Induction, Conjunction Introduction, and Safety

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Abstract

Depending on whether we are somewhat tolerant of nearby error-possibilities or not, the safety condition on knowledge is open to a strong reading and a weak reading. In this paper, it is argued that induction and conjunction introduction constitute two horns of a dilemma for the safety account of knowledge. If we opt for the strong reading, then the safety account fails to account for inductive knowledge. In contrast, if we opt for the weak reading, then the safety account fails to accommodate knowledge obtained via the method of conjunction introduction.

According to the safety account of knowledge, S knows that p only if S's belief in p is safe, that is, only if S could not easily have falsely believed p, or formally $Bp \Rightarrow p$ ('$\Rightarrow$' denotes the subjunctive conditional connective). The safety condition is usually cashed out in terms of possible worlds. As one of the main proponents of the safety account, Duncan Pritchard (2016) writes,

> Stated in terms of possible worlds, what [the safety condition] demands is not just that one's belief is true in the actual world, but that in all – or at least nearly all […] – near-by possible worlds in which S continues to believe that p, her belief continues to be true. […] Nonetheless, there is an important issue here that we should highlight. So far we have talked rather vaguely about safety requiring that one's true belief remain true across all, or at least nearly all, near-by possible worlds. But which is it: all, or just nearly all?' (Pritchard, 2016, pp. 27–8)

Depending on whether we are somewhat tolerant of nearby error-possibilities or not, the clause that S *could not easily have falsely believed* p is open to two different readings:

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Safety^{W}[1]

S's belief that *p*, formed on belief-formation method *M*[2], is safe, if and only if, in most of the nearby possible worlds where *S* forms a belief that *p* on method *M*, *p* is true.

Safety^{S}[3]

S's belief that *p*, formed on belief-formation method *M*, is safe, if and only if, in all nearby possible worlds where *S* forms a belief that *p* on method *M*, *p* is true.[4]

The conditions make us consider whether *p* is true in nearby possible worlds where *S* believes that *p*. If *p* is false in some/most of these possible worlds, then *S*'s belief in *p* is unsafe, and *S* does not know that *p*. If *p* is true in all/most of these possible worlds, then *S*'s belief in *p* is

[1] '*W*' is shorthand for 'the weak version'.

[2] The safety condition is usually relativized to the belief-formation methods to avoid putative counterexamples such as Alfano's (2009) REDWOOD, Goldman's (1976) JUDY & TRUDY, and Goldman's (1976, 1983, 2009) DACHSHUND, and Nozick's (1981) GRANDMOTHER. Because the argument here does not hinge on whether the conditions should be thus relativized, I shall leave this point aside. For discussions of the individuation of belief-formation methods, see Alfano (2009), Becker (2008, 2012), and Zhao (2022a, 2022c, forthcoming a, forthcoming b and forthcoming c).

[3] '*S*' is shorthand for 'the strong version'.

[4] The distinction between the two readings is made in Greco (2007). It has also been argued that the safety condition should be globalized to a set of propositions rather than the target proposition to account for why beliefs in necessary truths could still be true as a matter of luck. See Pritchard (2009, 2012, 2013, 2016), Sosa (2015), and Williamson (2000, 2009). The globalized version of the safety condition is also open to two different readings:

Globalized Safety^{W}: *S*'s belief that *p*, formed on belief-formation method *M*, is safe, if and only if, in most of the nearby possible worlds where *S* forms a belief on method *M*, the belief is true.
Globalized Safety^{S}: *S*'s belief that *p*, formed on belief-formation method *M*, is safe, if and only if, in all nearby possible worlds where *S* forms a belief on method *M*, the belief is true.

However, if the safety condition is thus globalized, then the safety account fails to preserve epistemic closure no matter whether we opt for a weak reading or a strong reading. See Zhao (2022b). For other discussions of the globalized version of the safety condition, see Bernecker (2020) and Hirvelä (2019).

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safe, and *S* knows that *p* unless it exhibits some non-modal shortcomings that would deprive it of the status of knowledge.

Though both versions of the safety condition can handle a wide range of cases involving knowledge-precluding epistemic luck as well as cases of knowledge, they perform differently in some cases. For instance, cases of inductive knowledge. To illustrate, consider the following case:

> ROOKIE COP
> Suppose two policemen confront a mugger, who is standing some distance away with a drawn gun. One of the officers, a rookie, attempts to disarm the mugger by shooting a bullet down the barrel of the mugger's gun. […] Imagine that the rookie's veteran partner knows what the rookie is trying to do. The veteran sees him fire, but is screened from seeing the result. Aware that his partner is trying something that is all but impossible, the veteran thinks (correctly as it turns out) [that the] rookie missed'. (Vogel, 1987, p. 212)[5]

Intuitively, the veteran knows that *the rookie missed*. After all, his inductive basis for the belief is as good as it could be. If the belief does not count as knowledge, then inductive knowledge would be very difficult, if not impossible, to obtain.

Is the belief safe? This depends on which version of the safety condition we opt for. Given the skill of the rookie, he missed in most of the nearby possible worlds where the veteran believes that *the rookie missed*. Thus, the belief is safe on Safe^{W}. However, though the task is almost impossible, there are still some nearby possible worlds where the rookie succeeds. After all, only a few changes are needed for the rookie to succeed, e.g., the orientation of the muzzle is deviated by a few millimeters. The veteran would still believe that *the rookie missed* in that possible world. Thus, the belief is unsafe on Safe^{S}. In a word, Safety^{W}, but not Safety^{S}, accounts for why the veteran knows that *the rookie missed*.

The two versions of the safety condition also perform differently in cases of knowledge obtained via the method of conjunction

[5] This case was first introduced by Vogel (1987) as a counterexample to the sensitivity account of knowledge. For similar cases such as CHUTE, ICE CUBE, and X-RAY and related discussions on why the account fails to account for inductive knowledge, see Sosa (1999a) and Vogel (1987, 2007, 2012). For the sake of simplicity, I shall not go through these cases though my discussions here apply to them.

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introduction. It is relatively uncontroversial that we can always extend our knowledge by the method of conjunction introduction. After all, what could be plainer than knowing that p & q when one already knows that p and knows that q? For instance, if you already know that *Jones owns a Ford* as well as *Brown is in Barcelona*, it would not be a surprise that you could also know that *Jones owns a Ford and Brown is in Barcelona* via the method of conjunction introduction. In the literature, it is also widely accepted that an advantage of the safety account over its main competitor, i.e., the sensitivity account, is that the safety account preserves epistemic closure, while the sensitivity account implies epistemic closure failure (Luper 2012; Pritchard 2002, 2005, 2008; Sosa 1999b, 2004). However, if we opt for Safety^{W}, then such an advantage is lost.

For the sake of simplicity, let us stipulate that 'most' in Safety^{W} means m%. In order for a belief to be safe, it should be true in, at least, m% of the relevant possible worlds, i.e., nearby possible worlds where one forms a belief in the target proposition on the same belief-formation method as that in the actual world. It should be a reasonable assumption that 'most' is larger than 50% and smaller than 100%. In a word, $50 < m < 100$. Suppose S knows that p and knows that q. On the basis of that, S also comes to believe that p & q via the method of conjunction introduction.[6] Assume that S's belief in p, as well as S's belief in q, in the actual world merely satisfies the threshold to count as safe, namely, it is true in m% of the nearby possible worlds where S believes it. Assume that p's being true and q's being true are independent events. Thus, p & q is true in m% × m% of all the relevant possible worlds, namely, it is true in fewer than m% of all the relevant possible worlds. For instance, if $m = 80$, then S's belief in p, as well as S's belief in q, is true in 80% of the nearby possible worlds where S believes it; while S's belief in p & q is true in 64% of all the relevant possible worlds. Therefore, S's belief in p & q is unsafe on Safety^{W}, and

[6] Williamson (2009), as one of the main proponents of the safety account, argues that one's method for believing the conclusion includes the method for believing each premise in cases of deduction. See Williamson (2009). If that is the case, then the method here should include S's method for believing p as well as q in addition to the method of conjunction introduction. However, it has been argued that such an individuation of the belief-formation methods implies problematically easy epistemic access to one's methods. See Goldstein and Hawthorne (forthcoming).

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thus does not count as knowledge. Given that S knows that p and knows that q, the result is very hard to swallow.

In contrast, Safety^S will not lead to such a surprising result. On Safety^S, if S knows that p and knows that q, then both p and q are true in all nearby possible worlds where S believes the target proposition. Therefore, p & q should also be true in all nearby possible worlds where S believes p & q, and thus S's belief in p & q is safe on Safety^S. It should count as knowledge unless it exhibits some non-modal shortcomings that would deprive it of the status of knowledge. In a word, Safety^S, but not Safety^W, accounts for why we can always extend our knowledge by the method of conjunction introduction.

In sum, induction and conjunction introduction constitute two horns of a dilemma[7] for the safety account of knowledge. On the one hand, the safety theorists need to be somewhat tolerant of nearby error-possibilities to account for inductive knowledge. On the other hand, the safety theorists need to be intolerant of nearby error-possibilities to accommodate knowledge obtained via the method of conjunction introduction. Therefore, the safety account cannot find a safe path between the Scylla of inductive knowledge and the Charybdis of knowledge obtained via the method of conjunction introduction.[8]

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[7] This is different from the dilemma for the safety account of knowledge proposed by Kelp (2009, 2018) and addressed by Mortini (2022). According to this dilemma, on the one hand, we need the safety condition to explain why the subject in Goldman's (1976) FAKE BARN does not know; on the other hand, the safety condition is too strong to accommodate Kelp's (2009, 2018) epistemic Frankfurt cases where one's belief counts as knowledge though it could easily have been false. While my dilemma is concerned about the modal strength of the safety condition, Kelp's dilemma is not because neither Safety^S nor Safety^W is satisfied in epistemic Frankfurt cases. The safety theorists such as Grundmann (2018) and Mortini (2022) have attempted to accommodate epistemic Frankfurt cases by appealing to a more fine-grained individuation of belief-formation methods or by relativizing the safety condition to environments in addition to belief-formation methods.

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