007, 2010). Thus, the linguistic choice indexes a set (or field) of potential positive or negative social meanings, but depending on the situational setting, the utterance's content, the interlocutors, their relationship, as well as the comprehender's stances, expectations, and experiences, the comprehender interprets a sub-set of the potential social meanings (Eckert 2008). For instance, in certain contexts the use of the *-in* form is considered appropriate, such as in informal contexts. Here, the user might be perceived as laid-back and relaxed. The *-ing* variant however, could be perceived as pedantic in the same context. As the link between social meaning and symbol, i.e., linguistic forms but also behaviors or clothing styles, is established in and through interactions, two sides exist: the user side, i.e., the individual using the meaning as 'impression management', a strategy that speakers might use to consciously or unconsciously influence the perception by others (Holtgraves 2002: 86–89; Holtgraves and Kashima 2007; D'Onofrio 2020), and the perception side, i.e., the individual perceiving the symbol and deriving the social meaning from it (Agha 2007: 235).

Classical sociolinguistic methods investigating the impression management side are ethnographies, which enable the researcher to connect with a community and observe their linguistic behavior (Hall-Lew et al. 2021). For instance, ethnography studies of the US and the British school culture showed that members of groups who distance themselves from authorities and the school use more NC constructions than members of groups who feel affiliated with the school (Eckert 1989b, 2019; Moore 2021). Such linguistic behavior could be the result of impression management, marking membership of a particular group and thus adherence to the social values associated with it. The perception side is classically researched with the matched guise technique (Lambert et al. 1960; Lambert 1967): In this method, which was developed to determine attitudes towards a particular language, dialect or accent, audio material, i.e., clips containing different variants of a variable in question is recorded by the same speaker. After listening to a clip, participants then complete a questionnaire about their perception of the speaker, e.g. sense of humor, likability or kindness. The perception side of NC constructions has, to our knowledge, not been sufficiently investigated. Deepening knowledge of social meaning and its relation to the processing will help to better grasp the multifaceted picture of NC in English.

We conducted a rating experiment investigating the interpretation and grammaticality of NC, as well as the social meaning associated to NC use in language comprehension. We focused on the perceived social background and persona linked to NC speakers and inter-individual variation. This serves as a first step before we

proceed to tackle intra-individual variation in different contexts and their interactions in future studies.

Our findings show that NC was interpreted similarly to NPIs but that it was rated as less grammatical. Furthermore, we found that NC gave rise to distinct social meanings from NPI constructions: NC was associated with lower levels in socioeconomic status and education, and perceived as less formal, polite, friendly, and confident, as well as more rebellious than NPI constructions.

This paper is structured as follows: In section 2, we summarize the relevant theoretical and experimental background motivating our experiment. In section 3, we report the details and the results of an experiment in American English. Section 4 briefly discusses the results and concludes the paper.

2 Negative concord in American English

2.1 Interpretation and grammaticality

Along the dimension of negation being a universal component of human language, natural languages can be divided into DN and NC languages according to the availability of interpretations (Zeijlstra 2004; see van der Auwera and Gianollo, this volume for discussion on the distinction between DN and NC languages and the resulting issues). It has been claimed that DN languages lack the SN interpretation for multiple negative elements – in such languages each negative element contributes a semantic negation so that multiple negations cancel each other out and render an affirmative statement. By contrast, NC languages enable the SN interpretation. English, among other languages, cannot be easily placed in these categories. The reason for this is that in English, multiple negations with DN/SN interpretations occur in everyday speech, especially in its non-standard varieties (Smith 2001).

Recent experimental work shows evidence for the potential availability of both the DN and SN interpretations, see Rotter and Liu (2024), a rating study on the interpretation of NC versus NPIs in American English, taking into account registers manipulated via social relations suggesting formal and informal situations. The results showed no register effects in interpretation, but a difference between NC and NPIs. NC was overall rated as less negative than NPIs, which the authors explained by the availability of the DN interpretation; NPIs in comparison are unambiguously interpreted as SN.

While the register did not show an effect on the interpretation of NC in Rotter and Liu (2024), existing literature indicates that certain other contexts, i.e., prosodic or syntactic cues, influence the interpretation. Employing prosodic marking

on both negative elements favours the DN interpretation in dialect speakers of NC languages (Labov 1972a: 146; Thornton et al. 2016; see an analysis of NC in Romanian as a strict NC language which instantiates DN by Ionescu, this volume). Furthermore, the SN interpretation was favoured if the second negative marker was in object position, see (2a), in comparison to one in subject position, see (2b); the latter favoured the DN interpretation (Blanchette 2017). Thus, both SN and DN readings are available in the DN language, i.e., standard English, and the NC language, non-standard English.

(2) a. *I didn't eat no breakfast.*
b. *Nobody didn't eat breakfast.*
(Blanchette 2017: 7)

In general, regardless of the prosody or position, multiple negations with the SN interpretation are perceived as "ungrammatical" (cf. Iyeiri 1999: 141) in modern standard English; this perception is closely related to the prescriptive forces that developed in the 18^{th} century (Nevalainen 1998; see Tieken-Boon van Ostade 1982 for discussion on the development of the grammatical rules in English).

While NC constructions commonly occurred in spoken and written Old and Middle standard English, they were replaced by a single negative element (or negative indefinite like *nothing*) with an NPI (Iyeiri 1999; Smith 2001). The decline in multiple negations was led by 'social climbers' (Nevalainen 1998), which were defined as individuals who excelled in social mobility by moving up at least two levels in the social hierarchy relative to their parental status. Crucially, the increasing use of NPI constructions was introduced by more highly situated and educated men, presumably to enforce a social distinction from lower social ranks. Thus, NC and NPIs obtained their indexical associations (Beltrama 2020) before prescriptive grammar rules were introduced (Nevalainen 2006).

In many North American non-standard English varieties NC is still a frequent feature (cf. Smith 2001), e.g., it is an obligatory feature for the negation in African American Vernacular English (Labov 1972a: 236; Pullum 1999). However, it has not yet been experimentally tested whether the claims about grammaticality hold in the context of US English.

2.2 Social meaning and persona

Social meaning describes the perception and communication of social identities through the means of language variation in social contexts (Eckert 2019; Beltrama 2020). Thereby, the linguistic choice of *functional equivalent forms* (cf. Labov 1972b:

271) can be influenced by the way individuals want to be perceived by others, i.e., impression management and communicative goals (Holtgraves 2002: 87–88, 143; D'Onofrio 2020). During social interactions, people present different personae, which is the expression of multifaceted selves that depend on the social context and the interlocutor. Thus, personae are not existing characters but functional roles, which are associated with specific behavior features (Brown 2020; D'Onofrio 2020), as such also specific linguistic markers and registers. For instance, a person might use the lexical item *supper* when talking to a family member, but use the item *dinner* when talking to their employees; these terms constitute different functional equivalent lexical items referring to the same event uttered in different functional roles. Thus, *supper* might sound more colloquial contributing to the perception of a closer relationship, which is appropriate in a family-internal interaction. *Dinner* sounds more elevated, reflecting a more formal conversational situation (e.g., a work environment), and/or a more formal interlocutor relation due to, say, the social distance or hierarchy.

In addition, registers and thus speech markers can be linked to social identities, e.g., demographic information like gender and age among others (Agha 1998; Beltrama 2020). Examination of gender differences has yielded mixed results in various studies. Some studies report little or no difference, e.g., in the use of indirect speech (Holtgraves 1997). Other studies (Lakoff 1973) have shown that women are less likely to use 'stigmatized forms' (Labov 1972b: 243) and more often use tag questions as well as more polite language than men (Carli 1990). The persona associated with tentative speech includes attributes such as being less competent and credible than people who use stronger expressions (cf. Newcombe and Arnkoff 1979). However, the reason for the variance of the results could be the inherent intertwining of gender with other situational variables (Holtgraves 2002: 71; Svendsen 2019) tied to normative expectations.

The influence of gender on the perception of NC has not been extensively investigated. Eckert (1989a) reports gender differences in adolescents. In the studied age group, the frequency of NC use depended on identification with two contrasting social groups in American high school culture. While the term "*jocks*" describes school-oriented individuals, the term "*burnouts*" is associated with city-oriented and school alienated individuals (cf. Eckert 1989b). The most common use of NC was found among rebellious individuals who identified as burnouts, regardless of gender. Crucially, girls who identified as wilder than regular burnouts, so-called "*burned-out burnouts*" (Eckert 2000: 182–183), showed the greatest use of NC compared to burnout boys and girls (Eckert 2012). NC is thus used as a marker to identify with an anti-authoritarian persona.

Sociolinguistic studies of the first wave (Eckert 2012) found relations between the age or socioeconomic stratification and the frequency of NC use in specific

populations. Wolfram and Christian (1975) report that younger speakers of Appalachian American English use NC constructions more often than older speakers. This effect is reversed for workers speaking the urban dialect of Alabama (Feagin 1979). Social stratification has been attested in both people of color and white people in New York (Labov 1972a), as well as in preadolescent and adult speakers of African American Vernacular English in Detroit.

These examples show how the usage of NC is multifaceted and that different aspects jointly contribute to attitudes towards NC constructions of a group of individuals. However, less has been done on the perception of NC use, i.e., what persona NC use suggests and what characteristics it conveys, and even less so, experimentally.

2.3 Current experiment

As shown in the previous sections, NC has a multifaceted interpretation and social meaning. NC constructions appear ambiguous in their interpretation compared to NPIs: while NPIs instantiate unambiguously the single negative reading, constructions that contain multiple negative elements can be interpreted as affirmative statements (DN interpretation) or SN. Even though many dialects embrace multiple negations as concord constructions, standard English grammar does not allow NC constructions, and prescriptive forces claim their ungrammaticality. In non-standard US English, different extra-linguistic factors, such as age, gender, and socioeconomic status, have an influence on the perception of NC. NC can be used as a tool to construct a persona specific to certain values and living conditions; they appear as stereotypical examples of being against the norm, rebellious, less educated, and alienated from institutions (Eckert 2012). However, sociolinguistic studies have, to our knowledge, investigated the social meaning of NC from an observative point of view using interviews and ethnographies to determine the frequency of NC use specific to social groups. We want to take it a step further and investigate the question using experimental methods with direct measures: What is the comprehenders' perception of NC constructions in terms of their interpretation, grammaticality, and social meaning in American English? We tackle this question with judgment tasks about the interpretation (cf. Rotter and Liu 2024), grammaticality, as well as measures for the speaker's social background and persona. For the social background, we used ratings for the socioeconomic status and education level (Rotter and Liu 2023). The persona measures consisted of adjectives: we used *rebellious*, which was previously attested as a characteristic of the persona associated with NC use (cf. Eckert 1989b), and, for explorative reasons, *formal, polite, confident, friendly, warm,* and *cool* (cf. Liu et al. 2023).

Additionally, we looked at inter-individual variation. Since sociolinguistic studies found age and gender effects in the usage and possibly in the perception of NC, we explored the influence of participants' demographic information on the rating. Based on the literature, we derived the following hypotheses:

(H1) NC constructions would receive higher interpretation ratings than NPI constructions. (NC > NPI)
(H2) NC constructions would be rated as less grammatical than NPI constructions. (NC < NPI)
(H3) NC constructions would receive lower ratings in the social background measures than NPI constructions. (NC < NPI)
(H4) NC constructions would be rated as more rebellious than NPI constructions. (NC > NPI)

3 Experiment

In order to test the aforementioned hypotheses, we conducted an experiment in American English. In section 3.1, we will detail the methodological approach used for the experiment. In section 3.2, we will present the results.

3.1 Method

3.1.1 Participants

104 native speakers of US English participated in the study on the crowd-sourcing platform Prolific (https://www.prolific.co/) and received monetary compensation. The experiment took roughly 35 minutes. All participants provided their informed consent as approved by the Ethics Committee of the Deutsche Gesellschaft für Sprachwissenschaft (DGfS) in the context of SFB 1412 'Register'. Due to the sparse data, we removed the entire data of three participants who indicated to be non-binary. The remaining data set consisted of 101 participants (mean age=39.3(SD=10.9), range=[19,63]; female N=50, male N=51). The participants of the study originate from 37 of the 50 US American states. In total, 7.9% of the participants reported to be dialect speakers with five dialect backgrounds: African American Vernacular English (N=1), Midwestern (N=2), New York (N=1), Southern (N=2), and West American English dialect (N=1) (dialect information missing (N=1)). The majority have completed college (45.5%) or hold a graduate degree (14.9%); 36.6% have completed

high school; 3.0% did not finish high school. More than half of the participants grew up in a suburban environment (57.4%), 27.7% grew up in an urban and 14.9% in a rural environment.

3.1.2 Material and design

The experiment was implemented using PCIbex (Zehr and Schwarz 2018) and hosted on the PCIbex farm platform (https://farm.pcibex.net/). It used a 1-factorial design with the factor NEGATION (NC vs. NPI). Participants were assigned one of four lists in a Latin Square design. We used 12 critical, see (3), and 29 filler items of similar structure. (S1) was a static sentence; it remained the same across the entire experiment (see (3)). (S2) contained the NEGATION manipulation. Sentences contained the contracted form *didn't*, which was present in NC and NPI conditions. The second negative element or NPI was placed in an object NP, which favours the SN interpretation (cf. Blanchette 2017). (Q1) asks for the interpretation and (Q2) for the grammaticality of the sentence.

(3) (S1) Somebody says:
(S2) NC: "I didn't / get / **no** results / so far."
NPI: "I didn't / get / **any** results / so far."
(Q1) Did the person get results so far?
(Q2) Is the sentence grammatical?

3.1.3 Procedure

Participants gave their informed consent before reading the instructions of the experiment. Then, they first familiarized themselves with the experimental setup with two practice sentences.

Each trial started with a fixation cross in the middle of the screen, to be continued by the pressing of the space key (see Panel A of Figure 1). Next, (S1) appeared on the screen (see Panel B of Figure 1), where participants used the space key to continue after they had read the sentence. (S2) was presented as a self-paced reading task, with each chunk — based on their length and position — being represented by a line on the screen (see Panel C of Figure 1). Participants indicated they had read the chunk by pressing the space key. Previous chunks always disappeared so that only the current chunk was visible. (S2) remained as an entire sentence on the screen while participants first answered questions about the perceived **social backgrounds** (*low*/*high socioeconomic status* and *low*/*high education*), then about

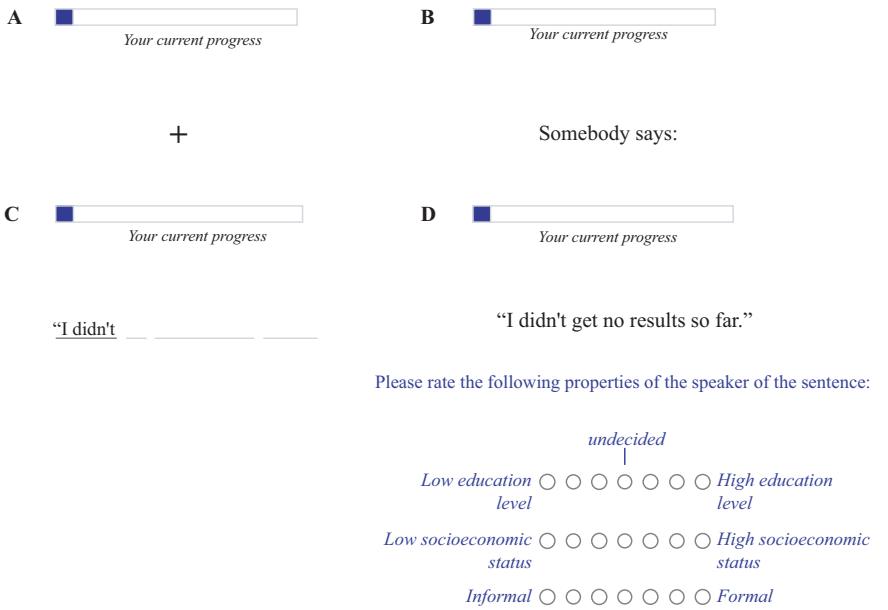

Figure 1: Screenshots of the experimental design. **Panel A** shows the fixation cross. **Panel B** shows the presentation of (S1), and **Panel C** the presentation of (S2). **Panel D** shows the Likert scale ratings.

the **persona** (*in*/*formal*, *im*/*polite*, *un*/*confident*, *un*/*friendly*, *cold*/*warm*, *un*/*cool*, and *obedient*/*rebellious*) of the speaker; the order of these measures appeared in groups of three and the order within the groups was randomized (see Panel D of Figure 1). In the two last screens, the participants first rated the **interpretation** (Q1-*Certainly no*/*Certainly* yes), and on a separate screen, the **grammaticality** (Q2-*Certainly no*/*Certainly yes*). We chose this order to allow for unbiased interpretations and to avoid conflicts when statements need to be interpreted after they have been classified as ungrammatical. The answers to the measures and questions were given on a 7-point Likert scale in which end- and midpoints were labels (i.e., 1:*informal* – 4:*undecided* – 7:*formal*). Participants used the mouse click to indicate their answer. After the experiment, the participants took part in a short demographic survey including their language background.

3.1.4 Data analysis

The data was processed and analyzed with the open source software 'R' (R Core Team 2023) in the RStudio environment (RStudio Team 2023). All participants

matched the inclusion criteria of being English native speakers and aged between 18 to 65 years.

The rating data was analyzed using the package 'ordinal' (Christensen 2019) in the cumulative link function model framework (Liddell and Kruschke 2018; Howcroft and Rieser 2021). Each measure was analyzed in a separate model. The link functions were identified by comparing the loglikelihood values of each of the five possible link functions (i.e., probit, logit, cauchit, loglog, and cloglog) with each other. The function with the highest value was chosen for the model (Christensen 2019). This method has the advantage that the chosen link function follows the shape of the data and accounts for skewness to maximize the model's fit. The used link functions for each model of the analyses are indicated in the result section.

We sum-coded the factor NEGATION (NC: 0.5, NPI: – 0.5), and the demographic factor GENDER (female: 0.5, male: – 0.5). The demographic factor AGE was added as a continuous variable. The models included all main effects, as well as the two-way interactions NEGATION × AGE and NEGATION × GENDER. If a two-way interaction turned out significant, we conducted a sub-analysis by splitting the data along the significant main factor of the interaction. The sub-analysis included the same coding of the main effects. Random effect structures were obtained with the help of the most parsimonious model approach. P-values were obtained with the help of loglikelihood ratio test comparisons of nested models (Bates et al. 2018). Significant levels were defined as below 0.05, marginally significance means values between 0.05 and 0.09. In cases where a NULL-model did not converge, the model's complexity was further reduced. In cases where the model choice was between only subject or only item intercepts (regardless of their slopes), we used the Akaike Information Criterion (AIC) in order to identify the best model; the model with the smaller AIC was chosen. The used models are indicated in the respective result section.

All statistical values of means, estimates and the like are rounded to the second decimals except for p-values smaller than 0.01.

3.2 Results

The descriptive statistics of the ratings of (Q1), (Q2), as well as the perception measures are shown in Table 1. Figure 2 shows the participants' means in comparison to the overall mean. In the following section, we first describe the results of the interpretation and grammaticality in section 3.2.1. Section 3.2.2 deals with the results of the social background measures and section 3.2.3 with those of the persona measures.

3.2.1 Interpretation (Q1) and grammaticality (Q2)

The output of the models for the interpretation and grammaticality ratings are shown in Table 2.

First, for the **interpretation** ratings, the model with the probit-link function and with only random subject intercepts fit the data best. The results showed no significant main effect or interaction.

Second, for the **grammaticality** ratings, the model with the logit-link function and with only subject intercepts fit the data best. The results showed a significant main effect of NEGATION in that NC was rated significantly lower than NPI

Table 1: Descriptive statistics (n=624) of the interpretation (Q1), grammaticality (Q2), social background, and persona ratings.

Measure	NEGATION	Median	Mean	SD	SE
Interpretation	NC	1	1.60	1.31	0.07
	NPI	1	1.55	1.42	0.06
Grammaticality	NC	1	1.84	1.61	0.07
	NPI	7	5.95	1.69	0.07
SES	NC	2	2.49	1.49	0.06
	NPI	4	4.66	1.24	0.05
Education	NC	2	2.38	1.46	0.06
	NPI	5	4.72	1.27	0.05
Formality	NC	2	2.27	1.57	0.06
	NPI	4	4.45	1.55	0.06
Politeness	NC	4	4.02	1.19	0.06
	NPI	5	5.13	1.20	0.05
Confidence	NC	5	5.20	1.44	0.06
	NPI	6	5.66	1.22	0.05
Friendliness	NC	4	4.25	1.34	0.05
	NPI	5	4.88	1.17	0.05
Warmth	NC	4	4.20	1.31	0.05
	NPI	5	4.76	1.24	0.05
Coolness	NC	4	4.00	1.44	0.06
	NPI	4	4.55	1.28	0.05
Rebelliousness	NC	4	4.25	1.48	0.06
	NPI	4	3.29	1.46	0.06

SD is the abbreviation for *standard deviation* and SE for *standard error*. Values were rounded to the second decimal.

($\hat{\beta}$ = – 8.49, $\chi^2(1)$ = 94.90, p < 0.0001). Furthermore, the two-way interaction NEGATION × GENDER turned out significant. In order to resolve the direction of the interaction, we conducted a sub-analysis by splitting the data along the NEGATION factor. The NC model fit best with the logit-link function and subject intercepts. GENDER turned out significant in that NC was rated lower by women than men ($\hat{\beta}$ = – 0.03, $\chi^2(1)$ = 8.19, p < 0.005). The NPI model fit best with the cloglog-link function and subject intercepts. GENDER did not show a significance ($\hat{\beta}$ = 0.29, $\chi^2(1)$ = 1.24, p = 0.27). Thus, the interaction is driven by the GENDER effect in the NC condition, which is not present in the NPI condition.

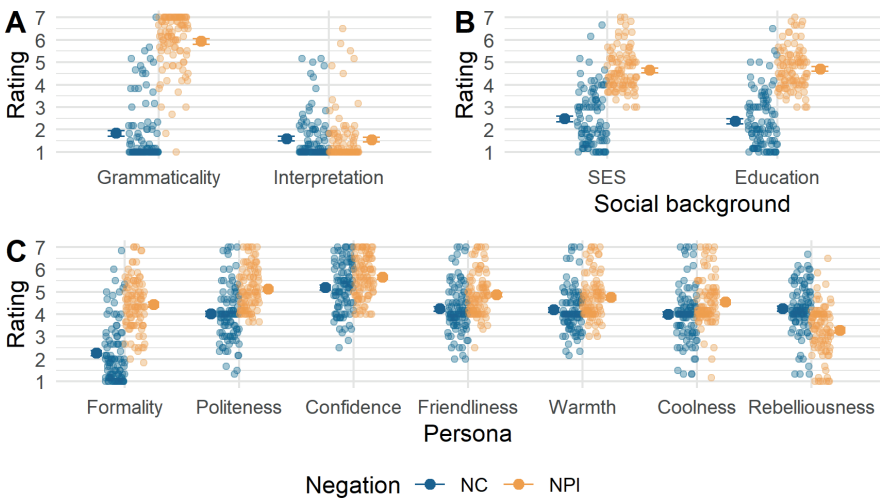

Figure 2: By-subject means of the rating measures in comparison to overall means. **Panel A** depicts the mean ratings of the grammaticality and interpretation, **Panel B** those of the social background measures, and **Panel C** those of the the persona measures; the x-axis indicates the specific measures. The colours indicate the factor NEGATION with NC, i.e., *negative concord*, in blue, NPI, i.e., *negative polarity items* in yellow. The y-axis depicts the ratings on a 7-point Likert scale. Transparent dots represent by-subject means, opaque dots show the overall mean with error bars. SES abbreviates *socioeconomic status*.

Table 2: Results of the interpretation and grammaticality measures.

		Fixed effects			Model comparison	
	Estimates	$\hat{\beta}$	**SE**	**z-value**	$\chi^2(1)$	**p-value**
Interpretation	NEGATION	0.23	0.37	0.62	0.38	0.54
	AGE	−0.01	0.02	−0.38	0.15	0.70
	GENDER	−0.33	0.32	−1.05	1.10	0.29

Table 2 (continued)

		Fixed effects			Model comparison	
	Estimates	$\hat{\beta}$	**SE**	**z-value**	$\chi^2(1)$	**p-value**
	NEG × AGE	<−0.01	0.01	−0.01	0.02	0.99
	NEG × GENDER	−0.28	0.18	−1.54	2.36	0.12
Grammaticality	NEGATION	−5.37	0.57	−3.88	95.21	<0.0001 *
	AGE	−0.02	0.01	−1.13	2.07	0.15
	GENDER	−0.37	0.30	−1.98	1.47	0.23
	NEG × AGE	0.01	0.01	−0.13	0.77	0.38
	NEG × GENDER	−1.46	0.29	−2.75	25.94	<0.0001 *

SE is the abbreviation for *standard error* and NEG for the factor *NEGATION* and SES for socioeconomic status. Estimate expressions including '×' indicate their two-way interaction. '*' at p-values indicates that the factor is significant.

3.2.2 Social background measures

The output of the models for ratings of the social background are shown in Table 3.

Table 3: Results of the two social background measures.

		Fixed effects			Model comparison	
	Estimates	$\hat{\beta}$	**SE**	**z-value**	$\chi^2(1)$	**p-value**
SES	NEGATION	−1.06	0.28	−3.75	14.15	0.0002
	AGE	−0.02	0.01	−2.11	5.54	<0.02 *
	GENDER	−0.20	0.17	−1.20	1.06	0.30
	NEG × AGE	−0.03	0.01	−4.29	17.40	<0.0001 *
	NEG × GENDER	−0.28	0.15	−1.89	2.95	0.09
Education	NEGATION	−1.40	0.28	−5.09	25.82	<0.0001 *
	AGE	−0.01	0.01	−0.71	0.51	0.48
	GENDER	−0.53	0.21	−2.48	5.99	0.01 *
	NEG × AGE	−0.02	0.01	−3.44	11.98	0.0005 *
	NEG × GENDER	−0.57	0.15	−3.82	14.59	0.0001 *

SE is the abbreviation for *standard error*, NEG for the factor *NEGATION*, and SES for *socioeconomic status*. Estimate expressions including '×' indicate their two-way interaction. '*' at p-values indicates that the factor is significant.

First, for the **socioeconomic status (SES)** measures, the model with loglog-link function and subject as well as item intercepts fit the data best. The results revealed a significant main effect for NEGATION in that the socioeconomic status for NC is rated lower than NPI ($\hat{\beta} = -1.06$, $\chi^2(1) = 14.15$, $p = 0.0002$). The main effect AGE turned out significant in that the higher the age, the lower the socioeconomic status is rated ($\hat{\beta} = -0.02$, $\chi^2(1) = 5.54$, $p < 0.02$). Furthermore, the two-way interaction NEGATION × AGE showed a significance ($\hat{\beta} = -0.03$, $\chi^2(1) = 17.40$, $p < 0.0001$). In order to resolve the direction of the interaction, we conducted a sub-analysis by splitting the data along the NEGATION factor. The NC model fit best with the loglog-link function and item and subject intercepts with age random slopes. The results showed that AGE turned out significant in that the higher the age, the lower the socioeconomic status rating for the NC conditions ($\hat{\beta} = -0.06$, $\chi^2(1) = -21.27$, $p < 0.0001$). The NPI model fit best with the cloglog-link function and only subject intercepts. The result revealed no significant effect of age ($\hat{\beta} < 0.01$, $\chi^2(1) = 0.18$, $p = 0.68$). Thus, the interaction is driven by the AGE effect in the NC condition, which is not present in the NPI condition.

Second, for the **education level** measure, the model with the loglog-link function and only subject intercepts fit best. The results showed a significant main effect of NEGATION in that NC was rated lower than NPI constructions. The main effect GENDER turned out significant in that females rated the education level lower than males ($\hat{\beta} = -0.53$, $\chi^2(1) = 5.99$, $p = 0.01$). The two-way interaction NEGATION × AGE turned out significant ($\hat{\beta} = -0.02$, $\chi^2(1) = 11.98$, $p < 0.0005$). Furthermore, the two-way interaction NEGATION × GENDER showed a significance as well ($\hat{\beta} = -0.57$, $\chi^2(1) = 14.59$, $p = 0.0001$). Therefore, we conducted a sub-analysis by splitting the data along the NEGATION factor. The NC model fit best with the loglog-link function and subject as well as item intercepts. The result showed a significant main effect of AGE in that the higher the age, the lower the education level rating for the NC condition ($\hat{\beta} = -0.05$, $\chi^2(1) = 7.24$, $p = 0.007$). GENDER turned out as marginally significant in that women rated the education level lower for NC conditions than men did ($\hat{\beta} = -0.73$, $\chi^2(1) = 3.04$, $p = 0.08$). The NPI model fit best with the probit-link function and only subject intercepts. The results revealed no significant effect GENDER ($\hat{\beta} = -0.25$, $\chi^2(1) = 1.35$, $p = 0.25$). Thus, the interaction is driven by the marginally significant GENDER effect in the NC condition which is not present in the NPI condition.

3.2.3 Persona

The output of the models for ratings of the persona measures are shown in Table 4. The results in the measures of formality, friendliness, warmth, and coolness are similar, but not for that rebelliousness.

Table 4: Results of the seven persona measures.

	Fixedeffects				Modelcomparison	
	Estimates	$\hat{\beta}$	**SE**	**z-value**	$\chi^2(1)$	**p-value**
Formality	NEGATION	−1.33	0.28	−4.81	23.21	<0.0001 *
	AGE	−0.01	0.01	−1.15	1.31	0.25
	GENDER	−0.36	0.23	−1.59	2.51	0.11
	NEG × AGE	−0.02	0.01	−2.87	8.28	0.004 *
	NEG × GENDER	−0.51	0.15	−3.45	11.92	0.0006 *
Politeness	NEGATION	−1.06	0.28	−3.75	14.14	<0.0002 *
	AGE	0.01	0.01	1.00	0.99	0.32
	GENDER	0.12	0.25	0.47	0.22	0.64
	NEG × AGE	<−0.01	0.01	−0.58	0.34	0.56
	NEG × GENDER	−0.04	0.15	−0.28	0.08	0.78
Confidence	NEGATION	−0.64	0.25	−2.60	6.79	0.009 *
	AGE	0.01	0.01	0.62	0.38	0.54
	GENDER	0.26	0.24	1.08	1.16	0.28
	NEG × AGE	<0.01	0.01	0.55	0.31	0.58
	NEG × GENDER	−0.15	0.13	−1.13	1.28	0.26
Friendliness	NEGATION	−0.52	0.27	−1.93	3.74	0.05 *
	AGE	0.02	0.01	1.29	1.66	0.20
	GENDER	−0.04	0.29	−0.13	0.02	0.89
	NEG × AGE	−0.01	0.01	−0.91	0.83	0.36
	NEG × GENDER	0.30	0.15	2.01	4.05	0.04 *
Warmth	NEGATION	−0.40	0.27	−1.51	2.29	0.13
	AGE	0.01	0.01	1.15	1.32	0.25
	GENDER	0.02	0.26	0.08	0.01	0.94
	NEG × AGE	−0.01	0.01	−0.98	0.96	0.33
	NEG × GENDER	0.32	0.15	2.17	4.69	0.03 *
Coolness	NEGATION	−0.15	0.28	−0.54	0.30	0.59
	AGE	0.01	0.01	0.81	0.66	0.42
	GENDER	0.14	0.29	0.47	0.22	0.64
	NEG × AGE	−0.01	0.01	−2.00	4.00	<0.05 *
	NEG × GENDER	−0.15	0.15	−0.94	0.89	0.35
Rebelliousness	NEGATION	1.90	0.42	4.54	20.86	<0.0001 *
	AGE	<0.01	0.02	0.03	0.01	0.98
	GENDER	−0.44	0.33	−1.36	1.82	0.18

Table 4 (continued)

	Fixedeffects				Modelcomparison	
	Estimates	$\hat{\beta}$	**SE**	**z-value**	$\chi^2(1)$	**p-value**
	NEG × AGE	–0.01	0.01	–1.06	1.11	0.29
	NEG × GENDER	0.47	0.22	2.11	4.44	< 0.04 *

SE is the abbreviation for standard error and NEG for the factor NEGATION. Estimate expressions including '×' indicate their two-way interaction. '*' at p-values indicates that the factor is significant.

First, for the **formality level** measure, the model with the loglog-link function and only subject intercepts fit the data best. The result showed a significant main effect of NEGATION in that the formality for NC was rated lower than for NPI conditions ($\hat{\beta} = -1.33$, $\chi^2(1) = 23.21$, $p < 0.0001$). The two-way interaction NEGATION × AGE turned out significant ($\hat{\beta} = -0.02$, $\chi^2(1) = 8.28$, $p = 0.004$). Furthermore, the two-way interaction NEGATION × GENDER showed significance as well ($\hat{\beta} = -0.51$, $\chi^2(1) = 11.92$, $p = 0.0006$). Therefore, we conducted a sub-analysis by splitting the data along the NEGATION factor. The NC model fit best with the loglog-link function and only subject intercepts. The results revealed a marginally significant main effect of AGE in that the higher the age, the lower the formality rating for NC conditions ($\hat{\beta} = -0.03$, $\chi^2(1) = 3.21$, $p = 0.07$). Furthermore, the main effect GENDER turned out significant in that women rated the formality levels of the NC condition lower than men did ($\hat{\beta} = -0.79$, $\chi^2(1) = 3.97$, $p < 0.05$). The NPI model fit best with the loglog-link function and only subject intercepts. The results revealed no significant effect of age ($\hat{\beta} = -0.01$, $\chi^2(1) = 0.20$, $p = 0.66$) or GENDER ($\hat{\beta} = -0.11$, $\chi^2(1) = 0.15$, $p = 0.70$). Thus, the interaction between NEGATION and AGE is driven by the AGE effect in the NC, and the interaction between NEGATION and GENDER by the GENDER effect in the NC condition; both effects are not present in the NPI condition.

Second, for the **politeness** measure, the model with the loglog-link function and with only subject intercepts fit the data best. The results revealed a significant main effect of NEGATION in that the politeness for NC was rated lower than NPI conditions ($\hat{\beta} = -1.06$, $\chi^2(1) = 14.14$, $p < 0.0002$). No further effects or interactions showed a significance.

Third, for the **confidence** measure, the model with the probit-link function and only subject intercepts fit the data best. The result showed a significant main effect of NEGATION in that the confidence for NC was rated lower than NPI conditions ($\hat{\beta} < -0.01$, $\chi^2(1) = 6.79$, $p = 0.009$). No further effect or interaction showed significant levels.

Fourth, for the **friendliness** measure, the model with the loglog-link function and only subject intercepts fit the data best. The results showed a marginal main effect of NEGATION in that the friendliness for NC was rated lower than NPI conditions ($\hat{\beta} = -0.52$, $\chi^2(1) = 3.74$, $p = 0.05$). Furthermore, there was a significant two-way interaction of NEGATION × GENDER ($\hat{\beta} = 0.30$, $\chi^2(1) = 4.05$, $p = 0.04$). Thus, we conducted a sub-analysis by splitting the data along the NEGATION condition. The NC and NPI model both fit best with the cloglog-link function and subject as well as item intercepts. In both models, the GENDER effect did not show a significance (NC: $\hat{\beta} = 0.14$, $\chi^2(1) = 0.58$, $p = 0.45$; NPI: $\hat{\beta} = -0.21$, $\chi^2(1) = 0.35$, $p = 0.56$). Thus, the direction of the interaction cannot be determined.

Fifth, for the **warmth** measure, the model with the loglog-link function and subject intercepts fit the data best. The results revealed a significant two-way interaction NEGATION × GENDER, therefore, we conducted a sub-analysis by splitting the data along the NEGATION factor. The NC model fit best with the loglog-link function and only subject intercepts. The results showed no significant effect of GENDER ($\hat{\beta} = 0.20$, $\chi^2(1) = 0.38$, $p = 0.54$). The NPI model was a cumulative linear model and fit best with the cloglog-link function. The results did not reveal a significant main effect of GENDER ($\hat{\beta} = -0.14$, $\chi^2(1) = 2.10$, $p = 0.15$). Thus, the direction of the interaction cannot be determined.

Sixth, for the **coolness** measure, the model with the loglog-link function and only subject intercepts fit the data best. The results revealed a significant two-way interaction NEGATION × GENDER ($\hat{\beta} = -0.01$, $\chi^2(1) = 4.00$, $p < 0.05$). We conducted a sub-analysis in order to resolve the direction of the interaction by splitting the data along the NEGATION factor. The NC model fit best with the loglog-link function and only subject intercepts. The results showed no significant effect of AGE ($\hat{\beta} < -0.01$, $\chi^2(1) < 0.01$, $p = 0.98$). The NPI model fit best with the probit-link function and subject intercepts. The results revealed no significant effect of AGE ($\hat{\beta} = 0.01$, $\chi^2(1) = 1.06$, $p = 0.30$). Thus, the direction of the interaction cannot be determined.

Lastly, for the **rebelliousness** measure, the model with the logit-link function and only subject intercepts fit the data best. The result showed a significant main effect of NEGATION in that the rebelliousness for NC was rated higher than for NPI conditions ($\hat{\beta} = 1.90$, $\chi^2(1) = 20.86$, $p < 0.0001$). Furthermore, the two-way interaction NEGATION × GENDER turned out significant ($\hat{\beta} = 0.47$, $\chi^2(1) = 4.44$, $p < 0.04$); thus, we conducted a sub-analysis by splitting the data along the NC factor. The NC model fit best with the loglog-link function and with only subject intercepts. GENDER did not show a significant level ($\hat{\beta} = -0.18$, $\chi^2(1) = 0.80$, $p = 0.37$). The NPI model fit best with the cloglog-link function and only subject intercepts. The results revealed a marginally significant effect of GENDER in that women rated the NPI condition as less rebellious than men did ($\hat{\beta} = -0.50$, $\chi^2(1) = 2.86$, $p = 0.09$). Thus, the interaction is driven by the GENDER effect in the NPI condition, which is not present in the NC condition.

4 Discussion and conclusion

Our study addressed the comprehension and perception of NC in comparison to NPI constructions in American English. Participants rated the interpretation, grammaticality, as well as social background and persona measures of speakers using NC vs. NPI constructions — by mostly self-reported non-dialect speakers of US English.[2] The results of the experiment are summarized in Table 5.

Table 5: Summary of the results in section 3.2

	NEG	AGE	GENDER	NEG×AGE	NEG×GENDER
Interpr.					
Gram.	NC<NPI				*:NC_F<NC_M
SES	NC<NPI	↑age,↓rating		*:↑age,↓NC	
Education	NC<NPI		F<M	*:↑age,↓NC	*:NC_F<NC_M
Formality	NC<NPI			*:↑age,↓NC	*:NC_F<NC_M
Politeness	NC<NPI				
Confidence	NC<NPI				
Friendliness	NC<NPI				*:x
Warmth					*:x
Coolness				*:x	
Rebel.	NC>NPI				*:NPI_F<NPI_M

Interpr. abbreviates *Interpretation*, Gram. *Grammaticality*, and Rebel. for *Rebelliousness*. NEG stands for the factor *NEGATION*. < indicates that the left entity is smaller than the right one; indicates the reverse. NC is the abbreviation for *negative concord* and NPI for *negative polarity item*. Upwards pointing arrows (↑) indicate the increase and downward arrows (↓) the decrease. F is the abbreviation for *female* and M for *male*. '∗' indicates *significant two-way interactions.* 'x' indicates a significant interaction whose direction cannot be resolved by a sub-analysis.

NC and NPI constructions were rated similarly in terms of their interpretations, contrary to (H1). This indicates that the DN reading was less available and the NC constructions were interpreted as a SN[3], which contrasts previous findings of rating studies (Rotter and Liu 2024). In comparison, in the current study we singled out the critical sentence and did not provide a context to take a first step to empirically investigate the social meaning of NC. The context, however, was a crucial

2 It would be interesting to replicate the study with dialect speakers in follow-up research, which we leave for future occasions.

3 Note that we did not explicitly include affirmative sentences in our experimental material. Thus, we do not directly compare the SN vs. DN interpretation, see Blanchette and Lukyanenko (2019b) for a direct comparison.

aspect in the design of Rotter and Liu (2024). In addition, our study included NC constructions where the second negative element was in an object position – such structures favor a SN over a DN interpretation in comparison to subject positions (Blanchette 2017). Thus, the absence of context and object negation may have facilitated NC as a default interpretation for the majority of participants. As can be seen in Figure 2, there is some variation between subject mean ratings in NC and NPI constructions. The rating range is larger for NPI (1 to 6.5) than for NC conditions (1 to 5), while the ratings of the vast majority are in the lower range of the scale for both conditions, i.e., 1 to 2, indicating a negative interpretation. Overall, the result of the current study suggests that NC constructions are interpreted similarly to NPI constructions, i.e., as SN, with no differences between age and gender groups.

Regarding grammaticality it can be noted that NC was rated as less grammatical than NPI constructions, which confirms (H2). This supports the often claimed *ungrammaticality* of NC, as English speakers are aware of standard English grammar rules. However, as can be seen in Figure 2, there is some variation between participants' mean ratings. While the majority rejected NC as ungrammatical, 12 rated NC as rather grammatical, i.e., their mean rating was above the indecisive point of 4. No pattern can be discerned among these participants, as they vary regarding age, gender, and the environment in which they grew up. However, among the eight self-reported dialect speakers, only one classified NC as grammatical, which shows that most speakers (self-reported dialect speakers or not) are aware of the different grammars, i.e., that of their dialect and of standard English. On the one hand, this hints at an effect of prescriptive pressure. On the other hand, although NC constructions were perceived as ungrammatical, they were nevertheless interpreted as SN in the study, and also judged as appropriate in the given situational context in previous research (cf. Rotter and Liu 2024). Thus, there is a gap between the grammar knowledge (i.e., of standard English) and the usage of NC constructions. This raises the question whether NC is part of the English grammar and in what sense, e.g., passive vs. active knowledge.

The results of the social background measures showed that perceptions of NC related to socioeconomic status and education differed from those of NPI. Both measures show that NC was rated lower than NPI constructions, confirming (H3). In addition, we found a relationship between NC and AGE for all three measures: the higher the age, the lower the rating – no such effect was present for NPI constructions. This suggests that younger generations perceive NC less as an indicator of lower socioeconomic status or lower education levels. The absence of such an effect on the other measures (i.e., interpretation, grammaticality, and the majority of the persona measures) suggests that the effects are specific to the social background measures and are not indicative of a general difference in rating behavior, i.e., that older participants generally have lower ratings than younger participants.

Thus, the age seems to have an influence on the perception of social background characteristics, possibly showing a generational development. Especially, the socioeconomic status was rated lower by older participants independent of the negation type. Many explanations are possible, e.g., it could be related to different reference points, i.e., older people (due to their seniority status in society) could have a higher socioeconomic status than younger people and therefore judge it differently. Regarding the education level, we note that women rated the education level lower independently of the negation type but also within the NC conditions. This could indicate that women are more aware of the social association in relation with NC, i.e., social stigmatization (cf. Labov 2006: 243). It may be that women have learned to be even more critical of NC than men because of social forces, expectations, and awareness (cf. Carli 1990; Lakoff 1973). However, the underlying mechanism for the age and gender effects need further research, as identifying the source of these effects for the socioeconomic status and education levels is difficult since the focus of our study was to distinguish between NC and NPI perceptions.

The results of the persona measures showed distinct characteristics associated with NC and NPI constructions. We note that the use of NC is perceived as less formal, less polite, less friendly, and less confident than that of NPI constructions. In particular, the mean scores for politeness and friendliness vary widely under NC conditions. While the majority of the mean ratings for NPI constructions fall between the undecided point and the maximum of the scale, the NC ratings diverge: Ratings of politeness show the greatest variation, ranging from 1.4 to 7. Mean ratings for perceived friendliness in NC use range from 2 to 7. Ratings of confidence level under NC conditions are similar to those under NPI conditions, with the vast majority ranging from 4 to 7.

The formality of the speaker showed an age effect specific to NC use in that the older the participant, the lower was the rating. A similar effect in the context of situational parameters suggesting different levels of formality, was found in a rating study manipulating on different situational parameters via social relations (Rotter and Liu 2023). Here, older participants showed lower formality ratings for public/formal situations compared to younger participants. However, the sources of such effects are difficult to disentangle from other social variables. Furthermore, while there was an overall difference in that NC was rated as less formal than NPI, women rated the NC conditions lower than men which again can be explained by a higher sensitivity of women with respect to social status and stigmatization. Our finding adds that women also perceive NC constructions as less formal than men.

The results also showed that NC is associated with higher levels of rebelliousness than NPIs, confirming (H4). The rebelliousness measure furthermore showed a gender effect in that women rated NPIs as less rebellious than men; this effect was

not present in NC constructions. Again, this may indicate a greater sensitivity to the impact of language use among women. In terms of coolness or warmth, we were unable to further specify the significant interaction between negation type and age that occurred on measures of coolness, and the interaction between negation and gender that occurred on measures of warmth and friendliness. Such effects might be too subtle to show significant levels in sub-analyses. Crucially, the overall negation effect was insignificant.

The persona and social meaning associated with NC use appears as negative. It is a linguistic marker for (i) lower socioeconomic status and education levels, but also for (ii) more negative concepts, like impoliteness, unfriendly, and less confidence, as well as more rebellious as persona characteristics. Whereas (i) is not surprising given the status of standard English, the stigmatization of NC for English and the prescriptive pressure, (ii) provides insights into the perception of the speaker in using NC. Native speakers of US English (mostly self-reported speakers of non-dialect English in our study) are aware of this perception and therefore reject the use of NC. Furthermore, the results of the grammaticality and education levels might be linked. Grammar rules but also register knowledge in the sense that appropriate language is used in social situations are enforced and taught by institutions, e.g., through school education (cf. Agha 2007: 169). Thus, people might associate violations of grammar rules and registers with lower levels of education, a pattern which may be present in our data as well. Furthermore, this leads to the question whether such patterns might also be present in other English variants, such as British English. Given that NC is well documented in British English dialects (see Smith 2001 for Buckie; Cheshire 1982 for Reading) and that similar usage among different social groups of young people in British school culture as in US high school culture (Eckert 1989a) is documented (Moore 2021), further research is needed to answer the question whether the social meaning of NC is comparable to that of US English.

Before concluding the paper, we would like to briefly discuss the scope and limitations of the study as well as possible outlooks for extending the methodological approach to NC. In our study, we presented individual sentences to participants. We excluded the context as the current study was designed to take a first experimental step towards the perception of NC. However, this type of presentation may have been too limited, since the impression of the interlocutor is formed in a dynamic and multifaceted way during the conversation (Holtgraves 2002: 86). More context could thus help to build a detailed picture of the speaker of the utterance. Furthermore, adding more situational parameters could help to find out whether the social meaning differs in different contexts, e.g. formal speech in informal contexts could be perceived as more distant and thus less friendly than informal speech (cf. Holtgraves 2002: 86). In addition, a possible effect of the interlocutor's gender, ethnicity,

and race as well as register can be further explored. As previously noted in the literature, social meaning and register are linked to norms and expectations (Lakoff 1973; Holtgraves 2002: 192; Agha 2007: 84–85; Eckert 2008). As such, the perception of women using appropriate vs. inappropriate registers differs from when men use an unsuitable register.

Furthermore, we would like to add another methodological remark on the social meaning measures based on adjectives: There is a rich literature on the semantics and pragmatics of gradable adjectives (see Kennedy 1999; McNally and Kennedy 2008) and more recently, rather independently, an increasing interest in social meanings combining linguistic analyses and experimental methods, using gradable adjectives (Burnett 2019; Beltrama 2020; Beltrama et al. 2022; Liu et al. 2023). In our study, we have used a selection of gradable adjectives to elicit comprehenders' perception of NC use, which were partially motivated by previous literature, and partially for explorative reasons. On the one hand, these adjectives are useful for measuring attitudes and social meanings but on the other hand, the data need to be interpreted with caution: 1) The adjectives associated with persona are inherently subjective, judge-dependent, and allowing "faultless disagreement" (Lasersohn 2005). That is, a person can find NC use 'cool' and another person can find it 'not cool', while both are right. This is in line with the finding of our study about variation in NC perception due to group differences in gender or age. 2) Relatedly, language users might have different understandings of the used adjectives per se as well. On this matter, we have engaged in an informal discussion about the notion of "rebelliousness" with two students both in their 20s at our university: one who identifies as queer and one who does not. For the former, the adjective has a relatively positive interpretation but for the latter, it has a rather negative meaning. This is in line with our results that there was the greatest variation for this measure in both NC and NPI (see Figure 2) – in contrast to the other measures in terms of degree of variation, where an effect for NPI was mostly absent. Nevertheless, our results also show that overall, "rebelliousness" has rather negative connotations, in comparison to the results of the other measures, potentially showing the effect of normative values and normative social behaviors. For future studies, the question of what adjectives should be used in a social meaning study needs further investigation and a case-to-case consideration. Lastly, we want to note that given the great variation in the nature of social meaning, the used sample might be still restricted to reach the optimal representativeness, in particular, as the subjects in the study were mostly self-reported non-dialect speakers.

With these factors taken into consideration, we report a study as one of the first that experimentally revealed a different social meaning of NC compared to NPIs.

The results show that comprehenders – mostly self-reported speakers of non-dialect US English – interpreted NC similarly to NPI, but judged NC as ungrammatical. Moreover, they associated NC use with lower levels in socioeconomic status and education than NPI; in terms of persona, NC use was perceived as less formal, but as more rebellious than NPI. Our study shows experimental evidence for inter-individual (i.e., age- and gender-related) variation in the comprehension and perception of NC.

Data repository

The datasets for this study can be found in the online repository: https://osf.io/zmw46/

Author contributions

S.R. and M.L. designed the study together. S.R. conducted the experiments and the data analyses; both authors were responsible for the interpretation of the data. S.R. prepared the first draft of the manuscript, with revisions from M.L. M.L. provided funding, project administration, and resources.

Abbreviations

AIC	Akaike Information Criterion
DN	double negation
F	female
gram.	grammaticality
interpr.	interpretation
M	male
NC	negative concord
NEG	NEGATION (i.e., factor in the experimental set-up)
NPI	negative polarity item
rebel.	rebelliousness
SD	standard deviation
SE	standard error
SES	socioeconomic status
SN	single negation

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