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Connectives and Straw Men. Experimental approach on French and English.

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Abstract: In this paper, we present experiments designed to assess the role of causal connectives with an attributive meaning (e.g. *since* and *puisque*) on the acceptability of straw man fallacies. Our results show that connectives play a role for the detection of straw man fallacies by increasing readers' awareness to the speaker's persuasive intent, thus creating a forewarning effect. We also uncover a crucial difference between causal connectives both within and across languages. Taken together, our experiments plead in favor of conducting fine-grained analyses of connectives in different languages in order to deepen our understanding of their role for argumentation.

Keywords: argumentation, causal connectives, cross-linguistic perspective, empirical validation, forewarning effect, straw man fallacy, subjectivity

1. Introduction

The study of connectives, and discourse markers in general, through the lens of argumentation is an established field. Yet, the influence of connectives for the acceptability of fallacies, and on argumentation more generally, has not empirically been assessed. In argumentation, discourse markers – a broad category that includes connectives – have been discussed from various theoretical perspectives (e.g. Anscombe & Ducrot, 1983; Eemeren, Houtlosser & Snoeck Henkemans, 2007a, 2007b). Whereas Anscombe and Ducrot (1983) suggest an approach that theorizes the role of argumentation embedded in language, the pragma-dialecticians (Eemeren et al., 2007b) offer a more general approach including connectives, discourse markers and other expressions and their relation to argumentative moves. What these approaches do not consider, however, is the different role played by specific connectives, as the latter may well vary depending on the type of coherence relation they encode, or as we argue here, their level of subjectivity. The straw man lends itself particularly well for linguistic-oriented experimental testing. The characteristics of a straw man that make it a fallacious argument rest on the linguistic structure used to perform it, since the distortion of the original position is considered an essential feature of this fallacy (see e.g. Aikin & Casey, 2016; Oswald & Lewiński, 2014). Manipulating the linguistic form of the straw man by using different causal connectives to introduce the fallacious argument therefore represents an opportunity to investigate the role of linguistic markers and their impact on fallacies. In order to better understand the linguistic characteristics of connectives that may impact their role for the communication of fallacies, studies in the field of pragmatics and discourse processing need to be considered, as they have provided extensive data on the role of connectives for communication and cognition over the past decades. Yet, these studies have mostly considered the role of connectives in descriptive rather than argumentative contexts. This paper aims at filling the gap between more linguistic-oriented contributions and the more argumentative-oriented study of fallacies. It also contributes to a better understanding of causal connectives in argumentative context from a cross-linguistic perspective.

2. The straw man fallacy

The study of fallacies has become a mainstay in argumentation theory over the past decades (Hamblin, 1970; Eemeren & Grootendorst, 1992; Hansen & Pinto, 1995; Walton, 1995; Tindale, 2007). Research specifically focusing on the straw man fallacy however, has mostly increased in more recent years (Aikin & Casey, 2011, 2016; Lewiński, 2011; Lewiński & Oswald, 2013; Oswald & Lewiński, 2014; Saussure, 2018), even if pragma-dialecticians have theorized it to some extent in the 1990s (Eemeren & Grootendorst, 1992; Eemeren & Houtlosser, 1999). Most of these studies have tackled the subject from several different normative and/or descriptive perspectives. Whereas pragma-dialectics focus on a normative approach, defining the straw man fallacy as a violation of the third rule for critical discussion (Eemeren & Grootendorst, 1992; Eemeren, Grootendorst & Snoeck Henkemans, 2002; Eemeren et al., 2014), other researchers like Aikin and Casey (2011; 2016) opt for a more descriptive approach, highlighting that there are several forms of the fallacy including a straw man, a weak man, a hollow man and an iron man. Oswald and Lewiński (2014) characterize the elements of the straw man fallacy combining findings from pragma-dialectics and relevance theory, and Saussure (2018) describes the fallacy from a more ethical and rhetorical perspective. But in general, all approaches describe the straw man in a similar way, defining it as a misrepresentation of an original position in order to more easily refute that position (see e.g. Aikin & Casey, 2011, 2016; Eemeren et al., 2014; Oswald & Lewiński, 2014; Saussure, 2018). An essential aspect that characterizes the straw man is therefore the misrepresentational element which is related to the linguistic structure (e.g. the use of connectives to introduce an argument, the segmentation of the discourse elements, etc.) which is used to convey the informational content. Many such linguistic structures lend themselves for empirical testing.

Fallacies are increasingly studied from an experimental point of view (Eemeren, Garssen & Meuffels, 2012; Hahn & Hornikx, 2016; Harris, Han, Madsen & Hsu, 2016; Lillo-Unglaube, Canales-Johnson, Navarrete & Fuentes Bravo, 1996; Ozols, Maillat & Oswald, 2016), but to our knowledge, only one study has empirically assessed the persuasiveness of the straw man fallacy. Bizer, Kozak and Holterman (2009) conducted two experiments in which they tested if individual personality traits like personal relevance and the need for cognitive closure affect the persuasiveness of the straw man. Bizer et al. (2009) report that participants in a high-relevance condition (content presented was important to the hearer) are less likely to be persuaded by the straw man fallacy. They also found that participants with a high need for cognitive closure (elevated decisiveness) are more likely to be persuaded because they want to get to a conclusion more quickly. These experiments have demonstrated that the straw man fallacy can indeed be influenced by cognitive factors such as individual differences in personality traits.

It emerges from this overview that no studies, theoretical or experimental, have targeted specific linguistic elements that influence the acceptability of the straw man fallacy. In previous research (Schumann, Zufferey & Oswald, 2019) we demonstrated that, amongst other factors, using the causal connective *puisque* to introduce the fallacious argument, leads to a lower acceptability of the straw man. We explained this effect by the observation that *puisque* frequently indicates a given information towards which the speaker often conveys a tacitly dissociative attitude (Zufferey, 2014). This means that by using the connective to introduce an argument, the hearer's awareness towards the fallacious misrepresentation of the original position is raised. These results begged the questions whether other causal connectives that also convey attributive meaning lead to similar results or not and whether such connectives behave alike across languages. We investigate this issue further in this paper.

3. Linguistic and psycholinguistic descriptions of connectives

What lacks in argumentative approaches to connectives is in an integration of the level of detail that is found in linguistic and psycholinguistic studies, as we now outline. In these studies, causal connectives are defined as linguistic units used to establish causal relations between

discourse segments, increasing textual coherence and structuring discourse (Halliday & Hassan, 1976; Knott & Dale, 1994; Mann & Thompson, 1988). They do facilitate discourse processing by instructing the hearer on how to interpret an utterance (Blakemore, 2002; Caron, Micko & Thüring, 1988; Cozijn, Noordmann & Vonk, 2011; Sanders et al., 2007; Zufferey & Gygas, 2016). However, they are usually optional, as discourse relations can also be left implicit and reconstructed by inference. For example, in (1) the connective *since* is used to indicate that the segment following the connective is to be understood as a justification of the preceding segment. By contrast, in (2), the meaning remains exactly the same when those two segments are simply juxtaposed.

- (1) The fridge is empty since she ate all the food.
- (2) The fridge is empty. She ate all the food.

The same causal relation can also be expressed by other connectives like *given that*, illustrated in (3), or *as*, illustrated in (4).

- (3) The fridge is empty given that she ate all food.
- (4) The fridge is empty as she ate all the food.

In examples (1), (3) and (4) the causal relation is formulated explicitly by using a connective, whereas in (2) this relation must be inferred. However, the same connective, can express different relations like it is the case for *as*. In (5) the connective *as* introduces a temporal relation:

- (5) She realized there was no food left as she opened the fridge.

In this case, *as* is used to show that both actions happen simultaneously. The above-mentioned examples demonstrate that causal connectives have a variety of functions, but it is necessary to differentiate them according to their specific nuances.

The number of studies that have assessed the role of connectives for discourse processing and understanding by inserting them in an argumentative context is very limited. To our knowledge, only one study by Kamalski, Lentz, Sanders and Zwann (2008) has investigated the difference between subjective causal connectives that are used to link claims and conclusion in the mind of the speaker (6) and objective causal connectives that are used to link facts and events in the real world (7).

- (6) Her fridge must be empty since she has eaten out the whole week.
- (7) Her fridge is empty because she has not been grocery shopping for a week.

In a first study, they found that participants were more likely to be persuaded when the texts contained objective connectives rather than subjective connectives because the latter act as forewarners, altering readers to the speakers' persuasive intention, making them more critical towards its content. The results of their second experiment confirmed the existence of a forewarning effect related to subjective connectives even further. They were able to show that short texts containing subjective connectives were less persuasive than texts with no connective. The study conducted by Kamalski et al. (2008) has shown that subjective connectives do indeed create a forewarning effect. However, their notion of subjectivity is not as fine-grained as suggested by other researchers. Degand and Pander Maat (2003) define subjectivity as a scalar notion and other researchers like Pit (2007) and Zufferey and Cartoni (2012) have shown that not every connective expresses the same degree of subjectivity. In contrast, Kamalski et al. (2008) used a list of connectives but did not make more fine-grained differences between them.

In this paper, we pursue this line of investigation further by assessing whether differences related to the specific characteristics of different causal connectives in English and French impact on the acceptability of straw man fallacies. To assess the roles of every connective, we focus on 4 factors: subjectivity, givenness, polyfunctionality and preferential placement. For

the experiments in French we worked with the connectives *puisque*, *étant donné que* and *comme* which are all used to express a causal relation that encodes an attributive meaning. According to the LEXCONN data base of French connectives (Roze, Danlos & Muller, 2012), *puisque* is a causal connective that can be used to convey objective, as well as subjective content. However, in a contrastive corpus study Zufferey and Cartoni (2012) have shown that 58.5% of the occurrences are related to the communication of subjective causal relations expressing given information. *Puisque* therefore qualifies as a subjective connective which, in addition, is often used to convey a tacitly dissociative attitude towards the expressed content. This makes it an interesting connective to investigate from the perspective of the straw man fallacy which relies on a misattribution content. The LEXCONN data base (Roze et al., 2012) does not indicate a preferential placement for the connective, it is equally used in sentence medial and sentence initial position.

The second causal connective with attributive meaning we focus on for the experiments is *étant donné que*. According to a contrastive study conducted by Zufferey and Cartoni (2012), this connective is used to convey both objective and subjective relations. The LEXCONN data base (Roze et al., 2012) comes to the same conclusion: *étant donné que* can express both types of causal links. Like in the case of *puisque*, *étant donné que* indirectly conveys the information that the content following the connective is shared by the participants of the discussion which creates an echoic meaning. *Étant donné que* has no polyfunctional value and no preferential position (Roze et al., 2012).

There are no corpus studies specifically focusing on the causal connective *comme*, but in the LEXCONN data base, *comme* is listed as a connective that can convey subjective as well as objective information. Like in both previous cases, *comme* has an echoic meaning, indicating the content following the connective as shared information. *Comme* is a highly polyfunctional connective that has different uses. According to LEXCONN (Roze et al., 2012) it can express causality, as well as temporal relations or indicate similarities and parallels. Compared to the previous connectives, *comme* has a preferential placement and is more frequently used in sentence initial position (Roze et al., 2012). However, this does not mean that *comme* is ungrammatical or unacceptable in sentence medial position – it is just less frequently used in this position.

For the experiments in English, we selected the closest equivalents of the French connectives, namely *since* (for *puisque*), *given that* (for *étant donné que*) and *as* (for *comme*). For the connective *since*, Zufferey & Cartoni (2012) report that in 41% of the cases, *since* was used to communicate subjective and given content, and in 51% of the cases subjective and new content. According to the Eng-DiMLex data base (Das, Scheffler, Bourgonje & Stede, 2018), *since* not only expresses a causal relation but it can also convey temporally related information, meaning that the connective has a polyfunctional value. The Eng-DiMLex data base (Das et al., 2018) does not indicate a preferential placement for the connective, it is equally used in sentence initial and sentence medial position.

Following the Eng-DiMLex (Das et al., 2018) the connective *given that* is a causal connective used to introduce subjective and objective information, and it is more often associated with given information. The connective is non-polyfunctional and does not have a preferential position. For *given that* there are no specific corpus studies focusing on the different functions of the connective.

For *as*, Zufferey and Cartoni (2012) have shown in their contrastive corpus study that the connective is mostly used to convey subjective and new information (51%), only in 25% of the cases it was used to convey subjective and given information. According to the Eng-DiMLex data base (Das et al., 2018) *as* is a highly polyfunctional connective that can be used to express different types of links like causal or temporal relations, and event similarities.

The table below contains an overview of the most important features of each connective.

Table 1: Main features of the connectives tested in the experiments

	Subjective or objective	Given or new	Polyfunctionality	Preferential placement
Puisque	Strongly subjective	More given	No	No
Étant donné que	Both	More given	No	No
Comme	Both	Both	Yes	Initial
Since	Strongly subjective	More new	Yes	No
Given that	Both	More given	No	No
As	More subjective	More new	Yes	No

We can conclude from this overview that, even if they all express a causal relation, the connectives differ in some of the features within the same language. For the French connectives, we notice that *puisque* has a very strong subjective feature compared to the other two connectives and *comme* seems to be less strongly subjective and not as often used to convey given information. Looking at the English causal connectives, we notice that *since* and *as* appear to share more features compared to *given that*. We also see that the cross-linguistic connective-pairs (*puisque* + *since* / *étant donné que* + *given that* / *comme* + *as*) are not identical in their features across languages.

4. Testing the influence of causal connectives for the acceptability of straw man fallacies in French and English

In the following experiments, we investigated the role of the English and French connectives described above for the acceptability of straw men. We pursued three main objectives for these experiments. First, we wanted to assess whether straw man fallacies are more detected when the fallacious segment is introduced with a connective, or when it is simply juxtaposed to the previous segment. In light of the results from our previous research (Schumann et al., 2019) and the forewarning effect put forward by Kamalski and colleagues (2008) we expect that arguments introduced with a subjective connective should be less accepted compared to arguments that are simply juxtaposed to the previous segment. Second, we wanted to demonstrate that different connectives lead to different effects, which contributes to explain why they are rarely interchangeable in a given language. We expect that connectives with a very strongly subjective meaning like *puisque* will lead to a lower acceptability score than less strongly subjective connectives like *comme* in French or *as* in English. Third, we expect that, even if there exist very close translation equivalents between languages, connectives are in fact not fully equivalent across languages. The experiments were structured following the same experimental design as in our previous research (Schumann et al., 2019). We summarize the methodology of these studies below. We then present results for the pair of connectives made of *puisque* and its closest English counterpart *since*, then move on to the pair made of *étant donné que* and *given that*, and finally we report results for the pair made of *comme* and *as*.

a. Participants

For the experiments in French, we recruited 123 French-speaking participants (94 women, mean age: 26, age range: 18-57) and for the experiments in English, we recruited 123 English-speaking participants (79 women, mean age: 35, age range: 18-75). All participants were recruited via the University of Fribourg and the crowdsourcing Platform Prolific© (Prolific, Oxford, UK). The participants who took part in experiment via Prolific were rewarded 2.70£ for their participation and the participants who participated via the University of Fribourg received 30 minutes in experimental points. Before taking part in the experiment, all participants had to give their informed consent. On average participants needed 26 minutes to complete the experiment.

b. Materials

We used a series of 40 short dialogues about various societal and political topics, as in Schumann et al. (2019). The same structure was applied to all dialogues: the first statement was always uttered by a person called Barbara and the second statement was a reply to Barbara's statement, expressed by someone called Alexander. As illustrated in (1), the first statement uttered by Barbara contained a standpoint in the first segment "It is crucial to better support young parents". The second segment "having a child means a lot of financial charges" was always introduced with the causal connective 'because' and expressed an argument in support of the standpoint.

- (8) Barbara: It is crucial to better support young parents because having a child means having a lot of financial responsibility.
Barbara: Il est crucial de mieux soutenir les jeunes parents parce qu'avoir un enfant signifie beaucoup de charges financières.

Barbara's part in the dialogue did not vary throughout the different experimental conditions. Alexander always introduced the second half of the dialogue which contained the tested variables and could appear in four different conditions. In the first condition illustrated in (9) the fallacious argument is introduced with a connective. The statement contains a possible consequence of the argument given by Barbara "Let's raise the family allowance". The first segment of Alexander's response was kept constant in all four conditions. Segment 1 was then followed by the causal connective which introduced a distorted version of the argument expressed by Barbara ("it only is about the money").

- (9) Alexander: Let's raise the family allowance CONNECTIVE it only is about the money.
Alexandre: Augmentons les allocations familiales CONNECTIVE on ne pense qu'à l'argent.

The second condition illustrated in (10) represents the exact same sentence, but this time the causal relation between the segments remains implicit, meaning that the fallacious arguments is simply juxtaposed to the previous segment.

- (10) Alexander: Let's raise the family allowance. It only is about the money.
Alexandre: Augmentons les allocations familiales. On ne pense qu'à l'argent.

The third experimental condition illustrated in (11) contains a non-fallacious reformulation of the argument given by Barbara, and it is introduced by a connective.

- (11) Alexander: Let's raise the family allowance CONNECTIVE the parents are under economic pressure.
Alexandre: Augmentons les allocations familiales CONNECTIVE les parents sont sous pression économique.

The last condition illustrated in (12) is the same sentence as in (11), but in this case the non-fallacious reformulation is juxtaposed to the previous segment without any connective.

- (12) Alexander: Let's raise the family allowance. The parents are under economic pressure.
Alexandre: Augmentons les allocations familiales. Les parents sont sous pression économique.

In order to ensure that every participant only saw one out of the four possible conditions per item, we attributed the four possible versions to four different lists using a Latin square design. In total the participants read 10 items per condition, 40 dialogues in total.

c. Procedure

We used the crowdsourcing platform Qualtrics© (Qualtrics LLC, Provo: Utah, USA) to set up the experiment. The first part of the experiment started with some short preliminary

instructions. The participants were told that they would have to read 40 short dialogues about different societal topics between Barbara and Alexander and that they had to respond to 4 questions for every dialogue. These instructions were followed by a few demographic questions about gender, age, native language, and place of residence. In order to familiarize the participants with the task, they were first presented with two trial dialogues. After that, the participants moved on to the actual experimental task. They had to read the 40 dialogues appearing in a randomized order. The participants were asked to respond to 4 questions on a 6-point Likert scale ranging from “No, absolutely not” to “Yes, absolutely”. An additional option (“I don’t know”) was included in case the participants were not able or not willing to respond to the questions. The first two questions illustrated in (13) and (14) focused on two core features of the straw man fallacy. The first question assessed the exaggerative nature of the straw man. This question was asked in order to investigate if the participants were able to detect cases in which Alexander expressed more extreme positions containing straw men.

(13) Is the conclusion reached by Alexander proportionate to what Barbara has said?

The second question aimed at the perceived logical link between the statements. This question was used to assess whether participants were able to spot the incoherence between the statements when the connective announcing attributive content was followed by a fallacious argument that did not endorse the content originally expressed by the speaker.

(14) Does the conclusion reached by Alexander logically follow from what Barbara has said?

The third question illustrated in (15) and the fourth question illustrated in (16) targeted the agreement with both speakers.

(15) Do you agree with Alexander?

(16) Do you agree with Barbara?

Answers to the question targeting the agreement with Alexander were expected to be influenced by the nature of the argument (non-fallacious or fallacious). Indeed, if participants have spotted the fallacy, agreement should be lower for the fallacious reformulations. The question targeting the agreement with Barbara was asked as a control question. In this case, we expected participants to respond according to their own beliefs and opinions, since Barbara’s statements did not contain any manipulated variable.

d. Analysis

We performed 2x2 repeated measure ANOVA with two within-subject factors (fallacious or non-fallacious argument; present or absent connective) on the data. One separate analysis was performed for each connective. Only answers given on the six-point scale were included in the analysis. When participants chose the additional option (“I don’t know”), their answer was treated as missing data. All connectives were analyzed with the same procedure.

e. Results for *since* and *puisque*

In Table 2, we report the means and standard deviation for each condition.

Table 2: Results for experiment 1a (*since*) and 2a (*puisque*)

	<i>Since</i>		<i>Puisque</i>	
	Mean	SD	Mean	SD
Question 1 targeting the proportion:				
Fallacious argument with connective	3.58	0.81	3.09	0.76
Fallacious argument without connective	3.65	0.78	3.35	0.74
Non-fallacious argument with connective	4.43	0.71	4.07	0.66
Non-fallacious argument without connective	4.54	0.63	4.07	0.72

Question 2 targeting the logical link:				
Fallacious argument with connective	3.64	0.73	3.54	0.71
Fallacious argument without connective	3.79	0.74	3.82	0.65
Non-fallacious argument with connective	4.47	0.67	4.17	0.59
Non-fallacious without connective	4.59	0.61	4.27	0.64
Question 3 targeting the agreement with Alexander:				
Fallacious argument with connective	3.49	0.7	3.16	0.74
Fallacious argument without connective	3.53	0.74	3.44	0.69
Non-fallacious argument with connective	4.46	0.51	4.19	0.65
Non-fallacious argument without connective	4.63	0.65	4.40	0.58
Question 4 targeting the agreement with Barbara:				
Fallacious argument with connective	4.46	0.63	4.35	0.58
Fallacious argument without connective	4.53	0.69	4.45	0.69
Non-fallacious argument with connective	4.69	0.54	4.59	0.55
Non-fallacious argument without connective	4.77	0.54	4.65	0.51

For the first question targeting the exaggerative nature of the straw man, we report a significant effect on the type of argument for the connective *since*: non-fallacious arguments ($M = 4.49$) are rated as more acceptable than fallacious ones ($M = 3.62$) [$F1(1,41) = 66.63, p < 0.001$; $F2(1,39) = 68.47, p < 0.001$]. No effect was found for the presence or absence of the connective *since* [$F1(1,41) = 1.664, p = 0.2$; $F2(1,39) = 1.78, p = 0.19$]. For the connective *puisque*, we found a similar pattern. First, fallacious arguments ($M = 3.22$) were less accepted than non-fallacious arguments ($M = 4.07$) [$F1(1,40) = 122.52, p < 0.001$; $F2(1,39) = 72.43, p < 0.001$]. Second, sentences with *puisque* were not less accepted compared to sentences without connective, even though the difference approaches significance in both analyses [$F1(1,40) = 4.3, p = 0.05$; $F2(1,39) = 3.1, p = 0.09$].

The results on the second question, targeting the logical link, returned two main effects for the connective *since*. First, participants rated the non-fallacious arguments as more acceptable ($M = 4.54$) compared to fallacious ones ($M = 3.72$) [$F1(1,41) = 96.07, p < 0.001$; $F2(1,39) = 75.72, p < 0.001$]. Second, arguments were more accepted when the causal relation was left implicit ($M = 4.2$) rather than introduced by *since* ($M = 4.06$) [$F1(1,41) = 96.07, p = 0.02$; $F2(1,39) = 4.14, p = 0.05$]. We also report two significant effects for the connective *puisque*. First, participants rated the non-fallacious arguments as more acceptable ($M = 4.22$) compared to fallacious arguments ($M = 3.68$) [$F1(1,40) = 47.9, p < 0.001$; $F2(1,39) = 39.7, p < 0.001$]. Second, arguments were more accepted when the causal relation was left implicit ($M = 4.05$) rather than introduced by *puisque* ($M = 3.86$) [$F1(1,40) = 10.09, p = 0.003$; $F2(1,39) = 7.97, p = 0.007$].

On the third question, with *since*, the analysis returned a significant effect for the nature of the argument. Fallacious argument scored a lower acceptability ($M = 3.51$) compared to non-fallacious ones ($M = 4.55$) [$F1(1,41) = 96.53, p < 0.001$; $F2(1,39) = 68.78, p < 0.001$]. By contrast, the presence or absence of *since* did not affect the scores significantly ($F2$) [$F1(1,41) = 2.1, p = 0.155$; $F2(1,39) = 4.09, p = 0.05$]. With *puisque*, the analysis also returned a significant effect for the nature of the argument. Again, fallacious arguments ($M = 3.3$) are less accepted than non-fallacious ones ($M = 4.3$) [$F1(1,40) = 95.82, p < 0.001$; $F2(1,39) = 85.77, p < 0.001$]. Contrary to *since*, the analysis also returned a significant effect for the use or non-use of the connective. Agreements were higher when the relation was implicit ($M = 3.92$) than when it was introduced by *puisque* ($M = 3.68$) [$F1(1,40) = 8.08, p = 0.01$; $F2(1,39) = 13.01, p = 0.001$].

Finally, for the last question targeting the agreement with Barbara, the analysis returned a significant effect for the type of argument with *since*. Participants rated non-fallacious arguments as more acceptable ($M = 4.73$) compared to fallacious ones ($M = 4.5$) [$F1(1,41) = 13.15, p = 0.001$; $F2(1,39) = 18.05, p < 0.001$]. No effect was found for the presence or absence of *since* [$F1(1,41) = 1.18, p = 0.28$; $F2(1,39) = 1.07, p = 0.31$]. For *puisque*, we also found a main effect for the nature of the argument, as non-fallacious versions were better accepted

($M = 4.62$) than fallacious ones ($M = 4.4$) [$F(1,40) = 12.5, p = 0.001; F(1,39) = 13.02, p = 0.001$]. No effect was found for the presence or absence of *puisque* [$F(1,40) = 1.77, p = 0.19; F(1,39) = 1.11, p = 0.3$]

f. Results for *given that* and *étant donné que*

The means and standard deviations of each condition are reported in Table 3.

Table 3: Results for experiment 1b (*given that*) and 2b (*étant donné que*)

	<i>Given that</i>		<i>Étant donné que</i>	
	Mean	SD	Mean	SD
Question 1 targeting the proportion:				
Fallacious argument with connective	3.63	0.8	3.97	0.9
Fallacious argument without connective	3.6	0.77	4.06	0.8
Non-fallacious argument with connective	4.45	0.63	4.68	0.6
Non-fallacious argument without connective	4.58	0.61	4.88	0.6
Question 2 targeting the logical link:				
Fallacious argument with connective	3.83	0.68	4.35	0.73
Fallacious argument without connective	3.45	0.77	4.41	0.73
Non-fallacious argument with connective	4.45	0.67	4.74	0.62
Non-fallacious without connective	4.62	0.63	4.88	0.61
Question 3 targeting the agreement with Alexander:				
Fallacious argument with connective	3.55	0.78	3.99	0.74
Fallacious argument without connective	3.61	0.77	3.94	0.77
Non-fallacious argument with connective	4.41	0.6	4.68	0.59
Non-fallacious argument without connective	4.66	0.56	4.88	0.58
Question 4 targeting the agreement with Barbara:				
Fallacious argument with connective	4.59	0.61	4.8	0.63
Fallacious argument without connective	4.48	0.71	4.8	0.52
Non-fallacious argument with connective	4.67	0.51	4.99	0.49
Non-fallacious argument without connective	4.75	0.5	4.9	0.61

For the first question targeting the exaggerative nature of the straw man, we report a significant effect on the type of argument for the connective *given that*: non-fallacious arguments are rated as more acceptable ($M = 4.52$) compared to non-fallacious ones ($M = 3.62$) [$F(1,39) = 73.69, p < 0.001; F(1,39) = 65.88$]. No effect was found for the presence or absence of *given that* [$F(1,39) = 0.49, p = 0.49; F(1,39) = 0, p = 0.99$]. For the connective *étant donné que*, two main effects were found. First, the acceptability was lower for fallacious arguments ($M = 4.02$) compared to non-fallacious ones ($M = 4.78$) [$F(1,40) = 71.37, p < 0.001; F(1,39) = 57.34, p < 0.001$]. Second, implicit relations were rated as more acceptable ($M = 4.5$) than arguments introduced by *étant donné que* ($M = 4.33$) [$F(1,40) = 6.05, p < 0.05; F(1,39) = 7.74, p < 0.01$].

Results on the second question targeting the logical link between the statements indicated a preference for non-fallacious over fallacious arguments. For *given that*, non-fallacious arguments were rated higher ($M = 4.54$) compared to fallacious ones ($M = 3.82$) [$F(1,39) = 81.29, p < 0.001; F(1,39) = 43.95, p < 0.001$]. However, the analysis returned no effect for the presence or absence of the connective *given that* [$F(1,39) = 1.33, p = 0.26; F(1,39) = 0.38, p = 0.54$]. The results for the French version with *étant donné que* returned a significant effect with a higher score for non-fallacious ($M = 4.81$) over fallacious arguments ($M = 4.38$) [$F(1,40) = 38.46, p < 0.001; F(1,39) = 24.54, p < 0.001$]. As in English, the analysis returned no effect for the presence or absence of the connective *étant donné que*, even though the results approached significance in both analyses [$F(1,40) = 3.96, p = 0.053; F(1,39) = 3.25, p = 0.08$].

On the question targeting the agreement with Alexander, the results showed a main effect on the type of argument for *given that*. Again, participants preferred non-fallacious ($M = 4.53$)

over fallacious arguments ($M = 3.58$) [$F(1,39) = 102.65, p < 0.001$; $F(1,39) = 49.76, p < 0.001$]. The presence or absence of *given that* did not result in a significant difference [$F(1,39) = 3.76, p = 0.6$; $F(1,39) = 3.37, p = 0.74$]. Results on the connective *étant donné que* show a significant difference for the nature of the argument. Non-fallacious arguments ($M = 4.78$) were rated as more acceptable compared to fallacious arguments ($M = 3.97$) [$F(1,40) = 105.57, p < 0.001$; $F(1,39) = 55.13, p < 0.001$]. The presence or absence of *étant donné que* did not produce a significant difference either [$F(1,40) = 1.04, p = 0.32$; $F(1,39) = 1.55, p = 0.22$].

Finally, on the agreement with Barbara, the analysis did not return any effect for the type of argument with *given that* [$F(1,39) = 3.91, p = 0.06$; $F(1,39) = 2.81, p = 0.1$], nor for the presence or absence of the connective [$F(1,39) = 0.12, p = 0.73$; $F(1,39) = 0.08, p = 0.78$]. No significant effect was found either for *étant donné que* on the type of argument [$F(1,40) = 3.63, p = 0.06$; $F(1,39) = 3.87, p = 0.06$], or on the presence or absence of the connective [$F(1,40) = 0.66, p = 0.42$; $F(1,39) = 0.54, p = 0.47$].

g. Results for *as* and *comme*

Table 4 reports the means and standard deviation for all conditions.

Table 4: Results for experiment 1c (*as*) and 2c (*comme*)

	<i>As</i>		<i>Comme</i>	
	Mean	SD	Mean	SD
Question 1 targeting the proportion:				
Fallacious argument with connective	3.68	0.74	3.45	0.63
Fallacious argument without connective	3.59	0.68	3.59	0.79
Non-fallacious argument with connective	4.57	0.63	4.49	0.71
Non-fallacious argument without connective	4.59	0.54	4.45	0.75
Question 2 targeting the logical link:				
Fallacious argument with connective	3.72	0.71	4.07	0.63
Fallacious argument without connective	3.75	0.71	4.14	0.72
Non-fallacious argument with connective	4.53	0.62	4.56	0.61
Non-fallacious without connective	4.58	0.55	4.62	0.63
Question 3 targeting the agreement with Alexander:				
Fallacious argument with connective	3.54	0.64	3.51	0.69
Fallacious argument without connective	3.45	0.64	3.53	0.59
Non-fallacious argument with connective	4.56	0.57	4.52	0.56
Non-fallacious argument without connective	4.58	0.67	4.47	0.72
Question 4 targeting the agreement with Barbara:				
Fallacious argument with connective	4.61	0.56	4.76	0.52
Fallacious argument without connective	4.64	0.59	4.71	0.57
Non-fallacious argument with connective	4.76	0.61	4.86	0.51
Non-fallacious argument without connective	4.78	0.56	4.92	0.6

For the first question targeting the exaggerative nature of the straw man, we report a significant effect on the type of argument for the connective *as*. Fallacious arguments ($M = 3.64$) are less accepted than non-fallacious ones ($M = 4.58$) [$F(1,40) = 100.46, p < 0.001$; $F(1,39) = 80.62, p < 0.001$]. The presence or absence of *as* did not result in a significant effect [$F(1,40) = 0.25, p = 0.62$; $F(1,39) = 0.36, p = 0.55$]. The French connective *comme* led to similar results. There was a significant effect for the nature of the argument, as non-fallacious arguments ($M = 4.47$) led to higher acceptance rates than fallacious ones ($M = 3.53$) [$F(1,39) = 102.44, p < 0.001$; $F(1,39) = 56.74, p < 0.001$]. The presence or absence of *comme* did not return any effects either [$F(1,39) = 0.55, p = 0.46$; $F(1,39) = 0.33, p = 0.57$].

We find the same pattern on the second question targeting the logical link between the statements. Again, for *as*, responses to non-fallacious arguments reached a higher score ($M = 4.56$) compared to fallacious arguments ($M = 3.74$) [$F(1,40) = 101.37, p < 0.001$; $F(1,39) = 66.18, p < 0.001$]. The presence or absence of *as* did not lead to a significant

difference [$F(1,40) = 0.34, p = 0.57; F(1,39) = 0.35, p = 0.56$]. The results for the connective *comme* did return a significant effect for the type of argument. Again, fallacious arguments ($M = 4.11$) led to a lower acceptability score than non-fallacious ones ($M = 4.59$) [$F(1,39) = 43.33, p < 0.001; F(1,39) = 30.45, p < 0.001$]. No effect was found for the presence or absence of *comme* [$F(1,39) = 1.65, p = 0.21; F(1,39) = 1.06, p = 0.31$].

The results for *as* on the third question targeting the agreement with Alexander show a significant difference for the nature of the argument. Participants gave higher acceptance scores to non-fallacious arguments ($M = 4.57$) compared to fallacious ones ($M = 3.5$) [$F(1,40) = 121.62, p < 0.001; F(1,39) = 68.8, p < 0.001$]. The results on the presence or absence of *as* did not return any results [$F(1,40) = 0.23, p = 0.63; F(1,39) = 0.23, p = 0.63$]. The same pattern was found for the connective *comme*. The results showed a main effect on the type of argument, with non-fallacious arguments ($M = 4.5$) leading to a higher acceptance rate compared to fallacious ones ($M = 3.52$) [$F(1,39) = 104.73, p < 0.001; F(1,39) = 62.31, p < 0.001$]. The presence or absence of *comme* did yield a significant difference [$F(1,39) = 0.03, p = 0.86; F(1,39) = 0.02, p = 0.88$].

Finally, for the agreement with Barbara, results showed a similar pattern. Again, participants gave a higher acceptance score to non-fallacious ($M = 4.77$) compared to fallacious ones ($M = 4.63$) [$F(1,40) = 5.06, p = 0.03; F(1,39) = 5.88, p = 0.02$]. The presence or absence of the connective *as* did not create a significant difference [$F(1,40) = 0.24, p = 0.627; F(1,39) = 0.57, p = 0.46$]. Results for the connective *comme* returned the same pattern. Participants gave a higher score to non-fallacious arguments ($M = 4.89$) compared to fallacious ones ($M = 4.73$) [$F(1,39) = 6.29, p = 0.02; F(1,39) = 7.15, p = 0.01$]. The presence or absence of *comme* did not create a significant effect [$F(1,39) = 0.01, p = 0.91; F(1,39) = 0.31, p = 0.58$].

h. Discussion

Results from our experiments clearly indicate that participants are intuitively able to detect fallacies: in all six experiments, they systematically rated non-fallacious statements as more acceptable compared to fallacious ones. In addition, the effects were always significant for the first three questions targeting the exaggerative nature of the straw man, the logical link between the statements and the agreement with Alexander. This is due to the fact that, in all three cases, the answers were influenced by the manipulated variables. By contrast, the question targeting the agreement with Barbara, sometimes led to a significant difference and sometimes not. This result was expected since answers to this question vary depending on the personal opinion of each participant (whether they agree with her standpoint or not) and should therefore not be influenced by the manipulated variables.

More critically for the argument of this paper, we also observed different patterns of effects related to the uses of connectives. A summary of the effects created by the six connectives in each of the four questions is presented in Table 5. In this table, “yes” means that a significant difference was found, always in the direction of a lower acceptability when the connective was used compared to the implicit version, and “no” means that no significant difference was found. The tag “fuzzy” was used when the analysis approached significance in both F1 and F2, and the lack of effect could therefore be due to lack of statistical power.

Table 5: Summary of significant effects created by each connective.

	Exaggeration	Logical link	Agreement with A	Agreement with B
<i>since</i>	No	Yes	No	No
<i>puisque</i>	Fuzzy	Yes	Yes	No
<i>given that</i>	No	No	No	No
<i>étant donné que</i>	Yes	Fuzzy	No	No
<i>as</i>	No	No	No	No
<i>comme</i>	No	No	No	No

First, our results indicate that the connective *puisque* does indeed function as a forewarner and leads the participants to be more vigilant regarding the segment following it. When the argument introduced by *puisque* is of a fallacious nature, reader expectations are not met because *puisque* instructs the reader to consider the content following the connective as given information whereas the attributed content is not faithful in the case of a straw man fallacy. These findings are in line with the forewarning effect put forward by Kamalski et al. (2008), showing that strongly subjective connectives act as indicators that the speakers' own subjectivity is at play. This effect was moreover found on two and even the three critical questions in our experiment. By contrast, its English "counterpart" *since* did not create such a clear effect, as it only gave rise to a significant difference in one of the questions, targeting the logical link between segments. Hence, our results provide some further indication that even closely related connectives in different languages do not function in a similar way, and this impacts their role in persuasive contexts. Similarly, *étant donné que* in French creates a stronger effect as a forewarner compared to *given that* in English.

Given that *puisque* and *since* are both rated as strongly subjective connectives in current analyses, it is not clear what could explain these differences, as the forewarning effect was specifically related to this feature. Our data indicates therefore that subjectivity is not the only feature that is relevant to explain the role of connectives for argumentation. We suggest that an alternative explanation could be the type of speaker attitude towards the attributed content. It has been argued that *puisque* conveys a tacitly dissociative attitude (Zufferey, 2014). It might well be that this feature is what sets this connective apart from the others. Future work will need to explore this feature using corpus data to empirically assess the validity of this hypothesis.

Another limitation from existing literature is that *étant donné que* and *given that* do not seem to have a variable profile in the databases of connectives, yet they do not play a similar role as forewarners. Again, this result points to the necessity of identifying additional features and also of getting a more fine-grained picture of their profile using corpus data. The last pair made of *comme* and *as* create the reverse problem. They seem this time to play a similar role for argumentation, given that none of them plays a role a forewarner. Yet, their profile is partly divergent in current databases of connectives. This result underlines again the necessity to go beyond coarse-grained classifications of connectives to get an empirically based profile of each connective in all these dimensions (subjectivity, givenness, speaker attitude). We have provided such an analysis for French connectives in Schumann, Zufferey & Oswald (submitted), and results clearly indicate that corpus-based analyses of connectives are much more accurate as predictors of their argumentative effects. Indeed, in this analysis, we found that *puisque* has a higher degree of subjectivity compared to *étant donné que*, which has in turn a higher degree of subjectivity compared to *comme*. Similarly, *puisque* is more often used to convey given information compared to *étant donné que*, which is in turn more used to convey given information compared to *comme*. Thus, the scaling of connectives is convergent on both dimensions: *puisque* > *étant donné que* > *comme*. In addition, this profile drawn based on corpus data perfectly matches the strength with which all three connectives affect argumentation. A similar analysis will need to be performed on cross-linguistic data in future work in order to further deepen our understanding of the role of connectives in argumentation.

5. Conclusion

In this paper, our goal was to illustrate the role of connectives for argumentation. Going beyond the coarse-grained classification of discourse markers found in some works in argumentation, we argued that the fine-grained analysis found in pragmatics and discourse studies provide more indications about the role of connectives as forewarners in argumentative contexts. We demonstrated in a series of experiments conducted on three French and three English causal connectives that connectives do not always play a similar role in argumentation. First, our experiments showed that the presence or absence of some connectives does indeed play a

significant role for the communication of fallacies. When the fallacious argument is introduced with a strongly subjective connective most often used to convey given information with a tacitly dissociative attitude (i.e. *puisque*), participants score lower acceptability rates which confirms the results from our previous work (Schumann et al., 2019) and adds credit to the forewarning effect reported by Kamalski et al. (2008). However, important differences are to be mentioned within the same language and across languages which begs the need for more fine-grained studies of specific connectives. In sum, the experiments presented in this paper show the necessity of a precise and more fine-grained investigation of connectives in order to understand their impact on fallacies and argumentation in general.

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