

Metadata of the chapter that will be visualized in SpringerLink

Book Title	9th International Workshop on Spoken Dialogue Systems	
------------	---	--

Series Title		
--------------	--	--

Chapter Title	Towards an Annotation Scheme for Causes of Laughter in Dialogue	
Copyright Year	2020	
Copyright HolderName	Springer Nature Singapore Pte Ltd.	

Corresponding Author	Family Name	Maraev
	Particle	
	Given Name	Vladislav
	Prefix	
	Suffix	
	Role	
	Division	Department of Philosophy, Linguistics and Theory of Science
	Organization	Centre for Linguistic Theory and Studies in Probability (CLASP), University of Gothenburg
	Address	Gothenburg, Sweden
	Email	vladislav.maraev@gu.se

Author	Family Name	Howes
	Particle	
	Given Name	Christine
	Prefix	
	Suffix	
	Role	
	Division	Department of Philosophy, Linguistics and Theory of Science
	Organization	Centre for Linguistic Theory and Studies in Probability (CLASP), University of Gothenburg
	Address	Gothenburg, Sweden
	Email	christine.howes@gu.se

Abstract	This paper presents a first attempt to develop an annotation scheme for laughter in dialogue operationalising the previously reported idea of laughter being caused by incongruity, and based on violations of Grice's maxims. This exploratory scheme is intended to form the basis of a spoken dialogue system that can laugh during dialogue in a human like manner and can understand why users laugh. We present the scheme and discuss preliminary results.	
----------	---	--

Towards an Annotation Scheme for Causes of Laughter in Dialogue



Vladislav Maraev and Christine Howes

1 **Abstract** This paper presents a first attempt to develop an annotation scheme for
 2 laughter in dialogue operationalising the previously reported idea of laughter being
 3 caused by incongruity, and based on violations of Grice's maxims. This exploratory
 4 scheme is intended to form the basis of a spoken dialogue system that can laugh
 5 during dialogue in a human like manner and can understand why users laugh. We
 6 present the scheme and discuss preliminary results.

7 1 Introduction

8 Recent research has focussed on creating more human-like spoken dialogue systems
 9 by means of adding capabilities to produce [4], or recognise laughter [12, 21,
 10 24], react appropriately [5, 15], recognise sarcasm [22], be humourous [11, 16],
 11 and discover how and where laughter occurs in dialogue [7, 23]. However, there
 12 is no agreement on the causes of laughter, with, for example, some research which
 13 focusses on humour [9, 19], and other research which highlights the social functions
 14 of laughter, such as affiliation and agreement [2, 20], and qualitative analysis of the
 15 roles of laughter in interaction and its coordination with speech (see [7], for a review
 16 of conversation analysis approaches to laughter).

17 Furthermore, as argued by [13], existing taxonomies of laughter have reliability
 18 issues: they mix the functions that use laughter as a means of communication with
 19 the different emotions that laughter triggers. For example, in [18], affiliation (i.e.
 20 agreement laughter) is roughly the illocutionary act performed by laughter, while
 21 joy is a feature triggered by laughter. Another issue with most current studies of

[AQ1]

V. Maraev (✉) · C. Howes

Department of Philosophy, Linguistics and Theory of Science, Centre for Linguistic Theory
 and Studies in Probability (CLASP), University of Gothenburg, Gothenburg, Sweden
 e-mail: vladislav.maraev@gu.se

C. Howes

e-mail: christine.howes@gu.se

© Springer Nature Singapore Pte Ltd. 2020

L. Fernando D'Haro et al. (eds.), *9th International Workshop on Spoken Dialogue Systems*,
 Lecture Notes in Electrical Engineering 579,
https://doi.org/10.1007/978-981-13-9443-0_24

1

22 laughter is that they do not tend to recognise the propositional content that laughter
 23 can convey (see [6], for discussion).

24 In the present study, following [6], we look at laughter based on the stimulus
 25 that provokes it, henceforth the *laughable*. Laughables will be analysed from two
 26 interlinked perspectives: (a) incongruity and (b) Gricean maxims.

27 The *theory of incongruity* explains laughter as arising from an inconsistency
 28 between the expectations of the conversational participants and some event. This
 29 has been studied extensively in theories of humour [9, 19], and offers a plausible
 30 account for the causes of humour in jokes, for example. However, although incon-
 31 gruity seems intuitive and offers an explanation for (some) causes of laughter, it is a
 32 vague and general notion, with incongruities being available at all levels of linguistic
 33 interaction (e.g. phonology, semantics, pragmatics). It is therefore difficult to build
 34 a computational account of incongruity as it is currently conceived. In order to offer
 35 a more fine-grained account, we assessed (i) whether incongruity is recognised by
 36 naive coders and (ii) whether it can be subdivided into categories corresponding to
 37 Grice's conversational maxims [8].

38 Four of these maxims, defined by [8] as part of the cooperative principle of con-
 39 versation which directs the interpretation of utterances in dialogue, can be briefly
 40 described as follows:

41 Maxim of Quantity	“Be exactly as informative as is required”
42 Maxim of Quality	“Try to make your contribution one that is true”
43 Maxim of Relevance	“Be relevant”
44 Maxim of Manner	“Be perspicuous”

45 Looking at a genuine example of laughter in dialogue, we now describe how
 46 flouting one of these maxims in dialogue can lead to a laughable, and the relationship
 47 to incongruity.

- 48 (1) A: they he had to fill out some forms but I guess California might be tougher I don't know
 49 B: yeah they might be or you know how we are here in Texas it's [laughter: like] everybody's
 50 a hunter so [**laughter**] I'm not much of a hunter but
 51 A: [laughter] yeah [noise] (Switchboard, sw2014, *discussing gun control*)

52 Focusing on B's second laughter (shown in **bold**) we can see that the laughter
 53 was caused by the the utterance: “Here in Texas it's like everybody's a hunter”.
 54 What can be said about this laughable? Definitely, that some sort of stereotypical
 55 proposition was produced. Analysing this from a Gricean perspective we can say
 56 that B's contribution is not true, like any other gross generalisation that ascribes all
 57 the members of a population with a single common habit. It seems that from the
 58 perspective of both dialogue participants this statement is taken to be false, i.e. it
 59 violates the maxim of quality.

60 In terms of incongruity, we can state that a clash between certain scripts has taken
 61 place,¹ namely between the “regular situation”, where not all of the population of the
 62 state are hunters and the “constructed situation”, where all the population are hunters.

¹ See [19, Chap. 6] for analysis of similar content in jokes.

63 In this case, we can see that the incongruity itself arises because of the violation of
64 the maxim of quality.

65 The functional role of the laughter here could be explained as indication by speaker
66 B, that s/he is aware that the utterance is not literally true. The laughter of speaker A
67 could be interpreted as showing her/his awareness of that and an acknowledgement
68 of B's statement.

69 The observation that laughter can be caused by the violation of Gricean maxims
70 led us to develop a preliminary annotation scheme for analysing laughter in dialogue
71 is terms of incongruities that can be sub-categorised according to these violations.
72 Specifically we ask: (a) how different are laughers in terms of their causes and
73 functions, (b) whether laughers are connected to violation(s) of the Gricean maxims,
74 (c) whether laughers are caused by incongruity of some sort, (d) to what extent do
75 people agree in their judgements regarding various features of laughables.

76 2 Annotation Scheme

77 For our preliminary study, we randomly selected one full dialogue from The Switch-
78 board Dialog Act Corpus (SWDA) [10], 5 excerpts from other conversations in
79 SWDA (provided with a brief context) and 5 from part of the British National Corpus
80 (BNC), previously analysed for laughter [14]. SWDA consists of dyadic telephone
81 conversations between American participants who were unfamiliar with each other
82 on a pre-determined topic, while the spoken portion of the BNC consists of British
83 face-to-face dialogues from a range of contexts (see [1], for details).

84 We asked participants to fill in the following questionnaire:

- 85 Q1 How well have you understood the given laughter? (from 1 to 5)
86 Q2 Please indicate the line where the cause for laughter occurs.
87 Q3 Was the laughter caused by something that the laugher says her/himself or the partner says?
88 Q4 Does the cause occur before, during, or after the laughter?
89 Q5 Was the laughter caused because one of the participants (from the laugher's perspective):
- 90 Q5.1 gives more or less information that was needed?
 - 91 Q5.2 gives information that was false or wasn't supported by evidence?
 - 92 Q5.3 gives information that was irrelevant for the discussion?
 - 93 Q5.4 gives information that was obscure or ambiguous?
 - 94 Q5.5 says something that clashed with a certain background information, common sense,
95 another interpretation or another utterance?
- 96 Q6 Please explain the cause of the laughter.
97 Q7 Please explain why the person has laughed.

98 Q1 was provided to give a self-estimated confidence score for the following ques-
99 tions. Questions Q2–Q4 are about some basic properties of laughables which are
100 usually considered to be agreed upon. Questions Q5.1–Q5.4 represent the Gricean
101 maxims and Q5.5 explicates the notion of incongruity in way that is comprehensible
102 for the coders. Q6 and Q7 are free form questions that give coders an opportunity

103 to explain, respectively, the cause and the function of the laughter. We also provided
104 coders with an example of annotation for example (1).

105 3 Preliminary Results

106 The results that we report here are from a pilot study with 3 annotators.² While there
107 is not enough data to calculate inter-annotator agreement, the free-form answers
108 to Q6 regarding the cause of laughter suggest that, at least in some cases, coders
109 understand and agree on the cause of the laughter.

- 110 (2) Ian: [pause] basic details, name [pause] and address, telephone number,
111 John: Okay, yeah.
112 Ian: national insurance number, date of birth.
113 Ian: Erm another code number form a directory [pause]
114 John: **[laugh]** (BNC, JNW, 402–405)
- 115 (3) Patrick: Oh if you don't think they look well then they obviously need it if they look better
116 after they've been watered, that's what the paper says.
117 Katherine: Well then they do need water.
118 Patrick: That's the answer
119 Katherine: They [unclear]
120 Patrick: if they look as though they need it they need it but if they don't look as though
121 they need watering don't water them.
122 Katherine: Well [pause] look, look at the birds **[laugh]** I [unclear dur=6] aren't they sweet
123 [pause] all the same I shall buy a nesting box next er next year.
124 Patrick: Mm. (BNC, KCV, 300–305, *discussing some plants*)
- 125 (4) B: there's an old profane expression about Texas weather,
126 B: it's always too damn cold, too damn hot, too damn windy **[laugh]**.
127 (SWDA, sw3936, 391–392)
- 128 (5) B: and you know, I mean, a lot of people they go, they're better than the Beatles,
129 B: and I'm like you know,
130 A: [laugh].
131 B: you don't know what you're talking about.
132 A: No [laugh].
133 B: I mean, the comparison made between New Kids On The Block with the Beatles [laugh].
134 It was just,
135 A: You can only laugh [laugh]. (SWDA, sw2020, 822–931)

136 In Example 2, there was total agreement on the violation of the maxim of quantity
137 (too little information, Q5.1), and 2 out of 3 coders annotated obscurity in Ian's
138 utterance (violation of the maxim of manner, Q5.4).

²The annotators were not native English speakers, which may mean they did not pick up on all the subtleties of the laughter and laughable. However examples in the BNC are also not necessarily produced by native speakers, and there are also cultural differences which are known to affect interpretations of humour and laughter even between native speakers (e.g. between American and British speakers of English). In future studies (see Discussion, below) we intend to involve a wide range of annotators, including native and non-native speakers of English.

139 In Example 3, coders agree on the violation of the maxim of relevance by the
140 sudden change of topic (Q5.3).

141 In Example 4, coders recognise incongruity against some “normal situation”
142 (Q5.5). For Q6, regarding the cause of laughter, one of the coders wrote: “Nor-
143 mally a place is either too cold, or too hot, or too windy. It is hard to have all the
144 extremes”.

145 Example 5 is interesting, because all the coders agree that neither of laughters are
146 caused by violation of any of the Gricean maxims. Nevertheless, the coders agree that
147 these laughters are caused by incongruity from comparing the incomparable Beatles
148 with a lesser band. According to the comments given by annotators, the attempt to
149 compare any band with The Beatles seems ridiculous to both interlocutors in (5) and
150 their laughters are driven by this.

151 Some of the presented excerpts show that even for humans it can be hard to
152 describe the cause and function of laughter even when they understood the laughters
153 quite well. Example 6 shows disagreement between the coders regarding the position
154 of the laughable (whether it occurred before or after the laughter); the cause of the
155 laughter (e.g. “Saying something sad about another person” vs. “Being depressed of
156 other peoples’ problems, and at the same time bringing them their problems”); and
157 its function (“Softening” vs. “Marking incongruity”).

- 158 (6) A: We have a boy living with us who works for a credit card, uh, company that,
159 A: and he makes calls to people who have problems, you know, credit problems,
160 B: Huh-uh.
161 A: that are trying to work out
162 A: and, uh, [laugh]. Poor thing he comes home very depressed every night [laugh],
163 B: Oh. (SWDA, sw2883, 451–481)

164 4 Discussion and Future Work

165 We believe that this approach, together with the precise identification of laugh-
166 ables in dialogue, can contribute towards an implementable account for identifying
167 events where laughter can be appropriate, i.e. as a result of violating Gricean maxims
168 (changes of topic, irony and sarcasm, jokes, bold statements). However, it is not the
169 case that every violation of a Gricean maxim or incongruity in dialogue results in
170 laughter, and we therefore believe that this kind of analysis should also be carried
171 out more generally, with some additional account of which potential laughables in
172 dialogue are more likely to elicit laughter (we expect this to be modulated by, for
173 example, familiarity of dialogue participants, formality of the domain, intonation
174 and other non-verbal cues etc). The precise positioning of the laughter with respect
175 to the laughable may also offer clues in understanding what triggers the laughter, and
176 help to differentiate between emotional or social causes and incongruous or humor-
177 ous causes (though of course, as with other features of dialogue, any given laughter
178 event may be multifunctional) which we also intend to investigate in future work.

179 We intend to run similar experiments with broader coverage of examples and
 180 annotators using Amazon Mechanical Turk. Given the shortcomings of agreement
 181 calculation using chance-adjusted metrics, e.g. Krippendorff's α , for tasks such as
 182 ours, we will use a probabilistic annotation model [3] that has been successfully
 183 applied to crowdsourced NLP data collection tasks, such as word sense annotation
 184 [17]. In these tasks, as with our laughter annotation, there is no gold standard and
 185 these methods are more reliable for deriving the ground truth from the population of
 186 annotators.

187 We are also aware of the role of prosody and phonetic form of laughter in identifying
 188 its causes and functions, and our annotators reported that audio would have
 189 been helpful for better understanding. We therefore plan to extend our text-based
 190 samples with audio to check whether it improves inter-annotator agreement.

191 Our ultimate aim for this work is to implement a spoken dialogue system (for
 192 a limited domain) which can understand, produce and reason about laughter in its
 193 dialogues with users, and to demonstrate how laughter contributes semantic and
 194 pragmatic import to dialogue. This kind of system would be a proof of concept that
 195 can be used to test theoretical insights about human conversation.

196 **Acknowledgements** This research was supported by a grant from the Swedish Research Council
 197 for the establishment of the Centre for Linguistic Theory and Studies in Probability (CLASP) at the
 198 University of Gothenburg. We would also like to thank Staffan Larsson, Jonathan Ginzburg, Chiara
 199 Mazzocconi and our anonymous reviewers for their useful comments.

200 References

- 201 1. Burnard L (2000) Reference guide for the british national corpus (World Edition). Oxford
 202 University Computing Services. <http://www.natcorp.ox.ac.uk/docs/userManual/>
- 203 2. Chapman AJ (1983) Humor and laughter in social interaction and some implications for humor
 204 research. In: Handbook of humor research. Springer, pp 135–157
- 205 3. Dawid AP, Skene AM (1979) Maximum likelihood estimation of observer error-rates using the
 206 em algorithm. Appl Stat 20–28
- 207 4. Ding Y, Prepin K, Huang J, Pelachaud C, Artières T (2014) Laughter animation synthesis. In:
 208 Proceedigns of AAMS 2014. International Foundation for Autonomous Agents and Multiagent
 209 Systems, pp 773–780
- 210 5. El Haddad K, Çakmak H, Gilmartin E, Dupont S, Dutoit T (2016) Towards a listening agent: a
 211 system generating audiovisual laughs and smiles to show interest. In: Proceedings of the 18th
 212 ACM international conference on multimodal interaction. ACM, pp 248–255
- 213 6. Ginzburg J, Breitholtz E, Cooper R, Hough J, Tian Y (2015) Understanding laughter. In:
 214 Proceedings of the 20th Amsterdam Colloquium
- 215 7. Glenn P (2003) Laughter in interaction, vol 18. Cambridge University Press
- 216 8. Grice H (1975) Logic and conversation. Syntax Semant 3(S 41):58
- 217 9. Hempelmann CF, Attardo S (2011) Resolutions and their incongruities: further thoughts on
 218 logical mechanisms. Humor-Int J Humor Res 24(2):125–149
- 219 10. Jurafsky D, Shriberg E, Biasca D (1997) Switchboard SWBD-DAMSL shallow-discourse-
 220 function annotation coders manual. Institute of Cognitive Science Technical report 97–102
- 221 11. Katevas K, Healey PG, Harris MT (2014) Robot stand-up: engineering a comic performance. In:
 222 Proceedings of the workshop on humanoid robots and creativity at the IEEE-RAS international
 223 conference on humanoid robots humanoid (Madrid)

- 224 12. Kaushik L, Sangwan A, Hansen JH (2015) Laughter and filler detection in naturalistic audio.
225 In: Proceedings of Interspeech Germany
- 226 13. Mazzocconi C, Tian Y, Ginzburg J (2016) Multi-layered analysis of laughter. In: Proceedings of
227 SemDial 2016, Proceedings of the 20th workshop on the semantics and pragmatics of dialogue,
228 Rutgers
- 229 14. Mazzocconi C, Tian Y, Ginzburg J (in prep) What's your laughter doing there? A taxonomy of
230 the pragmatic functions of laughter
- 231 15. Niewiadomski R, Hofmann J, Urbain J, Platt T, Wagner J, Piot B, Cakmak H, Pammi S,
232 Baur T, Dupont S et al (2013) Laugh-aware virtual agent and its impact on user amusement.
233 In: Proceedings of the 2013 international conference on Autonomous agents and multi-agent
234 systems, pp 619–626
- 235 16. Nijholt A, Niculescu AI, Alessandro V, Banchs RE (2017) Humor in human-computer inter-
236 action: a short survey. In: Adjunct conference proceedings interact 2017
- 237 17. Passonneau RJ, Carpenter B (2014) The benefits of a model of annotation. *TACL* 2:311–326
- 238 18. Poyatos F (1993) Paralanguage: a linguistic and interdisciplinary approach to interactive speech
239 and sounds, vol 92. John Benjamins Publishing
- 240 19. Raskin V (1985) Semantic mechanisms of humor. *Synthese language library*, vol 24. Reidel,
241 Dordrecht
- 242 20. Scott SK, Lavan N, Chen S, McGettigan C (2014) The social life of laughter. *Trends Cogn Sci*
243 18(12):618–620
- 244 21. Tahon M, Devillers L (2015) Laughter detection for on-line human-robot interaction. *Cough*
245 85(65.0):0–77
- 246 22. Tepperman J, Traum D, Narayanan S (2006) “Yeah right”: sarcasm recognition for spoken
247 dialogue systems. In: Ninth international conference on spoken language processing
- 248 23. Tian Y, Mazzocconi C, Ginzburg J (2016) When do we laugh? *SIGDIAL Conference* 360–369
- 249 24. Truong KP, Van Leeuwen DA (2007) Automatic discrimination between laughter and speech.
250 *Speech Commun* 49(2):144–158

Author Queries

Chapter 24

Query Refs.	Details Required	Author's response
AQ1	Please check and confirm if the author names and initials are correct.	

UNCORRECTED PROOF

MARKED PROOF

Please correct and return this set

Please use the proof correction marks shown below for all alterations and corrections. If you wish to return your proof by fax you should ensure that all amendments are written clearly in dark ink and are made well within the page margins.

<i>Instruction to printer</i>	<i>Textual mark</i>	<i>Marginal mark</i>
Leave unchanged	... under matter to remain	Ⓟ
Insert in text the matter indicated in the margin	∧	New matter followed by ∧ or ∧ [Ⓢ]
Delete	/ through single character, rule or underline or ┌───┐ through all characters to be deleted	Ⓞ or Ⓞ [Ⓢ]
Substitute character or substitute part of one or more word(s)	/ through letter or ┌───┐ through characters	new character / or new characters /
Change to italics	— under matter to be changed	↵
Change to capitals	≡ under matter to be changed	≡
Change to small capitals	≡ under matter to be changed	≡
Change to bold type	~ under matter to be changed	~
Change to bold italic	⌘ under matter to be changed	⌘
Change to lower case	Encircle matter to be changed	≡
Change italic to upright type	(As above)	↕
Change bold to non-bold type	(As above)	↕
Insert 'superior' character	/ through character or ∧ where required	Υ or Υ under character e.g. Υ or Υ
Insert 'inferior' character	(As above)	∧ over character e.g. ∧
Insert full stop	(As above)	⊙
Insert comma	(As above)	,
Insert single quotation marks	(As above)	Ŷ or Ŷ and/or Ŷ or Ŷ
Insert double quotation marks	(As above)	Ÿ or Ÿ and/or Ÿ or Ÿ
Insert hyphen	(As above)	⊥
Start new paragraph	┌	┌
No new paragraph	┐	┐
Transpose	└┐	└┐
Close up	linking ○ characters	⸸
Insert or substitute space between characters or words	/ through character or ∧ where required	Υ
Reduce space between characters or words		↑