On glasses half full or half empty: understanding framing effects in terms of default implicatures

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Abstract

The variations in how subjects respond to positively or negatively framed descriptions of the same issue have received attention from social science research, where, nevertheless, a naïve understanding of speech interpretation has undermined the different explanations offered. The present paper explores the semantic-pragmatic side of framing effects and provides a unifying explanation of this phenomenon in terms of a combined effect of pragmatic presuppositions and default implicatures. The paper contributes to a more comprehensive understanding of representations and cognitive processes involved in the framing bias by showing how well-entrenched linguistic practices associated to frame choice, and conducive to an implicit focus, result in default implicatures on the addressee's side.

Keywords Valence framing effects · Default implicature · Pragmatic presupposition · Focus · Polarity

1 Introduction

People seem to prefer their glasses half full to half empty. Our initial reaction to this phenomenon may be to say: "But they're both the same!" and then distrust the intellectual capacity of individuals who show that preference. Although in a more articulate fashion, this has also been the initial reaction in the field of economic methodology when confronted with framing effects like the one just described.[1] The prevalent view is that framing effects should be seen as signs of irrationality.

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[1] In what follows, I will restrict my analysis to the so called "valence framing effects"—i.e. effects caused by frames where the same issue is described either in positive or negative terms—and I will just talk of 'framing effects' when referring to them.

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Framing effects are widely studied in social sciences, being commonly understood as variations on how subjects respond to different but objectively equivalent descriptions of the same issue. The pioneering and influential studies by Amos Tversky and Daniel Kahneman (1979, 1981, 1991) shed light on the way individuals process information depending on how such information is presented to them. Their prospect theory emphasizes the connection between positive/negative framing and the interpretation of the framed options in terms of gains or losses, which, in turn, triggers several psychological biases --like loss aversion and the endowment effect. They also acknowledged that the reference point regarding the value of an outcome varies depending on whether the frame involves an interpretation of the outcome as a gain rather than a loss. The underlying semantic and pragmatic nature of these shifts in the reference point, however, is not analyzed by them and, with few exceptions, remains unexplored.[2] This paper examines the semantic-pragmatic features of framing effects, thereby offering a unifying explanation of them in terms of default implicatures.

Despite framing effects being considered a rather uncontroversial fact from an empirical or descriptive point of view, the apparent conflict between such fact and the normative principle usually known as the "principle of extensionality" or the "invariance principle" has provoked numerous controversies. According to this principle, which is still a common assumption in rational choice theory, different ways of presenting the same set of possible options should not change the subjects' choices with respect to those options. Since economists and social psychologists systematically ignore the literature in philosophy of language and philosophers of language reciprocate by systematically ignoring the literature in economic methodology and social psychology, framing effects have hardly been addressed by philosophers and their current account thus remains both poorly developed on the conceptual level and theoretically scattered into different approaches. A comprehensive, unifying approach to framing effects, as the one advocated here, reinforces the idea that the factual-normative gap may be only apparent, since the use of valence frames is informatively richer than it has been assumed, making a legitimate cognitive difference in the processing of alternatively framed descriptions.

The following discussion is primarily intended as a philosophical contribution to the understanding of framing effects. It is aimed at identifying those fundamental concepts that could be most useful to explain such phenomena, bridging the gap between the vast literature on presuppositions and implicatures from the philosophy of language and the broad literature on framing effects available in psychology and social science. Heterogeneous framing effects are covered by a single, general explanation that, in turn, unifies previous explanatory notions and hypotheses. In particular, the article shows how framing effects ultimately relate to pragmatic presuppositions and default implicatures, thus adding to some recent arguments for reassessing the invariance principle so that it implies the preservation of whatever

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[2] An early attempt at showing the importance of this side of the problem can be found in Jones (2007, p. 168). For a recent argument highlighting the relevance that research on foundational issues in the philosophy of language has for explaining framing effects, see Fisher (2020).

implicit information is relevant for making decisions (Bourgeois-Gironde & Giraud, 2009; Le Menestrel & van Wassenhove, 2001; McKenzie & Nelson, 2003; Moscati, 2012; Sher & McKenzie, 2011).[3] By scrutinizing the nature of the implicit information conveyed by frames, the analysis dismantles a rather caricature-like divide between, on the one side, the Tversky and "Kahnemanish" position that says that framing effects demonstrate the violation of the invariance principle, and, on the other, the position advocated by authors like McKenzie and Nelson (2003), Sher and McKenzie (2006, 2008), Geurts (2013), and Mandel (2014) who suggest otherwise.[4] Consequently, the focus of the controversy is shifted from rationality or irrationality of judgement (or choice) to that of interpretation, for only once a rational interpretation of the described options is fixed can the question about the rationality of choice be raised. Additionally, the discussion below provides a deeper understanding on how reference points and attention focus mechanisms come into play in framing effects, an understanding that requires a more developed conception of speech interpretation. Both reference points and attention focus mechanisms can be traced back to some interconnected semantic-pragmatic features of frames, i.e. respectively default implicatures about standard background conditions and linguistic focus.

The structure of the paper is as follows. After briefly characterizing framing effects (Sect. 2), I discuss the few attempts at providing a semantic-pragmatic explanation of them in terms of situated linguistic understanding and a revised notion of extensionality (Bourgeois-Gironde & Giraud, 2009, pp. 385–87, Moscati, 2012, p. 8), placing a particular emphasis on the important contributions coming from the information leakage approach to framing effects (Sher & McKenzie, 2006) and Joanne Ingram's application of the presupposition denial account to the same issue (Sect. 3). The remaining sections offer a deeper and unifying approach to framing effects by applying the notions of complement set, default implicature and pragmatic presupposition (Sect. 4), thereby integrating some valuable contributions to the subject. I conclude that default implicatures about a complement set, which are located in an intermediate layer between semantics and pragmatics, best explain how different information is conveyed by alternative frames.

2 Framing effects

As empirical phenomena, framing effects have been established to a very high degree of reliability and robustness (Freling et al., 2014; Kühberger, 1998; Piñon & Gambara, 2005). Following Levin et al., (1998, p. 151, 181), we can distinguish three main kinds: risky choice, attribute, and goal framing.

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[3] For an enlightening discussion of the different informational levels involved in determining informational equivalence see Sher & McKenzie (2011) and Sher & McKenzie (2008, p. 83, 94).

[4] Since both McKenzie et al.'s and Geurts' contributions to the rationality debate related to framing are very closely connected to the one suggested here, their approaches will be carefully discussed on Sects. 3 and 4.2. respectively. Mandel's interesting insights on description effects, as resulting from lower bounds and usually mistaken for framing effects, will be also addressed on Sects. 3.4. and 4.2.2.

In risky choice framing, the complete set of outcomes from a potential choice involving options with different levels of risk is described either positively or negatively. The framing effect, here, is measured by comparing the rate of choices for risky options in each frame condition. A wide variety of experiments on risky choice (Levin et al., 1998, pp. 154–157), from bargain situations to medical treatments, show that, when the outcome is described in terms of gains (lives saved, earned income), subjects' tendency to take risks diminishes. Conversely, such tendency increases when outcomes are expressed in terms of losses (lost lives, incurred debts).

In attribute framing, the positive or negative description of a characteristic of an object or event affects item evaluation, which is estimated by comparing the attractiveness ratings for the single item in each frame condition. It has been established to a very high degree of reliability and robustness that positively described objects or events, like consumer products, job placement programs, medical treatments or students' level of achievement, are more positively valued (Levin et al., 1998, pp. 160–163). Ground beef, for example, was rated as better tasting and less greasy when it was described as 75% lean rather than as 25% fat.

Finally, in goal framing, the same consequences of a conduct are specified either in positive or negative terms. Experimental evidence shows that most subjects appear more inclined to adopt a certain conduct, –example.g., breast self-examination, use of public resources or a credit card–, when they receive information stressing the potential losses derived from not engaging in such conduct than when presented with information highlighting the potential profits resulting from engaging in it (Levin et al., 1998, pp. 169–171).

Some shared theoretical processes underlying the different explanations of framing effects are the following:

– negativity bias, that is, the tendency to pay more attention to negative than positive information (Taylor, 1991, pp. 68–71, Yechiam & Hochman, 2014), which includes loss aversion and preservation of the status quo (Kahneman & Tversky, 1979)[5]; and

– anchoring bias, i.e., the grasp or inference of implicit information about reference points (Kahneman & Tversky, 1979), which concerns the implicit standard

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[5] It must be noted that the negativity bias is more prominent in risky-choice framing than in goal framing. The reason for this is that in risky-choice framing the choice is not only between positive and negative framing descriptions, but also between a probabilistic description presented in both frames, and a description in terms of absolute numbers that is framed as positive or negative. For example, in the so called "Asian disease problem" ('ADP', in what follows; Tversky & Kahneman 1981), subjects have to choose between the two independent options with different level of risk presented in each of the following pairs: a) a sure saving of one-third the lives versus a one-third chance of saving all the lives and a two-thirds chance of saving no lives; (b) a sure loss of two-thirds the lives versus a one-third chance of losing no lives and a two-thirds chance of losing all the lives. The majority of subjects select the first option in the positively framed version of the task, and the second option in the negatively framed version. The negativity bias has been strongly related to the asymmetric presentation using mixed presentation (both positive and negative description) for the probabilistic option and a single presentation (either positive or negative) for the numerical option.

(or implicit assumptions about the *status quo*) that is used in assessing the value of a potential gain or loss.

In the specific case of risk framing, framing effects are explained on the basis of the different value function applied by subjects in what they interpret as the gain domain as opposed to what they regard as the loss domain (Kahneman & Tversky, 1979). The value function is convex in the loss domain—for it increases in disutility from the reference point of 0 losses at the origin–, but concave in the gain domain—as it increases in utility from the reference point of 0 gains at the origin. Consequently, framing effects would result from people being risk averse in the gain domain and risk seeking in the loss domain. In the case of attribute framing, the main theoretical processes invoked have been focus, selection attention and associative processes. Although it has not been hitherto possible to determine the relative contribution of these mechanisms when they operate jointly, recent empirical research proves that there is a unique contribution of attention mechanisms in mitigating framing effects (Kreiner & Gamliel, 2018).

Interestingly, there is empirical evidence of an inverse relationship between the intensity of the framing bias and the amount of information provided to the subject, or the level of processing of such information (Maheswaran & Meyers-Levy, 1990, p. 365, Larrick et al., 1992, p. 199, Smith & Levin, 1996, p. 283, Schoorman et al., 1994, p. 520). For instance, adding to the survey some questions about the subject's reasons for a certain choice have been proven to diminish the corresponding framing effects. These phenomena suggest that when information is not provided by the frame, addressees "complete" such information—and, they may do that, not only in a way unintended by the pollsters, but also as a result of well entrenched linguistic practices pollsters are unaware of. Even more interestingly for the present discussion, we know that the framing bias is eliminated when the implicit frame—e.g., the '25% empty' implicit in the '75% full'- is also presented explicitly both verbally and visually (Gamliel & Kreiner, 2013; Kreiner & Gamliel, 2016), or when the addressee's attention is drawn to it (Kreiner & Gamliel, 2018).[6] Moreover, in an enlightening discussion on the role that detailed quantitative information plays in valence framing, Gamliel and Kreiner (2019) provide some experimental results suggesting that, even if message recipients process quantitative information more reflectively than non-quantitative information, they are nonetheless sensitive to the magnitude of the quantitative information. Indeed, their results show framing bias actually increases as the magnitude polarization employed in the descriptions is more extreme. These results, even if seemingly in conflict with the acknowledgment of an inverse relationship between the amount of information or the level of processing of such information and the intensity of bias, fit nicely with the account of framing effects offered here, where the role of polarity in linguistic practices is emphasized (see Sect. 4). The mitigating strategy consisting in providing more detailed information may only work if the corresponding information does not contribute to reinforce

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[6] The possibility of eliminating framing effects by shifting the focus of attention to the implicit frame is later connected to the easy cancellability of local, default implicatures (see Sect. 4.2.).

the speech interpretation mechanisms involving polarity that are here identified as triggering framing effects.

In addition to all the above mentioned empirical evidence, there is an increasing acknowledgment of how different frames may be implicitly conveying different choice-relevant information. A new emphasis on choice-relevant informational equivalence as opposed to mere extensional equivalence between frames has been made accordingly. Against this background, the need to examine linguistic practices involved in frames becomes more pressing.

3 Earlier attempts at explaining framing effects in semantic-pragmatic terms

Let us focus now on some previous contributions leading to the recognition of the semantic pragmatic nature of framing effects.

3.1 The intension/extension distinction and the information leakage account

There have been a few attempts at explaining framing effects in general on the basis of the traditional semantic distinction between extension or what is designated by an expression (like the class of all cats as that designated by the expression 'cat') and intension or the way of determining extension (the concept of cat as what enables us to identify instances of cats). All of these attempts have questioned the way in which the principle of extensionality is usually understood or applied.

From the field of philosophy of economics, for example, Ivan Moscati has argued for understanding framing effects as doxastic effects caused by the intensional discrepancy between extensionally identical descriptions (Moscati, 2012, p. 7). According to him, surveys constitute intensional contexts were the relevant meaning of descriptions is interpreted as tied to beliefs. For example, the events described by saying that "v is not greater than 2" and "v is not greater than the 12th root of 4096" are extensionally equal but intensionally different, and hence somebody may reasonably believe the first without believing the second (*ibid*. pp. 12–13). In Moscati's view, the normative judgment on the irrationality of subjects is only appropriate once the intensional component of survey interpretation is determined by identifying those beliefs on which subjects build on their interpretation (2012, p. 8). Within this framework, the economic relevance of interactive beliefs and interactive knowledge—that is, respectively, beliefs or knowledge that an individual has about what other individuals believe or know about the world-, is highlighted, since in many cases individuals take action on their basis (Moscati, 2012, p. 14).

Sacha Bourgeois-Gironde and Raphaël Giraud (2009) follow a different approach, based on the information leakage account. The leakage approach relies on some empirical data collected over the last decade showing that listeners (or readers) are able to make inferences about current or presupposed states from the speaker's (pollster's) choice of frame (Leong et al., 2017; McKenzie & Nelson, 2003; Sher & McKenzie, 2006, 2008, 2011). In some of the cases studied, depending on whether

the glass was described as half empty or half full, readers were able to successfully infer its previous volume of liquid (the inference being that the glass was previously completely full or completely empty, respectively). As noted by Sher & McKenzie, this shows that background conditions influence a speaker's choice of frame, and listeners can infer these background conditions based on the selected frame. According to this account, frames incorporate a leakage of choice-relevant information about the speaker's reference point. Therefore, rather than being objectively equivalent, alternative frames would leak information allowing to infer the existence of certain background conditions from the speaker's choice of frame. The different information about background conditions conveyed by alternative frames is not part of the literal meaning of the framed descriptions, but nonetheless, when the background conditions are choice-relevant, framing effects are not irrational (McKenzie & Nelson, 2003). Ultimately, as also argued by Bourgeois-Gironde & Giraud, informational equivalence is not guaranteed by literal meaning equivalence.

Bourgeois-Gironde and Giraud (2009, pp. 385–87) use the distinction between intension and extension with the purpose of explaining the mechanism by which framing effects emerge. Controlled experiments on the use of alternatively framed questionnaires reveal that what needs to be guaranteed by means of co-extensional descriptions is not only logical and semantic equivalence as traditionally understood (i.e., preservation of truth value and truth conditions)[7]—which does not guarantee informational equivalence–, but also the preservation of whatever implicit information is relevant for making decisions. Only after such information has been specified and the frames have been created equivalent in this respect, could framing effects be ascertained as genuine violations of the extensionality principle in the contexts of decision under study. Violating extensionality would then imply that choice-irrelevant information determines the choices or judgments made by the subjects.

Focusing again on the views developed respectively by Bourgeois-Gironde and Giraud (2009) and Moscati (2012), it is important to note that they use the term 'intension' in a sense that may include explicit contents (conventional meaning, truth conditions) as well as implicit contents (speaker's meaning, contextual information). Unlike the standard notion of intension, usually restricted to explicit contents, this broad notion is tightly associated with implicit contents, whose nature, however, remains highly underdetermined. Furthermore, if we grant that alternative valence frames are usually designed, not only to guarantee interchangeability *salva veritate*, but also so that they share the same explicit contents, then response shifts induced by alternative frames are most likely due to differences in their implicit contents.

Once that implicit contents are brought to the foreground two related questions arise: (a) what is the nature of the implicit information conveyed by extensionally equivalent frames sharing the same explicit contents? And (b) how is the implicit

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[7] While logical equivalence depends on sentences sharing the same logical form, semantic equivalence hinges on sentences being co-referential—that is, referring to the same facts—and having the same truth conditions. The present paper reinforces the idea that framing effects should be understood as revealing that both forms of equivalence do not guarantee the informational equivalence of alternatively framed descriptions of the same issue. On the other hand, if logic and semantic equivalence are redefined in non-classical terms, they might then guarantee informational equivalence.

information conveyed by the frames? Drawing on some empirical data presented below, my answer to the first question is that the (choice-relevant) implicit information conveyed by the frame is about the most likely context of use of a frame, that is, the typical background conditions corresponding to such context. This information is not part of what is asserted in the frame, but rather part of what is assumed about context whenever a certain frame is employed. The resulting assumption concerns neither the intentions of any particular speaker, nor any other particular contextual aspect surrounding the framed utterance, since surveys are usually non-conversational contexts where both the "speaker" (pollster) and the framed issue are absent. In implicitly conveying information typically associated with a frame, valence framing induces an addition of a proposition to that literally expressed by an utterance, which bring us to the second question. The propositional addition induced by framing seems to occur through the activation of a default mechanism resulting from a process of standardization, i.e. by way of a regular pattern of use or choice of a frame whenever certain contextual conditions are assumed to be the case. As we will see, this is also suggested by recent empirical data on frame choice.

3.2 The presupposition denial account

Linda Moxey's "Presupposition Denial Account" of natural language quantification (2006, further developed in 2011) provides important cues for the semantic-pragmatic analysis of framing effects. The label refers to the assumption that, in interpreting a negative description, we presuppose a denial of a positive alternative (i.e. a complement set) since this maximizes the information we can get from the utterance—by the same token, we presuppose that a positive frame involves a denial of a negative alternative.[8] According to Moxey, the polarity of natural language quantification serves to frame quantity information in either a positive or a negative way ('a few' as opposed to 'few'). Each quantifier activates a regular pattern of focus on a complement set relative to the reference set (the overall set would include both sets). It must be noticed that the notion of "complement set" is not employed here in the strict, set-theoretic sense, as the set of all elements not in the reference set, but rather in the more pragmatic sense of contrast class. As emphasized by Moxey (2011, pp. 119–123), this shows that, as interpreters, we seek out information, not only about what is in fact the case, but also about what is assumed about context, especially if deemed choice-relevant. This information is tightly connected to usual opinions or expectations on the facts in question and rooted in a standard choice of frame alternatives in certain contexts.[9]

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[8] Note that here 'negative' is applied to frames and, therefore, it must be understood in a valence sense involving polarity, not in a linguistic sense. In the latter sense it does not hold that a positive statement (an affirmative sentence) involves a denial of a negative alternative (i.e., a negative sentence). As forcefully established in the literature on reasoning with negations, negative and affirmative sentences are not mirror images, negated sentences bringing up their affirmative counterparts and inducing clear slow-downs in reasoning, but not the converse.

[9] Moxey has shown how this "presupposition denial account" of focusing properties of natural language quantification can also be extended to other linguistic resources, like the ones related to frequency or probability (2011, pp. 119–123). In a similar vein, Mandel (2001, 2008) claims that probability judg-

As argued by Joanne Ingram (2010, pp. 14–15, 175–176), the "presupposition denial account" includes a hypothesis that could be generalized to valence framing, even if developed for natural language quantification. The hypothesis states that focus and polarity together are a main kind of presupposition trigger. In both cases, the inferential mechanism would hinge on the contrast between what is expected (the complement set) and what is denoted (the reference set), regardless of whether the contrast is between amounts or between attributes. Empirical research on natural language quantification supports the claim that negative quantifiers (like "not many" or "few" as opposed to "a few") lead interpreters to assume that the small amount denoted is in contrast to a larger supposed amount. Conversely, terms like "a few" leaks information about a smaller supposed amount in contrast to the small amount denoted (Sanford et al., 2002). For example, saying that

In the airplane crash, a few people were killed

leads readers to focus on those people who could have survived but did not, and thus, given that complement set, to consider the described fact as bad news. By contrast, saying that

In the airplane crash, few/not many people were killed

leads readers to focus on a different complement set, namely, those passengers who could have been killed but were not, and consequently, the described fact is taken as good news (Ingram, 2010, pp. 32–3). If, following Ingram, we use the expression 'shortfall set' to refer to the difference between a higher expected amount or value and the lower actual one (*ibid*. 25), then we could call the reverse difference (i.e. between a lower expected amount or value and the higher actual one) the 'surplus set'.

Sanford et al., (2002, pp. 130–133) show how assumptions similar to the ones above are triggered by logically equivalent frames like '25% fat' and '75% lean'. Relying on this previous work, Ingram (2010, pp. 47–76, chapters 2 & 3) provides further evidence that implicit reference to a complement set can be triggered even in the absence of natural language quantification.

In applying Moxey's ideas to valence framing, Ingram concludes that focus can thus be originated by a choice between alternative frames, thereby yielding a soft presupposition trigger regarding the existence of a complement set—a full glass as opposed to a half empty glass or the reverse. In this sense, the complement set of a half empty glass is a full glass, not a not half empty glass, which could be

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Footnote 9 (continued)

ments are attached to descriptiosns of events rather than to events, which means that descriptions, together with evidence for probability assignment, are both represented before probability is assigned. According to him, by using alternative, complementary descriptions like 'one head in four coin tosses' versus 'three tails in four coin tosses', a strict refocusing manipulation can be performed, so as to make a difference in the probability judgement related to each description. Interestingly, he has also drawn attention to the significant resemblance between the study of strict refocusing on probability judgment and the study of gain–loss framing effects on choice. Some other violations of the extensionality principle in the domain of equiprobable descriptions have been experimentally established by Teigen & Keren (2003).

instantiated by many irrelevant alternatives (an almost empty glass, a one third empty glass, and so on). Valence framing leaks information about a complement set that is assumed to be usually part of the objective context when a reference set is mentioned in a description (Ingram, 2010).[10]

Going back to one of our examples, it becomes clear that, depending on how the reference set is described in a sentence (for instance, a piece of beef as being 75% lean), there is a focus on a complement set, i.e., on the assumed average qualities ascribed to the sort of thing included in the reference set (pieces of beef being usually less than 75% lean). It is interesting to note that the linguistic focus examined by the above authors is directly related to the focus of attention, which happens to be advocated as the main explanatory from the psychological approach to framing effects. In fact, the linguistic focus is very often employed by speakers as a rhetoric means to draw the attendees' attention to particular elements in the discourse. Hence, it can be conceived of as part of the attention bias mechanism that invokes framing, and can be integrated with cognitive attention accounts proposed in the social sciences literature (e.g. Kreiner & Gamliel, 2018). Indeed, attention accounts proposed for framing remain silent about the linguistic-communicative processes involved in framing, but at the same time they seem to accept them as an inherent part of the message.

3.3 Lower bound unilateralism

David R. Mandel's (2014) distinctive approach to what is usually regarded as the problem of framing effects deserves separate consideration. He criticizes what he calls "*naïve bilateralism*", i.e. the assumption that rational subjects would interpret numeric quantifiers as exact values, a view that, according to him, must be rejected given the large empirical evidence already available suggesting otherwise (2014, p. 2). By appealing to a proof by arithmetic argument, the standard conception of framing effects would neglect the extensive body of literature showing that quantifiers are most often interpreted as lower-bounded. In describing a domain of 600 lives in danger, the arithmetic fact that $600 - 200 = 400$ is taken as a proof that the alternative frames '200 lives saved' and 'and '400 lives lost' describe equivalent expected outcomes. Mandel provides some important empirical results showing that number expressions appearing in framed descriptions are interpreted as denoting lower-bound or minimum quantities, making it rational for subjects to prefer '[at least] 200 lives saved' rather than '[at least] 400 lives lost'. Subjects would therefore be making expected-value-maximizing choices on the basis of lower-bound interpretations of numeric quantifiers (Mandel, 2014, p. 3, 5). These results challenge the proof by arithmetic argument and, consequently, the traditional account of framing effects as

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[10] In frames, the kind of pragmatic presupposition triggered by focus is not about the existence of an alternative set in the sense of an opposite, but about the existence of a complement set (i.e. not an opposite but a standard contrast class). As pointed out above, there is no single obvious opposite for a half full glass, since 'a not half full glass' ambiguously suggests many different alternatives to "a half full glass", being 'an empty glass' only one of them.

violations of the extensionality principle, an account that relies on the arithmetic argument. If certain choices are rational when their descriptions are interpreted as lower-bounded, then, a prior question to address is whether such interpretations are rational (Mandel, 2014: p. 10, 11; Fisher, 2020, p. 17).

As Mandel has accurately pointed out, the discussion on framing effects presupposes that extensionality (as traditionally understood) is "locked down" when descriptions of supposedly the same issue are framed positively or negatively. Insofar as this presupposition does not hold, it becomes imperative to distinguish, between non-coextentional descriptions and coextensional ones. The question arises then of whether and in what sense we could still speak of framing effects in the first case or if (as suggested by Mandel, 2014, p. 9) we should rather speak of "description effects" associated with a variation on what is described. Certainly, if we assume that "200 [out of 600] will be saved" is interpreted according to the lower bound as "at least 200 will be saved", and thus as "it could be more than 200", it follows that "400 will not be saved" would not be co-extensional with "200 will be saved", since "possibly more than 400 not saved" amounts to a range of possibly not saved people higher than "possibly more than 200 saved".

The fact that coextensionality is not preserved in ADP kind of scenarios seems clearly related to the lower bound involved and, more generally, to the uncertainty about the extension. Indeed, this constitutes a significant change in the way in which the problem of framing effects is usually presented. Nevertheless, two comments are in order as regards the relevance of this change. First, it is possible that the case exemplified by ADP falls under a special kind of framing effect where extensionality is not preserved due to the uncertainty affecting the quantified property.[11] It is not clear that lower bound interpretations can be assumed in other kind of framing scenarios where uncertainty about extension is not taken for granted. For instance, describing a piece of beef as "25% fat" does not seem to suggest a context of uncertainty, but rather one in which some laboratory test yielded an accurate result. Secondly, some important aspects of framing effects can also be observed in ADP cases, where an explicit lower bound has been experimentally proven to add its effects to the ones of framing making them stronger (Mandel, 2014, p. 5).

3.4 Setting the stage for a unified explanation of framing effects

Before presenting a unified explanation of framing effects in terms of default implicatures, a couple of clarifications are in order.

First, what a 'positive' or a 'negative' frame is depends on some accepted value; on how 'lean' and 'fat' are interpreted and valued in a given society (see remarks on cultural defaults in Sect. 4.2). Describing something as exhibiting an attribute above or below 50% does not directly imply framing it positively or negatively, respectively -think about 'zero sugar' as a positive frame stressing a gain because sugar is

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[11] The special role that uncertainty plays in quantified descriptions is to some extent also acknowledged by Fisher (2020, 20), who notes the importance of assumptions regarding whether exact numbers to quantify an event or property are known.

supposed to be bad. Also, a positive frame can be easily transformed into a negative one and vice versa just by adding some extra element to the description, for instance, you can express a loss by saying 'hardly 75% lean' and a gain by saying 'only 25% fat'. Adding 'only' changes everything, for it adds a positive valence by suggesting that the negative feature is reduced to the minimum. Henceforth, I leave these complexities aside, as they do not affect the core of my argument.

Moreover, although the examples I use here are all instances of attribute framing, the focus and polarity approach would apply also in cases of risky choice and goal framing, even if only partially. In risky choice framing, when a reference set is positively described as "a sure saving of one-third the lives versus (…)", this creates a focus on a complement set by suggesting that the usual saving of lives with other treatments is below that proportion. Conversely, if the reference set is "a sure loss of two-thirds the lives versus (…)", the focus is now on a different complement set, namely, the assumed fact that the usual loss of lives with other treatments is below that proportion. In both cases, the second member of each pair only adds a more uncertain option once the focus has been established. Similarly, in goal framing, depending on whether the reference set is described positively or negatively, there is a focus on a complement set involving, respectively, the assumption that individuals do not usually obtain a certain gain, or the assumption that individuals usually avoid a loss.[12] To show the explanatory power of the default implicature account where it applies most clearly, Nevertheless, only cases of attribute framing will be mentioned in what follows, since the default implicature account applies most clearly to such cases.

The next step is to identify the notion that best captures both the well-established empirical features of the way addressees make assumptions on the basis of the speakers' choice of frame and the insightful theoretical insights coming from some previous approaches, in particular, those related to the role of the complement set (Ingram, 2010; Moxey, 2006, 2011) and the ones invoking information leakage (Leong et al., 2017; McKenzie & Nelson, 2003; Sher & McKenzie, 2006, 2008, 2011).

Potential candidates should make it possible to account for the following features of the phenomenon under study:

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[12] Despite the general applicability of the same theoretical framework to the different kinds of valence framing, its explanatory power is only partial in the cases of risky choice and goal framing, where further complexities no doubt need to be taken into account in order to provide the whole picture of how the framing triggers certain effects. This partiality is especially evident in the case of risky choice, where, as explained earlier in the paper, the choice is not only between positive and negative framing descriptions, but also between a probabilistic option is introduced with a mixed presentation (both positive and negative) and a numerical option introduced with a single presentation (either positive or negative). Interestingly, however, when frames do not describe gain and losses, the polarity and complement set mechanisms involved in valence framing convey the implicit idea of a potential loss, since half empty glasses are worse than half full glasses because the first, not the second, could have been more than half full.

(a) It involves an addition of a proposition to the one explicitly expressed by the utterance (the proposition that the glass was empty before being half full is added to the proposition that the glass is half full);

(b) The addition is part of the addressee's interpretation of the utterance, not necessarily part of what the pollster's meant by the latter (the addressee, not necessarily the pollster, assumes the glass was empty before being half full);

(c) What is added concerns not current but typical contextual conditions associated to the use of a frame (there is no glass in the present context, but the utterance is interpreted by considering how the typical situation is at the times when that kind of utterance is framed in a certain way);

(d) The addition is about a complement set relative to a reference set explicitly mentioned in the utterance (an empty glass relative to the half full glass);

(e) The addition is triggered by a focus on a complement set, resulting in turn from a choice of a frame over the other alternative (focus on a glass being empty before being half full as a result of choosing the positive frame "half full" over the alternative negative frame "half empty");

(f) The addition is automatic (as soon as the frame is identified, the assumption about the previous state of the glass as being half full or half empty is made);

(g) The addition is easily cancellable (if a description of the previous state of the glass as being full is explicitly added to the positively framed utterance about the half full glass, then the usual assumption that the glass was previously empty is cancelled).

4 The role of presuppositions and default implicatures in framing effects

I now explore the possible application of the concepts of pragmatic presupposition and default implicature to account for the phenomenon of framing effects. Both notions have been widely discussed by philosophers of language and have proven relevant in understanding the nature of implicit contents. I will not tackle the details and debatable points in the analysis. Instead, I will simply rely on a schematic, rather uncontroversial version of them.

4.1 Pragmatic presuppositions and framing effects

Let us first consider presupposition. It is commonly understood that if sentence s presupposes p, then p is projected from both s and its negation $\neg s$. "The present king of France is happy" presupposes the proposition that there is a king of France, which is triggered by the definite description included in the sentence. Since assumptions triggered by frames are not projected under negation, they do not fit this notion of presupposition. From the sentence "the glass is not half full", we would not assume that it was previously empty, in all likelihood we would not know what to think about the state of the glass prior to not being half full. Nonetheless, it is customary to distinguish between a semantic conception of presupposition and a pragmatic

one (Simons, 2013; Potts 2015). Semantic presuppositions would be linguistically triggered by some lexical item –like the definite description construction "*the-noun-phrase/singular common noun*"– and would be necessary to determine the truth conditions of the sentence projecting them. Assumptions triggered by frames are not necessarily involved in determining the truth value of framed sentences. Consequently, frame assumptions are not to be explained on the basis of phenomena like saturation (i.e. completing an incomplete proposition) or pragmatic enrichment (i.e. adding contents to a proposition).[13] Rather, they have to do with conveying information beyond the propositional content of a sentence, that is, with adding a proposition to either the literal meaning or the enriched proposition expressed by a sentence.

We may find a more promising approach, then, if we move on to pragmatic presuppositions. After all, according to the Stalnakerian picture, such presuppositions are not primarily projected from sentences (nor even from generic uses of sentences) but from the agent's conversational dynamics (Simons, 2013, p. 7). He characterizes pragmatic presuppositions as the agent's beliefs about common ground (Stalnaker 1974/2002, p. 716), i.e., about common beliefs regarding what propositions are accepted by all parties in a conversation. The hearer's identification of a speaker's presuppositions would thus require the identification of the latter's intentions and beliefs in a conversational context. Obviously, this approach to presuppositions renders many instances of them closer to implicature than to saturation or pragmatic enrichment. Simons' example of a contextual presupposition would be a case in point; if a chair of a meeting, which is supposed to start at 3:00, says to the audience "OK, it's 3 o'clock", hearers would assume that it is time to start. Obviously, here presupposition failure would not result in truth-non-evaluability of such proposition.

The question is whether the focus on a complement set originated by a choice between alternative frames is such as to trigger a wrong pragmatic presupposition on the addressee's side regarding the pollster's beliefs about common ground. One essential aspect of Stalnaker's notion of pragmatic presupposition is its emphasis on the importance of identifying the speaker's intentions and beliefs (1974/2002), and it is this very aspect that does not match with the kind of presupposition triggered by valence frames. The sort of framing used in surveys operates in generic non-conversational textual contexts where there is no speaker. In order to overcome this difficulty, the modified notion of pragmatic presupposition introduced by Marina Sbisà (1999, p. 330), explicitly developed to be applicable to text understanding, may prove useful. She argues that pragmatic presuppositions are shared beliefs about the objective context rather than about others' representations of objective context. Shared beliefs would be the result rather than the essence of common ground. One of the main ideas behind her view is that not only speakers carry pragmatic presuppositions, but sentences as well. Beliefs about objective context could thus be understood as including beliefs about background conditions associated with the use frames.

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[13] As it is customary in the literature, "pragmatic enrichment" is understood here in contrast with "conversational implicature" (Recanati 2012, p. 68).

We could try to reconcile both Stalnaker's and Sbisà's views by arguing that the common ground involved in framing may be more complex than usually thought, and include assumptions not only about the others' beliefs concerning some implicit information that is taken for granted (for instance, '25% fat' being equivalent to '75% lean') but also about what conditions of the objective context make it more appropriate to use one frame rather than the other (average level of fat being usually under 25% makes it more appropriate to use '25% fat' instead of '75% lean'). Hence, we arrive at the following explanation of framing effects in terms of pragmatic presuppositions (within survey contexts): where pollsters presuppose that, in a survey context, describing, say, a piece of beef as being "75% lean" is equivalent to describing it as being "25% fat", respondents take it as stressing that percentage over the usual, which would be presupposed to be lower than 75%. The disagreement arises, then, because pollsters do not endorse the respondents' assumptions about the relevance of both the usual percentage (below 75%) and the typical linguistic practice consisting in choosing a positive frame to stress a gain with respect to the average context (or a negative one to emphasize a loss with respect to the average context).

All in all, the problem of valence framing is twofold, including two overlapping phenomena that create the 'perfect storm' conditions for survey interpretation to go astray. On the pollster's side, when frame effects are unintended, there may be wrong presuppositions concerning the kind of context that the respondent will take into account in interpreting utterances. There, pollsters operate with the idealized assumption that describing a piece of beef as being "75% lean" is equivalent to describing it as being "25% fat", and so they ignore what happens on the respondents' side, namely, their assumptions regarding the relevance of the typical linguistic practice consisting in choosing a positive frame to stress a gain with respect to the average context (or a negative one to emphasize the converse).[14] Of course, we could be considering a different scenario in which, rather than naïve pollsters doing research on rational choice, there were twisted marketing agents who were well-aware of framing effects and who used such effects to their advantage. If you know that 75% lean can convince the consumers to buy more of your products than 25% fat, then it is perfectly rational for the producer to use such labelling. However, the two scenarios diverge mainly on the goals and strategies followed by pollsters, and not so much on the pollsters' understanding of the underlying mechanism governing framing effects. Non-marketing researchers on rational choice are not trying to deceive the respondents and most likely understand framing effects as a sign of irrationality; on the other hand, marketing agents may very well share this understanding, but integrate it in a strategy to deceive the respondents. If, as suggested below, framing effects are easily reversible, then, deliberately avoiding the reversion may as well be acknowledged as part of the deceiving strategy adopted in marketing.

Focusing again on pollsters, their misunderstanding of how respondents interpret surveys can be due to two different situations: (a) they ignore the kind of default

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[14] This kind of disagreement concerning assumptions quite naturally relates to the notion of soft trigger, i.e. and optional presupposition that can occur only when it fits into the context and can be easily suspendable (; Abusch, 2002).

assumption usually involved when a certain frame is employed; (b) they do know the kind of default reasoning associated with frames, but wrongly believe that the addresses will be able to identify the ideal nature of survey contexts and suspend such reasoning. Either way we have a defective context due to the pollster's wrong presupposition regarding (common ground on) the relevant context, although in (b) that goes together with endorsing a wrong informative presupposition about the possibility of changing the common ground in survey contexts so that respondents assume that the idealized context is the relevant one for interpreting the sentence. Informative presuppositions occur whenever a speaker utters a presupposing sentence perfectly knowing that the presuppositions of the sentence are not part of the common ground, but at the same time believing that they will be common ground following the utterance (Simons, 2003, pp. 16–20).

Now, the traditional notion of pragmatic presupposition may not fully capture the peculiar, systematic fashion in which frames induce responses from the addressees. The kind of presupposition relevant to framing effects is one involving well-entrenched or crystallized uses of certain expressions, nicely complying with Gricean maxims of quantity and relation.[15] Assumptions prompted by frames could be better accommodated by applying a notion closely related to that of pragmatic presupposition, i.e., the notion of *generalized conversational implicature* (Grice, 1975). Implicatures are inferences in which the inferred proposition bears no truth functional relation to the utterance contained in the text. They are taken to arise from the interaction of the proposition actually expressed in the utterance, certain features of the context, and the assumption that the speaker is obeying the Cooperative Principle, that is, making the contribution such as is required given the accepted purpose of the talk exchange (Grice, 1975, p. 45). In the case of generalized conversational implicatures, the inferences have "crystallized" as a result of the standard use of the propositions expressed by the utterances, and so the context becomes irrelevant. An implicature of this kind is one which does not depend on particular features of the context, but is instead typically associated with the proposition expressed (in this case, with the frame chosen).

As I show in the next section, the notion of default implicature is the one that proves most useful in accounting for the fact that informative additions triggered by frames are automatic (as soon as the frame is identified, the corresponding assumption is made), and arise locally (as soon as a construction reveals the kind of frame used, the addition is triggered).

4.2 Understanding framing effects in terms of default implicatures

Most if not all modern theories of implicature agree that in many cases implicatures can be incorporated into the meaning of the uttered sentence via reasoning about the utterer's beliefs, in terms of a complex but automatic and unconscious process,

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[15] The first states that one should try to be as informative as one possibly can, and give as much information as is needed, and no more, the second, that one should try to be relevant, and say things that are pertinent to the discussion.

which some authors also see as locally triggered. This is especially clear in the case of scalar implicatures, i.e. quantity implicatures where the hearer compares the speaker's utterance *S* to a certain class of statements the speaker could have made but chose not to and that only differ in the members of the scale that they include (inferences as from "some" to "some but not all").

The notion of default implicature, as characterized by Stephen Levinson (2000), is the one that best captures the phenomenon of framing effects, for it includes all the aspects mentioned at the end of Sect. 3 (context-independence, locality, cancellability, etc.). Such notion deviates slightly but significantly from Grice's notion of generalized conversational implicature where implicatures only occur after the addressee has grasped the literal meaning of the uttered sentence, particularly as regards the features of locality and independence from the speaker's intended meaning. According to the Gricean picture, implicatures only occur after the addressee has grasped the literal meaning of the uttered sentence, i.e. they are a global phenomenon related to the overall explicit meaning of the sentence. Levinson argues, on the contrary, that some lexical constructions can locally and by themselves prompt implicatures by addressees. The sentence 'Some boys came' is interpreted as 'Not all of the boys came' by virtue of it including the word 'some' that by itself leads to interpretation 'not all' (Levinson, 2000, pp. 36–37). The same way that such interpretation is automatically and locally prompted by the construction 'some x', the sentence 'the glass is half empty' includes the negative frame construction 'half empty x', which locally triggers by default the interpretation "previously full [or more than half full] and now half empty". Analogously, the positive frame construction 'half full' by itself triggers the reading 'previously empty [or more than half empty] and now half full'. Also, negative frame constructions like '20% fat' or '20% errors' are understood, respectively, as expressing 'being 20% fat and above the average level of fat' and 'having 20% errors and being above the average level of errors'. The same way that Levinson explains cases like 'some' by appealing to the Q-heuristic ('what isn't said, isn't'), we could appeal to the following heuristic for the case of frames: what is said in a positive or negative way is, respectively, positively or negatively above average. It does not come as a surprise, thus, the easy and relatively frequent cancellability of local implicatures, a feature that has been noted by Levinson and that, as shown before, is also shared by local implicatures triggered by frames.

The grammatical approach to scalar implicature (Chierchia et al., 2012), even if from a very different angle, also provides some insight into the nature of locally triggered implicatures. According to the grammatical account of exhaustification, the usual epistemic step (Sauerland, 2005) involved in the interpreters' tendency to go from "it is not the case that *x* believes that *p*" to "*x* believes that not *p*" goes hand in hand with adding a silent 'only' when interpreting certain sentences. For instance, when hearing the utterance "Joe or Bill will show up", we would go from understanding "it is not the case that the speaker believes that Joe and Bill will show up" to finally interpreting "the speaker believes that it is not the case that Joe and Bill will show up" by adding an implicit ("silent") 'only' at the beginning of the initial

utterance (Chierchia et al., 2012, Sect. 1.2.). Framing effects, however, seem to go epistemically further than exhaustification, since, not only is there an alternative that is denied (if a piece of beef is described as "75% lean", it is assumed that it is "not more than 75% lean"), but also the assumption that 75% lean is above average and, therefore, a gain. In other words, the epistemic step characteristic of framing effects concerns the assumption that there is a complement set (the average beef being less than 75% lean).

Framing effects certainly involve a certain type of epistemic step, although most likely one that is not dependent on implicit grammatical additions, but rather on polarity combined with cultural or world defaults of the sort characterized by Katarzyna M. Jaszczolt (2010/2015). Her notion of default embraces two kinds of default meanings, viz., cognitive defaults, triggered by the properties of human inferential system, and social, cultural and world-knowledge defaults, triggered by the shared background on social conventions and knowledge of both cultural and physical properties of the environment (Jaszczolt, 2010/2015, pp. 746–750).[16] These two sources of default meanings would automatically yield certain information whenever a certain construction is employed—or, if we endorsed Jaszczolt's account, whenever a certain typical situation occurs. To use her own example, world-knowledge defaults would be responsible of interpreting 'and' as 'and as a result' in sentences like 'The temperature fell below -10 degrees Celsius and the lake froze'. As for inferential system defaults, they would explain the default referential as opposed to the attributive interpretation of definite descriptions, i.e., 'The author of *Don Quixote* fought in the Battle of Lepanto' (interpreted as 'Cervantes fought in the Battle of Lepanto', and not as 'Whoever is the author of *Don Quixote* fought in the Battle of Lepanto').

4.2.1 Default implicatures and counterfactual alternatives

As I have been arguing, default implicatures triggered by frames concern complements sets, which, in turn consist in certain counterfactual possibilities, i.e., those regarded as most likely or standard. The counterfactual aspect of framing effects has been emphasized by Bart Geurts, who claims that, the same way that "[counterfactual] alternatives figure prominently in the derivation of so-called 'quantity implicatures'" (2013, p. 6), they should also be acknowledged as central in the derivation of frame implicatures. Frames support counterfactual reasoning of the sort: if a state of affairs is positively or negatively described, then a different, respectively less or more advantageous state of affairs could have been the case. Even if committed to a globalist view of implicatures induced by frames as opposed to the localist view assumed here, an important innovation of Geurts' approach is the explanation of framing effects, not only in terms of alternatives, but also in terms of what he calls "alignment". Expressions like 'too' or 'even' would depend on alternatives for conveying the speaker's intended message. For instance, 'even φ' would mean that φ

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[16] In Jaszczolt's view, these defaults would be meaning components that could combine with others. These other components are not discussed here, since her ideas are presented in a simplified version, only to show the relevance of what she calls 'default meaning' to explain framing effects.

is true and that φ's prior probability is low, relative to φ's alternatives (2013, p. 7). Such alternatives are ordered in a scale and being "stronger" in the scale could be expressed with'>'. According to Geurts, implicatures depending on ordered alternatives support automatic inferences (or default assumptions) about the correlation (alignment) between prior probabilities and strength (2013, p. 8). The definition of alignment states that, for any ψ, ψ' that are included among φ's alternatives, if ψ > ψ then ψ ≫ ψ' (where 'ψ ≫ ψ' means that ψ is more improbable than ψ'). The intuition behind this definition can be expressed by saying that "'more' on the quantity scale entails 'more' on the improbability scale" (2013, p. 9).

As characterized by Geurts, the Alignment assumption is optional (thus not part of the lexical meaning) and operates by default on the basis of world knowledge (2013, p. 10). Our regular exposure to correlations between quantitative and qualitative scales, together with our tendency to establish connections and pursuing coherence, would explain the emergence of alignment assumptions (2013, p. 11). Framing effects would also be a manifestation of this combined phenomenon, they being the result of establishing connections between different frames and different counterfactual alternatives. In applying the above analysis to framing, Geurts arrives at an evaluative understanding of framing effects and, therefore, adds 'it is good that [φ]' in order to uncover the underlying alignment assumptions (with '≫' now meaning 'is better than'). Imagine that an airplane with 600 passengers crashed and we hear that 300 people survived or, alternatively, that 300 people died.[17] Our default alignment assumption would automatically yield the following interpretation for the positively frame description: 300 people survived ≫ n people survived (such that $300 > n$). Obviously, this interpretation would be inconsistent with our usual understanding of the negatively framed description, that is to say, we would reject that 300 people died ≫ n people died (such that $300 > n$). As Geurts concludes, far from being equivalent, both descriptions convey mutually inconsistent information about counterfactual states of affairs (2013, p. 12).

Geurts' enlightening approach to framing effects brings together many of the relevant explanatory aspects previously discussed in this paper. Two important details should be made explicit. First, it must be noted that strength is systematically aligned with valence in each type of frame. In negative frames, like '25% fat', the chosen description is assumed to be stronger (more negative\worse) than its alternatives, for example, '22% fat', '15% fat', and so on. Positive descriptions, like '75% lean', are also assumed to be stronger (more positive/better) than its alternatives, that consequently would include '73% lean', '65% lean', etc. Second, orderings or scales associated with the sets of alternatives suggested by frames should be understood as elements of the complement set, that is, elements of the usual or average set of alternatives. 'Half full', for instance, has a complement set that includes the following alternatives: empty, almost empty, 1/4 full, 1/3 full…n full, where n is lower than 1/2 full. The polarity entailed by frames gives rise to this complex, systematic phenomenon, which is hardly accountable by just appealing to scalar implicatures. Since it is the contrast between a reference property and the assumed weaker average, rather

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[17] I am here slightly modifying Geurts' example for the sake of simplicity.

than between the former and a specific scale, which constitutes the main informative surplus provided by frames. The fact that there are alternative—either negative (half empty) or positive (half full)—ways to describe the same property (a glass at half capacity) is an intrinsic feature of language. Pragmatically, a certain systematic way of choosing among alternative frames has crystalized, thus becoming standard. In particular, positive frames are standardly used to emphasize a salient positive aspect as opposed to the usual and, therefore, less salient one. The same would apply to negative frames, which would be chosen to emphasize a salient negative aspect as opposed to the usual (less negative) one. Consequently, if 75% lean beef is less lean than most other beef, then the standard way to describe it would be to use a frame that emphasizes the corresponding negative feature, that is to say, "25% fat".

Despite Geurts explicit turn from '$\gg$' meaning 'more improbable than' to it meaning 'is better than', in order to provide an evaluative account of framing effects, it must be emphasized that the probability interpretation of '$\gg$' is still relevant (as it was in the case of 'even'). The reason is that it ('$\gg$') captures an important feature that shows the relevance of framing both to emphasize what is more striking (less probable) and to justify why it is good or bad by virtue of being less probable than some implicit alternatives. Rather than replacing a probability interpretation with an evaluative one, both interpretations should be combined. The positive description '75% lean' does not only suggest that such property is stronger than its alternatives, but also that it is less likely to be the case. The same holds for negative descriptions. Put shortly, the "message" conveyed by frames is the following:

– for negative frames, negative means improbable and negative, which in turn means worse than usual;
– for positive frames, positive means improbable and positive, which in turn means better than usual.

In the case of framing effects, the shared cultural background regarding standard uses of frames is definitely involved in triggering default implicatures. Whether they are also cognitive defaults related, for instance, to the human tendency to operate with contrast classes and to project the past to the present, is a question that goes beyond the limits of the present paper. A straightforward relation between default implicature and framing effects seems to emerge once we summarize the above points and retrieve the seven features of framing effects mentioned right before Sect. 4. Interestingly, this tight relation sheds light on the assumed relation between the reference points and framing effects, being the former usually postulated in the explanation of the latter. Explaining framing effects in terms of default implicatures forces us to recognize that the main mechanism activated by frames is norm recruiting rather than reference points recruiting. The standard use of frames—determined by focus and polarity—leads to the "usually less than n" interpretation, i.e., to what is the norm, rather than to an interpretation based on specific reference points. Norms and reference points are nevertheless closely connected in that both might serve as anchors. So even if the implicit information resulting from default implicatures concerns assumptions on the *status quo*, these assumptions are not to be equated with information about reference points, but with information about the

usual situation or, in more technical terms, the 'complement set' (either a short-fall set or a surplus set, depending on whether the frame is negative or positive, respectively).

The account of framing effects in terms of default implicatures also proves helpful to better understand the attention focus mechanism involved in framing effects and most often invoked in explaining attribute framing effects. The focus mechanism characteristic of default implicatures, closely tied to polarity, is also involved in the preference shifts observed in risk framing effects. In essence, framing effects involve an automatic, frame-triggered addition of a proposition to the one explicitly expressed by the utterance (features a, d, f mentioned in Sect. 4), which clearly accords with what is suggested by the notion of default implicature and the closely related idea of automatic free enrichment. As soon as the frame is identified, without mediation of conscious inference or consideration of the context, a cultural default assumption about a complement set (relative to a reference set explicitly mentioned in the utterance) is triggered. The fact that such assumption is made by the addressee exclusively on the basis of the standard conditions associated to the use of a frame (features b, c), and regardless of what the pollsters intended, further reinforces the presumptive, context-independent nature of frame interpretations. Moreover, both the source and the content of default interpretations involved in framing effects—that is, both the competence on frame choice and knowledge of usual background objective conditions concerning complement sets (features c, d, e)- suggest that at least some cultural and world-knowledge defaults play an essential role in such phenomenon. Finally, the easy cancellability of assumptions triggered by frames (feature g, in 3.5.) clearly shows that, even if standardly connected to frames, such assumptions should not be explained in terms of stable semantic contents like semantic presuppositions or lexical meanings.

4.2.2 Default implicatures and lower bounds

One may wonder whether the present account is in conflict with Mandel's view invoking lower-bounded 'at least' meanings (see Sect. 3.4.). Granting that numeric quantifiers are consistently interpreted in certain discursive contexts—particularly, those resembling the ADP—as having unilateral lower-bounded ('at least x') meanings, rather than bilateral, exact ones, it may seem implausible that such interpretation is combined with the default 'usually less than x'. However, a couple of observations are in order, one related to the generalizability of the explanation invoking lower-bounded meanings, and another regarding the compatibility of both explanations—i.e. the lower bound account and the default implicature account.

Let us examine the apparent tension between the norm recruiting view of framing effects, which emphasizes that "200 will be saved" is interpreted by default as "usually less than 200 are saved", and some findings suggesting that "many people interpret the quantifiers in the sure option of the ADP as lower bounds—or, more specifically, as meaning "at least 200 will be saved" or "at least 400 will die"." The inference about a lower bound seems to conflict with that about "an even lower-valued norm". Yet, in principle there is no incompatibility between the two interpretations "at least n" and "usually less than n". Note that the default assumption

"usually less than n" is about what are regarded to be the most likely counterfactual alternatives concerning what is described (i.e., the 'complement set'), not about the property, event, etc. being described (the reference set). For instance, the "reading" or interpretation of '200 lives saved' based on the lower bound "at least 200" conveys information about the lives saved in the situation described, which are the "reference set", i.e. what is explicitly mentioned in the utterance, delivering the information that there could be more than 200. On the other hand, the interpretation '200 lives saved' based on the default implicature "usually less than n" conveys information about the lives usually saved in similar situations, which are the "complement set", i.e. the implicit counterfactual alternatives to the reference set, delivering the information that their number is usually less than 200. To put it differently, default implicatures of the form "usually less than n" are related to the unlikeliness of the reference set given what is usual, while lower bounds "at least" relate to the uncertainty of the reference set. Conveying both uncertainty about the reference set and improbability of the reference set relative to the complement set, 'n lives saved' is consistently interpreted on the basis of both lower bound and default implicature as "at least n lives saved and usually less than n lives saved".

Notwithstanding the above, the incompatibility issue could emerge if we thought that the standard interpretation of "usually less than n" implies something stronger, namely, either the upper bound "at most n" or a combination of the latter with the lower bound "at least n" to convey the message "exactly n". Based on Mandel's findings, we can discard the exact interpretation as the standard one for quantification in the ADP kind of scenario. However, an exact interpretation may apply to the type of cases exemplified by "75% lean", that is, to cases where no uncertainty affects the reference set. It is worth noting that, when used separately, both at most and at least refer to estimations in cases where the reference set is not exactly determined. But once again, the separate question remains as to how quantifying descriptions should be interpreted, regardless of how they are actually interpreted. So, despite all the above considerations, it remains unclear whether the "exactly n" interpretation could be the right reading for cases like "75% lean".

Interestingly, the default implicature triggered by "75% lean" is not only compatible with either kind of interpretation (exact, lower bound or upper one), but its associated framing effects also add to the description effects in cases of unilateral lower bound.[18] In other words, framing effects and description effects reinforce each other. If, according to a lower bound interpretation, it could be that beef is over 75% lean, this would make the reference set even more unlikely in comparison to the complement set. The implicature "usually less than 25% fat", and the associated understanding that this case (being 25% fat) is worse than the usual, is now strengthened by the lower bound interpretation "in this case maybe more than 25%", since being above 25% fat would be even more unusual than being exactly 25% fat, hence being even worse. The same sort of reinforcement would occur in the case of positive framing, only in this case an even greater positive value (rather than an even greater negative one) would then be given to the described option. The

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[18] Relatedly, see Teigen and Nikolaisen (2009, p. 273).

fact that lower bounds' descriptive effects increase the kind of positive or negative assessment due to framing effects has also been empirically determined in Mandel's experiments (2014, p. 3, 5).

On the other hand, Mandel notes that, when novel situations are described, an interpretation including a default implicature about what the typical case is would not make much sense.[19] Whether or not most subjects would interpret those descriptions of novel situations by default could in principle be settled by experiment. But, leaving this empirical issue aside, there is still the normative question about whether we should interpret by default in novel cases. Clearly, it does not seem rational to project a default implicature regarding what is typically the case to interpret a description of non-typical cases. Rather, the atypicality of the described event should cancel such kind of implicature. If that is not the case in the actual interpretation of framed descriptions, then such interpretation is not rational. The last question connects with the issue of evaluating the rationality of interpretation as a more fundamental question than that of evaluating rational choice (between described options), an issue in need of discussion, as already emphasized by Mandel (2014, pp. 10–11) and Fisher (2020, p. 17).

Certainly some nuances in connection with the issue of novel situations could be taken into consideration. In particular, depending on how qualitatively novel the case may be -our world knowledge may compel us to reason by analogy and project our usual pattern of interpretation to those cases and take the description as conveying a default implicature. I merely mention the problem here, since both the empirical and the normative side of the issue regarding novel cases deserves a separate discussion.

These remarks suggest that we should distinguish between different sorts of cases, depending on whether default implicatures are combined or "work together" with exact or upper/lower bound interpretations. It seems plausible that the difference between both kinds of cases depends on the uncertainty of the described event—the effectiveness of a medical treatment on a newly discovered disease involves more uncertainty than how full a glass is or how fat a piece of beef is. However, the discussion of this issue is beyond the scope of this paper.

5 Conclusion

On the side of the addressee, framing effects result from default implicatures (about a complement set) triggered by focus and polarity, which are in turn generated by standardized, well-entrenched linguistic practices related to frame choice. On the side of the pollster, when the framing effects are unintended, the problem arises due to wrong pragmatic presuppositions, within survey contexts, with regard to the relevant context for interpretation. In cases where pollsters are well aware of the effects induced by frames, the problem remains unless adequate resources to neutralize the effect of focus and polarity are used, thus cancelling the default implicature.

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[19] Mandel (personal communication, 02/02/2021).

The above account of framing effects reveals their semantic-pragmatic nature. By placing the focus on the semantic-pragmatic dimension of framing effect as the most fundamental, it has been possible to achieve an explanatory unification with regard to both the target phenomenon of framing effects and their extant accounts. As to the first, a unified explanation has been provided for the three different kinds of framing effects, which would all share the same essential dependence on the default implicature mechanism associated with frames. Regarding the second, the unified explanation integrates some of the most valuable previous contributions to the subject, showing the underlying connection between some key notions fruitfully applicable to the issue of framing effects, although separately developed in fields like psychology (attention focus), social science (reference point), or linguistics (linguistic focus, polarity, complement set). The unifying and explanatory potential of notions such as pragmatic presuppositions and default implicature, supplemented by the above linguistic notions, enables a further development of the information leakage framework, where the information leaked by frames could now be characterized in terms of default implicatures about complement sets. Lower bound unilateralism can also be enriched by taking into account the default implicature approach put forward here. The "usually less than n" implicature still holds in ADP and similar cases, although there it is combined with the assumption related to the lower bound in turn associated with extensional indeterminacy. Interpreting that people saved/not saved could have been more than 200/400 is compatible with interpreting that those ranges are above the usual. This mutual reinforcement between framing effects (due to default implicatures) and descriptive effects (due to lower bound interpretation) adds to arguments in favor of the rationality of variations in the response to different descriptions of (supposedly) the same facts or (supposedly) the same information.

On the basis of a more developed conception of speech interpretation, the above discussion provides a deeper understanding of whether and/or how reference points and attention focus mechanisms come into play in framing effects. Both the anchors typically attributed to reference points and attention focus mechanisms can be traced back to some interconnected semantic-pragmatic features of frames, i.e. respectively default implicatures about standard background conditions and linguistic focus. Default implicatures implicitly convey assumptions about the *status quo*; yet these assumptions need not be about reference points, since the implicatures provide information about the usual situation—or what we have been calling the 'complement set'.

Although attention focus has been most often invoked in explaining attribute framing effects, the focus mechanism operating in default implicatures is involved too in the preference shifts characteristic of risk framing effects. Having been ignored by both philosophers and linguists, the linguistic focus generated by valence frames hinges on the polarity involved in valence frames, that is, in the contrast between positive and negative descriptions. That focus goes beyond positive or negative associations, drawing attention to some information leaked by the frame, in particular, to a complement set of a counterfactual nature, which can be potentially choice relevant.

The scope of the suggested approach to framing effects is broader than the previous ones as well in that it does not only account for the addressees' side, but

also for the pollsters' side. The latter is explained by invoking the notion of pragmatic presupposition to argue that defective contexts arises from pollsters' wrong pragmatic presuppositions as to what respondents take to be the common ground in such contexts.

The approach championed here has important implications for the rationality/irrationality debate, It shows that the different default implicatures conveyed by alternative frames seem relevant for judgement on the described options. As a consequence, it strengthens the arguments opposing the traditional understanding of the principle of invariance. As a result, additional reasons are also provided to support the rationality of framing effects, since once the normative principle of invariance is reformulated to be sensitive to the implicit information conveyed by frames, framing effects can no longer be considered as violations of such principle. Ultimately, it shifts the focus of the controversy, from rationality or irrationality of judgement (or choice) to that of interpretation, for the central question to pursue is: when is it rational to interpret on the basis of defaults?

Ultimately, the analysis paves the way for a unified account of framing effects, showing the connection between previously unrelated explanations invoking different cognitive heuristics and biases. It also shows the significance of supplementing economical-psychological approaches with linguistic-philosophical ones, encouraging further work in this area.

References

Abusch, D. (2002). Lexical alternatives as a source of pragmatic presuppositions. In Brendan, J. (Ed.), *Semantics and linguistic theory* (*SALT) XII*, Ithaca NY: CLC Publications. Resource document. http://conf.ling.cornell.edu/abusch/Abusch-PragmaticPresupposition.pdf. Accessed 4 June 2021.

Bourgeois-Gironde, S., & Giraud, R. (2009). Framing effects as violations of extensionality. *Theory and Decision, 67*(4), 385–404.

Chierchia, G., Fox, D., & Spector, B. (2012). The grammatical view of scalar implicatures and the relationship between semantics and pragmatics. In P. Portner, C. Maienborn, & K. von Heusinger (Eds.), *Semantics: an international handbook of natural language meaning.* Berlin: Mouton de Gruyter.

Fisher, S. A. (2020). Rationalising framing effects: At least one task for empirically informed philosophy. *Crítica, Revista Hispanoamericana De Filosofía, 52*(156), 5–30.

Freling, T. H., Vincent, L. H., & Henard, D. H. (2014). When not to accentuate the positive: Re-examining valence effects in attribute framing. *Organizational Behavior and Human Decision Processes, 124*(2), 95–109.

Gamliel, E., & Kreiner, H. (2013). Is a picture worth a thousand words? The interaction of visual display and attribute representation in attenuating framing bias. *Judgment and Decision Making, 8*(4), 482–491.

Gamliel, E., & Kreiner, H. (2019). Applying fuzzy-trace theory to attribute-framing bias: Gist and verbatim representations of quantitative information. *Journal of Experimental Psychology: Learning, Memory, and Cognition,.* https://doi.org/10.1037/xlm0000741

Geurts, B. (2013). Alternatives in framing and decision making. *Mind and Language, 28*(1), 1–19.

Grice, H. P. (1975). Logic and conversation. Speech ActsIn P. Cole & J. L. Morgan (Eds.), *Syntax and semantics* (Vol. 3, pp. 41–58). Academic Press.

Ingram, J. (2010) *Focus, polarity and framing effects.* PhD thesis. Resource document. http://theses.gla.ac.uk/1446/. Accessed 15 June 2016.

Jaszczolt, K. M. (2010/2015) "Default semantics". In B. Heine & H. Narrog (Eds.), *The Oxford handbook of linguistic analysis* (pp. 743–771). Oxford: Oxford University Press.

Jones, M. K. (2007). A Gricean analysis of understanding in economic experiments. *Journal of Economic Methodology, 14*(2), 167–185.

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An analysis of decision under risk. *Econometrica, 47*(2), 263–291.

Kreiner, H., & Gamliel, E. (2016). Looking at both sides of the coin: Mixed representation moderates attribute framing bias in written and auditory messages. *Applied Cognitive Psychology, 30*, 332–340.

Kreiner, H., & Gamliel, E. (2018). The role of attention in attribute framing. *Journal of Behavioral Decision Making, 31*, 392–401.

Kühberger, A. (1998). The influence of framing on risky decisions: A meta-analysis. *Organizational Behavior and Human Decision Processes, 75*(1), 23–55.

Larrick, R. P., Smith, E. E., & Yates, J. F. (1992) "Reflecting on the reflection effect: Disrupting the effects of framing through thought". Paper presented at the *Meetings of the society for Judgment and Decision Making*, St. Louis, November, MO.

Le Menestrel, M., & van Wassenhove, L. (2001). The domain and interpretation of utility functions: An exploration. *Theory and Decision, 51*, 329–349.

Leong, L. M., McKenzie, C. R. M., Sher, S., & Müller-Trede, J. (2017). The role of inference in attribute framing effects. *Journal of Behavioral Decision Making, 30*, 1147–1156.

Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All frames are not created equal: A typology and critical analysis of framing effects. *Organizational Behavior and Human Decision Process, 76*(2), 149–188.

Levinson, S. C. (2000). *Presumptive meanings: The theory of generalized conversational implicature.* MIT Press.

Maheswaran, D., & Meyers-Levy, J. (1990). The influence of message framing and issue involvement. *Journal of Marketing Research, 27*(3), 361–367.

Mandel, D. R. (2001). Gain-loss framing and choice: Separating outcome formulations from descriptor formulations. *Organizational Behavior and Human Decision Processes, 85*, 56–76.

Mandel, D. R. (2008). Violations of coherence in subjective probability: A representational and assessment processes account. *Cognition, 106*, 130–156.

Mandel, D. R. (2014). Do framing effects reveal irrational choice? *Journal of Experimental Psychology: General, 143*(3), 1185–1198.

McKenzie, C. R. M., & Nelson, J. D. (2003). What a speaker's choice of frame reveals: Reference points, frame selection, and framing effects. *Psychonomic Bulletin & Review, 10*(3), 596–602.

Moscati, I. (2012). Intension, extension, and the model of belief and knowledge in economics. *Erasmus Journal for Philosophy and Economics, 5*(2), 1–26.

Moxey, L. M. (2006). Effects of what is expected on the focussing properties of quantifiers: A test of the presupposition-denial account. *Journal of Memory and Language, 55*, 422–439.

Moxey, L. (2011). Mechanisms underlying linguistic framing effects. In G. Keren (Ed.), *Perspectives on Framing* (pp. 119–134). Psychology Press, Tylor & Francis Group.

Piñon, A., & Gambara, H. (2005). A meta-analytic review of framming effect: Risky, attribute and goal framing. *Psicothema, 17*(2), 325–331.

Recanati, F. (2012). Pragmatic enrichment. In G. Russell & D. Graff Fara (Eds.), *Routledge companion to philosophy of language* (pp. 67–78). New York: Routledge.

Stalnaker, R. (1974/1999) "Pragmatic presuppositions". In Stalnaker, R. (Ed.), *Context and content* (pp. 47–62). Oxford: Oxford University Press.

Sanford, A. J., Fay, N., Stewart, A. J., & Moxey, L. M. (2002). Perspective in statements of quantity, with implications for consumer psychology. *Psychological Science, 13*, 130–134.

Sauerland, U. (2005) "The Epistemic Step". Resource document. https://www.researchgate.net/publication/228949507_The_epistemic_step. Accessed 21 December 2018.

Sbisà, M. (1999) "Presupposition, implicature and context in text understanding". *Proceedings of the Second International and Interdisciplinary Conference on Modeling and Using Context* (pp. 324–338). London: Springer.

Schoorman, F. D., Mayer, R. C., Douglas, C. A., & Hetrick, C. T. (1994). Escalation of commitment and the framing effect: An empirical investigation. *Journal of Applied Social Psychology, 24*(6), 509–528.

Sher, S., & McKenzie, C. R. M. (2006). Information leakage from logically equivalent frames. *Cognition, 101*, 467–494.

Sher, S., & McKenzie, C. R. M. (2008). Framing effects and rationality. In N. Chater & M. Oaksford (Eds.), *The probabilistic mind: Prospects for Bayesian cognitive science* (pp. 79–96). Oxford University Press.

Sher, S., & McKenzie, C. R. M. (2011). Levels of information: A framing hierarchy. In G. Keren (Ed.), *Perspectives on framing* (pp. 35–63). Psychology Press Taylor & Francis Group.

Simons, M. (2003). Presupposition and accommodation: Understanding the Stalnakerian picture. *Philosophical Studies, 112*, 251–278.

Simons, M. (2013). Presupposing. In M. Sbisà & K. Turner (Eds.), *Pragmatics of speech actions* (pp. 143–172). De Gruyter Mouton.

Smith, S. M., & Levin, I. P. (1996). Need for cognition and choice framing effects. *Journal of Behavioral Decision Making, 9*, 283–290.

Taylor, S. E. (1991). Asymmetrical effects of positive and negative events: The mobilization-minimization hypothesis. *Psychological Bulletin, 110*, 67–85.

Teigen, K. H., & Keren, G. (2003). Surprises: Low probabilities or high contrasts? *Cognition, 87*, 55–71.

Teigen, K. H., & Nikolaisen, M. I. (2009). Incorrect estimates and false reports: How framing modifies truth. *Thinking & Reasoning, 15*(3), 268–293.

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science, 211*(4481), 453–458.

Tversky, A., & Kahneman, D. (1991). Loss aversion in riskless choice: A reference-dependent model. *Quarterly Journal of Economics, 107*, 1039–1061.

Yechiam, E., & Hochman, G. (2014). Loss attention in a dual task setting. *Psychological Science, 25*(2), 494–502.