

# Resolving the small improvement argument: a defense of the axiom of completeness

JACK ANDERSON  
*University of Utah*

**Abstract:** This paper defends the axiom of completeness against a particular incomparabilist objection, the small improvement argument (or SIA). In my view, a theory of choice must admit of a number of folk psychological assumptions, most importantly, that agents conceive of choice options as simplified possible worlds and have preferences between such worlds. In addition, this paper argues that an additional folk psychological assumption allows a trimodal theory of choice to satisfactorily address the concerns about preference-indifference intransitivity raised by the SIA. This additional claim is that agents resolve their consideration of choice options to varying degrees. In my view, the SIA can be answered without abandoning or modifying the axiom of completeness.

**Keywords:** axiom of completeness, comparability, folk psychology, preference, utility theory

**JEL Classification:** B40, B41, D80

This paper defends an assumption in utility theory, specifically the assumption that agents either hold a strict preference over two options, or that they are indifferent between them. I will call this sort of comparison ‘trimodal’. This assumption of comparability will be defended against a particular sort of objection, the small improvement argument (SIA), perhaps most famously presented by Ronald De Sousa as the problem of the ‘fairly virtuous wife’ (1974, 544).<sup>1</sup> The fairly virtuous wife appears to be indifferent “between keeping her virtue for nothing and losing it in Cayucos for \$1,000” (1974, 545). The fairly virtuous wife, however, also appears to be indifferent between keeping

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<sup>1</sup> The term “small improvement argument” is from Ruth Chang (2002).

her virtue and losing it for \$1,500, which presents a problem for utility theorists. For them “indifference, like preference, in terms of which it is defined, is a transitive relation” (De Sousa 1974, 545), and the wife’s rankings are a case of preference-indifference intransitivity.<sup>2</sup> While it is a failure of the assumption of transitivity that brings the problem into focus, De Sousa holds that the options presented to the fairly virtuous wife are actually incomparable. In general, philosophers have shared this interpretation of the choice problem. Joseph Raz, for example, refers to failures of transitivity as “the mark of incommensurability” (1985, 120).

The structure of the SIA exposes an inconsistency between the assumption of completeness and the assumption of transitivity. If the wife’s deliberative stances—by which I mean her attitudes about the two options (absent any particular theoretical account of choice being applied to those attitudes)—are understood as preference rankings, then those rankings are intransitive and leave the wife vulnerable to a money pump. The response to that apparent inconsistency between completeness and transitivity advanced in this paper involves the claim that agents may consider an option in more or less detail depending on what that option is being compared to. I will argue that the objection to comparability illustrated by the SIA can be answered without abandoning a trimodal approach to explaining choice, provided that the approach also assumes that agents are able to resolve<sup>3</sup> choice options at finer or coarser grains—which is to say, that the number of details considered when assessing a choice option and, importantly, the precision with which agents consider those details may vary.<sup>4</sup> I will also

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<sup>2</sup> See Gustafsson and Espinoza’s “Conflicting reasons in the small-improvement argument” (2010) for a detailed account of how preference-indifference intransitivity allows for a money pump type problems to arise.

<sup>3</sup> This use of “resolution” is similar to the manner it is employed by Nien-He Hsieh in the paper, “Equality, clumpiness, and incomparability” (2005). Both Hsieh and I argue that the resolution at which options are compared will vary. However, there are significant differences between Hsieh’s conception and the one I will be suggesting. For Hsieh, the variation in resolution occurs because the “covering considerations” with respect to which the options are assessed are themselves clumpy (Hsieh 2005, 181). For example, one grading scale might clump student papers into As, Bs, Cs, etc., while another, more fine grained grading scale, might clump papers in to As, A-minuses, Bs, etc. And, Hsieh understands “comparison to be distinct from choice” (2005, 199). In contrast, I examine the role resolution might play in a utility theoretic explanation of choice, an explanation which does not necessarily involve the notion of covering considerations at all. In my account, resolution is a fundamental feature of how agents mentally represent choice options as opposed to a feature of certain types of covering considerations.

<sup>4</sup> This claim depends on the notion that there is a large degree of variability in terms of what an agent might believe about choice outcomes, i.e., it is a response that depends

argue that the costs to agents of making comparisons will vary depending on the resolution at which the comparisons are made. For example, the representation of an outcome as “I receive a bag of oranges” is less finely resolved than the representation of an outcome as “I receive a bag containing 11 oranges”; a fortiori, generating that less finely resolved representation is less costly as I do not have to count the oranges.

I will explain the process of resolving in the context of an axiomatic, subjective, folk psychological theory of rational choice, and will provide an account of that utility theory below. However, this paper is not meant to provide a *tout court* defense of comparability but, rather, a response to a very specific sort of objection particular to the SIA. And, as many examples of the SIA, like De Sousa’s, conflate that specific sort of objection with various other objections to comparability, I first want to isolate the particular problem I mean to solve.

### THE PARTICULAR PROBLEM POSED BY THE SIA

In examples such as De Sousa’s, at least part of the reason for focusing the objection on the assumption of comparability—rather than on the assumption of transitivity—is the idea that the two options are “qualitatively different” (De Sousa 1974, 545). Sinnot-Armstrong illustrates preference-indifference intransitivity using choices between death and amounts of pain, and the problem is often illustrated via choice situations between various sorts of careers, such as the choice between becoming a lawyer or a clarinetist (Raz 1985, 126). However, examples such as these, which involve such qualitatively different options, actually conflate two separate sorts of objections to the notion of comparability. The first sort of objection is simply that such

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on making adjustments to the choice options which then account for apparent cases of preference-indifference intransitivity. John Broome is dubious of “refining the individuation of outcomes” in this fashion. He states that, “if this sort of individuation is always allowed, transitivity will truly be an empty condition” (1991, 101). However, while I do claim that the notion of resolution does eliminate the apparent inconsistency between the assumptions of comparability and transitivity illustrated by the SIA, I do not claim that all instances of intransitive preferences can be eliminated in this way. I do not, for example, dispute that perceptual thresholds can result in the sorts of intransitive preferences described by W. S. Quinn in “The puzzle of the self-torturer” (1990), and, the notion of resolution as presented here does not leave transitivity as “an empty condition”.

qualitative differences necessarily render certain options incomparable.<sup>5</sup> In De Sousa's presentation of the SIA, for example, the force of this objection stems from the intuition that virtue simply cannot be priced in dollars. The second sort of objection, the sort particular to the SIA, stems from the intuition that the wife's deliberative stances are plausible and reasonable. In what follows, I will be concerned with answering the second sort of objection rather than the first—this is for two reasons: (1) because the second objection applies to a much wider range of choice situations (among them are the sorts of choice situations routinely addressed by economists); (2) because it is this second sort objection that actually arises from the structure of the SIA (whereas in the first sort of objection the structure of the SIA is just a consequence of the prior intuition—that some options are evaluatively different and that such differences make trimodal comparisons impossible). Ruth Chang (2002) presents the SIA as a choice between tea and coffee, where the agent is supposed to be indifferent both between a cup of tea and a cup of coffee, and between a slightly improved cup of tea and the same cup of coffee. This example, which I will examine in some detail below, shows that the problem of preference-indifference intransitivity arises not just in choice situations that involve hard choices between things like virtue and money (or death and pain), but even in the simplest situations involving choices between what Chang calls “mere market goods” (2002, 96).

Again, one might object that it is impossible to compare things when the options are qualitatively different. One can quite sensibly take the position that, in certain hard cases, the assumption of comparability is *prima facie* (or for any number of reasons<sup>6</sup>) false, and that things like virtue cannot be compared to things like money. But, one need not *begin* with the intuition that virtue and money are somehow inherently incomparable to note that the wife's three deliberative stances are, taken together, intuitively sensible. Even the trimodal comparabilist that is absolutely convinced that there is no such thing as qualitatively

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<sup>5</sup> Or, at least that such options cannot be compared trimodally. For an account of how the existence of such evaluatively different options might be compared using a tetramodal comparative approach, see Chang 2002.

<sup>6</sup> For example, one might be convinced by an argument from the diversity of values—that “some items are ‘so different’ that there is no ‘common basis’ on which a comparison can proceed” (Chang, 2002, 72). Or, one might be convinced by the claim that certain options are constitutively incomparable, where the constitutive features of certain options prevent those options from being compared in certain cases (Raz, 1986). Again, however, replies to these objections are available (see Chang, 2002).

different options, or that such qualitative differences simply have no effect on an agent's ability to compare, still faces the problem illustrated by the SIA if that same comparabilist nonetheless intuitively that deliberative stances like the virtuous wife's are plausible and reasonable.

### A TRIMODAL THEORY OF CHOICE

That the force of the SIA is intuitive is significant. The account of rational choice advanced here should be understood as what Alexander Rosenberg describes as "folk psychology formalized" (2008, 80).<sup>7</sup> It assumes that agents not only choose, but that choices are motivated by an internal preference set which is both complete and transitive. Such an account is vulnerable to objections which appeal to intuitions given that the process of formalization needs to account for intuitive judgments about the nature of agents' mental states. If it seems at least plausible that the fairly virtuous wife has the deliberative stances that she does and, at the same time, that she is rational, then the SIA presents a problem for a trimodal theory of choice which also assumes that a rational agent's preference rankings must be transitive.

Understood in the context of a folk psychological account of choice, the assumption of comparability involves claims about agents' capacities. And, per the utility theoretic account of choice forwarded here, agents' choices are entirely motivated by their preferences, where 'preference' is understood as an agent's all-inclusive, subjective judgment about which of two options she wishes to consume.<sup>8</sup> So, I will defend a trichotomy of choice where the agent either prefers A to B, or prefers B to A, or is indifferent between them (where indifference can be understood as the agent being willing to say "you choose", i.e., the agent is willing to accept either option on offer). These three modes are derived from utility theory's axiom of completeness: for *all*  $X_1$  and  $X_2$  in

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<sup>7</sup> Revealed preference theorists will object to this approach, but I regard the arguments forwarded by Daniel Hausman (2012) and Alexander Rosenberg (2008) as to why economics must be understood as having to do with the mental states of agents as convincing.

<sup>8</sup> My use of "preference" is similar to Hausman's, who defines "preferences" as the agent's "total comparative subjective evaluations" (2012, 34). That the judgments are entirely subjective is significant and means that there is a distinction in the choice theory between objects of preference and the outcomes which will actually obtain. The theory holds that a preference for a mental representation of some actual outcome motivates the agent to choose the actual outcome represented. The theory is silent both in regard to *how* the internal mental state of preferring motivates actual choice and in regard to how mental representations come to be *about* actual outcomes.

$X$ , either  $X_1 \succcurlyeq X_2$  or  $X_2 \succcurlyeq X_1$ , where  $X$  is the consumption set, and  $X_1$  and  $X_2$  consumption options within that set. Expressions of strong preference, for example “the agent prefers A to B”, formally represented as  $(A \succ B)$ , are derived from pairs of weak preference relationships,  $((A \succcurlyeq B) \& \sim(B \succcurlyeq A))$ . Again, in this choice theory ‘preference’ is understood as the mental state which motivates an agent to choose, and whatever motivates preference is, as per the usual economic approach, exogenous to the theory. So, the virtuous wife’s preferences can be given as follows:

virtue  $\approx$  \$1000

virtue  $\approx$  \$1500

\$1500  $\succ$  \$1000

As noted above, these preferences are problematic because they violate utility theory’s axiom of transitivity: for any three elements in the consumption set  $X$ :  $X_1, X_2, X_3$ , if  $X_1 \succcurlyeq X_2$ , and  $X_2 \succcurlyeq X_3$ , then  $X_1 \succcurlyeq X_3$ .

In addition to the axioms of completeness and transitivity, this folk psychological conception of rational choice involves another assumption about agents’ capacities, one rarely formally recognized. It is usually omitted that the options compared by agents are not the actual outcomes that obtain.<sup>9</sup> These options are, rather, mental representations, which I will refer to as “simplified possible worlds”.<sup>10</sup> Call the assumption that agents mentally represent choice outcomes as simplified possible worlds the “axiom of subjectivity”:  $X$  is the consumption set of simplified possible worlds as conceived of by the choosing agent.

I further assume that the simplified possible world that an agent conceives of as representative of some particular actual outcome can vary in resolution. This last assumption suggests that the fairly virtuous wife’s preferences given above are composed of comparisons made at varying resolutions, and that the failure of transitivity appears to be a consequence of comparing differently resolved options—a comparison the virtuous wife herself never actually makes.

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<sup>9</sup> Of course, expected utility theory explicitly involves agent beliefs, but I mean to point out that choice options must be considered in this manner even when agents are unconcerned with assigning probabilities to various outcomes.

<sup>10</sup> These options are sometimes called states of affairs. Matthew Adler uses the term “simplified possible worlds” (2012, 514) to refer to the choice options faced by choosing agents, and that term seems apt.

To reiterate, these assumptions, that agents prefer, that agents mentally represent options, are to be understood as a folk psychological in nature. Theoretical terms such as ‘prefer’ are, therefore, “definable functionally, by reference to their causal roles” (Lewis 1972, 207). Though, I do not hold that the functional roles such terms play in a folk psychological interpretation of utility theory actually reflect the ordinary folk understanding of those terms. Rather, the theory being deployed here supposes that the functional roles described by theoretical terms (“to prefer” and “mentally represent”) are roles agents are actually capable of performing. Agents believe (mentally represent, somehow) things about alternative outcomes. Given beliefs about alternatives, agents are able to weakly prefer (or not) a mental representation (a collection of beliefs about some alternative) of some outcome to another. The epistemological justification for assuming completeness is that it is possible for agents to actually think in the manner described by the axiom. Agents can weakly prefer one option to another, and weakly preferring is a thing agents do in their heads by comparing “alternatives they *believe* to be available” (Hausman 2012, 15; emphasis added).

## RESPONDING TO THE SIA

There are two distinct argumentative lines of the SIA: a practical line and an abstract one. The abstract line is meant to present the objection without allowing for replies which simply posit agent error, as such replies are, arguably, sufficient responses to practical examples of the SIA. However, by abstracting completely away from any actual choice situation, the abstract line of the argument also loses quite a bit of intuitive force. I will show that the abstract line depends, not on the intuition that the deliberative stances presented in the SIA are plausible and reasonable, but rather, on the prior intuition that certain options are, for whatever reason, incomparable. Without this prior intuition, some actual choice options must be posited in order to get any sort of objection off the ground. I will proceed by explaining how a trimodal comparabilist might respond to the abstract line of the SIA. I then show how the capacity to resolve any given choice outcome with varying degrees of precision and detail allows agents to rationally navigate the difficulties presented by the practical line without abandoning a trimodal approach to choice.

***The abstract line of the SIA***

The abstract line of the SIA rests upon the claim that certain sorts of small improvements simply cannot make a difference to an agent's preferences. Ruth Chang presents the argument quite clearly. Though the trichotomy that she considers ('better', 'worse', 'equally good') departs from the trichotomy of preference that I am interested in defending, the distinction makes no difference in terms of the comparabilist response. It will be helpful to consider her presentation of the abstract line of the SIA in some detail.

Chang describes the abstract intuition as "in general, for evaluatively very different sorts of items, certain small improvements—given by a dollar, a pleasurable tingle, and so on—cannot effect a switch from an item's being worse than another to its being better" (2002, 128). She accurately notes that,

[...] if this intuition is correct, then it follows that the trichotomy of relations sometimes fails to hold. For take an arbitrary pair ( $r$ ,  $s$ ) of evaluatively diverse items. We can create a spectrum of  $r$ -items by successively adding or subtracting dollars (or pleasurable tingles, etc.) from  $r$ . If we add enough dollars, we get an  $r$ -item,  $r_+$ , that is better than  $s$ , and if we subtract enough dollars, we get an  $r$ -item,  $r_-$ , that is worse than  $s$ . Now, according to our abstract intuition, adding a dollar, pleasurable tingle, etc., cannot make a difference to whether one item is better or worse than another item evaluatively different from it. Therefore, there must be some  $r$ -item,  $r^*$ , in the spectrum that is neither better nor worse than  $s$ . But what relation holds between  $r^*$  and  $s$ ? Suppose one of the trichotomy [for our purposes that the agent either prefers  $r$  to  $s$ , or vice versa, or is indifferent] always holds. Then since  $r^*$  is neither better nor worse than  $s$ , it and  $s$  must be equally good [the agent must be indifferent between them]. According to our intuition that a dollar cannot make a difference, however, this is impossible. For if we add fifty cents to  $r^*$ , we get an item that is better than  $s$ ; if we take away fifty cents from  $r^*$ , we get an item that is worse than  $s$ . And the difference between  $r^*$ -plus fifty cents, which is better than  $s$ , and  $r^*$ -minus fifty cents, which is worse than  $s$ , is a dollar. Thus  $r^*$  and  $s$  cannot be equally good (Chang 2002, 128).

The main issue that I want to address here is the notion of "our abstract intuition" and that intuition's role in the subsequent development of the abstract line of the SIA. Chang's presentation is quite precise. If one begins with the assumption that qualitatively different options exist, and that "certain small improvements cannot [in



choice situations involving such qualitatively different options] effect a switch from” one preference to another, then, as Chang shows, intransitive preference rankings such as the sort exhibited by the virtuous wife can be shown to follow as a consequence of that initial assumption. Formally, in the abstract line as given by Chang, an agent can be shown to have the following preferences that conform to the usual, problematic, SIA pattern:

$$r^* \approx s$$

$$(r^* \text{ plus fifty cents}) \approx s$$

$$(r^* \text{ plus fifty cents}) > r^*$$

Again, these preferences are intransitive and the agent having such preferences can be subject to a money pump. Chang’s solution to this problem is to question the propriety of classifying the relationships between  $s$  and  $r^*$  and between  $s$  and  $r^*$  plus fifty cents as ‘indifference’ in the usual utility theoretic fashion.<sup>11</sup> But, as her presentation of the abstract version of the SIA suggests, there is an alternative, straightforward, response available to the comparabilist presented with the abstract line of the SIA—namely, to reject the foundational abstract intuition. Without the abstract intuition, that “certain small improvements” cannot effect a comparative difference between options which are qualitatively different, there is no particular reason to regard the above abstract preference rankings of  $r^*$ ,  $s$ , and  $r^*$  plus fifty cents as plausible; therefore the abstract line can simply be put aside.

Of course, the abstract intuition is abstracted from somewhere, and in Chang’s presentation of the abstract line of the SIA, it is developed through examples of the usual sorts of hard choices which are often assumed to be the clearest examples of qualitatively different options: “a career in hang-gliding and one in accounting, a Sunday afternoon in the amusement park and one at home with a book, a zero-tolerance policy towards crime and one that aims only to reduce homicides, and so on” (2002, 128). Choice theorists differ on how convincing such examples are in terms of establishing the notion of ‘qualitatively different’; incomparabilists may assert that it is impossible to price virtue in dollars, while comparabilists may assert that it is quite possible and that so-called qualitatively different options can be compared in the

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<sup>11</sup> Chang suggests a fourth comparative relationship—“on par” (2002).

same fashion as comparisons between mere market goods, such as tea and coffee. However, what is really significant about the SIA is that even if the comparabilist dismissal of the possibility of qualitatively different options which make for hard choices stands, and all choices are ultimately as simple as the choice between tea and coffee, the argument *still* presents a trenchant objection to trimodal accounts of choice. To show exactly how that objection runs, and how I think the notion of resolution answers it, I will now consider one final instantiation of the SIA, the practical example proposed by Chang of a choice between a cup of tea and a cup of coffee.

### ***The practical line of the SIA***

Hopefully, the structure of the practical line of the SIA is at this point familiar. It consists of three plausible deliberative stances, all held by a single agent. Those deliberative stances are often presented and meant to be understood as outside the context of any particular theoretical description, as the SIA is meant to present evaluative judgments to which the standard trimodal descriptions do not apply. However, as noted above, the force of the SIA can be demonstrated quite simply by applying a trimodal theoretical description to the plausible evaluative judgments and then proceeding to illustrate exactly how such a description entails a failure of transitivity. For example, one might propose that Abby the agent has the following preferences:

- (i)  $\text{tea} \approx \text{coffee}$
- (ii)  $\text{tea}^+ \approx \text{coffee}$ , where  $\text{tea}^+$  is a slightly improved version of tea
- (iii)  $\text{tea}^+ > \text{tea}$

Again, per utility theory, each of the following axioms applies:

**Axiom of subjectivity:**  $X$  is the consumption set consisting of  $X_1, X_2, \dots, X_n$ , where any  $X_i$  is some simplified possible world as mentally represented by the agent.

**Axiom of completeness:** for *all*  $X_1$  and  $X_2$  in  $X$ , either  $X_1 \succcurlyeq X_2$  or  $X_2 \succcurlyeq X_1$

**Axiom of transitivity:** for any three elements in the consumption set  $X$ :  $X_1, X_2, X_3$ , if  $X_1 \succcurlyeq X_2$ , and  $X_2 \succcurlyeq X_3$ , then  $X_1 \succcurlyeq X_3$

The preference relationships given in (i), (ii), and (iii) are problematic for this axiomatic theory because, if those relationships are as described, then the axiom of transitivity fails to hold. And, the “tea or coffee” example constructed by Chang illustrates two important features of the SIA. First, as noted above, the objection clearly applies to choice situations involving mere market goods, and the problem clearly applies to a very wide array of choice situations. Second, the alternatives on offer are immediately and fully comprehensible, unlike De Sousa’s (or any other example which involves a large amount of uncertainty, such as a choice between a career as a lawyer and a career as a clarinetist). Whereas the fairly virtuous wife might reasonably be thought to be facing a choice situation best explained with an expected utility model, the “coffee or tea” problem does not seem to involve anything other than a straightforward trade-off between two choice options that can be known with as much certainty as anything can.

Interestingly, it also seems quite reasonable that Abby is actually indifferent (willing to say, “you choose”) between the two options in the cases where she does not express a strict preference for one over the other. Abby not caring whether she gets tea or coffee seems plausible. However, Abby not caring whether she keeps her virtue or gets \$1000 seems somewhat less plausible. This points to a problem with examples from De Sousa, Raz, and Sinnott-Armstrong that attempt to present practical situations which are meant to strongly invoke incomparable intuitions prior to any consideration of an agent’s preferences. Such examples involve momentous choices. From a practical perspective, an agent being genuinely indifferent between such significant options seems suspect unless one intuits that, for example, the fairly virtuous wife when presented with the choice between either \$1000 or \$1500 and her virtue is content to say to her suitor, “you choose”. While such a conclusion is certainly possible, it seems so unlikely that it invites practical dismissals of the problem, most obviously that the fairly virtuous wife’s lack of preference for either the money or her virtue does not indicate any sort of fixed deliberative stance at all, but rather that she is still thinking about it. The trimodal comparabilist can simply admit that a trimodal description of the wife’s deliberative stances does not apply because the wife has not actually reached any evaluative judgments. Abby’s preferences, in contrast, do not invite this sort of dismissal, and, nonetheless, they exhibit preference-indifference intransitivity. The practical line of the SIA is, I think, best illustrated

with mundane choices. This is not to say that examples of the SIA that involve hard choices cannot be understood as manifesting the particular objection that I am concerned with answering here (that the agent's preference rankings appear plausible yet intransitive); rather, such examples may conflate various incomparabilist objections, and such hard case examples of the SIA permit the objection to be evaded rather than addressed. That said, the response to the SIA suggested here will work just as well in such hard case examples, provided that the objection is understood as the objection arising from the structure of the SIA. Again, if one comes to such hard case examples of the SIA already intuitively convinced that certain options simply cannot be compared, no answer to *that* intuition is offered here.<sup>12</sup>

The apparent inconsistency between Abby's preferences and the axiom of transitivity can be clearly seen if Abby's preferences are described slightly more formally:

- i) (tea  $\succcurlyeq$  coffee) & (coffee  $\succcurlyeq$  tea)
- ii) (tea+  $\succcurlyeq$  coffee) & (coffee  $\succcurlyeq$  tea+)
- iii) (tea+  $\succcurlyeq$  tea) &  $\sim$ (tea  $\succcurlyeq$  tea+)

And now, in violation of the axiom of transitivity, it is plain that, while (tea  $\succcurlyeq$  coffee, from (i)), and (coffee  $\succcurlyeq$  tea+, from (ii)), it is also the case that ( $\sim$ (tea  $\succcurlyeq$  tea+), from (iii)). Nonetheless, it seems very reasonable that, if Abby is indifferent between tea and coffee, then she would be indifferent, as well, between tea+ and coffee. Given that failures of transitivity are more difficult to explain than failures of completeness,<sup>13</sup> even when prior incomparabilist intuitions are put aside, the problem exposed by the SIA still suggests that either Abby's preferences are not, in fact, complete, or that the meaning of 'completeness' is not, exactly, as described by the axiom of completeness. Given the nature of Abby's preferences, and given that they seem perfectly sensible, the problem is often regarded, as it is by Chang, as a problem with the notion of

<sup>12</sup> Those interested in such replies can find a multitude of them in Ruth Chang's *Making comparisons count* (2002), where she argues that the SIA is, in effect, the last objection to trimodal comparability left standing.

<sup>13</sup> There are a number of alternatives on offer that might allow a rational agent to choose without referencing a complete preference set (or, indeed, without preferring at all, see, for example, Chan 2010), or that propose that the notion of completeness be adjusted (see, for example, Chang 2002).

indifference. In such accounts, Abby's perfectly sensible preference relationships which (i) and (ii) attempt to describe, are not instances of indifference between the options therein considered, but rather, some other type of comparative relationship or the absence of any comparative relationship whatsoever.

By contrast, the account proposed here suggests that Abby's preference relationships can be explained by a trimodal theory of choice. That theory must assume that agents have the capacity to resolve choice options in various ways. Given the capacity to represent outcomes as simplified possible worlds, resolution is, I think, a capacity agents quite obviously possess. The SIA simply shows that it is a capacity that must also be theoretically acknowledged. Once it is acknowledged, the objection raised by the SIA can be answered in a straightforward manner.

To illustrate how the process of resolution works, I will include resolutions with Abby's preferences.

- i)  $\text{tea} \approx \text{coffee}$  (at resolution alpha)
- ii)  $\text{tea}^+ \approx \text{coffee}$  (at resolution alpha)
- iii)  $\text{tea}^+ > \text{tea}$  (at resolution beta)

In the first choice problem (i) Abby must decide between tea and coffee. Abby considers her options at resolution alpha, and she is indifferent between the two options. In the second choice problem (ii) Abby must decide between  $\text{tea}^+$  and coffee. Again, Abby considers her options at resolution alpha, and she is indifferent. In the third choice problem (iii) Abby must decide between tea and  $\text{tea}^+$ . In this case, Abby considers her options at a different resolution, beta, at which she notes the superior aroma of  $\text{tea}^+$  as compared to tea. Abby prefers  $\text{tea}^+$ . But, she is considering the simplified possible world that will result if she picks  $\text{tea}^+$  differently in case (iii) than she does in case (ii). Abby's preference rankings will, to some extent, vary depending on the resolution Abby uses to consider her choices.

The question of why Abby considers case (iii) at a different resolution than cases (i) and (ii) admits of a straightforward and intuitive answer. It is less costly to compare two types of tea than it is to compare tea with coffee, so smaller differences can be taken into account in pursuit of smaller benefits. As incomparabilists tend to raise

objections to the axiom of completeness precisely because of this intuition—that some comparisons are more difficult than others—I do not think it needs much defending here. However, in this instantiation of the SIA, the explanation might be that the options in (i) and (ii) are considered relatively crudely by Abby as “a cup of tea” or “a cup of coffee”, with no attention being paid to finely grained details (such as the very slightly superior aroma of tea+), because the costs of resolving the choice problem in a manner that takes such small details into account exceed the benefits Abby might reasonably expect to get by noticing them. In (iii), the items under consideration are fundamentally the same, tea. This circumstance lowers the costs of considering such small details. This low cost makes it more likely that Abby will use a fine resolution as she can expect to receive benefits that exceed her comparison costs. Comparing tea+ to tea is less costly than it is to compare tea+ to coffee because Abby can take advantage of the fundamental sameness to avoid the costs associated with generating a simplified possible world populated with details about tea entirely. There is no need for Abby to consider how tea tastes compared to tea+, for example, as they taste the same. The only comparison Abby actually makes in (iii) is to note that tea+ offers a ‘+’ and tea does not. In effect, Abby simply disregards everything about the two options that is the same, and chooses between what is left. Her choice in (iii) amounts to the choice between the ‘aroma improvement’ (the ‘+’) or ‘nothing’. Even though Abby is using a more fine-grained resolution in (iii) in order to be able to consider the improvement, the costs of comparing in (iii) are still, I think, likely to be far lower than in (i) and (ii), as there are far fewer details that Abby needs to include in the simplified possible worlds she compares in (iii).<sup>14</sup> In general, any change to an agent’s mental representation of an outcome can be considered a matter of resolution. A simplified possible world which includes the sort of office chair that a career as a lawyer would have me sitting in is more finely resolved than the simplified possible world that just has me sitting in some chair, and the simplified possible world which includes details

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<sup>14</sup> The reader will have noticed that, throughout this paragraph, I have been discussing the choice problem as a choice between actual things in the world, tea and coffee, rather than between simplified possible worlds. This is purely a matter of grammatical convenience. As always, the choice options are more accurately described by the, admittedly cumbersome, “the simplified possible world that the agent believes will result if...” construction.

about how sitting in that particular chair might actually feel is more finely resolved still.

By my account, *at any particular resolution* Abby's preferences are complete and transitive. If she considered all three comparisons, (i), (ii), and (iii), at resolution alpha, then, in (iii), Abby would be indifferent between tea+ and tea and no violation of the axiom of transitivity would occur. If she considers all three options at resolution beta, the only thing certain is that she will prefer tea+ to tea. Taking small details like particular aspects of aroma into account, Abby may prefer tea to coffee, prefer coffee to tea, or remain indifferent. If she does remain indifferent between tea and coffee at resolution beta, she will, at resolution beta, prefer tea+ to coffee.

It might be thought that Abby's indifference between tea+ and coffee at resolution alpha must be an error in judgment on her part, if, as argued here, she has the capacity to discern qualities that could cause her to prefer tea+. Especially if we allow that Abby is permitted a sip of each beverage before choosing, it seems reasonable to wonder, given the simplicity of the choice situation, how Abby might fail to notice some feature of tea+ at resolution alpha that she does notice at resolution beta. But, even simple experiences like sipping tea can be attended to more or less closely. I might, for example, appreciate the same sip as "warm tea", or as "warm tea with a soft, sweet flavor, and ginseng accents". This variation in how objectively identical experiences may be perceived translates quite naturally to variation in how simplified possible worlds are resolved.

Of course, the same sorts of concerns that apply to agents making adjustments to the partitions of states in an expected utility model of choice apply here as well. The same choice situation considered at different grains of resolution may result in the agent making different choices. As described above, indifference may resolve into strict preference, and there is no particular reason to disallow outright preference reversals. Abby, might, for example, prefer a cup of coffee to a cup of tea, but, were she to examine the options at some finer grain of resolution, she might find the aroma of tea (a detail she had not considered at all at the coarser resolution) so delightful that once this aroma is considered at some finer level of resolution she finds the tea preferable to the coffee.

Such preference changes might appear problematic. If more finely resolved choice options provide Abby with "a fuller and more realistic

picture” of her choice situation (Joyce 1999, 70), then it seems as if Abby, knowing she has the capacity to resolve choice options more finely, rationally should pursue that fuller, more realistic picture in order to establish as accurate preference rankings as possible. The notion of costs, however, goes some distance towards answering such concerns. Abby may be well aware that if she took the time and effort to consider her sample sips of tea and coffee at a finer degree of resolution her preference would change and she would cease to be indifferent between the two options. But, there is the matter of cost, the extra time and effort. While Abby might prefer tea to coffee when she considers the choice situation at resolution beta, unless the benefits of choosing tea over coffee exceed the extra costs of considering the choice situation at a finer resolution, Abby should use the coarser resolution. Therefore, Abby should only use resolution beta to compare coffee and tea when she suspects that, for example, she will not just prefer one option to the other at that resolution, but that she will prefer the simplified possible world where she gets the now preferred option and pays some extra costs (the cost of comparing at resolution beta minus the cost of comparing at resolution alpha) to the world where she gets the lower ranked option and does not pay the extra cost.

## CONCLUSION

The SIA shows that intuitively plausible deliberative stances may constitute an objection to the assumption that agents can compare by establishing one of three comparative relationships between any two options. Directed at a utility theoretic account of choice, the objection shows that if the axiom of completeness is an accurate account of such preferences, then the axiom of transitivity cannot be an accurate account of them, as the intuitively plausible preferences display preference-indifference intransitivity.

However, a more complete account of choice also assumes that choice options are simplified possible worlds, mentally represented by agents; I call this assumption the axiom of subjectivity. An agent’s ability to represent alternative outcomes as choice options includes the capacity to vary the amount and precision of details included in the simplified possible worlds. The capacity to resolve choice options to a finer or coarser degree answers the SIA by showing that as long the agent’s preferences are all described at the same degree of resolution, the inconsistency between the claims made in the axiom of



completeness and the axiom of transitivity is eliminated. So, the objection is illustrated by a failure of the axiom of transitivity, directed at the axiom of completeness, and answered by referring to the axiom of subjectivity.

I maintain that the force of the objection presented by the SIA depends on comparing choice options in a manner that does not correspond to a reasonable folk psychological account of how agents actually go about comparing. Agents resolve different choice problems at varying grains of resolution, and have good reasons (namely costs) for doing so. If one compares a simplified possible world that has been appraised by an agent at a certain grain of resolution with a simplified possible world that has been appraised at some other grain of resolution, one is making a mistake. Absent this sort of mixing and matching of differently resolved simplified possible worlds, the SIA does not illustrate any inconsistency between the axioms of completeness and transitivity

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**Jack Anderson** is a doctoral candidate in the department of philosophy at the University of Utah. His research focuses on the areas of practical reasoning and the philosophy of economics.

Contact e-mail: <jack.anderson@utah.edu>