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ALTERING THE STATE OF THE ALTERED STATE DEBATE: REPLY TO COMMENTARIES

Sakari Kallio[1] and Antti Revonsuo[2]

[1]*University of Skövde, Sweden and* [2]*University of Turku, Finland*

Abstract

The main point of our article 'Hypnotic phenomena and altered states of consciousness: A multilevel framework of description and explanation' was to clarify, explicate and reveal the differences between current theoretical viewpoints in explaining hypnosis. Furthermore, we wanted to present a research programme and propose some experiments that if carried out, might lend decisive support to either the Nonstate View (NSV) or the State View (SV) approaches to hypnosis. The commentaries revealed that the concept of altered state of consciousness (ASC) still lacks a commonly accepted definition and is in need of further clarification. The controversy between NSV and SV of hypnosis seems to boil down to the question concerning the explanatory power of the neural level and especially to what the results at this level tell us. In this reply we further clarify the multilevel framework of explanation, the problems associated with the concept of ASC, and we explain the rationale for our proposal of using virtuosos as a model system in hypnosis research.

Key words: altered states of consciousness, hypnosis, hypnotic virtuoso, levels of explanations, state/nonstate debate

Introduction

We are grateful for the thoughtful commentaries on our target paper. Although the commentators have some reservations about our approach to hypnotic phenomena, it seems that many issues have been clarified in the discussion and there is promise of unification of the field in the future. In this reply to the commentaries on our paper, we want to highlight issues that everyone seems to agree about as well as some issues that require further clarification.

Irrespective of the problems encountered already in the definition of the central concepts of the discussion, we regard the state issue as being both highly interesting and relevant in order for the field to proceed towards a better understanding of hypnosis and the phenomena associated with it. We sincerely hope that the 'state debate' would go on or, rather, that it could now reach a new level (or a new 'altered state') where the central questions can be approached from a fresh angle. We were glad to note that most of the commentators seemed to share this optimistic prospect with us, regarding the debate more as an opportunity to sharpen our understanding of hypnosis rather than a hostile battle between squarely opposing 'camps'. We respectfully disagree with the view

according to which the attempt to reveal the causal mechanism of a theoretically crucial phenomenon is just 'a distraction from the real business' as Kihlstrom (page 34, this volume) suggests.

As the commentators point out (e.g. Kirsch; Wagstaff and Cole, both this volume), everyone agrees that hypnosis is associated with altered experiences. Therefore, if the mere occurrence of altered experiences were the criterion of an altered state, then everyone would agree that hypnosis is an altered state, and there would be no debate. Also, there seems to be overall agreement that it is necessary to study hypnosis in a multi-level context (social-psychological, personal, phenomenal, cognitive and neural levels). Therefore, experiments at all these levels can add to our understanding of hypnosis. Also the phenomenal level is regarded as playing a central role, as pointed out by many researchers long before us.

Regardless of the theoretical viewpoint defended, SV or NSV, it seems that everyone takes the occurrence of the key phenomenon to be a matter of degree and, therefore, for it to manifest itself in the normal population as almost normally distributed, or as forming a single continuum. This background assumption leads to the view that the explanans behind all kinds of changed behaviours and experiences in the hypnotic context is a single phenomenon: either a nonstate phenomenon that occurs in different degrees in different people and different situations or a state phenomenon that reaches different levels or 'depths' in different individuals. If the NSV is correct, then both simple ideomotor responses as well as vivid sensory and perceptual hallucinations must be explained by referring to the same types of nonstate factors; respectively, if the SV is correct, then both types of phenomena must be explained by the altered state they share. Therefore, our suggestion about focusing primarily on virtuosos and on hallucinations was generally regarded as being too restrictive an approach.

The disagreement that still divides the field is this: is there an altered background state, underlying or causing the altered experiences, that is unique to hypnosis ('hypnotic trance')? If there is such a state, then it is also supposed to figure in the explanation of the altered experiences. The NSV views hold that *all* the altered experiences occurring in the context of hypnosis can be elicited without *any* altered hypnotic state being *ever* involved. The whole range of altered experiences is instead produced by such things as imagination, expectation, placebo effects, the social context that gives the 'license' to hallucinate, eidetic imagery, strategies, and so on. By contrast, the SV holds that hypnotic inductions produce a special hypnotic state and this state is needed when explaining *all* hypnotic phenomena ranging from ideomotor responses to hallucinations. After a hypnotic induction, a person can be in this state to varying degrees and the degree or 'depth' of the state is directly related to the probability that different types of suggestions are fulfilled. An analogy can be drawn with the effects of alcohol: the relative amount of alcohol in a person's blood volume is correlated with the effects that alcohol has on the behaviour and experience of the person.

Another controversy seems to focus on how the empirical evidence from the different levels of explanation and description should be interpreted. This concerns especially the neural level: how to interpret the findings from the neural level, obtained by using the different brain sensing and imaging methods. What exactly do the results from the neural level tell us?

The point we want to raise is this: do the NSV theorists truly need the lower levels (cognitive and neural) in order to explain hypnosis? If the answer is 'yes', then why exactly for what do they need it? Another way of putting this is to ask whether anything crucial would be missing from the NSV explanation of hypnosis if it had all the social-

psychological and cognitive factors and mechanisms already sorted out perfectly, but it wouldn't describe those mechanisms at the lower, neural level? The same question can also be asked from the SV theorists in a slightly different way. How exactly would the hypothesized ASC reveal itself in the data we get from brain sensing and imaging methods?

Lynn et al. (this volume) state that in order to claim that there is an ASC involved in hypnosis we need 'extraordinary proof'. One purpose of our article was to try to figure out what that 'proof' could look like in the experimental context. The crucial question is this: is it possible to devise or at least imagine an experimental setting that puts the SV and NSV against each other in a decisive test?

Furthermore, we wanted to expose and analyse the problems that are not purely experimental but derive from the difficulties of arriving at a clear and empirically testable definition of the concept of 'ASC'. The commentaries demonstrate that the question of the relationship between ASC and hypnosis cannot be solved unless the concept of ASC is first clarified, and everyone participating in the discussion shares approximately the same notion of ASC.

Here we try to further clarify the points the commentators raised as follows. First, we will focus on the theoretical background of multilevel explanation and clarify some issues concerning the levels and their explanatory power. Second we will discuss the problems of the concept of ASC and argue that the only way to proceed in the SV/NSV controversy to a stage where they can be experimentally contrasted with each other is to regard the hypothesized 'state' (or ASC), if it exists at all, as being both ontologically real as well as having causal powers. Third, we will further explain the rationale of focusing on hypnotic virtuosos as research subjects.

Multilevel biological explanation

It seems that both NSV researchers as well as SV researchers regard the phenomenal level as crucially important when studying hypnosis. Kirsch (this volume) even notes that the phenomenon that needs to be explained resides at the phenomenal level. Furthermore both Lynn, Fassler and Knox, and Kirsch (both this volume) point out that the levels residing under the phenomenal level (cognitive and neural levels) provide us with highly interesting data concerning hypnosis. Also Wagstaff and Cole (this volume) stress that NS theorists have had much to say about the cognitive mechanisms underlying hypnotic responding.

However, there seem to be strongly conflicting views concerning the explanatory power of the cognitive and the neural levels (e.g. Naish versus Kirsch; both this volume). This disagreement seems to focus on our conclusion that the most important levels of explanation for hypnosis are somewhat different for SV and NSV. Since our argument is based on the framework of multilevel explanation, let us briefly take another look at the theoretical basis of this framework.

In current philosophy of science there are two somewhat opposing views of scientific explanation (Salmon, 1989): the unification approach, which is mostly based on how explanation works in physics, and the mechanistic approach, which applies especially to the biological sciences.

The mechanistic approach sees explanatory knowledge as an understanding of the hidden mechanisms by which nature works. Proponents of this view (e.g. Bechtel, 1994; Machamer, Darden and Craver, 2000) have pointed out that the traditional notion of a universal law of nature has few if any applications in neurobiology and molecular

biology. Biologists typically first identify and describe an interesting system or phenomenon at one level of organization in nature and then try to figure out what the components of this system are, how they interact, and how they produce the effects that can be observed at the level of the whole system. After this biologists attempt to build an idealized multilevel model of the system, the purpose of which is to show the general structure and function of the system across several levels of organization (Revonsuo, in press).

When applied to hypnosis research this means that if the phenomenal level is the level to be explained then there have to be some lower level mechanisms which are crucial in explaining and understanding this higher level. This does not mean that the sole and only explanation would reside at the lower level (i.e. cognitive and neural levels) but rather that also an account of the lower levels is necessary in order to fully understand the higher level (i.e. the phenomenal level). We do not argue that other levels such as the social level would somehow be less important since the whole explanation requires all the relevant levels.

But make no mistake, even the multilevel explanation of hypnosis need not and should not reach beyond the explanatorily relevant levels. Otherwise we would have to consider an endless sequence of more and more microscopic levels, such as the chemical, the physical, and quantum levels etc., before we would have a full explanation of any higher level phenomenon.

Therefore, multilevel explanations are restricted to the explanatorily relevant levels. Below the lowest explanatorily relevant level, the explanation 'bottoms out'. Above the highest explanatorily relevant level, the explanation 'tops out'. Beyond these levels, there is nothing further to be found that would help us to understand the explanandum. Thus, also the multilevel explanation of hypnosis will also bottom out at some lower level. Our suspicion is that for the NSV it tends to bottom out earlier than for the SV theorists.

Since the NSV theorists argue that the full explanation of hypnosis/hypnotic phenomena is found at the social-psychological and personal level, this means that what they expect to gain from research done at cognitive and neural levels are correlates of ordinary psychological concepts such as expectations, mental strategies, or perhaps neural correlates of extraordinary imaginative abilities. But still, even those correlates are correlates of fundamentally the same type of imaginative abilities as found in any other situation or population rather than anything special to hypnosis.

Thus, since at the neural levels there is nothing truly crucial to be found required for the satisfactory explanation of hypnosis, the multilevel explanation from the NSV viewpoint will bottom out before the neurophysiological levels come into play. If this interpretation of NSV is not correct, then the NSV theorists should tell us what precisely is it that the neural level specifically adds to their explanatory model of hypnosis. There seems to be nothing to be found there that would be unique to hypnosis, therefore the description of the neural mechanisms does not seem to add anything special to the explanation, just as describing the sub-atomic level would not bring anything special or relevant to the explanation of, say, volcanic eruptions or prey-predator population dynamics.

Correspondingly, for the SV theorists there should also be some lower level where the multilevel explanation bottoms out and therefore investigating such lower levels (e.g. single neurons, molecules) would not provide any additional explanatory power and would therefore not be needed when explaining hypnosis.

Thus it can be concluded that NSV theorists regard the neural level as an interesting extra while the SV theorists regard the information from this level as absolutely crucial in order to fully explain hypnotic phenomena. It is crucial because at that level they expect

to find some well-defined phenomenon that is causally potent and unique for hypnosis. Reference to that phenomenon will therefore be necessary when explaining and understanding the special state associated with hypnosis. However, as we noted (Kallio and Revonsuo 2003: 134) so far the SV theorists have not been able to tell how exactly the hypothetical hypnotic state would reveal itself in the context of experimental manipulation, (i.e. how its existence could be empirically either confirmed or falsified).

What is an ASC?

The question of an ASC, trance or hypnotic state has been the centre of the whole state debate throughout its history. Contrary to Kihlstrom (this volume) we consider that one of the main problems of this debate is the persisting lack of a commonly accepted definition of consciousness and therefore, also a similar lack concerning the definition of ASC. As long as different researchers do not have a shared understanding of the concept of ASC, it is difficult to reach the stage at which fruitful discussions about hypnosis and ASC can take place. Therefore it is crucially important to present a clear and explicit formulation of the concept of ASC and of its hypothesized relation to the phenomenon of hypnosis.

We believe that hypnosis research should be integrated with multidisciplinary research on consciousness in general and with the models of other altered states of consciousness in particular. Therefore, we have defined the concept of ASC in such a way that the same concept covers as well some of the most common forms of ASC (dreaming, drug states) as well as the hypothesized ASC of hypnosis. We noted, however, some lingering misunderstandings in the commentaries concerning the definition of ASC. Therefore, we try to further clarify our position.

We defined the paradigmatic baseline state of consciousness as a state where we are awake and perceive the environment and ourselves more or less accurately. In this baseline state the contents of consciousness are modulated by the physical environment and the physical body and therefore consciousness succeeds in accurately representing them. For a state of consciousness to count as an altered state, it must be altered in certain ways in relation to this baseline state (for a comparable view, see Hobson, 2001).

Paradigmatic altered states of consciousness (ASCs) are such that the background mechanisms of subjective experience (i.e. the etiological and constitutive mechanisms; see Kallio and Revonsuo, 2003 or Revonsuo, in press) for definitions for these concepts) are temporarily predisposed to create contents of consciousness that misrepresent or create delusional beliefs about the environment or the self.

One of the crucial points in our definition of ASC is that the purely phenomenal contents of consciousness, the patterns of subjective experience as such, do not necessarily reveal whether the 'state' of consciousness is somehow altered or not (noted also by Spiegel, this volume). This means that since the person who is in ASC does not always know that this is the case, neither the subjective experience as such nor the subject's beliefs or judgements about his/her mental state can constitute the decisive criterion for ASC. As we pointed out, there are paradigmatic cases of ASCs (such as dreaming) where the content of experience may be mundane or where the subject does not recognize her state as an altered state.

Kirsch (this volume) adequately notes that there are two problems when measuring neurophysiological changes in the background state of consciousness. First, since we will probably find some kind of neurophysiological difference between any two conditions, it is crucially important to define what exactly counts as a sufficient alteration. Second, this

alteration has to have a causal role in producing hypnotic phenomena. The AST views this state as ontologically real, as causally efficient, and thus as a necessary part of the multilevel and causal explanation of hypnotic phenomena.

Concerning the neural level changes that would constitute firm evidence for an ASC, it seems too early to tell what these changes might be like. In any case, they should indicate a peculiar state of the background mechanisms of consciousness that cannot be found in the baseline state, not even in simulators or during imagination or after waking suggestions in non-virtuosos. The AST we put forward proposes that if hypnosis involves an ASC, then the emergence of this state should be detectable at the neural level as a difference between the pattern of neurophysiological activity before and after a pure hypnotic induction.

Kihlstrom (this volume) seems to be pessimistic that such a pure state of hypnosis could be found, and he would opt for looking at the neural correlates of suggested changes in the particular contents of consciousness. While we believe it is also important to study the latter type of changes in the contents of consciousness, it is really the former kind of state change that could really settle the issue about a special hypnotic state being involved. Vivid hallucinations do not seem possible in a brain whose state is not somehow unusual to begin with when the suggestion for experiencing the hallucination is given. So far we believe that the neural correlates of the ASC of hypnosis might be found in the changed activity of the frontal areas (e.g. Gruzelier 1998, 2000). However, it is still too early to tell whether the changes so far observed are sufficient proof that hypnosis involves some sort of altered state that falls into the same category as the other, less controversial instances of ASCs.

The second problem is associated with the question of whether there are some phenomena that can only be experienced or detected after a hypnotic induction and in association with the hypothesized change in the brain state. Kirsch (this volume) reveals new data showing that the change in the Stroop effect reported by Raz, Shapiro, Fan and Posner (2002) could also be detected without hypnosis. This is an interesting finding and if it gets further support it clearly shows that hypnosis is not needed to account for the findings. Lynn et al. (this volume) further note that their recent findings show that hypnotic induction hardly adds anything to baseline suggestibility. This question about the difference between baseline suggestibility and hypnotic suggestibility is a complicated issue but has been elegantly analysed by, for example, Hilgard (1973) and we will not go into it in more detail. Furthermore, the studies conducted around this issue have used widely different approaches and criteria when selecting subjects.

What strikes us as extraordinary is the view by Lynn et al. (this volume) that no uniform definition or operationalization of hypnosis or ASC is really even required in science. On the contrary, we believe that progressive and unified research programmes in science can only be based on a clear conceptual foundation that is widely shared in the research community. This is what we find in the more mature branches of science where the most basic concepts (say, 'inclusive fitness', 'gene') are understood in the same way by most if not all of the scientists working in the field. Certainly, such a consensus does not come suddenly, out of the blue, but is usually reached slowly and gradually as the result of decades of disagreement, debate, theorizing and experimentation. If such phenomena as 'hypnosis', 'consciousness', or 'altered states of consciousness' exist at all, then for science to describe and explain them coherently, surely the relevant research community in psychology and cognitive neuroscience should aim at developing an internally coherent and widely shared theoretical vocabulary to make genuine progress in their scientific explanation.

Why use virtuosos?

The proposal brought up by us about focusing on hypnotic virtuosos and case studies is generally seen as too restrictive (e.g. Naish, this volume) and therefore not capturing the whole range of the phenomenon (e.g. Lynn et al.; Spiegel; Woody and Sadler, all this volume). We believe here is a slight misunderstanding of our position. We do not claim that the whole area of hypnosis research could be covered by just studying a few cases of virtuosos.

Instead we suggested using virtuosos and case studies as a model system in hypnosis research because in them, hypnotic phenomena are manifested in an exceptionally prominent form, just like many genetic phenomena are manifested in the fruit fly in a prominent form. As evidenced by the history of biology, a useful strategy to make initial theoretical progress in a relatively new and fuzzy area of empirical research is to utilize model systems. A good model system allows focused and efficient experimental research to be performed on the most interesting phenomena. Furthermore, the model system may lead to theoretically significant observations and insights that would be difficult to reach otherwise. We consider that in virtuosos the phenomena of hypnosis manifest themselves in their clearest possible form and therefore they can be sharply demarcated from other phenomena with which they might otherwise be confused (however, see Wagstaff and Cole, this volume, for a contrary opinion). In hypnosis research the virtuoso as a model system allows easy observation and manipulation of the phenomenon, such as, for example, rapidly changing between hypnosis and baseline while monitoring the brain function of the subject.

Thus the idea behind this approach is that in order to make headway in understanding hypnosis it is useful to begin the research by focusing on subjects where the phenomena are as clear as possible. If we find something interesting in the virtuosos that we can get a proper empirical grip of we should then move forward to study larger groups and non-virtuoso populations. When building further research on the results acquired from studying the model system, it is possible to form empirically testable hypotheses and theoretical principles that guide the field forward. So the use of virtuosos and case studies is just the point at which to start the quest.

AST predicts that there is a change in the 'brain-state' associated with a hypnotic induction (for example, a hand clasp as posthypnotic suggestion to enter hypnosis without any further suggestions, i.e. neutral hypnosis) and that that particular change takes place only in a small proportion of selected individuals. Thus, the way to falsify AST is to show that no such changes take place even in the best virtuosos. If nothing like an ASC can be found even in the most astounding hypnotic virtuosos, then AST can be safely discarded. If something hinting to an ASC is however found, then we need to figure out what it is and whether the same sort of thing can be found in other people. AST predicts that outside the virtuoso population, the same sort of state change is not necessarily found. Instead, the ASC of hypnosis is expected to be restricted to a small fraction of the general population.

The commentators also raise the issue about virtuosos not being a homogenous group (e.g. Woody and Sadler). We agree, and we believe that this variability is another good reason for doing more detailed research on the virtuoso population. Certainly, it might turn out that only a special subgroup of hypnotic virtuosos will show evidence of an ASC. In any case, the virtuoso population should be systematically charted as to their hypnotic abilities and experiences, and then subjected to decisive empirical tests for the presence of an ASC in the brain. It may turn out that the ASC of hypnosis is equally rare as, say,

the altered experiences of genuine synesthesia have been found to be, which are estimated to occur in 1/2000 of the general population. But no matter how rare, if it exists at all, it is a real and important phenomenon, just like synesthesia.

As we previously pointed out (Kallio and Revonsuo, 2003: 146) it is highly important to achieve a phenomenal profile of each virtuoso. However, when doing research with virtuosos it is important to analyse carefully the phenomenal experience and not only the behavioural response. As we and many others have previously noted, the behavioural responses are inadequate as such if they are not associated with the appropriate subjective experience.

Lynn et al. (this volume) regard the claim that ASCs only occur in virtuosos as 'extraordinary'. They suspect that even if such a group of special individuals is found, it might not be anything else than the same small group who experience eidetic imagery. This is an interesting suggestion, and fortunately an empirically testable one at that. A group of individuals with eidetic imagery should be subjected to hypnotic suggestions, and a group of hypnotic virtuosos to visual imagery tasks and tests, to determine whether Lynn's hypothesis holds. However, even eidetic imagery is, in the normal case, voluntarily controlled, and not confused with external reality. Eidetic imagery is still imagery rather than hallucination, and something would have to be added in the hypnotic context to turn the imagery into a vision that is taken as reality. We suspect, however, that if eidetic imagery and hypnotic hallucinations would be manifestations of a single underlying phenomenon or ability, the close coupling of these two extraordinary phenomena would have been noticed long ago and already reported in the literature. As far as we know, there is nothing in the literature to suggest that such a coupling exists.

Kirsch (this volume) raises the question that the clinical usefulness of hypnosis is not restricted only to virtuosos. We want to point out that the clinical usefulness of hypnosis and the theoretical explanation of hypnosis are two different things. If mental imagery, relaxation, suggestions, etc., as used in the already well-established clinical practices, have been found helpful, no future theoretical account of hypnosis can change that fact. Conversely, if an ASC related to hypnosis is found only in the virtuoso population, nothing can change the fact that then the clinical usefulness of hypnosis and the altered state of consciousness related to hypnosis, are based on different mechanisms, and perhaps form two distinct categories of phenomena altogether. Then again, if no ASC will be found even in virtuosos, then the entire range of hypnotic phenomena, including their wide clinical usefulness, can probably be explained with the same type of mechanisms operating across the whole population.

The difference between AST and the current SV and NSV

The NSV views hold that *all* the altered experiences occurring in the context of hypnosis can be elicited without any altered hypnotic state being involved. Correspondently, the SV hold that whole range of altered experiences is associated with some kind of ASC.

This is where the theory we propose, AST, differs profoundly from the two traditional views. AST agrees that socio-cognitive mechanisms might well produce all sorts of exceptionally vivid imagery that alter the subject's experience. AST also agrees that these types of altered experiences do not indicate an ASC because they do not count as genuine hallucinations.

In our view, there is a crucial difference between altered experiences produced by imaginative phenomena that are under a subject's top-down attentional and voluntary control, and genuine hallucinations. We hold that a person cannot, by voluntary effort,

attention, expectation, strategy, or social license, produce vivid, genuine hallucinations, including the firm belief that the hallucinated content is a part of physical reality out there rather than a product of one's own mind. To vividly see an elephant in front of you when in reality there's nothing there, and to earnestly believe that such a creature really is there, requires an altered state of consciousness by definition. Some background mechanisms of consciousness must be working in a highly unusual manner to produce a vivid lifelike percept without any effort from the subject's part, and to have the subject believe that there has been a change in the external physical reality rather than just in one's own mind.

Thus, contrary to the commentators, we do not think that hypnotic phenomena form one smooth continuum. There is a continuum of imaginative phenomena that do not involve any ASC and these cover most of the hypnotic phenomena. And then there are genuinely hallucinatory phenomena that necessarily involve an ASC. Or at least that is the AST hypothesis to be tested: that virtuosos experience genuine hallucinations and that in doing so they are in an altered state of consciousness.

Consider an analogy: dreaming and lucid dreaming are different states of consciousness. Although there is a continuum of reflective thought in ordinary dreams, lucid dreaming is a qualitatively different phenomenon that happens only rarely. Most sleep researchers didn't believe that lucid dreams even exist (but held that the experiences happened during brief arousals from sleep) until a few 'lucidity virtuosos' were carefully studied in the laboratory, where it was possible to show to the sceptics that lucid dreaming exists and is a rare and special state of consciousness that takes place in unambiguous REM sleep, the same neurophysiological context where also ordinary dreams are produced. In the same vein, in hypnotic virtuosos there may be a qualitatively different state of consciousness involved. To test this hypothesis, virtuosos have to be studied in great detail in laboratory conditions. The special state, if it exists at all, surely will never be found by studying large groups of individuals who are not even serious candidates for having it.

When using virtuosos in experimental research, it is highly recommendable to use an adequate reference or control group, such as simulators or low hypnotizables. However, we proposed that it would be even better to come up with experimental designs and tasks that cannot be managed successfully by using only mental imagery, compliance, expectation and the other NSV mechanisms. We are glad to note that Naish (this volume), for example, has carefully considered our suggestions for experimentally testing our theory and gives some constructive criticism concerning the experiment utilizing the 'pop-out' effect. Also, the interesting result about suppressing the Stroop effect by suggestion only (Pollard, Raz and Kirsch, 2003) shows that it is not justified to exclude the NSV mechanisms as playing a role before they have actually been tried out in experimental context. However, we believe that it is possible to come up with experimental designs that would constitute decisive tests of AST. We hope that anyone interested in defending or falsifying AST would contribute to this task.

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Address for correspondence:
Sakari Kallio
University of Skövde
School of Humanities and Informatics
54128 Skövde, Sweden
Tel: +46 500 448824
Email: sakari.kallio@his.se