Inner Speaking as Pristine Inner Experience

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Inner speaking is a directly apprehended phenomenon, not an inference or metaphorical claim about a psychological process. Investigations of inner speaking require a method that carefully explores phenomena as they actually occur. Descriptive Experience Sampling (DES) is our attempt at such a method, and we describe it here, including an annotated case study of its results. DES investigations suggest that many claims about inner speech are hugely mistaken, leading us to conclude that powerful presuppositions about inner speech can lead investigations astray; we discuss the recognition and the bracketing of presuppositions. We suggest skepticism about claims based on Vygotskian or other theory, on introspection, on experimental manipulations, or on questionnaires unless the method used provides a principled rationale for the bracketing of presuppositions. We describe aspects of inner speaking not frequently recognized as occurring: partially or completely unworded inner speaking, multiple simultaneous inner speaking, meaningless inner speaking.

Scientific articles about inner speech typically begin and/or conclude with statements such as these:

> "Introspection reveals that one is frequently conscious of some form of inner speech, which may appear either in a condensed or expanded form." (Martínez-Manrique & Vicente, 2010, p. 141)

> "The little voice inside our head, or inner speech, is a common everyday experience." (Perrone-Bertolotti et al., 2014, p. 220)

> "These are the internal monologues and inward remarks, the silent self-reminders and covert speech rehearsals, the 'little voice in the head' that says what it likes throughout the day. Why do we go on in this way?" (Langland-Hassan, 2014, p. 511)

> "Human beings talk to themselves every moment of the waking day." (Baars, 2003, p. 106)

> "Inner dialog is . . . universal and continuous to human beings, and also one of which they are acutely if not infallibly aware." (Archer, 2000, p. 193)

> "Inner speech is an *almost continuous* aspect of self-presence." (Ihde, 2007, p. 134)

> "It is perfectly certain that the inner hearing or pronouncing or both, of what is read, is a constituent part of the reading of by far the most of people, as they ordinarily and actually read." (Huey, 1908/1968, pp. 117-118)

> "While reading silently, we often have the subjective experience of inner speech, or a 'voice inside our heads'." (Filik & Barber, 2011, p. 1)

> "Most of the time we can clearly hear our voice saying the words in the text." (Rayner, Pollatsek, Ashby, & Clifton, 2012, p. 187)

These statements, as is typical, acknowledge that inner speech is experience that occurs directly-before-the-footlights-of-consciousness, is inner experience that naturally occurs while people go about their everyday activities in their natural, everyday environments. That is, these statements describe inner speech as being instances of what Hurlburt and his colleagues call "pristine inner experiences," which are the phenomena (including seeings, hearings, inner speakings, thoughts, tickles, sensations, feelings, etc.) that effortlessly occur and are directly apprehended by people in their everyday environments. Pristine experiences are

> natural occurrences … unspoiled by the act of observation or reflection. We use 'pristine' here in the same way that we would use it in saying that a forest is pristine: unspoiled by civilization. We recognize that a pristine forest contains things that are clean and dirty, simple and complex, healthy and rotting; however, it does not have the clearcut stumps and plastic bottles that are the signs of human exploitation, and it does not have the park-

> service maps and visitor centers that tell you how to see and therefore interfere with the seeing of what's already there. Likewise, pristine experiences can be simple or complex, clear or messy; we use 'pristine' to refer to experiences in their natural state, not disturbed by the act of observation, unplanned, unmapped, un-'figured out' already, uninterpreted, un-heuristicized real experience (Hurlburt & Akhter, 2006, 272-273).

That is, pristine inner experiences are directly apprehended, not inferred; they are "before the footlights of consciousness," not unconscious or subconscious; they are phenomena, not constructs. Hurlburt (2011, ch. 17) made the provocative claim that although pristine inner experiences are private, they are "radically non-subjective," by which he meant, for example, that at 6:47:12 pm, either Belinda was saying "What's on TV?" in her inner voice, or she was not saying that. Whether Belinda was experiencing such a saying is not a matter of subjective impression (neither Belinda's nor anyone else's), it is a question of direct apprehension: at 6:47:12 either Belinda apprehended herself as innerly saying "What's on TV?" or she did not.

Characteristics of an adequate method

If inner speaking is accepted to be a feature of pristine inner experience at particular moments, inner speaking should be investigated "in genuine submission to the constraints that the endeavor to apprehend moments of experience imposes" (Hurlburt, 2011a, p. 19). For example, one constraint is that "experience changes dramatically and quickly" (Hurlburt, 2011a, p. 24): Belinda's experience at 6:47:17 might well have absolutely nothing whatsoever to do with TV programs or with speaking, both of which had been ongoing features of her 6:47:12 (5 sec before saying "What's on TV?") experience. As a result, a method designed to explore pristine inner experience in high fidelity is constrained, according to Hurlburt (2011a), to identify with precision the moment to be explored.

Hurlburt (2011a) advanced over 100 such constraints that he held are imposed on any method that intends to apprehend inner experience in high fidelity. Hurlburt and Heavey (2015) collapsed that into four main (overlapping) methodological features: (1) identify with specificity the moments under consideration and then relentlessly limit discussion to ("cleave to") those moments (Hurlburt, 2011a); (2) relentlessly focus on ("cleave to") only pristine experience to the exclusion of all else (Hurlburt, 2011a); (3) relentlessly bracket presuppositions about experience (Hurlburt, 2011; Hurlburt & Heavey, 2006; Hurlburt & Schwitzgebel, 2011b); and (4) iteratively train participants (Hurlburt, 2009, 2011a) in the apprehension and description of inner experience.

It is by definition impossible to investigate pristine inner experience without disturbing it to some degree: *pristine* implies *prior to* or *in the absence of* investigation. Our investigative aim should therefore be to disturb minimally and in predictable ways. Metaphorically, this is like parachuting "into a pristine forest and reporting what is there: certainly the parachute landing disturbs some aspects of the forest – small animals scurry to invisibility – but some (many, actually) forest features can be apprehended and described with fidelity" (Hurlburt, in press).

Descriptive Experience Sampling

Our best efforts at submitting to those constraints (at that parachuting into pristine experience) have resulted in the creation and evolution of Descriptive Experience Sampling (DES), a method designed to explore pristine inner experience in high fidelity. We sketch DES briefly here (for more methodological detail see Hurlburt, 1990, 1993, 2011, in press; Hurlburt & Akhter, 2006; Hurlburt & Heavey, 2006; for critical discussion see Caracciolo & Hurlburt, 2016; Hurlburt & Schwitzgebel, 2007; for comparison with other methods see Heavey, Hurlburt, & Lefforge, 2010; Hurlburt, 2011a ch. 7; 2011b; Hurlburt & Akhter, 2006; Hurlburt & Heavey, 2006, ch. 12; 2015; Hurlburt & Schwitzgebel, 2007 ch. 11).

The participant wears a random beeper in her natural environments. The random beep cues her to try to apprehend / pay immediate attention to her inner experience that was ongoing at "the moment of the beep"—the last undisturbed moment before the beep interrupted her—and to jot down in a notebook (or otherwise record) some features of that ongoing experience. Within 24 hours after collecting (typically) six such samples, the participant meets with a team of interviewers ("co-investigators," along with the participant) for an "expositional interview" designed to help the participant provide faithful descriptions of the (six) sampled experiences. The questions in that interview are always some variants and follow-ups of what Hurlburt and Heavey (2006) called the one legitimate question about inner experience: "What (if anything) was in your experience at the moment of the beep?"

Within 24 hours of the expositional interview, one investigator prepares a written "contemporaneous" characterization of the (six) ongoing inner experiences and circulates it to the other interviewers for commentary, amplification, disagreement, and so on. That circulation is designed to honor discrepant points of view; the process might resolve a discrepancy or leave discrepancies, potential disagreements, alternative viewpoints, misgivings, skepticisms, and so on explicitly acknowledged and valued. Thus the "raw contemporaneous characterization" of each sampled experience is *not* necessarily intended to be a high fidelity description of the (six) experiences but rather a messy collection of potentially descriptive bits that *are intended* to reflect the participant's experience with fidelity but are acknowledged to be potentially perspectival, incomplete, distorted.

The natural-environment-sample/expositional-interview/raw-contemporaneous-characterization sequence is iterated (successively improved) over a number of days (typically four to eight). The efforts at moment-cleaving and experience-cleaving, as well as attempts at clarification, disambiguation, question-raising, alternative-exploring and so on, that occurred during the first expositional interview may help the participant become better able to apprehend her inner experience during the second sampling day. Those interview-based undertakings, as well as the confrontations exposed during the messy process leading to the first raw contemporaneous characterization, may help the interviewers be more able to inquire, apprehend, and describe the details of the participant's experience with greater fidelity and/or to be open to alternative understandings (Hurlburt, 2009, 2011 ch. 10). For the same reasons, the participant's third sampling day may be more skillful and the third expositional interview more adequate than the previous day; and so on. On each day, the discussions during the interview and in the preparation of the raw contemporaneous description might clarify something that had been left messy in a previous description ("Oh! *That's* what she meant when she said *X*!"), in which case the previous description might be updated.

When all natural-environment-sample/expositional-interview/raw-contemporaneous-characterization sequences are completed, all interviewers meet for a "characterization review" where they discuss each of the sampled experiences, reawakening the recollection of each

experience, aided by the (perhaps updated) raw contemporaneous characterizations, but now influenced by the close proximity of the discussions of all the other samples. Following this characterization review, each investigator independently writes an informal characterization of the salient characteristics of the participant's experience; thereafter, the investigators create a final salient-characteristic description that reflects all interviewers' joint views as well as each interviewer's individual perspectives. Once experiences have been apprehended and described by these procedures, quantifications may be applied, for example rating each experience on the presence or absence of particular phenomena.

Armed with that brief description, we now discuss some ways in which DES submits to the constraints that exploring pristine inner experience imposes:

(1) Identify with specificity the moments under consideration and then relentlessly focus on ("cleave to") those moments. Pristine experience is evanescent and fleeting, often changing dramatically over the course of a few seconds. Therefore any high fidelity exploration of pristine experience must carefully define temporally the target experience to be apprehended. DES uses a beeper which delivers unambiguous, fast-rise-time beeps. We instruct participants to report only experience that was ongoing at the moment of the beep, to avoid reporting experiences that were prior to or subsequent to the moment of the beep. That is, we instruct participants to cleave to the moment of the beep.

However, we have found that, no matter how precise those physical beeps may be, and no matter how careful or illustrative our instructional exhortations, participants do not initially simply describe events that had been ongoing at beeped moments (that is, they do not cleave to the moment of the beep). Instead, participants report about experiences that happened a few seconds, minutes, hours, or days prior to the beep, or that were after the beep or otherwise in response to it. We have instituted prior-to-sampling moment-of-the-beep training in a variety of ways, none of them successful. The only way we have had success in keeping participants cleaving to the moment of the beep is to use iterative training (see 4 below) across successive sampling days.

Because an instruction such as "report only what was ongoing at the moment of the beep" seems so simple and unambiguous, many sampling studies rely exclusively on such instruction. Our experience, however, is that participants do not, at the outset of sampling, actually follow this *at the moment of the beep* instruction.

(2) Relentlessly focus on ("cleave to") pristine experience to the exclusion of all else. Prior to sampling, we instruct participants in general terms about the nature of pristine inner experience—that it involves only what is directly apprehended at the moment of the beep, and does not include generalities about their own or others' experience, speculations about the cause of experience, comparisons with the experience of others, and so on. We instruct participants to report only pristine experience, to avoid reporting all else. That is, we instruct participants to cleave to experience.

During the first-day expositional interview, participants nearly always veer away from describing such phenomena and instead engage in speculation or generalization. We gently but firmly lead them back to (help them to cleave to) pristine experience.

Furthermore, and perhaps more importantly, the "descriptions of experience" that participants provide in their first expositional interview often reflect their presuppositions about experience more than the experience itself. For example, participants often initially say they had been "talking to themselves" at the moment of the beep, when subsequent investigation suggests that there had actually been no talking (inner or outer) ongoing at that moment.

As in point1 above, because an instruction such as "report only what was ongoing in experience" seems so simple and unambiguous, many sampling studies rely on such instruction. However, most participants do not, at the outset of sampling, actually follow this *only what was ongoing in experienc*e instruction. To recapitulate: despite the apparent simplicity of "report only what was ongoing in experience at the moment of the beep," most participants, at the outset of sampling, both fail to cleave to the moment of the beep and fail to cleave to experience. Studies that do not overcome both failures will be of limited experiential fidelity. The only way DES has had success in such overcoming is to use iterative training (see 4 below) across successive sampling days.

(3) Relentlessly bracket presuppositions about experience.

> A presupposition is a preconception, something that is taken for granted. It is a notion about the world that is so fundamental that it exists prior to critical examination. It is something accepted without controversy as being true, something that shapes perception, behavior, and affect without the fact of that shaping being noticed or recognized. It is an unquestioned manner of relating to the world that chooses what is seen and what is not seen, what is experienced and how it is experienced, so invisibly that what is seen and experienced seems to be the world itself, not aspects of the world selected, shaped, and distorted by the presuppositional process. (Hurlburt & Heavey, 2006, p. 151)

A presupposition is a persistent turning away from evidence that might run counter to the current view, a compulsive assumption that one's current methods are adequate, an aversion to examining or improving one's methods or the skill with which one uses them (Hurlburt & Schwitzgebel, 2011b). Presuppositions are delusions, not merely ignorances; as a result, presuppositions are not overcome easily, and it is nearly impossible to eliminate presuppositions on one's own (Hurlburt, 2011a, ch. 21).

DES uses a host of procedures to aid in the bracketing (setting aside or putting out of play) of presuppositions, including: it chooses moments at random rather than selecting moments based on theory; it uses multiple interviewers trained to value disagreement and constructive confrontation; its investigations are open-beginninged (that is, they do not specify in advance the phenomena to be explored), as are the expositional questions. "What, if anything, was in your experience at the moment of the beep?' is open-beginninged because it invites apprehension of any phenomena without favoring inner speech, imagery, sensation, or any other particular kind of experience (Hurlburt, 2009, 2011; Hurlburt & Heavey, 2006), and because it accepts that people frequently have idiosyncratic definitions or usages of words as they apply to inner experience and therefore takes pains to discover the meaning of all words used in expositional interviews (Hurlburt, 2011a).

We have found that no amount or method of prior-to-sampling instruction is effective in overcoming presuppositions. The only way DES has had success in so doing is to use iterative training (see 4 below) across successive sampling days.

(4) Iteratively training participants. For the reasons that we have foreshadowed above, we believe (with Hurlburt, 2009, 2011) that any method that would attempt to explore inner experience in high fidelity must be iterative: the skills in cleaving to the moment of the beep, cleaving to experience, and bracketing of presuppositions must be acquired as successive

approximations trained on the participant's home turf, using examples of distortions and misunderstandings in the participant's own vocabulary, discovered and explored as they present themselves in the participant's own failure to cleave and/or bracket, successively approximated as the participant gradually acquires skill and reveals additional levels of distortion or avoidance.

As we have described, in first-day expositional interviews participants frequently veer away from the moment of the beep and/or from describing only pristine experience. In constructive confrontations, the interviewer tries to corral the conversation to describing experience at the moment of the beep. This is generally unsuccessful, because the participant did not adequately cleave to experience or to the moment of the beep in the crucial periods just after the beeps sounded. Such on-the-job training typically raises the participant's recognition of the importance of such cleaving; that generally helps participants in the periods just following their second-day's sampling beeps to focus their apprehensions more directly on the experience that was ongoing at the precise moment of the beep; that generally helps participants during the second-day's expositional interview to be able to keep their descriptions closer to that ongoing experience. During that second interview also, when participants do veer away from experience that was ongoing at the moment of the beep (typically less frequently on the second day than on the first), the interviewer again corrals the description to the moment, which again improves the participant's third-day apprehensions, which improves the third-day interviews; and so on across sampling days. DES calls "iterative" the training that leads to this successive improvement in apprehensions and descriptions. (In passing, we note that DES investigations routinely discard first-day descriptions because DES investigators know them to be of very limited validity. A corollary is that we believe that a science that relies on one-shot data acquisition or even repeated data acquisition without iterative training is likely to be of limited validity.)

It follows that an exploration (and the interviews thereabout) must be "open-beginninged (Hurlburt, 2011a; Hurlburt & Heavey, 2006): must start with nothing and gradually, through successive approximation, come to an understanding. This emphasis on open-beginningedness is a corollary to the necessity of bracketing presuppositions: beginning with some a priori emphasis is likely to be a reification of a presupposition rather than a bracketing of it. If you start with the belief that inner speech is ubiquitous, you will likely "discover" ubiquitous inner speech, whether that exploration is conducted by questionnaire, interview, or whatever. If you start with the belief that inner speech is condensed, you will likely discover condensed inner speech. If you start with the belief that inner speech is important, you will likely discover that inner speech is important, but probably for the wrong reasons. If the aim is fidelity, one must start with essentially no view, and let the view emerge, driven by the phenomena. If one starts nowhere, and it *emerges* that inner speaking is important, then phenomena may be discovered that are directly connected to the importance.

Our discussions above show that there is substantial ongoing/evolving discussion/contact between interviewer and participant, and therefore substantial opportunity for influencing the features of the participant's reports. We believe that there is no alternative to this influence: presuppositions are the dragons that guard the entrance to kingdom. However, such discussion/contact creates very real opportunities for the investigators to impose their own presuppositions on the investigative process and thereby substantially influence the results. Therefore, the bracketing of presuppositions processes must be aimed not only at the participant but also (and arguably more importantly) at the investigators.

An example of how an investigator creates progress in bracketing presuppositions without imposing his own presuppositions might be useful. Hurlburt (2011a) described an

interview with "Ahmed," a participant who (prior to participation) believed himself to have frequent inner speech.

> The subject 'Ahmed' said during an expositional interview, "I was saying to myself, 'my girlfriend should buy some bananas.'" The interviewer, noting that people don't generally say to themselves "My girlfriend should ..."— they say the much more natural "Jessica should..."— recognized that Ahmed was probably not quoting himself accurately and therefore asked Ahmed, "Exactly what were you saying?" Ahmed replied, "My girlfriend was on the way to the store and I thought maybe I should call her cell phone and tell her to buy bananas." The interviewer, now noting that Ahmed wasn't responding to the "Exactly what were you saying?" question, asked, "Yes, but exactly what words, if any, were you saying?" Ahmed replied, "I'd like to have bananas for a sundae that evening and Jessica could bring them." That again was not responsive to the "exactly what words?" question, so the interviewer continued to press Ahmed for the details of his experience. Ahmed said he was talking to himself, but he was unable to say exactly what the words were; that inability was frustrating to Ahmed. (Hurlburt, 2011a, p. 60)

Note that the interviewer's questions were *all* aimed *toward* inner speech, *not* away from it—the interviewer never once suggested that Ahmed was *mistaken* about the existence of his inner speech. Instead,

> The interviewer reassured Ahmed by saying, "Sometimes words are present during thinking, sometimes not; either way is OK. We don't have to worry too much about this particular sample—if this phenomenon is important, we'll see it on subsequent sampling days and we can figure it out then." (Hurlburt, 2011a, p. 60)

Eventually, on subsequent sampling days, Ahmed's claims about inner speech fell away. Hurlburt (2011a) claimed that Ahmed's change from reporting inner speech to not reporting it was not the result of some transformation of Ahmed's experience and not the result of the interviewer's discouraging Ahmed from reporting inner speech; it was because the interviewer helped Ahmed apprehend his inner experience with higher fidelity, and under Ahmed's own scrutiny of Ahmed's own inner experience, Ahmed's prior commitment to inner speaking fell apart.

Reflections on the Current Science of Inner Speech

This chapter does not claim that DES is a perfect nor even an adequate method; it does not claim that DES is the epistemic tribunal against which other methods should be judged (see Hurlburt & Schwitzgebel, 2011a). Nor is this chapter an account of what we have discovered about inner speaking using DES (see Hurlburt, Heavey, & Kelsey, 2013 for such an account, including a discussion of why we think the term "inner *speaking*" is a more faithful description of the phenomenon than is "inner *speech*"). However, we do claim that DES is a principled attempt to apprehend pristine experience in high fidelity and that we have applied it over a fairly long haul with genuine and relentless efforts to submit to the constraints that such an effort imposes. In the hope that drawing on our experience using DES might be a contribution to the science of inner speaking, we offer the following comments.

I. The Appeal to Vygotsky

Many modern inner speech investigations are based on the early 20th century work of Russian psychologist Lev Vygotsky. Vygotsky's commentaries are wide ranging, but there can be said to be two main aspects that are relevant here: that his work is *not* based on an attempt to encounter or apprehend pristine experience directly; and that his theory is based on the ramifications of the view that inner speech is a special kind of dialog wherein the speaker and the hearer are the same person.

As far as we know, Vygotsky never attempted to examine inner speech directly; instead, his view of inner speech was the result of extrapolation from his observations of overt language used during child development. Vygotsky observed that children initially acquired speech in dialog with parents and others; that this verbal dialog eventually became employed as the egocentric overt speech of children to themselves, for example, when a child solving a manipulation puzzle says "I want put block here." Vygotsky contends that gradually, across a few years, children stop stating the subject ("I") of such sentences because in their egocentric speech there is no need for the child to specify who wants the block (the child already knows that it is *I* who wants it); as a result, the older child's egocentric speech eliminates the subjects of sentences, thus becoming entirely "predicated" (e.g., "Want put block here"). Vygotsky held that "it is as much a law of inner speech to omit subjects as it is a law of written speech to contain both subjects and predicates" (Vygotsky, 1934/1986, p. 243). Vygotsky understood that because the speaker and the person spoken to are one, such egocentric speech gradually becomes more and more condensed, so that an older child in the same situation might say simply "block." Vygotsky's theory of inner speech rests on the fundamental principle that inner speech is the next step in this condensation of egocentric speech: eventually even the predicate of the sentence does not need to be said aloud, and overt egocentric speech morphs into silent inner speech.

Because the inner speaker is also the inner hearer, Vygotsky also held that inner speech had additional characteristics including a "decrease of vocalization, the preponderance of sense over meaning, and agglutination" (Vygotsky, 1934/1986, p. 248). Vygotsky's "agglutination" is a particular form of idiomatic speech where the speaker creates words by combining two or more publicly understood words into one idiomatically understood word. Vygotsky's "sense" is the idiosyncratic idiomatic understanding of common words. Thus, Vygotsky held that the words used in inner speech do not have the shared meanings that might be found in a dictionary, and as a result, overheard inner speech (if that were possible) would be unintelligible to the overhearer.

However, our DES studies find predication (or other forms of condensation) only occasionally, far less than expected by Vygotsky's law that specifies "predicates only." We find that inner speech usually has vocalization aspects quite similar to that of external speech, unlike the decrease that Vygotsky specifies (Hurlburt, Heavey, & Kelsey, 2013). We find agglutination in the Vygotskian sense *extremely* rarely. We find no more idiomatic sense aspects in inner speech than we do in external speech. In short, we find nothing in our DES studies that supports Vygotsky's claims about inner speech, nothing that suggests any intimate-speaker-and-listener-have-shared-access characteristic that Vygotsky describes. Instead, we find inner speech that is most often in complete sentences. Against the potential criticism that we ourselves are simply blind to Vygotskian characteristics, we believe that our DES studies have been fully open to finding predication and other forms of condensation, but no more specifically them than any other features), and as the Ahmed example above illustrates, the expositional interview relentless clarification of statements about inner experience (including that inner speech is in complete sentences and that inner speaking is condensed) results in the successively approximated bracketing of presuppositions. Furthermore, we have included Vygotskian psychologists among

our expositional interview co-investigators in an effort explicitly to avoid the possibility that DES was inadvertently suppressing reports of the Vygotskian characteristics.

There are theoretical/analytical reasons to question the Vygotsky conclusions, but here we have considered only that his predictions do not conform to what we find when we apprehend inner experience as carefully as we know how to do. As a result, we conclude that an appeal to Vygotsky is not a substitute for a careful examination of pristine inner experience.

II. Discriminations of phenomena

The statements that begin this chapter raise the question of whether inner speech (which is accepted as being nearly universally ongoing) is something that is heard or spoken. Speaking and hearing are very different things that are rarely confused in the real world. Imagine saying "To be, or not to be; that is the question" into a tape recorder; and then playing back that recording. The spoken and replayed instances have the same words, same voice, same rhythm, same prosody, but there is absolutely no question that you spoke the one and heard the other—the fundamental phenomena of hearing and speaking are distinct. And yet, the phenomenon that is referred to as inner speech is with confidence sometimes described as heard (and thereby called "auditory imagery") and sometimes as spoken (and thereby called "inner speech"). Furthermore, there is little or no discussion in the literature regarding the distinction between inner speech and inner hearing. Our research using DES indicates that sometimes inner verbal experience involves the phenomena of (innerly) producing speaking, whereas at other times it is of (innerly) hearing the speaking. Moreover, when adequate care is taken, many if not most people make this discrimination between inner speaking and inner hearing with high confidence, similar to the confidence expressed in distinguishing between the speaking into a tape recorder and hearing your own voice being played back.

A similar observation can be made with respect to unsymbolized thinking (Hurlburt & Akhter, 2008), the experience of an explicit, differentiated thought that does not include the experience of words, images, or any other symbols. Unsymbolized thinking is a directly apprehended phenomenon—as directly apprehended as is inner speech, for example—and is not an inferred concept, construct, or state. Unsymbolized thinking is a distinct phenomenon, not merely, for example, an incompletely formed inner speech or a vague image. Our DES work shows that unsymbolized thinking frequently occurs—perhaps a quarter or so of our samples include unsymbolized thinking (Heavey & Hurlburt, 2008). Prior to 2008, there was little or no discussion of the possibility that unsymbolized thinking might be a frequent phenomenon in inner experience. There is now scientific discussion of the theoretical import of unsymbolized thinking (e.g., Carruthers, 2009; Martínez-Manrique & Vicente, 2015), but as far as we know, no further careful investigation of the phenomenon itself has been conducted except by Hurlburt and his colleagues.

The inner speaking/inner hearing and unsymbolized thinking examples highlight, in our view, the paucity of investigations of experiential phenomena, including inner speaking. A robust science of inner experience will need to attend to these and perhaps many other discriminations among phenomena that otherwise might be inappropriately treated as one or overlooked.

III: Introspection

"Introspection" is a problematic term in science in that it means very different things in different contexts. For example, to what did Martínez-Manrique and Vicente (2010) refer when

they wrote, in the passage cited near the beginning of this chapter "introspection reveals…"? Introspection (often written with a capital *I*) refers to the formal method applied by Wundt, Titchener, and others, a method that was largely discredited by about a century ago; introspection with a lower case *i* refers to a disparate variety of modern efforts including questionnaire and other self-report, casual (the occasional attending to the results of asking oneself, *What am I thinking now?*) and serious (called "self-initiated present-tense first-person targeted judgments" by Siewert, 2011) armchair introspection. Hurlburt and Schwitzgebel (2011a) criticized such efforts, as did Caracciolo and Hurlburt (2016) and Hurlburt (2011a). Here, we note that the results of such introspections typically do not conform to our DES results, as, for example, when Martínez-Manrique and Vicente's introspections suggest the possibility of a high frequency of condensed inner speech. We believe that casual introspection is not to be trusted, for the variety of reasons described elsewhere, but including prominently the failure to bracket presuppositions; the Ahmed example above illustrates how casual introspection rests largely on presuppositions rather than actual experience, and therefore can be substantially mistaken. Investigations that rely on "introspection" should, at a minimum, describe precisely the process or procedures they employed and reasons for believing their procedures were adequate.

IV: Bracketing presuppositions

As we have noted above, a presupposition is a preconception, is taken for granted, and is fundamental. We are blind to our own presuppositions because we take them as beyond question, examination, or even recognition; they operate *prior to* any such consideration. To explore pristine inner experience with the hope of *discovering* phenomena, rather than simply confirming one's presuppositions, one needs an effective process to bracket (put out of play, render inoperative) presuppositions; but such procedures are rare in modern psychology.

Moreover, the bracketing of presuppositions is exquisitely difficult:

> Presuppositions are mini- or maxi-delusions, insidious, recalcitrant foes that operate in everyone's (and that includes my and probably your, dear reader) own personal blind spots (Hurlburt & Schwitzgebel, 2011b).
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> A presupposition is a delusion, not merely an ignorance. Ignorance is simply lacking knowledge; delusion is believing that it is not necessary to know. Ignorance is lacking skill; delusion is believing that one's current skill is good enough. Ignorance is a vacuum whose natural tendency is to be filled up by new content; delusion is hyperbaric pressure whose natural tendency is to resist any new content. Ignorance is created by the universe – we are born ignorant. Delusion is self-created – it arises from some prior (but inadequate) skill acquisition. Ignorance is relatively easily recognized; delusion is stubbornly invisible. Ignorance is easily remedied – practice and training easily align with the forces pressing inward. Delusion is hard and perhaps impossible to remedy – practice and training are actively opposed by the hyperbaric pressure forcing outward.
>
> Delusion makes it seem like you already know what you don't actually know; makes it seem like you don't need to know what you actually need; makes it seem like you are more skillful than you are; makes the important seem trivial; makes the trivial seem important. Delusion always seems reasonable, seems intelligent, seems necessary, seems Right with a capital *R*, seems Good with a capital *G*, seems True, seems Virtuous. (Hurlburt, 2011a, p. 419)

The battle against presuppositions is central to a science of inner experience because the private nature of inner experience is a particularly fertile breeding ground for presuppositional delusions. Caracciolo and Hurlburt (2016) can be read as an extended case study of "the fight to the death" (p. 198) with presuppositions about inner experience. Hurlburt (2011a) can be read as a suggestion of a hundred ways to help bracket presuppositions. Because of the importance of the bracketing of presuppositions but the difficulty in the self-diagnosis of presuppositions, we discuss here four examples of how a reader might acquire glimpses into the existence of his or her own presuppositions: expressing or implying unfounded certainty, presuming that inner experience is unitary and observed, presuming that inner speech is meaningful, and presuming the existence of a single language processor.

Expressing or implying unfounded certainty. The use of over-confident expressions is evidence of the operation of a presuppositions (Hurlburt, 2011a). If you find yourself thinking, saying, or writing phrases such as "certainly," "of course," or "obviously," or "doubtless," it is likely that your presuppositions are operating.

Sometimes, as for example in the statements at the opening of this chapter, that (over)confidence is expressed directly: "it is perfectly certain," "it is universal," "every moment of the waking day," it is "a law." There may be acknowledged limitations (e.g., "most people" or "most of the time"), but the implication, at least to our ears, is that those limitations are meant as exceptions that prove a self-evident rule. Absent from such statements are inquiries about the existence or ubiquity of inner speech, or skepticism about the familiarity with inner speech across people.

Our DES results (Hurlburt, 2011a; Hurlburt & Heavey, 2006; Heavey & Hurlburt, 2008; Heavey, Hurlburt, & Kelsey, 2013) show (a) substantial individual differences in pristine inner experience; and (b) that descriptions of private events can be substantially problematic. Thus we agree with Langland-Hassan in his discussion of the relation of inner speech to auditory verbal hallucinations and reports of "inserted thoughts" in schizophrenia:

> What one person calls "hearing another's voice," might easily be labeled by another as "having someone else's thoughts in my head." And what one patient describes as being somewhat like hearing someone speak might be described by another as being more like experiencing someone else's verbal thought. Similarly, what one person conceives of as a "soundless voice" may be conceived by another as "verbal thought." Nor is there anything in the ambiguous and often conflicting reports of patients that stands in the way of such an assimilation. We must keep in mind both the unusual nature of the phenomena being reported, for which there is no conventionalized terminology, and the wide variability in how people describe their inner experiences. (Langland-Hassan, 2016, p. 676)

Furthermore, our DES results show (c) that the inner experience situation is even more problematic than Langland-Hassan suggests: people are often substantially mistaken not only about the labels they apply but about their own inner-experience phenomena themselves. For example, our own unpublished investigations indicate that at least some of what patients initially reports as "auditory verbal hallucinations" have nothing auditory and nothing verbal about them—there are presences felt or known to be "there," without speech, vocal, or otherwise auditory characteristics.

Nonpatients also frequently describe their own inner experience using vocabulary that does not conform even remotely to Webster. For example, the word "thinking" when applied to one's own experience may well have absolutely no cognitive connotation: when people say "I was thinking" they often mean that they were *seeing*, or that they were *feeling*, or that they were *sensing*, or that they were engaged in some other non-cognitive mode (Hurlburt & Schwitzgebel, 2007, p. 61). As we discuss discussed above, we believe that such mistakenness can be reduced by using an adequate method, including iterative training, but that the scientific (or otherwise) use of such methods is rare. As a result, for the moment we believe that there is little reason to be confident about what is known about inner experience in general and about inner speaking in particular.

Frequently the overconfidence is conveyed implicitly. We examine a typical example:

> Our view on these matters is straightforward. Inner speech exists: It is phonetic in nature, we are consciously aware of it, and we can inspect it through self-perception. However, it does not continue when we speak aloud, because of articulatory suppression. … Perception can monitor either our overt speech or our silent speech, but not both of them at the same time. (Vigliocco & Hartsuiker, 2002, pp. 466-467)

There are, we think, implied *of course*s throughout this passage, as if it had been written:

> Our view on these matters is straightforward. *Of course* inner speech exists: *Of course* it is phonetic in nature; *of course* we are consciously aware of it, and *of course* we can inspect it through self-perception. However, *of course* it does not continue when we speak aloud, because of articulatory suppression. … Perception can, *of course*, monitor either our overt speech or our silent speech, but *of course* not both of them at the same time.

The problem, in our view, is that none of those *of course* statements is actually true, or at least not always true, as best we can say on the basis of our painstaking DES observations. We highlight some of these aspects below.

Presuming the ubiquity of inner speech. *Of course* inner speech exists: We find using DES that inner speech exists *sometimes*, in *some people*, in *some circumstances*; that it is a mistake to assume that it exists in any particular situation.

Presuming the unity of experience and the separation of the experience from the perceiver. As a second example of how the reader might acquire glimpses into the existence of his or her own presuppositions, we note that if you find yourself thinking, saying, or writing phrases that imply that experience is unitary and/or that it is observed, it is likely that your presuppositions are operating.

We continue our example from Vigliocco and Hartsuiker (2002), because it highlights this common presupposition about inner speech. They wrote (with our editorial insertions), "*Of course* we are consciously aware of it [inner speech]…. *Of course* we can inspect it through self-perception…. Perception can, *of course*, monitor our silent speech." To say that "we are consciously aware of it" implies first that there is a unified *it* (the inner speech) that is perceived and second that there is a separation between the *it* and the "I" (the seat of conscious awareness, whatever that is) that is consciously aware of it. Similarly, to say that inner speech is *perceived* (or *inspected* or *monitored*) is to imply that inner speech is a unitary thing created by one mental

faculty which is then perceived (or inspected or monitored) by a separate mental faculty. However, the existence of separate faculties for the creation of and the perception of inner speech should be established, not merely (*of course*) presumed. We think it more likely (or at least possible) that it is better to think of inner speech as a phenomenon that presents itself as itself of itself, or perhaps a coordination of phenomena that present themselves as and of themselves, rather than as a mental event that is observed by some other mental event. That is, rather than inner speaking's being created for the consumption of a separate observer, it is possible or likely that inner speaking is a phenomenon whose phenomenal existence includes inseparably the apprehending.

It is indeed the case that casual introspection seems to reveal inner speech as a unitary phenomenon: when I set for myself the task of producing inner speech so that I can note its characteristics, it does indeed seem I create coherent inner speech. But that kind of on-demand let-me-observe-my-speech-now armchair introspection is not how pristine inner speech usually occurs, and there is reason to believe that on-demand inner speech is not similar to spontaneous inner speech (Hurlburt et al., 2016). Using DES, we have found instances that suggest that inner speaking is the result of multiple functionalities that are often (but not always) coordinated: inner speaking is the merger of words, semantics, intention, prosody, rhythm, and so on that, when all works well, coordinate themselves into a coherent unity.

However, we have seen instances where this easy coordination of the ingredients of speaking does not exist. For example, Hurlburt, Heavey, and Kelsey (2013) described partially unworded speaking:

> Sometimes (not frequently, we think) inner speaking has missing words—"holes" in the stream of speech. For example, a person might describe innerly saying "I'd like a _____ with cream cheese," where the blank is understood to be a rhythmic space for the word "bagel" but the word "bagel" is not itself present at the time of inner utterance. Thus the rhythm of the inner speaking can exist intact even though a word or words may be absent. This seems to be different from external speech, which generally breaks off when a missing word is encountered. (Hurlburt, Heavey, and Kelsey, 2013, p. 1483)

We have also seen (infrequent) instances where the experience is of speaking yet no words at all are experienced; if this seems impossible, consider this thought experiment: Does the hole in "I'd like a _____ with cream cheese" seem plausibly an inner speaking with a missing word? If so, then does a two-hole example see possible: "I'd like a _____ with _____"? If so, then an example with all holes should seem possible; Hurlburt, Heavey, and Kelsey, 2013) call that unworded inner speaking: there is the experience of speaking, but there are no experienced words. Unworded inner speaking is distinct from unsymbolized thinking: unsymbolized thinking does not involve any experience of speaking (Hurlburt & Akhter, 2008).

That example calls into question another aspect of inner speech that Vigliocco and Hartsuiker take for granted: *Of course* "it is phonetic in nature." DES shows that sometimes (when it is unworded) inner speaking is not at all phonetic. Sometimes inner speaking is phonetic but in surprising ways, for example, when a person describes that she was speaking in her own voice except that the pitch that is substantially higher than her own natural speech, or that she was speaking in her own voice but its characteristics were that of Bob Dylan's voice (See Susan 7.7 below).

Presuming that inner speech is meaningful. As a third example of how the reader might acquire glimpses into the existence of his or her own presuppositions, we note that if you find yourself thinking, saying, or writing phrases that presume that inner speaking is meaningful (that *of course* inner speech conveys an intended meaning), it is likely that your presuppositions are operating.

DES shows that inner speech is not always as directly connected to meaning as is usually assumed. For example, Smith (1990) reported the experience of what she called "word repetitions," where "Sonja" was innerly speaking words or fragments of sentences that might have been meaningful a while earlier, but now were being mindlessly repeated. For example, at one moment she was innerly saying "I have never wanted" but had no idea what was wanted or what the genesis of that fragment had been. Sometimes Sonja could reconstruct the genesis of a word repetition; for example, she was innerly saying "lunch bag" which she could trace back to having thought about *tea* bags a while earlier. The corruption of *tea* to *lunch*, like her other word repetitions, "assum[ed] a life of their own without her conscious control,… seemed to undergo changes and deviations that were not directed by her but 'just happened'" (Smith, 1990, p. 118).

As another example, Caracciolo and Hurlburt (2016) discussed the experience of "Alex" while reading Kafka's *The Metamorphosis* in a DES study. Alex innerly spoke the text while he was reading it, but whereas he innerly spoke the printed words as he read, he did not experience himself as speaking meaningful words. He innerly spoke; from an external perspective he innerly spoke words; from Alex's perspective he innerly spoke meaningless pronunciations that had no more semantic structure than had he said "pwipsie durasiot, ek stolt hiftral worf" (Caracciolo & Hurlburt, 2016, p. 42). His inner speaking, for example, was devoid of signs of meaningfulness: for example, there was no natural inflection, no pause for comma or period, no rise (or pause) when encountering a question mark, and so on. Alex understood what he was reading, but that understanding was not reflected in the slightest by the *inner speaking* while reading.

Presuming the existence of a single language processor. As a fourth example of how the reader might acquire glimpses into the existence of his or her own presuppositions, we note that if you find yourself thinking, saying, or writing phrases that imply the existence of a single language processing system, it is likely that your presuppositions are operating.

We continue our example from Vigliocco and Hartsuiker (2002), because it highlights this common presupposition about inner speech. They wrote (with our editorial insertions), "*Of course* [inner speech] does not continue when we speak aloud because of articulatory suppression…. Perception can, *of course*, monitor either our overt speech or our silent speech, but *of course* not both of them at the same time." That implies the existence of one language processor, which if occupied with one linguistic process cannot entertain another. The single-linguistic-processor supposition is widespread; for example:

> If inner speech is to be used in cognition *it must be processed*, as any other representation in mind. Yet inner speech can only be processed by the linguistic processor. No other system in the cognitive architecture is capable of taking linguistic items as input. The consequence is that if we use inner speech to serve some further cognitive purpose, we have to exploit the computational resources of the linguistic processor. (Martínez-Manrique & Vicente, 2010, p. 160)

However, DES shows robustly, we believe, that it is indeed possible to speak aloud one thing and speak innerly quite a different thing at the same time. Here is an example from our DES studies:

> Abigail sample 4.3: Abigail was talking on the phone to a friend. At the moment of the beep she was passively, innerly saying to herself, "that's what's going to be best." She was simultaneously saying aloud to her friend: "I'm trying to be better for me."

Those two simultaneous utterances are not recastings of the same thought in two different phraseologies; the inner speaking is not merely a premonition or practice for what is about to be said aloud. Those speakings might be said to be orthogonal—proceeding in different directions from each other. This is not a rare occurrence in our DES studies; we have examples of: one inner speech experienced in the front of the head while another (orthogonal) speaking is experienced as being in the rear of the head; two inner speakings simultaneously experienced in the same cranial locale; a complete-sentence inner speaking simultaneous with a partially unworded inner speaking; an inner hearing of one sentence simultaneous with an inner speaking of another; and so on. Here are a few examples:

> Belinda sample 2.2: Belinda was in her kitchen and was listening to the TV. At the moment of the beep she was innerly saying: "What's on TV?" in her inner voice while simultaneously saying: "Chocolate News" in her inner voice. She had begun innerly saying "what's on TV" slightly before "Chocolate News" such that her inner saying "…on TV" was overlapped with her inner saying "Chocolate News."

> Cedric sample 4.5: Cedric was innerly speaking the word "tradition?" with a tone of making fun of or mocking the director of a TV show he had been watching. Cedric was also innerly speaking many other phrases simultaneously that had to do with his belief that the way the TV show had told the story was incorrect, or foolish, for example, "that's not possible," and "doesn't make sense." There were more than five of these phrases being spoken simultaneously, but he could not write fast enough to capture all of them.

> Dana sample 3.5: Dana, a nursing student, was speaking with a fellow student, Sharissa who was learning how to take a blood sample. At the moment of the beep, Dana was telling Sharissa (aloud): "Squeeze the finger to where it turns red, kind of purplish, so you have a lot of blood when you poke it." Simultaneously, Dana was innerly saying to herself, "the finger has to turn reddish or purplish for blood to gather up." Dana was more focused on what she was innerly saying than what she was saying out-loud. She was innerly saying it to herself in her own voice as if she were reading it from a book, as if someone were supplying the words to her.

> Melanie sample 6.4 (described in Hurlburt & Schwitzgebel, 2007, pp. 206-217): Melanie was innerly hearing several overlapping "echoes" of the phrase "nice long time" from a recently completed (but no longer ongoing) episode of inner speech. That is, "nice long time" overlapped with "nice long time" overlapped with "nice long time" and so on, each starting independently or asynchronously.

(Melanie 6.4 is another example of a meaninglessness of inner speech/hearing. "Nice long time" had at one time been meaningful: Melanie had been cleaning flower petals from the countertop and had innerly spoken "They [the flowers] lasted a nice long time." But now, at the moment of the beep, there was no meaning remaining in the overlapping echoes.)

In our sampling, such multiple inner speakings are relatively infrequent but decidedly nonzero; we mention these examples because we wish to emphasize the importance of presuppositions, and one important, widely held presupposition is the belief that there is one thought at a time, that there is one linguistic processor—even if it is true that there is a single underlying neural language system, that would not necessarily preclude the possibility that that system could support multiple, simultaneous, asynchronous inputs and outputs. However, such possibilities are not frequently encountered in the literature—it requires something like DES to remind us of such possibilities.

Presuppositions, like all delusions, are worthy adversaries, masquerading as virtue, stubbornly resisting discovery and modification. But unless they are effectively bracketed, they will destroy the ability to apprehend inner experience with fidelity. For tips on how to proceed, we recommend Caracciolo and Hurlburt, 2016; Hurlburt, 2011a; Hurlburt and Heavey, 2006; Hurlburt and Schwitzgebel, 2011b. We happily acknowledge that our own DES investigations are endangered by our own presuppositions, to which we ourselves would (*of course*) be blind. We can say that we have taken extraordinary measures to bracket those presuppositions, but cannot claim to have been successful. Replication by others is required.

Here we have discussed a few of the presuppositions that must be bracketed if one is to apprehend inner experience in high fidelity. This discussion is far from compete—we think that there is no list of presuppositions that can be specified a priori—presuppositions take us by surprise. The general skill is that one has to bracket presuppositions about *whatever* arises, to be indifferently open to surprises or impossibilities. And for the purposes of the discussion in this chapter, it is worth emphasizing that when a person in good faith asserts that she was "saying to herself" *X*, anyone who wishes carefully to apprehend pristine experience should happily recognize the likelihood that there were no experiential words ongoing, was no experiential speaking ongoing.

V. Indirect Methods of Investigating Inner Speech

Given the difficulties involved in investigating pristine inner experience adequately, including that it is private, the science of inner experience often attempts to sidestep these difficulties by conducting behavioral investigations that do not require descriptions of inner experience. We consider two typical examples. Geva et al. (2011) used a task where aphasia patients were required to determine, without speaking the words aloud, whether words rhymed. For example, "bear" and "chair" rhyme even though they are orthographically different, whereas "food" and "blood" do not rhyme even though they are orthographically similar. "This allowed us to determine whether patients are using their inner speech or resorting to an alternative cognitive strategy, in this case, solving the task using orthography" (Geva et al., 2011, p. 3074).

In our second example, Oppenheim and Dell (2008) used a tongue twister task: (1) Cue words such as "LEAF REACH" appeared on a computer screen. (2) In synch with a 1-Hz metronome, the participant was required to say aloud four repetitions of "leaf reach," pausing between repetitions. (3) Then the cue words disappeared (the presumption is that the participant has memorized them by now) and one of two cues appeared on a screen: a picture of a mouth indicated that the participant was to recite the words aloud, or a picture of a head indicated that

the participant was to recite the words internally. The cue words reappeared in a small low-contrast font, and the metronome now became faster (2-Hz). The participant was now to attempt to recite "leaf reach" four times, pausing for four metronome beats between (aloud or internal) utterances. Then the participant gave an oral (aloud) error report (e.g., ''Oops, I said REEF LEECH instead of LEAF REACH''). This is Oppenheim and Dell's *Conclusion*:

> The little voice inside your head[1] has much in common with articulated speech. Just like overt speech, inner speech has speech errors in it, and these errors exhibit one of the most important error effects, lexical bias. But inner speech is also different from overt speech. Perhaps because inner speech lacks articulation, it is also impoverished at the featural level. Poor generation of features during the "production" of inner speech or poor sensitivity to features during its "perception" eliminated the effect of phonemic similarity on slips. Ultimately, we can understand inner speech as a form of mental imagery. Although images are much like the real thing, they are also more abstract (Pylyshyn, 1981) and less ambiguous (Chambers & Reisberg, 1985). In the speech domain, this translates into representations that emphasize lexical and segmental properties, rather than featural and articulatory ones." (Oppenheim & Dell, 2008, p. 535-536).

<<<Begin footnote 1:>>> Continuing the important theme of the bracketing presuppositions, we note that Geva et al.'s reference to "using *their* inner speech" seems to be another exemplar of the confidence described above: this seems to assume that (all) people experience inner speech in everyday situations (that is, it is part of their pristine experience); what is in question is only whether it is used in the rhyming task. The same confidence is demonstrated by the reference to "the little voice inside your head" in Oppenheim and Dell (2008), which seems to imply that you (and, therefore, presumably everyone) do experience inner speech in everyday situations (that is, that inner speech is part of everyone's pristine experience). Reviewers have disagreed with our interpretation, holding that the Geva and Oppenheim statements assume only that most people will have some idea what is meant by the terms "inner speech" and "little voice in the head"—not that everyone experiences lots of it. Unpacking this seems useful from the standpoint of bracketing presuppositions about inner speech.

Had Geva written "This allowed us to determine whether patients are using inner speech or orthography," then inner speech and orthography would be given equal likelihood, equal prominence. The experiment would have to determine whether the patients had inner speech, and, if so, whether they used it; and the experiment would have to determine whether the patients had orthography, and, if so, whether they used it. But instead, Geva wrote "This allowed us to determine whether patients are using *their* inner speech or *resorting to an alternative* … strategy,… orthography." This sentence is constructed grammatically parallel to "This allowed us to determine whether stroke patients are using *their* hands or *resorting to an alternative* … strategy,… feet"; in such constructions, what follows the *their* (hands or inner speech) is assumed *of course* to be the usual dominant strategy. The only experimental question is whether they use their dominant strategy in the experimental situation. Thus we take Geva to be assuming that inner speech is the dominant strategy.

This is an important issue, because our DES results suggest that many people (a quarter? a third?) use inner speech rarely if at all in their natural environments. It seems dramatically

misleading, and reflective of a common but probably not true presupposition, to ask whether they use *their* inner speech to perform some experimental task.

<<<End Footnote 1>>>

These studies assume that inner speech in natural environments (that is, pristine inner speech) is the same phenomenon as the inner speech performed when required (in a laboratory) to make judgments about rhymes or to recite tongue twisters while the twister itself is printed on the screen. The inner speech process may be the same in all those situations, but at best that is an assumption that needs to be verified. Hurlburt, Alderson-Day, Kühn, and Fernyhough (2016) provide a DES/fMRI example that questions that assumption. Brain activations were recorded when inner speech was experimentally elicited (e.g., when the participant was requested to innerly "Say 'elephant'") and when inner speech happened to be ongoing at the moment participants were signaled by a DES beep. The task-elicited inner speech was associated with decreased activation in Heschl's gyrus and increased activation in left inferior frontal gyrus, but the spontaneous inner speech had the opposite effect in Heschl's gyrus and no significant frontal gyrus effect. That was a small study which requires replication, but it does suggest the desirability of being skeptical about the identity of task-elicited and spontaneously occurring inner speaking.

Thus we think that the rhyming task performance, for example, indicates that people can innerly deploy phonological processes, but that performance does not indicate whether those phonological processes *are* inner speech (as Geva et al. seem to imply), are *always part of* inner speech, are *sometimes part of* inner speech, are separable processes *independent of* inner speech, or are part of inner speech for some people but not others. Indirect methods such as these experimental manipulations can perhaps shed important light on pristine inner phenomena such as inner speech, but they should not be considered to be direct investigations of pristine phenomena, nor should any results be extrapolated uncritically as directly reflecting the phenomena of pristine inner experience.

We note that we are not focusing our discussion particularly on Geva et al. and Oppenheim and Dell. We cite those studies because they are exemplary; they illustrate what we take to be common themes in the investigation of inner speech that we believe deserve substantial skepticism.

VI. Questionnaires and non-DES experience sampling

Much research on inner speech is conducted using questionnaires such as the Scale for Inner Speech (SIS; Siegrist, 1995), the Self Talk Inventory (STI; Burnett, 1996), the Self-Talk Use Questionnaire (STUQ; Hardy, Hall, & Hardy, 2005), the Self Talk Scale (STS; Brinthaupt, Hein, & Kramer, 2009), and the Varieties of Inner Speech Questionnaire (VISQ: McCarthy-Jones & Fernyhough, 2011). Hurlburt and Heavey (2015) were critical of questionnaires as measures of inner experience because, they claimed, experience inheres in moments but the moment is not clearly defined in questionnaires; people may not apprehend the characteristics of their own ongoing inner experience; even if they do apprehend their experience at some series of moments, the problematics of retrospection makes it likely that those experiences are not reported accurately; people do not use shared meanings of words that describe inner experience (Hurlburt & Heavey, 2001); rating scales are not used consistently across participants, and participants are likely to report their presuppositions about experience rather than their experience itself.

Experience sampling techniques such as the Experience Sampling Method (ESM; Csikszentmihalyi, Larson & Prescott, 1977) and Ecological Momentary Assessment (EMA; Shiffman, 2000) use a signal in the natural environment in attempt to improve on questionnaire measures by increasing ecological validity, identifying the moments to be examined, and reducing the retrospections by requiring participants to fill out brief questionnaires immediately following the signal. However, Hurlburt and Heavey (2015) point to DES results that show (and as we have discussed above) that DES participants do not typically report experience that was ongoing at the moment of the beep, even though carefully instructed to do so, until they have received iterative training; and they are skeptical that such sampling methods can overcome presuppositions, making it likely that participants in ESM and EMA studies will report presuppositions rather than ongoing experience.

Apprehending in High Fidelity: A Case Study

We present here a case study as (a) an example of the fidelity required when apprehending inner speaking; and (b) of the kinds of inner speaking that actually occur and which therefore must be taken into account by any theory of inner speaking that wants to be consistent with first-person phenomenology. "Susan" was a 25-year-old female participant in the DES/resting-state functional MRI (fMRI) study by Hurlburt, Alderson-Day, Fernyhough, and Kühn (2015); a few of her in-scanner samples were described by Hurlburt, Alderson-Day, Fernyhough, and Kühn (2017). We (all the interviews were led by RTH; four other investigators were singly or multiply present for all sampling days) sampled with Susan on four days in her natural environment (six samples each day; discarding the first day leaves 18 natural-environment samples) and nine DES sessions in an fMRI scanner (four samples each session, 36 total samples).

Seven of Susan's 18 natural environment samples (39%) included instances of inner speaking; similarly, 14 of her 36 in-scanner samples (39%) included inner speaking. On a self-report questionnaire administered prior to sampling (the Nevada Inner Experience Questionnaire; Hurlburt et al., in preparation), Susan indicated that she believed about 90 percent of her inner experience involved inner speaking.

Sample	Experience	Commentary
8.7	At the moment of the beep Susan was innerly seeing her hand breaking away from her dad's hand. Her hand was small (perhaps representing when she was about 13 years old); she saw the back of the hands with the thumbs on the bottom, her hand was moving slowly to the right away from her dad's hand. At the same time Susan was innerly speaking in her own voice "it's natural, she's growing up." Susan was feeling how her dad would have felt when she stopped holding his hand: the words somehow reflected this feeling process. The words were in her voice,	This is a straightforward instance of inner speaking. Note that it is a complete sentence, with no Vygotskian condensation. The possibility exists that the interviewers or that Susan herself were insensitive to condensation (that is, that the interviews were of low fidelity from the perspective of condensation). However, some of the co-investigators were from the Vygotskyian tradition, and…

	not his, and were clear [the feeling is hard to describe].	
5.8	Before the beep Susan was thinking about Ben, and that he looks like a happily married being-taken-care-of guy. Susan was saying to herself the complete sentence (except perhaps the article "a" is missing) "He seems happy in a young marriage." She felt happiness-in-a-young-marriage; she felt this in her—that is, it was her own happiness-in-a-young-marriage feeling—but she recognized that it was for him, a reflection of what she took him to feel.	…this sample is sensitive or perhaps hypersensitive to the possibility of condensation (trying to be careful about the elimination of the article "a"). Article elimination, however, is not the kind of condensation Vygotsky described. Regardless of the condensation, this and the previous example illustrate straightforward inner speaking of the kind that many commentators presume is ongoing.
6.3	Susan was recalling asking RTH a few questions prior to being scanned. Now Susan was innerly saying "[It's] nice to be the interviewer." Simultaneously Susan was innerly hearing the REM song "Ignoreland" as it was originally performed, with vocal and accompaniment.	This is an example of predication as Vygotsky defines it: the subject "It's" has been omitted in Susan's inner speech. This is a bit of evidence that the sampling process was not tilted against Vygotsky. Also, this could be taken as an example of two simultaneous ("orthogonal") verbal processes: an inner speaking and an inner hearing including words.
5.6	Before the beep Susan had noticed that her chest was tight, taken a deep breath and exhaled, and now was feeling a bit calmer. She was now innerly saying to herself "Is a tight chest my calm?" and then was continuing to think without words or symbols *Is this something I should have said all along?* The inner saying is in a soft voice, almost *sotto voce*, and an almost declarative tone even though it is a question. Susan was much more focused on the question than she was on the bodily sensation in her chest, which mostly occurred prior to the beep.	*Is this something I should have said all along?* is an instance of unsymbolized thinking. Commentators sometimes discredit unsymbolized thinking on the basis that is merely a participant's idiosyncratic way of describing inner speech. Here, inner speaking and the continuing unsymbolized thinking occur in the same sample from the same participant—clearly Susan is capable of describing inner speaking.
3.5	Susan, from the window, had just waved goodbye to her partner as he walks across the garden. At the moment of the beep Susan was thinking that he knew she was going to wave: How did he know that?—Was it	This is another instance of unsymbolized thinking, this time occurring as the main aspect of experience.

	her body language when he left?—etc. There were no words to this thinking, but it is clearly a specific thinking. At the same time Susan was feeling happy/light, a lightness to her step as she walked away from the window.	
4.1	Susan had just text-messaged a friend; that is, she had just typed the response. Now Susan was reading it over: Was it nice? Would she receive it well? Susan was reading the words to herself in her own voice, "brushing over" the words, that is, vocalizing some aspects of them—rhythm, intonation, etc.—without saying the actual words. She had half-way believed herself into the role of editor, pretending to be an editor, as if reading it from a different standpoint to discern whether the words were believable, whether they reflected a caring standpoint. This seems to be a mental process—that is, Susan was not feeling a reaction to the words.	This "brushing over" involves condensation, but it is the opposite of what Vygotsky proposed. Vygotsky believed the rhythm, intonation, and so on would be reduced, but here those aspects remain intact while the words disappear. One might speculate that such brushing over occurs only when reviewing written words. Perhaps that is the case. Here, we simply notice that that potential explanation exists only because of the careful apprehension of pristine experience on multiple occasions. The validation of such an explanation requires further instances.
7.7	Susan was singing a Bob Dylan song and had gotten to the word "Aeroplane," which Dylan says in a cute way. Susan was doing the singing, but the voice was Dylan's. Susan was also paying a bit of attention to the odd/even nature; she has been doing the entire sentence in odd/even. She minorly hears the accompaniment.	Inner speaking is generally held to take place in one's own voice, but in this example, it is Susan who sings, who is the agent and creator of the inner action, but the voice created is not her own. Note that this is *not* merely experienced as an inner hearing of Dylan's voice, *not* merely experienced as an imitation of Dylan's voice; Susan is experientially singing and the voice is Dylan's. (About odd/even, see below.)

The above examples illustrate the semantically connected nature of inner speaking. The inner speakings can be condensed, but still they are sentences that seem to express thoughts; in this regard, they are the kind of inner speakings contemplated by most who theorize about inner speech.

The examples that follow illustrate a substantial disconnect between inner speech and the semantic nature of speech.

Sample	**Experience**	**Commentary**

4.5	[Susan was coming home, and at the bottom of the stairs she noticed that the walker that is usually chained there is gone.] At the moment of the beep Susan was saying to herself in her own inner voice, "Where's the old man?" but she was not asking herself a question or trying to answer it—she already knows the answer: he's in hospital. This is simply being said/asked without a connection to the saying/asking. She feels some sadness/empathy (for the wife)/curiosity, which is a mental experience.	This inner speaking has the linguistic structure of a query, but that structure seems to have little direct attachment or connection to any meaningful thought process. Much as the greeting "How are you?" is typically more a verbal gesture that acknowledges familiarity than an overt inquiry that matches a thoughtful interest in health, "Where's the old man?" is more a verbal gesture than a meaningful communication (whether to self or other). It is as if the word-generating apparatus is operating, takes its input from the surroundings, and then emits an inner utterance whose linguistic structure does not connect with an underlying thought process. The condensation here is backwards from Vygotsky, who held that the words were condensed and the meaning was intact. Here the words are intact (it is indeed a complete sentence) but the meaning is relatively condensed.
3.4	[Susan is at a friend's house sitting on her bed. iThe friend was out of the room for a moment and Susan's eyes fell on a sign that says "Willkommen in Berlin."] At the moment of the beep Susan was "saying 'Willkommen'." "Saying" has a specific idiosyncratic meaning for Susan in this sample and elsewhere: "*Saying*" refers to repeatedly and seemingly automatically *spelling* the word forward and backward: "double – i – l – l – k – o – m – m – e – n – n – e – m – o – k – l – l – i – double – double – i – l – l –…" and so on.	This "saying Willkommen" is articulated quickly and fluidly, so quickly that the saying of the letters "almost becomes" the saying of the word. In the saying there is no pause; the letters run-on even when wrapping around the beginning or the end of the word. Note that Susan says "double" instead of "doubleU" because, she says, "'doubleU' is very clumsy." The inner speaking here is related to the current external world (the sign says "Willkommen"), but if there is any semantic relationship, it is certainly very different from what is usually contemplated when imagining inner speech. Note that Susan led off the interview by reporting, matter-of-factly, that she had been "saying Willkommen" at the moment of the beep. It is only through a careful interview process that requires disambiguation of everything, including

		common words such as "saying," that we discovered Susan's idiosyncratic usage.
6.5	Susan was innerly "saying defence" (that is, saying "d – e – f – e – n – c – e – …– e – c – n – e – f – e – d…") while stressing/focusing in alternation her left side and right side. She started on odd (left) and ended on right (even). The emphasis is mental and bodily primarily in the hands, feet, and head.	The word *defence* is "even," according to Susan, in that it "ends on the right" of the left-right sequence. This "saying" has the same semantic disconnection from the usually contemplated inner speech as was described for "Wilkommen" in sample 3.4.

These descriptions show that Susan's inner speaking has characteristics that might be surprising or unusual: She sings in someone else's voice (we have seen other examples where people speak in another's voice, so this is not unique to singing); she speaks a sentence whose meaning is mostly disconnected from the linguistic structure (cf. Sonja "I have never wanted" above); she treats words as reversible strings of letters; she focuses on odd(left)/even(right)ness of words that she innerly or outerly speaks. Should we believe that those descriptions are faithful accounts of Susan's experience? That, of course, is a central issue; we refer the reader to Hurlburt, 2011a; Hurlburt and Heavey, 2006; Hurlburt and Schwitzgebel, 2007; Caracciolo and Hurlburt, 2016; and Hurlburt et al., 2017. But to lend some insight into the nature of fidelity, we note about the *defence* sample 6.5 that the multiple interviewers present for this sample could not agree on one aspect of this sample: some interviewers believed Susan indicated that there was a rhythmic space or rest/breath after the last-letter-of-the-word *e*, which allows for the stresses to occur as if as eighth notes in musical 4/4 time, with an emphasis on the first of each pair of eighth notes; however, Susan was certain that the word was even, and inserting the space would make the word odd (unless a similar space was inserted after the last-letter-of-the-backwards-word *ecnefed*). Other interviewers held that Susan indicated that there were no intercalated spaces—that one saying was a 14-letter series with no spaces and therefore ending even/right. Therefore we happily acknowledge that the description is not perfect. By the time the full discussion was completed in the interview, there were far too many confounding influences to be confident that Susan was still reporting experience at the moment of the beep and not the results of reconstruction. However, we are quite confident that Susan was "saying defence," and that that "saying" involved reciting letters forward and backward, and that there was a simultaneous odd/left and even/right sense. Of course there are alternative explanations, such as (as Carruthers, 2009, might say) that *nothing* was ongoing at the moment of the beep, but in swift response to the beep (which is to say, *after* the beep), Susan created the experience of saying *defence* with its odd-even nature. We cannot defend against such arguments except to say that we are happily open to that possibility; that we try to investigate it as carefully as we know how; that we cannot find any evidence in favor of it; and if such arguments are to be accepted, then one should radically excise *all* first-person reports, including self-introspection, from science.

Perhaps you are thinking that because Susan's inner speaking is unusual, it can be safely ignored by a theory of inner speech. To the contrary, we believe that, unusual or not, any theory of inner speaking must incorporate Susan's kind of inner speaking (assuming that the fidelity of the report is accepted and/or can be established by replication). That this kind of inner speaking has not been contemplated in prior accounts reflects, we think, a relative lack of fidelity of

exploratory method and/or judgments about inner speech based on inadequate samples (perhaps only on self-observation).

We also note the absolute inability for existing questionnaires or usual experience sampling methods to discover such features of Susan's experience, because none of those methods contemplate important features of her experience: speech disconnect from meaning, mindless forward-backward letter naming, and so on.

Discussion

We have argued that many researchers state characterizations of ongoing natural undisturbed ("pristine") inner speech, but that many of those characterizations are hugely mistaken, dramatically over-estimating the frequency of inner speaking, under-appreciating the variety and details of its phenomena, and confounding inner speaking with other related or disparate phenomena. We believe that understanding pristine experience, including inner speaking, is an important component of the science of psychology, and therefore that a mature science of inner experience (and therefore a mature science of psychology) must come to grips with our claims about mischaracterizations of pristine inner experience, either by discrediting them or developing ways to extend, delimit, or otherwise refine them.

The arenas in which explorations of pristine inner experience must take place are defended on all sides by the dragons of presuppositions, which are indeed formidable foes, at first invisible, then seemingly irrelevant, then masquerading as virtue (Caracciolo & Hurlburt, 2016; Hurlburt, 2011a; Hurlburt & Heavey, 2006; Hurlburt & Schwitzgebel, 2011). We ourselves are of course vulnerable and blind to our own presuppositions; it is perhaps we who are mistaken: the use of DES does not guarantee that our apprehensions and descriptions are of high fidelity or that the conclusions based on those apprehensions are appropriate. Yet whereas we happily accept our own fallibility and the lack of a DES guarantee, we have taken substantial pains to bracket our own presuppositions and to apprehend inner experience in high fidelity, so we believe that the claims we make deserve to be taken seriously. Certainly science should be skeptical of our claims, should attempt to replicate or dispute them in a variety of ways and from a variety of perspectives. But in the meantime, we think we have advanced a sound enough argument to suggest that science should be reluctant to base its conclusions about pristine inner experience on casual introspection, on questionnaires, on sampling that does not somehow provide a rational (probably iterative) procedure to bracket presuppositions, on inferences from experimental manipulations.

We are not suggesting a blanket criticism of those methods—they may indeed have great utility in validating (or invalidating) characterizations of pristine provided by DES or other methods that seek to explore inner experience in high fidelity. Our suggestion is that science has in recent history, particularly in regard to experiential phenomena, put too much emphasis on experimental manipulation and questionnaires and not enough emphasis on careful investigation of pristine phenomena. The investigation of phenomena is difficult, and, as we have said, fraught, but we believe that science cannot avoid it, and instead should develop methods of exploration and independent methods of evaluation of the fidelity of descriptions of inner experience (Hurlburt, Alderson-Day, Fernyhough, and Kühn, 2017, have discussed one way of evaluating fidelity.) In the meantime, science should be conservatively wary of providing or endorsing descriptions of pristine inner experience unless those descriptions are based on rationally sound methods.

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