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The ambiguous relation between verbal irony understanding and need for cognitive closure: Reports from two studies

Research on individual differences in irony understanding is not sparse, however the need for cognitive closure (NFC) has not been taken into consideration yet. This article presents the results of two studies on the relation between irony understanding and NFC. The Need for Cognitive Closure Scale in a Polish adaptation and a set of short vignettes with ironic statements were used in both studies. Two hundred and fifty-two (Study 1) and 137 (Study 2) participants completed the study. Results of Study 1 showed no statistically significant relation between irony understanding and NFC, while Study 2 showed a statistically significant, negative correlation between the closed-mindedness subscale of NFC and understanding of praise-by-blame irony. Moreover, in both studies, the ratings of playfulness, criticism, and flattery of ironic statements were analyzed.

Key words: individual differences, irony, need for cognitive closure, verbal irony, irony understanding

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A short definition of verbal irony describes it as saying the opposite of what is meant (e.g., Averbeck, 2013). Usually, it is used to criticize someone or the current situation (Pexman & Olineck, 2002) or, less often, to compliment (Bromberek-Dyzman, 2011). It is not a rare language phenomenon – irony appears in around 8% of statements uttered during conversations between friends (Gibbs, 2000), and even more often in computer-mediated communication (Aguert et al., 2016). Despite that, irony understanding is not always immediate – it requires language competence as fluency, the ability to recognize nuance and ambiguity (Bromberek-Dyzman, 2011), and experience in personal use of this type of speech (Banasik-Jemielniak & Bokus, 2019). Knowledge about the context and current situation is also important (Bromberek-Dyzman, 2011).

However, individual characteristics not related to language fluency or situational factors may also play an important role in understanding irony. As the systematic review of to-date research on irony use and understanding showed (Kałowski et al., 2023), personality, social competencies, or cognitive abilities are also crucial for flawless ironic communication. For example, it is worth considering the need for cognitive closure (NFC), which is connected to looking for explicit problem solutions and avoiding ambiguous situations (Kruglanski & Webster, 1996). High NFC is characterized by a preference for certain, unambiguous information, order, and predictability (Kossowska et al., 2012). However, this construct is related to the motivational dimension of cognitive functioning, not mental abilities (Kruglanski & Webster, 1996).

Because of these characteristics of NFC, it is assumed that people with a higher need for structuring, a tendency to simplify, and to rely on schemas may have more difficulty in understanding ironic statements than people who are more cognitively flexible. Relying on a literal, first layer of speech leads to a misunderstanding of the intended meaning, and as previous research showed – people with a higher NFC are sensitive to information that comes first, not paying equally much attention to that coming later (Kossowska, 2003; Webster & Kruglanski, 1997). However, it must be noted that some models of irony processing do not consider literal meaning as the first layer of an ironic statement. For example, the one-phase model of irony processing (Banasik-Jemielniak & Bokus, 2019; Bromberek-Dyzman & Rataj, 2016), described also as the direct access model (DAM, Gibbs, 1994) assumes that irony is comprehended as fast as literal statements – ironic speech does not require prior activation of the literal meaning, the context and linguistic cues are processed in parallel, and an ironic interpretation appears immediately when cues suggesting such meaning are noticed (Bromberek-Dyzman, 2011; Colston & Gibbs, 2007; Pexman, 2008). Similar assumptions are part of the graded salience hypothesis (Giora et al., 1998), which assumes that the order of activated meanings is crucial for statement processing. These activated first determine understanding of what is important – these do not have to be literal meanings but can be nonliteral as well. Due to this, nonliteral (e.g., ironic) statements can be processed as quickly

as literal ones – the most important is clarity of information, conventionality of statement, prototypicality, or frequency of occurrence in everyday language (Colston & Gibbs, 2007; Giora, 1999).

Nevertheless, depending on the methodology and types of irony analyzed, current research does not confirm clearly if these assumptions are accurate – sometimes irony is understood better than literal statements (e.g., Bromberek-Dyzman & Rataj, 2016; Giora, 1999), but sometimes – worse (e.g., Bromberek-Dyzman, 2011; Giora, 1999). That is why it is important to research irony processing taking into consideration not only the importance of the linguistic cues and irony characteristics but also characteristics of cognitive functioning that may play a role in the whole process.

The aim of this article was to present results from two studies analyzing the relation between NFC and verbal irony understanding, considering the importance of perspectives taken by participants in interpreting irony. Moreover, the perception of playfulness, criticism, and flattery of ironic statements was investigated.

Verbal Irony

As stated above, irony may be described simply as saying the opposite of what is meant (e.g., Averbek, 2013). However, it is a complex, broad phenomenon. Being a type of figurative language, it has two layers: literal and nonliteral (Bryant & Fox Tree, 2002; Wilson & Sperber, 2007). It is characterized by ambiguity, intentionality, and dependence on the context (Gucman, 2016). Most researchers focus on the conflict between the literal and nonliteral meaning, considering it the most important for understanding irony (Allemann, 2002; Bromberek-Dyzman, 2011).

At the same time, irony is not just a way of saying something that could be said literally, but in a nondirect way – the ironic message is also supposed to carry an emotional meaning (Bromberek-Dyzman, 2011; Ososiński, 2014; Szturc, 1994). It could be a way to combine seriousness with a joke, soften criticism, or express praise in a nonobvious way (Ososiński, 2014). The most prototypical form, ironic criticism – blame-by-praise irony – is supposed to, in some situations, soften the criticism, but in others – enhance the harsh overtone of the statement (Gucman, 2016). On the other hand, ironic compliments – praise-by-blame irony – are rarely used, mostly to save one's face, when complimenting someone may be threatening to one's self-presentation, for example, in the group of new people (Hutcheon, 2002; Milanowicz et al., 2017). As complimenting someone is seen as something that is supposed to please the other person, praise-by-blame irony is considered less prototypical and more difficult to comprehend (Hutcheon, 2002; Milanowicz et al., 2017).

Another important feature of ironic conversation is the perspective that the participant takes – the absence or presence of a personal component may be important for irony understanding and its perception in general. It is possible to distinguish at least three perspectives concerning irony speech comprehension. Firstly, people could be receivers of the ironic statement – in other words,

addressee or aim of the irony (e.g., Jorgensen, 1996). Secondly, it is possible to observe or witness a conversation where irony appears, not being the aim of this ironic statement. However, being present in the situation could be interpreted as the presence of a personal component. And lastly, it is possible to receive a narration about the conversation where verbal irony appears. The person is not present or involved in the described situation, just reads or hears a story with an ironic statement (e.g., Pexman & Zvaigzne, 2004). In this case, no personal component is involved.

One of the aims of this article was to see if the perspective taken by the participant is related to verbal irony understanding. Two perspectives were taken into consideration – that of a receiver of irony and a receiver of narration about a conversation where irony appears. Moreover, the ratings of playfulness, criticism, and flattery of irony were analyzed to see whether the perception of irony would differ depending on the perspective taken in the conversation.

Need for Cognitive Closure

As indicated earlier, irony understanding relies on many factors related to individual differences. One of the potentially important characteristics is NFC (Kossowska et al., 2012; Webster & Kruglanski, 1994). It is connected to the process of opinion formulation and information processing in various areas of social functioning. A high need for cognitive closure is connected to more stereotypical judgments, sensitivity to the priming effect, and a worse ability to cope with a large inflow of new information (Kossowska, 2005; Kossowska et al., 2012; Kruglanski & Webster, 1996).

According to Webster and Kruglanski's (1997) theory, knowledge formulation takes place in two phases: seizing and freezing. The first phase consists of searching for information, formulating conclusions, and striving to reduce uncertainty about reality (Błoch & Doliński, 2006). The second stage is based on consolidating ("freezing") the gained knowledge (Błoch & Doliński, 2006). People with higher NFC tend to quickly consolidate acquired knowledge and withdraw from processing new information (Kruglanski & Webster, 1996).

It also seems that people with higher NFC more often look for the causes of someone's behavior in their personality, and not in situational factors (Kruglanski & Webster, 1996). This is consistent with other findings regarding high NFC – such people prefer abstract (general) rather than specific (detailed and situational; Kruglanski, 2004; Kruglanski & Webster 1996) descriptions of people and situations.

Research on situationally induced high NFC showed that it can interfere with taking others' perspectives, especially when their characteristics differ from the characteristics of the person with high NFC (Webster & Kruglanski, 1997). This may be important for interpersonal communication in which sharing the perspective and the ability to assume the position of the other person enables an adequate understanding of the statements said by the interlocutor (Kruglanski, 2004).

The Relation Between Verbal Irony Understanding and the Need for Cognitive Closure

Knowing that irony is an ambiguous part of speech and NFC is related to preference and/or ability to process ambiguous information, it may be hypothesized that these characteristics of cognitive functioning may play an important role in irony comprehension. However, no previous research in this area was conducted, and it is difficult to draw certain conclusions or to interpret this relation with certainty. In this case, treating the ironic statement as an ambiguous task to be resolved may help in showing the expected relation between described concepts. Firstly, solving an ambiguous and complex task requires a decision when a correct answer has been reached (Kruglanski, 2004; Nair & Ramnarayan, 2000). Cognitive closure achieved too early may result in ignoring important information incoming after the closure, which leads to incorrect solution of the task. Research by Webster and Kruglanski (1994) showed a weak, negative correlation between the cognitive complexity of a task and NFC – solving a complex task was less pleasant for people with higher NFC than for those with a lower NFC. The low level of NFC allows for a more thorough analysis of the incoming information, which results in achieving cognitive closure later, and is connected to building a more complex and complete picture of the task or situation (Kossowska, 2003; Nair & Ramnarayan, 2000). Such characteristics of cognitive functioning of people with high and low NFC may differently impact interpersonal communication (Kruglanski & Webster, 1996), and thus the understanding of verbal irony in everyday communication.

Moreover, the ambiguity intolerance included in the definition of NFC associated with difficulties in integrating and recognizing the positive and negative aspects of an object or situation may be significant for understanding irony (Kossowska, 2003; Webster & Kruglanski, 1994), as it is often based on the inconsistency of positivity and negativity (Allemann, 2002; Czajeczny, 2016). Additionally, people with higher NFC tend to rely on the most memorable, expressive, or first information (Webster & Kruglanski, 1994). Moreover, they tend to experience discomfort in ambiguous situations, which favors a superficial analysis of the situation and leads to simplified interpretation. People with lower NFC should have no problems with understanding irony – the tendency towards deeper and less superficial analysis is helpful in decoding ambiguous information.

In conclusion, we assumed that people with a greater need for structuring, and a tendency to simplify and rely on established schemas may have more difficulty in understanding ironic statements than people who are more cognitively flexible. Relying on a direct, easily accessible layer of speech leads to a misunderstanding of the interlocutor, more cognitive errors, and less effective information selection (Kossowska, 2003; Webster & Kruglanski, 1997). Understanding irony requires a deeper analysis of statements, going beyond the scheme and information provided directly. High NFC would be associated with worse understanding of ironic statements, and low NFC – with better understanding.

Additionally, it is important to treat blame-by-praise irony and praise-by-blame irony separately. As mentioned before, blame-by-praise irony is more prototypical and widely used, while praise-by-blame irony is generally harder to process (Milanowicz et al., 2017).

The Current Study

This article aimed to analyze the relation between verbal irony understanding and NFC. Two studies using the same methodology were conducted, the only difference between them being the perspective taken by the participants in short stories measuring verbal irony comprehension. In Study 1, participants were not involved in the vignettes, they read narration containing ironic statements directed toward one of the characters in the story. In Study 2, participants were receivers of ironic statements – they were involved personally in the story. Besides analyzing the relation between irony understanding and NFC, we also considered participants' ratings of playfulness, criticism, and flattery of the presented ironic statements to see if being the receiver of the irony or receiver of the narration of the irony would change the general perception of irony.

Study 1

Research Question and Hypotheses

The main aim of the Study 1 was to check whether verbal irony understanding is related to NFC. The hypothesis was that the level of NFC, understood as a constant cognitive trait, would be negatively correlated with verbal irony understanding. This prediction was based on the knowledge that NFC has different consequences for cognitive and social functioning (Kruglanski, 2004). The two sides of the NFC continuum differently shape the information processing and the attitudes toward ambiguous situations and information (Kossowska, 2003; Webster & Kruglanski, 1997). Higher NFC is related to a higher tendency to simplify and rely on well-known schemas. It may cause difficulties with verbal irony comprehension. Due to that, it was predicted that people with higher NFC would perform worse in verbal irony understanding.

While the hypothesis was formulated for irony comprehension in general, blame-by-praise irony and praise-by-blame irony were analyzed separately – as praise-by-blame irony comprehension is generally worse due to its nonprototypicality, the results of its understanding may be lower for the whole sample. Separation of these types of irony allows controlling the effect of the prototypicality of specific statements.

Moreover, we explored the ratings of playfulness, criticism, and flattery of ironic statements. No specific hypotheses were made in this case.

Method

The study was conducted on the population of young Polish adults aged 18-30. The sample was defined as young adults, where the upper limit is usually set around the age of 30 (Trempała, 2012). Moreover, the rationale for such a choice was that humor-related behaviors tend to change across the life span (e.g., Martin et al., 2003), and irony is often considered as one of them (e.g., Ruch et al., 2018). To avoid confounding results by age, we decided to limit the sample to the young adult population. Overall, 252 participants completed the study. Two of them were not included in the analysis due to their age not matching the above assumption (age above 30).

Finally, data obtained from 250 participants ($M_{\text{age}} = 22$, $SD = 2.85$) were analyzed. The sample consisted of 174 women (69.9%) and 75 men (30%). One person identified as nonbinary. 50% of the sample were students, and 32% of people had higher education. The rest of the sample (18%) consisted of participants without higher education and not currently studying.

Measures

The Irony Comprehension Questionnaire

The Irony Comprehension Questionnaire was a measure built for the current study. Although similar measures already exist, for example, the Test of Verbal Irony Detection Aptitude (Bruntsch & Ruch, 2017) or the Irony Processing Task (Milanowicz, 2016), they do not fully cover the aim of the current study. It was designed to measure understanding of two irony types: blame-by-praise (meant to criticize someone or the situation), and praise-by-blame irony (meant to compliment someone or the situation), and the participant's ratings of playfulness, criticism, and flattery of the presented statements.

The questionnaire consists of 12 short vignettes mirroring real-life situations. The content of the stories was proposed by the authors, while their form was based on previous tools used in irony research, for example, Kałowski (2017), Gucman (2015), and Bajerski (2015). Each story consists of two to three sentences describing the context, and one statement uttered by one of the vignettes' characters. All vignettes were formulated in a way that put the participant in the perspective of a receiver of the narration about the irony. It was crucial to avoid including personal aspects in the proposed stories. To mask the real aim of the questionnaire (measuring irony comprehension) half of the vignettes contained literal statements, and the other half contained ironic ones.

Vignettes were chosen based on competent judges' ratings. Five judges, experts in the area of irony research, received detailed instruction (describing the purpose of the questionnaire and the aim of the study) asking them to evaluate 24 short stories containing ironic and literal statements. They received a set of 24 randomly arranged vignettes: eight with blame-by-praise irony, eight with

praise-by-blame irony, and eight with literal statements. At first, they were asked to group the vignettes into the three above categories to see whether the vignettes fit them properly. They did not know how many items each category should have contained and were supposed to decide which vignette best represented each category. The competent judges achieved complete agreement in terms of accurately assigning the statements to each category.

In the second step, the competent judges were asked to rank the vignettes in the three previously distinguished categories, from those fitting the best (rank = 1) to those fitting the least. Assigning the highest value in a given category meant that this vignette was the worst representation of the category in the proposed pools. The highest value depended on the number of vignettes assigned to a given category. Then, the statements with the biggest discrepancies (range of assigned values greater than the half of scale, i.e., 4) in the assessment were removed from the pool. It was considered that such large discrepancies may be caused by poor wording or difficulties in the interpretation of the vignette.

After removing the ambiguous vignettes, 12 vignettes remained in the pool. Six were literal (buffer tasks), and six were ironic. W Kendall's analysis of consistency ratings showed that the competent judges' compliance was satisfactory ($W = .43$, $p < .05$). Due to that, these 12 vignettes were included in the final version of the tool. Three were related to blame-by-praise irony, for example:

The last few days have been hard for Martha. She missed her dishwashing turn in the flat she shares with her friend. Her friend, seeing the sink full of dirty dishes, says to her: *It's great that you care about our flat so much!*

Another three vignettes contained praise-by-blame irony, for example:

Dominica celebrates her twentieth birthday today. On this occasion, her boyfriend Cristian prepared a gift in the form of tickets for a concert by her favorite band. Opening the gift, Dominica said: *I see you do not know what I like at all!*

Six vignettes contained literal statements, treated as buffer items, helping to not show the real purpose (measuring irony understanding) of the study, for example:

Michael was supposed to throw out the rubbish before going to work. Due to the rush, he forgot to do it. It happened for the third time this week. When his wife came home, She saw the basket full and said: *You didn't throw out the trash again!*

All vignettes were presented in a perspective that did not contain any personal components. Participants were receivers of the narration about a situation where an ironic statement appeared.

Participants were asked to answer an open-ended question related to irony understanding ("How, in your opinion, can this statement be understood?"). We chose to use an open-ended question to receive a spontaneous interpretation of the presented statement. Likert scales or cafeteria-type questions are widely used in such research (e.g., Brunsch & Ruch, 2017), however, they suggest an ironic interpretation of the presented statement. The use of open-ended questions enables capturing a natural and spontaneous way of understanding irony. Interpretations were then evaluated by three competent judges, recruited from the group of judges participating in the vignette selection. Before the evaluation, the judges received detailed instructions including a description of the purpose of the study, a request to evaluate the answers in terms of the correctness of the interpretation of three types of statements (blame-by-praise irony, praise-by-blame irony, and literal statements), and the evaluation criteria. The instructions also contained examples of correct and incorrect interpretations of the presented stories. Besides that, judges received the full version of the measure, an Excel spreadsheet containing participants' answers with the columns prepared for entering the score and any additional comments. Each answer was assigned a value of 0 (clearly incorrect interpretation) or 1 (clearly correct interpretation). The judges assessed a total of 2424 statements from 250 participants. To check the compatibility of the judges' assessment, the Krippendorff α index (resistant to missing data, which is common for open-ended questions) for each story was calculated. Its values ranged between 0.80 and 0.97, which indicates high agreement among judges. Therefore, we were able to proceed with the next steps of analysis.

For each vignette, the average of the competent judges' scores was calculated. Fractions were rounded to the nearest integer – 0 or 1. The final score of irony understanding, for both irony types, was calculated by summing the item scores. The score varied from 0 to 3. The higher the score, the better the irony understanding.

We also decided to measure the perception of playfulness, criticism, and flattery of the presented statements. For this purpose, a five-point scale was used, where "1" means that the statement is not critical, flattering, or playful at all, while a rating of "5" means that the given item is very critical, flattering, or playful. The assessment of criticism and flattery also allows us to conclude understanding the intention of the presented statement – noticing criticism and praise where they appear. The final score was calculated separately for the assessment of criticism, playfulness, and flattery as the sum of proper items. The final score varied from 3 to 15.

The Need for Closure Scale

The Need For Closure Scale was created by Webster and Kruglanski (1994). In this study, the Polish adaptation by Kossowska (2003) was used. The scale consists of 32 items. Participants answer on a six-point Likert scale, where "1" means strongly disagree, and "6" means strongly agree. The questionnaire is divided into five subscales: need for order (e.g., "I think that having clear rules and order at work is essential for success"), need for predictability (e.g., "When

dining out, I like to go to places where I have been before so that I know what to expect."), decisiveness (e.g., "I would quickly become impatient and irritated if I would not find a solution to a problem immediately."), avoidance of ambiguity (e.g., "I don't like situations that are uncertain."), and closed-mindedness (e.g., "I dislike questions which could be answered in many different ways."). Cronbach's α calculated for the Polish version of the questionnaire has values between 0.62 (need for predictability) to 0.81 (need for order; Kossowska, 2003).

Scores of 12 items are reverse-scored. The subscale scores and the total score are calculated by summing up relevant item scores. The higher the scores, the higher the NFC.

The last measure was a demographic data questionnaire containing questions about participants' age, gender, education level, and occupation. Participants were asked to write down their answers or to tick the a next to the proper answer.

Descriptive statistics for the Need for Cognitive Closure Scale, blame-by-praise and praise-by-blame irony understanding, playfulness, criticism, and flattery ratings are presented in Table 1. Intercorrelations of the scales are presented in the Appendix.

Procedure

The study was conducted online, using the Google Forms platform. The study was advertised on public social media groups on Facebook. The questionnaire was fully anonymous, participants were not asked about their names or e-mail addresses.

The questionnaire consisted of two main parts, displayed in the same order for each participant. First, participants were informed about the aim of the study, the time needed to complete the questionnaire, its anonymity, and the possibility to withdraw from the study without giving an explanation. The second part after the instruction was the demographic questionnaire. Then, the participants filled out the Irony Comprehension Questionnaire and The Need For Closure Scale.

At the end, participants were thanked for their time and participation, and the authors' email address was given, enabling them to ask questions about the procedure or request the report of results after the end of the project.

Results

To verify the hypothesis that NFC is significantly and negatively related to verbal irony understanding, bootstrapped correlation analysis using IBM SPSS Statistics was conducted. Analysis was conducted separately for blame-by-praise and praise-by-blame irony understanding scores. Due to missing data in participants' answers, 196 cases were analyzed in blame-by-praise irony analysis and 180 in the praise-by-blame irony analysis. To show a correlation between chosen variables and the statistical significance level of the results, confidence intervals for r coefficients are reported. Intervals containing the 0 value indicate statistically nonsignificant results. Table 2 presents detailed results of the analysis.

Table 1. *Descriptive Statistics for the Need for Cognitive Closure Scale, Blame-by-Praise, and Praise-by-Blame Irony Understanding, Playfulness, Criticism, and Flattery Ratings*

Variable	N	M	SD	min	max
Need for cognitive closure					
Need for order	250	26.82	7.33	10	42
Need for predictability	250	30.28	6.97	10	48
Decisiveness	250	17.18	5.32	6	29
Avoidance of ambiguity	250	25.34	4.77	10	36
Closed-mindedness	250	17.60	3.80	10	30
Total score	250	117.21	17	70	159
Blame-by-praise irony					
Criticism	249	11.14	2.22	4	15
Flattery	249	4.08	1.51	3	13
Playfulness	249	8.94	2.67	3	15
Understanding	196	2.87	.40	1	3
Praise-by-blame irony					
Criticism	244	11.14	2.22	4	15
Flattery	244	7.65	3.43	3	15
Playfulness	243	7.07	3.26	3	15
Understanding	180	1.42	1.18	0	3

The analysis showed no statistically significant correlations between blame-by-praise and praise-by-blame irony and NFC. Moreover, analyses of the bootstrapped correlation between verbal irony understanding and the Need for Cognitive Closure Scale subscales were conducted. Again, none of them were statistically significant.

Moreover, we decided to check whether irony understanding correlated with the assessments of criticism, flattery, and playfulness of irony. We focused on assessing the criticism of blame-by-praise irony and flattery of praise-by-blame irony. It was also checked whether irony understanding is related to the assessment of its playfulness. Table 3 presents detailed results of the bootstrapped correlation analysis.

The correlation between blame-by-praise irony criticism ratings, praise-by-blame irony flattery ratings, and playfulness ratings turned out to be statistically significant.

Table 2. *Correlation Coefficients Between the Subscales of the Need for Cognitive Closure and Verbal Irony Understanding*

Need for cognitive closure	Blame-by-praise irony (N = 196)			Praise-by-blame irony (N = 180)		
	r	Lower CL	Upper CL	r	Lower CL	Upper CL
Total score	-.10	-.23	.05	-.07	-.22	.08
Need for order	-.06	-.21	.08	-.08	-.22	.07
Need for predictability	-.03	-.16	.09	-.03	-.18	.19
Decisiveness	-.09	-.23	.04	-.05	-.19	.09
Avoidance of ambiguity	-.03	-.20	.15	-.05	-.19	.08
Closed-mindedness	-.11	-.23	.01	.03	-.19	.09

Note. Intervals containing 0 are equal to statistically nonsignificant results.

Table 3. *Bootstrapped Correlation Analysis for Criticism, Playfulness, and Flattery Irony Ratings and Blame-by-Praise, and Praise-by-Blame Irony Understanding*

	Blame-by-praise irony (N = 196)			Praise-by-blame irony (N = 177)		
	<i>r</i>	Lower CL	Upper CL	<i>r</i>	Lower CL	Upper CL
Criticism	.24	.03	.41	-	-	-
Flattery	-	-	-	.83	.78	.87
Playfulness	.06	-.11	.21	.73	.64	.81

Note. Intervals containing 0 are equal to statistically nonsignificant results. Statistically significant results are bolded.

Study 2

Research Question and Hypotheses

As stated above, Study 2 was conducted as a replication of Study 1. Despite the statistically nonsignificant results of Study 1, it was important to carry out a similar study to check whether slight changes in the procedure (described in detail in the following section) would alter the results.

Since Study 2 was a replication of Study 1, the research question was the same: is NFC related to verbal irony understanding, and if so, how? The hypothesis was also similar: TNFC is related to verbal irony understanding – the higher the NFC, the worse the verbal irony understanding. We also decided to explore the ratings of playfulness, criticism, and flattery of ironic statements. No specific hypotheses were made in this case. As in Study 1, blame-by-praise irony and praise-by-blame irony are analyzed separately.

Method

Overall, 137 Polish-speaking participants took part in Study 2. We decided not to set an age limit, as Study 1 showed statistically nonsignificant results in the chosen age group. The age range was 18-55 ($M = 24.31$; $SD = 6.70$), 93 participants were women, and 29 were men. Fifteen people described their gender as "other." 40% of the sample were students, 28.5% were people with higher education. The rest of the sample (31.5%) consisted of participants without a higher education level and not currently studying

Tools

The Irony Comprehension Questionnaire in a modified version was used in Study 2. It consisted of the same set of 12 vignettes with open-ended questions. However, two important changes were made:

1. In Study 1, the addressees of ironic statements were fictional characters

of the stories – there was no personal component, participants were receivers of the narration where irony appears. In Study 2, original stories were modified in order to include participants as receivers of the ironic statements. That change affected the context of the situation, as well as the participants' role, which could have the potential affect the understanding of irony (Milanowicz, & Kałowski, 2016; Pexman et al., 2010).

2. Putting participants in the position of irony receivers made it necessary to create two parallel versions of the questionnaire for women and men, as the Polish language is gendered. People choosing the "other" option in the question related to gender filled out the male version of the questionnaire. The choice was motivated by the grammar rules of the Polish language, where the masculine form is seen as default.

Table 4 presents an example of vignette modification.

The scoring procedure was the same as in Study 1. The same group of competent judges as in Study 1 took part in evaluating the participants' answers.

The short version of the Need for Cognitive Closure Scale (Kossowska et al., 2012) is based on the Polish adaptation of the Need for Cognitive Closure Scale (Kossowska, 2003). It consists of 15 items. We decided to use a shorter version of the scale as it is as reliable as the full version (Kossowska et al., 2012) while being more accessible to participants.

As in the full scale, participants answered on a six-point Likert scale, where 1 means *strongly disagree*, and 6 means *strongly agree*. The subscale pattern is also the same – the scale includes the subscales of need for order, need for predictability, decisiveness, avoidance of ambiguity, and closed-mindedness. General results and results for individual subscales are calculated by first reverse scoring particular items, and summing up the relevant item scores. A high score is equal to a high NFC.

Table 4. *Example of Irony Comprehension Questionnaire Vignette Modification*

Original version	Modified version
English: The last few days have been hard for Martha. She missed her dishwashing turn in the flat she shares with her friend. Her friend, seeing the sink full of dirty dishes, says to her: <i>It's great that you care about our flat so much!</i>	English: The last few days were hard for you. You missed your dishwashing turn in the flat shared with your friend. Your friend, seeing the sink full of dirty dishes, says to you: <i>It's great that you care about our flat so much!</i>
Polish: Ostatnie dni były dla Marty bardzo ciężkie. Zaniedbała swoją kolej mycia naczyń w mieszkaniu, które dzieli z przyjaciółką. Po powrocie do domu, zauważając zlew pełen naczyń, przyjaciółka Marty mówi: Świetnie, że tak dbasz o czystość!	Polish – male: Ostatnie dni były dla Ciebie bardzo ciężkie. Zaniedbałeś swoją kolej mycia naczyń w mieszkaniu, które dzielisz z przyjaciółką. Po powrocie do domu, Twój przyjaciel zauważa zlew pełen naczyń i mówi: Świetnie, że tak dbasz o czystość!
	Polish – female: Ostatnie dni były dla Ciebie bardzo ciężkie. Zaniedbałaś swoją kolej mycia naczyń w mieszkaniu, które dzielisz z przyjaciółką. Po powrocie do domu, Twoja przyjaciółka zauważa zlew pełen naczyń i mówi: Świetnie, że tak dbasz o czystość!

Descriptive statistics for the short version of the Need for Cognitive Closure scale and the blame-by-praise and praise-by-blame irony understanding, playfulness, criticism, and flattery ratings are presented in Table 5. Intercorrelations of the scales are presented in the Appendix.

Procedure

The study was conducted using an online questionnaire on the Qualtrics platform. The study was advertised on social media groups on Facebook. The procedure was the same as in Study 1.

Results

To verify the hypothesis that NFC is statistically significantly and negatively related to verbal irony understanding, bootstrapped correlation analysis using IBM SPSS Statistics software was conducted. Due to missing data, 29 participants were excluded from this part of the analysis. Table 6 presents the results of the analysis. Significant correlations are bolded.

A statistically significant negative correlation between the level of closed-mindedness and praise-by-blame irony understanding was obtained. These results confirm the hypothesis.

Moreover, we decided to check whether irony understanding correlates with the assessments of criticism, flattery, and playfulness of irony. Again, we focused

Table 5. *Descriptive Statistics for the Short Version of the Need for Cognitive Closure Scale, Blame-by-Praise, and Praise-by-Blame Irony Understanding, Playfulness, Criticism, and Flattery Ratings*

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	min	max
Need for cognitive closure					
Need for order	137	11.63	3.67	3	18
Need for predictability	137	11.15	3.47	3	18
Decisiveness	137	8.56	3.44	3	18
Avoidance of ambiguity	137	14.27	2.90	4	18
Closed-mindedness	137	9.61	1.46	6	13
Total score	137	55.23	8.78	20	73
Blame-by-praise irony					
Criticism	138	10.57	2.66	4	15
Flattery	137	3.88	1.40	3	9
Playfulness	137	9.72	2.86	3	15
Understanding	118	2.70	.60	0	3
Praise-by-blame irony					
Criticism	137	8.66	3.57	3	15
Flattery	137	6.31	3.51	3	15
Playfulness	137	6.72	3.40	3	15
Understanding	108	1.20	1.17	0	3

on assessing the criticism of blame-by-praise irony, and flattery of praise-by-blame irony. A positive correlation between these pairs of variables was expected. We was also checked whether irony understanding is related to the assessment of its playfulness. Table 7 presents detailed results of the bootstrapped correlation analysis.

The correlation between blame-by-praise irony criticism rating, praise-by-blame irony flattery, and playfulness ratings turned out to be statistically significant.

Discussion

Our main research question was: Does NFC correlate with irony understanding? It was formulated on the basis of research and theoretical studies, which assume that human cognitive and social functioning is largely influenced by individual features characterizing the way of information processing (Bromberek-Dyzman, 2011; Nair & Ramnarayan, 2000; Kruglanski, Webster, 1996).

Ironic statements appear in communication relatively often (Aguert et al., 2016), although they are not always correctly understood. Irony itself can be understood as an incoherent stimulus that is ambiguous, and requiring cognitive effort (Allemann, 2002; Czajeczny, 2016). One of the dimensions that make up the construct of NFC is intolerance of ambiguity, which is associated with difficulties in integrating contradictory features of an object (Kossowska, 2003). Others are the preference for order, predictability, and closed-mindedness. For

Table 6. *Correlation Coefficients Between the Subscales of the Need for Cognitive Closure and Verbal Irony Understanding*

	Blame-by-praise irony (N = 118)			Praise-by-blame irony (N = 108)		
	<i>r</i>	Lower CL	Upper CL	<i>r</i>	Lower CL	Upper CL
Total score	.05	-.13	.23	-.08	-.27	.11
Need for order	.14	-.04	.26	.11	-.07	.29
Need for predictability	.05	-.14	.18	-.07	-.26	.19
Decisiveness	-.00	-.18	.18	-.10	-.28	.09
Avoidance of ambiguity	-.02	-.16	.20	-.11	-.29	.08
Closed-mindedness	-.17	-.34	.02	-.17	-.35	-.02

Note. Intervals containing 0 are equal to statistically nonsignificant results. Statistically significant results are bolded.

Table 7. *Bootstrapped Correlation Analysis for Criticism, Playfulness, and Flattery Irony Ratings and Blame-by-Praise, and Praise-by-Blame Irony Understanding*

	Blame-by-praise irony (N = 118)			Praise-by-blame irony (N = 108)		
	<i>r</i>	Lower CL	Upper CL	<i>r</i>	Lower CL	Upper CL
Criticism	.21	.03	.38	-	-	-
Flattery	-	-	-	.77	.68	.84
Playfulness	.08	-.10	.26	.75	.65	.82

Note. Intervals containing 0 are equal to statistically nonsignificant results. Statistically significant results are bolded.

this reason, high NFC was expected to correlate negatively with understanding ironic statements. Solving an ambiguous task – understanding an ironic statement – should require the analysis of many contradictory aspects of the message, and at the same time, cause a feeling of discomfort for people with such characteristics (Kruglanski, 2004). Cognitive closure that is obtained too early may also mean that much important information will not be taken into account, inhibiting a correct understanding of the ambiguous statement (Nair & Ramnarayan, 2000). Therefore, we assumed that the relationship between NFC and irony understanding would be negative – low NFC would be associated with good understanding of irony and vice versa.

We presented results of two studies on the relation between irony understanding and NFC.

In Study 1, we predicted that verbal irony understanding would be negatively and statistically significantly related to NFC. The obtained results do not support this hypothesis – no statistically significant correlations were found. However, the results are in line with the one-phase irony understanding model (Banasik-Jemielniak & Bokus, 2019; Giora, 1997) and the graded salience hypothesis (Giora et al., 1998). This hypothesis assumes that for statement comprehension, the sequence of meanings activated in the brain is important. Those activated first determine the understanding of the whole statement – taking into consideration literal and nonliteral meanings. As a result, nonliteral statements can be processed as quickly as literal ones (Colston & Gibbs, 2007; Giora, 1999). The most important thing is the clarity of information – prototypicality and frequency of occurrence in everyday language. It is also possible that irony, being used often in communication (Gibbs, 2000; Hancock, 2004), does not require any additional cognitive effort to be understood.

Moreover, research conducted by Strojny et al. (2016) showed that high NFC does not always negatively affect cognitive functioning. In some situations, the need for certain and unambiguous knowledge turns out to be positive – it may be associated with a more careful and more thorough search for information in the seizing phase (Strojny et al., 2016). Diligence at this stage of information processing allows for avoiding errors in the further stages. A task containing little information of good quality allows people with a high NFC to generate a few hypotheses and quickly reach a correct solution. The current results and the results by Strojny et al. (2016) lead to the conclusion that certain elements of the NFC construct may be adaptive and allow for efficient functioning in a cognitively complex world. This probably also applies to the understanding of ironic utterances.

Despite the statistically nonsignificant results, we carried out Study 2 as a replication of Study 1. A slight change in the method was introduced – participants in Study 2 were in the position of irony receiver, while in Study 1, we used the perspective of a receiver of the narration where irony occurs. We also predicted that NFC will be negatively related to irony understanding.

The results partially supported the hypothesis. Closed-mindedness was

statistically significantly and negatively related to praise-by-blame irony understanding. We predicted that high NFC would be negatively related to irony understanding. The results are partially in line with this assumption. One dimension of NFC – closed-mindedness (Kossowska et al., 2012) – negatively correlated with praise-by-blame irony understanding. It means that people with higher results on this subscale were more likely to misinterpret ironic praise expressed through criticism. Therefore, people seeking faster cognitive closure may have problems with understanding ambiguous stimuli (Webster & Kruglanski, 1994). Moreover, as stated before, irony used to compliment is less prototypical than critical irony (Milanowicz et al., 2017). That may be why it was harder for people with higher levels of closed-mindedness (described as an unwillingness to have knowledge or opinions confronted by inconsistent evidence, see e.g., Webster & Kruglanski, 1994) to understand this type of irony.

The results lead to the conclusion that the modification of the perspective taken by the participant in the Irony Comprehension Questionnaire could be related to the change in the results of the study. The role of the participant was changed from a receiver of the narration where irony appears (observer) to that of a receiver of irony (addressee). The transition from observer to active participant in the situation also changed the context of the situation – the ironic statements directly concerned the participants – they were criticized or praised. Perhaps these changes turned out to be significant for the hypotheses tested in this study.

The concept of the participant structure proposed by Philips (1972, see: Milanowicz & Bokus, 2020) is important to explain these results. Change in the role of one of the participants in the situation also changes the structure of participation in the discourse (Bokus & Shugar, 1998). The modification of the participant structure in the vignettes probably changed the perception and evaluation of ironic statements. However, more research is needed to draw conclusions about the impact of the perspective taken during the conversation on irony understanding.

Another explanation is that the correlation in Study 2, being on the border of statistical significance, was in fact not statistically significant, and the results were random. It is possible that this correlation does not exist in reality. Irony appears in interpersonal communication quite often (Hancock, 2004). Thanks to this, all people establishing any social relations are prepared for the possibility of irony appearing in the conversation. They are familiar with it, and ambiguous statements cease to be something surprising, instead becoming an ordinary element of everyday communication. Also, no relationships between the understanding of ironic statements and the level of intelligence and social competencies were found (Gucman, 2016; Milanowicz, 2013). This may support the assumption that thanks to its ubiquity, the understanding of irony does not depend on the characteristics of cognitive functioning.

Studies of people with damage to structures important for language use have shown that the understanding of irony is related not only to language mechanisms, but also to the understanding of emotions, the flexibility of incorporating new

information into existing structures, and the level of development of the theory of mind (Colston & Gibbs, 2007). This suggests that the characteristic of cognitive functioning affecting the understanding of irony – more important than NFC – could be cognitive flexibility. This is an interesting direction that future research on the understanding of ironic utterances may take.

As stated before, NFC is associated with susceptibility to relying on patterns and the primacy and recency effect (Kossowska, 2005; Kruglanski, 1996). The fact that people with a high NFC understood irony as well as people with the opposite characteristics may mean that in this case, these people were more likely to base their judgments on information that came first. In this case, this was the context for the later ironic statement – relying on this information and replying on the primacy effect worked to the advantage of people with a high NFC. Relying only on the latest information could result in an erroneous understanding of irony – in this case, ironic messages were the last to reach the participants. These assumptions, however, require verification in further research.

It is also possible that in this situation, there was a greater motivation for specific closure – the participants were looking for a specific answer to a specific question, and not any quick solution to the task (Kruglanski & Webster, 1996; Webster & Kruglanski, 1997). The situation of the study could be associated with the requirement of specific, good answers from the respondents, hence the increased motivation to look for correct answers to the questions. The intolerance of ambiguity, which is characteristic of a high NFC, does not necessarily mean that such tasks are solved at a worse level (Strojny et al., 2016). They can be solved just as well as the preferred unambiguous tasks, and their solving can occur faster – precisely through the motivation to reduce discomfort in the face of an intolerable type of cognitive challenge and achieve certain, specific knowledge, as well as quickly complete the stage of hypothesis generation. Thus, having such inconsistent results, it is important to further study this area.

Additionally, in Studies 1 and 2, a correlation analysis between criticism, flattery, and playfulness ratings and blame-by-praise and praise-by-blame irony understanding was conducted. The results showed an interesting pattern – while the correlation between criticism ratings and blame-by-praise irony understanding was low, the correlation between flattery and praise-by-blame irony understanding was high and positive in both studies. As blame-by-praise irony is treated as more prototypical (Milanowicz & Bokus, 2020), its understanding may be less related to its perception – attitudes toward this type of irony may be more driven by personal preferences than in the case of praise-by-blame irony. Moreover, the correlation between playfulness ratings and praise-by-blame irony understanding was high and positive. As it is the less prototypical and more risky form of irony (Milanowicz & Bokus, 2020), the mere fact of its understanding can result in a higher rating of playfulness.

Limitations

It is possible to point out a few limitations of the described research. First, it is worth noting that besides a satisfactory sample size in Study 1 (250 participants), the sample in Study 2 was significantly smaller (137 participants). Thus, the results of these two studies may differ. Moreover, age distribution (Study 1 was conducted only in the group of young adults, while Study 2 had no age limitations), and the lack of gender balance – the majority of participants were women – could disrupt the final results.

Additionally, both samples consisted mostly of students. To date, research has not shown any relation between education level and irony understanding (e.g., Pexman, & Olineck, 2002), however, the overrepresentation of one of the groups possibly was significant for the final results. A more gender and education-level balanced sample would be a better representation of the general population.

Notably, the mean for blame-by-praise irony understanding was very high in both studies (close to 3, which was the highest possible score). The vast majority of participants understood this type of irony correctly. This is not surprising, as verbal irony is considered a typical figure of everyday communication (Gibbs, 2000).

Additionally, irony understanding may be explained by many other individual factors. As Kałowski et al.'s (2023) systematic review showed, personality, humor-related traits, theory of mind abilities, and empathy level may influence verbal irony understanding and attitudes toward it. As none of them were controlled in the current studies, it is hard to conclude that the perspective taken during the conversation only had an impact on the obtained results.

Moreover, the studies were conducted using only questionnaires. This method is broadly used in irony research, however, it is important to mention that the method may also influence the results.

Conclusions

The results of two presented studies suggest that the perspective taken during the ironic conversation is important for irony understanding. Probably, the presence of a personal component (being the receiver of the irony) may enhance the emotional impact of the statements and result in worse irony understanding. However, more research considering both perspectives in one study to allow for comparisons and controlling for more individual differences factors – empathy, personality, or theory of mind abilities – should be conducted.

The relation between verbal irony understanding and NFC seems to be ambiguous, as Study 1 showed no significant relation, and Study 2 showed a significant, negative relation between closed-mindedness and irony understanding. Thus, as these studies are the first step in understanding the complicated relationship between irony and NFC, future research should probably focus on other aspects of the ironic conversation and on dimensions of NFC rather than on this concept in general.

Acknowledgments

I would like to express my deepest gratitude to my supervisor, prof. Barbara Bokus - it would not be possible to conduct this research without her help and support.

Conflict of Interest Disclosure

The Authors report no conflicts of interest.

Funding

The Authors report no sources of funding.

Research Ethics Statement

Institutional ethical approval was not necessary as both studies were conducted as a part of master thesis (Study 1) and empirical paper (Study 2), the institution doesn't require ethical approval to conduct research as a part of students' research.

During the research, no personal information about participants were collected (research was anonymous) or included in the report. Moreover, no threatening stimuli were used in the studies. Participants were notified about the possibility to withdraw the study at any moment without explanation.

At the beginning of the study, participants were informed, for example, about the anonymity, possibility to withdraw from study, and aggregate data analysis. They were asked to continue filling in the study if they agree to take part or to close the study window if they don't want to participate in the study.

Authorship Details

Katarzyna Branowska: research concept and design, collection and/or assembly of data, data analysis and interpretation, writing the article.

Konrad Koziński: research concept and design, collection and/or assembly of data, data analysis and interpretation.

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Appendix

Table A1. *Intercorrelations of the Scales of the Irony Understanding Tool (Study 1)*

Variable		1.	2.	3.	4.	5.	6.	7.
1. Blame-by-praise understanding	<i>N</i>							
	<i>r</i>							
	<i>p</i>							
2. Praise-by-blame understanding	<i>N</i>	177						
	<i>r</i>	.17						
	<i>p</i>	.03						
3. Blame-by-praise criticism	<i>N</i>	196	180					
	<i>r</i>	.24	.11					
	<i>p</i>	.000	.13					
4. Praise-by-blame criticism	<i>N</i>	193	177	244				
	<i>r</i>	-.08	-.84	.01				
	<i>p</i>	.26	.000	.86				
5. Blame-by-praise playfulness	<i>N</i>	196	180	249	244			
	<i>r</i>	.06	.18	-.22	-.12			
	<i>p</i>	.43	.01	.000	.05			
6. Praise-by-blame playfulness	<i>N</i>	192	176	243	243	243		
	<i>r</i>	.08	.73	.00	-.64	.38		
	<i>p</i>	.29	.000	.98	.000	.000		
7. Blame-by-praise flattery	<i>N</i>	196	180	249	244	249	243	
	<i>r</i>	-.39	-.08	-.21	.12	.27	.04	
	<i>p</i>	.000	.26	.000	.06	.000	.50	
8. Praise-by-blame flattery	<i>N</i>	193	177	244	244	244	243	244
	<i>r</i>	.12	.83	.13	-.78	.19	.71	.00
	<i>p</i>	.10	.000	.04	.000	.003	.000	.96

Table A2. *Intercorrelation of the Scales of the Need for Cognitive Closure Scale (Study 1; N = 250)*

Variable		1.	2.	3.	4.	5.
1. NFC total score	<i>r</i>					
	<i>p</i>					
2. Need for order	<i>r</i>	.82				
	<i>p</i>	.000				
3. Need for predictability	<i>r</i>	.76	.50			
	<i>p</i>	.000	.000			
4. Decisiveness	<i>r</i>	.31	.13	-.16		
	<i>p</i>	.000	.05	.10		
5. Avoidance of ambiguity	<i>r</i>	.62	.45	.51	-.18	
	<i>p</i>	.000	.000	.000	.004	
6. Closed-mindedness	<i>r</i>	.33	.10	.11	.17	-.04
	<i>p</i>	.000	.12	.08	.008	.51

Table A3. *Intercorrelations of the Scales of the Irony Understanding Tool (Study 2)*

Variable		1.	2.	3.	4.	5.	6.	7.
1. Blame-by-praise understanding	<i>N</i>							
	<i>r</i>							
	<i>p</i>							
2. Praise-by-blame understanding	<i>N</i>	108						
	<i>r</i>	.32						
	<i>p</i>	.000						
3. Blame-by-praise criticism	<i>N</i>	118	108					
	<i>r</i>	.21	.07					
	<i>p</i>	.02	.46					
4. Praise-by-blame criticism	<i>N</i>	118	108	137				
	<i>r</i>	-.11	-.75	.07				
	<i>p</i>	.24	.000	.42				
5. Blame-by-praise playfulness	<i>N</i>	118	108	137	137			
	<i>r</i>	.08	.15	-.40	-.14			
	<i>p</i>	.36	.13	.000	.10			
6. Praise-by-blame playfulness	<i>N</i>	118	108	137	137	137		
	<i>r</i>	.17	.75	-.07	-.64	.36		
	<i>p</i>	.06	.000	.39	.000	.000		
7. Blame-by-praise flattery	<i>N</i>	118	108	137	137	137	137	
	<i>r</i>	-.37	-.25	-.27	.14	.19	.03	
	<i>p</i>	.000	.008	.002	.11	.02	.74	
8. Praise-by-blame flattery	<i>N</i>	118	108	137	137	137	137	137
	<i>r</i>	.15	.77	.15	-.73	.19	.73	.001
	<i>p</i>	.10	.000	.08	.000	.03	.000	.99

Table A4. *Intercorrelation of the Scales of the Need for Cognitive Closure Scale (Study 2; N = 137)*

Variable		1.	2.	3.	4.	5.
1. NFC total score	<i>r</i>					
	<i>p</i>					
2. Need for order	<i>r</i>	.74				
	<i>p</i>	.000				
3. Need for predictability	<i>r</i>	.75	.46			
	<i>p</i>	.000	.000			
4. Decisiveness	<i>r</i>	.36	.06	-.08		
	<i>p</i>	.000	.52	.35		
5. Avoidance of ambiguity	<i>r</i>	.67	.35	.54	-.06	
	<i>p</i>	.000	.000	.000	.52	
6. Closed-mindedness	<i>r</i>	.20	-.02	.10	-.03	.04
	<i>p</i>	.02	.84	.24	.72	.67