I suggest that a dysfunction in the reticular thalamic nucleus does not explain all the findings in the schizophrenia literature. I propose that a mechanism, which I refer to as "dynamic modulating equilibrium" and which mediates the balance between afferent stimulation and intrinsic activation, is faulty. This dysfunction leads to a shift in the locus of attention toward the conceptual (intrinsic) side of the interaction. This view is consistent with the target article in regard to the basic equality between the waking (data-driven) and dreaming (conceptual) state, except that this position does not view the imbalance as a result of overactivation of thalamic relay cells. Instead, as a consequence of reduced prefrontal activity (Niznikiewicz et al. 2003), modulation or amplification of external input is decreased. This reduced impact of external sensory information shifts the locus of attention on the continuum between the balance of these two states internally. (To elaborate: When daydreaming, attention is focused inward, therefore reducing the impact of the external world on cortical networks. On the other side of the continuum would be, for example, intense focus during batting at a baseball game. During this time, very little inward thought would occur compared to daydreaming.)

According to the target article, intrinsic activation is present and underlying, and external input only constrains the underlying excitation; therefore, any reduction of afferent stimuli should lead to an increase in weighting of internally driven thoughts and stimulus patterns. This shift in weighting causes disproportionate amplification of internally driven thoughts and perceptions, thereby bringing them into awareness as hallucinations. This is consistent with the phenomenology of "thoughts becoming audible" (Alpert & Angrist 2003).

Instead of a deficit in gating resulting in sensory flooding and overactivation of the cortex (Adler et al. 1982), I suggest the opposite – namely, that there is less resolution of afferent stimuli from diminished amplification. The following outlines are evidence for this approach.

The reduced N400 wave to incongruent words at the end of a sentence, found in schizophrenic populations, is interpreted as an overly broad lexical search (Mathalon et al. 2002). These findings lend support for the proposed hypothesis and reflect the signal-to-noise and time-dependent manner of activation in cortical networks. In indirect priming paradigms, priming is facilitated at short Stimulus Onset Asynchrony (SOA) and is reduced at longer intervals for schizophrenic subjects. In contrast, normal subjects' results show that priming is facilitated at longer SOAs and is reduced at shorter SOAs. This has been interpreted as diffuse activation in the semantic maps (semantic loosening), which returns to baseline levels in a shorter time frame in schizophrenics compared with controls (Mathalon et al. 2002; Spitzer 1997).

Because increased constriction of a semantic concept will increase the time the concept stays activated, the same should hold true for lower-level functioning related to external input. Compatible with this viewpoint, and an alternative interpretation of the reduced P50 ratio found in schizophrenia patients, is that it reflects a loss of short-term sensory memory. I posit that, as a result of the reduced amplification shifting the locus of attention inward, the excitation caused by the first click does not reach a critical activation threshold to sustain its activation pattern across the temporal gap. When the second click is introduced, the reduced P50 ratio reflects the decay of activation and "forgetting" of the previous stimuli, and therefore no inhibition is necessary. The difference found between schizophrenics and normal subjects has been eliminated in two different task manipulations, compared to the standard 500-msec interval approach. The first one varied the time interval and found that at 75 msec (Nagamoto et al. 1989), 750 msec, and 1000 msec (Dolu et al. 2001) no differences were found. For the 75-msec condition, gating occurred, and for the 750-msec and 1000-msec intervals, gating did not occur for patients or controls. In the 75-msec task, the latency was short enough for the stimulus to remain active, whereas for the 750-msec and 1000-msec tasks, the activation of both the controls and patients had already dissipated. The second study found no difference in gating when the click presentation was of 10 msec duration (Guterman & Josiassen 1994), suggesting that the stimulus intensity reached a threshold to remain active for the schizophrenia patients.

The lower amplitude of the P50 wave in schizophrenia patients, compared to first-degree relatives and controls (Freedman et al. 1983), can be interpreted within this hypothesis as being reduced amplification. Studies have shown that the P50's amplitude can be manipulated by stimulus intensity. Ninomiya et al. (2000) report that an increase in decibels (up to 85 db) increases the amplitude, whereas another study found increased amplitude to the human voice from multiple band frequencies to recruit more of the cortex (Chen et al. 1997). These findings reflect the variability related to stimulus intensity and time. Caution should be used when interpreting the reduced P50 ratio in schizophrenia patients as being solely a deficit in gating. Further studies that vary intensity and time intervals are needed to elucidate this variability.

Finally, because a diminished P50 ratio is found in both patients and their first-degree relatives, as well as the relatives who do not have the reduced P50 amplitude (Clementz et al. 1998), this finding can be inferred to indicate a greater shift toward the internal on the continuum of attentional locus during active psychosis, reflecting the vulnerability of the relatives.

Deficits in visual backward-masking (VBM) tasks found in schizophrenia patients are thought to result from an interruption of the first mask because of an overactive transient channel (Butler et al. 2002). Consistent with the target article's view that the first mask failed to engage gamma oscillations is the finding that reduced amplification of the first stimulus results in a more rapidly decaying activation pattern that is more easily interrupted by the mask. Because the effects of VBM can be manipulated by intensity, luminance, and time (Butler et al. 2002), just like the amplitude of the P50, the assumptions that the findings infer gating deficits in schizophrenia have to be questioned.

This novel theory would predict a global reduction in high-frequency gamma waves induced by stimuli. Evidence for this deficit is outlined in Phillips and Silverstein's (2003) theory on impairment in cognitive coordination, which results from NMDA-receptor hypofunctioning reducing gamma-wave synchronization. The main effect of reduced synchronization is contextual ambiguity and thought disorganization.

The target article offers an integrative approach to psychosis and hallucinations, combining findings from psychophysical and behavioral measures. Because the brain works as an integrative system, it seems that psychosis can emerge from a dysfunction of gating, the balance between excitation and inhibition, or structures that play central roles in modulating and integrating information.

Getting real about experience

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Abstract: The idea that experience is essentially subjective rather than of the real world is paradoxical and deeply flawed. The external world is, much more than a mere constraint, essential to meaningfully describe experience and neural activity. This is illustrated by an analysis of the phenomenology of veridical perception and by the study of experience in psychopathology by the Experience Sampling Method (ESM).

Behrendt & Young (B&Y) must be complemented for the well-documented development of their case. It is unfortunate, however, that the philosophical framework that holds together their effort is deeply problematic, even fatally flawed. The idea that experience

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is fundamentally subjective, and merely *constrained* by external reality should be seen as a can of worms rather than as a promising starting point for empirical and theoretical scientific research. Perhaps, most fundamentally, its truth would paradoxically imply that it could not be stated: How would we know about the constraining role of external reality if all of experience were subjective? More concretely, how could subjective experiences be externalized in "virtual space" if there were nothing either external or spatial – that is, if the concepts of externality and space really referred to nothing at all? Similarly, what would experience be of, if it were "merely subjective"? What are these "subjective items" that constitute subjectivity? The authors assume that the experienced world emerges from autonomous neural activity, without providing any explanation for how autonomous neural activity could ever give rise to the experience of a real world in all its infinite variety.

The infelicitous implications of their philosophical foundations manifest themselves throughout the article. An example can be found in the discussion of how to account for the (presumed) phenomenology of hallucinatory experiences. Cognitive theories are criticized for explaining this in terms of a misattribution to external reality. According to the authors, this move is insufficient because it is doubtful that just a misattribution to external origin could transform thoughts or mental images into perceptual experiences. Whatever the merits of cognitivism, it seems in any case to have an explanatory advantage over B&Y's theory. While cognitivism has at least *some* explanation for the phenomenology of hallucinations, the authors have none. They simply propose to put hallucinations in the same bag as veridical perceptions, and take both as a kind of primitive. Someone who has no explanation for A & B is simply not in a position to criticize someone else for not having an explanation for B. This is not to say that we think the cognitivist explanation should be endorsed. On the contrary, we think it suffers, though in a milder way, from the same deficiency as the target article: the overemphasis of factors purely "in the head" of subjects, whereas a more fruitful strategy would be to look for how subjects interact with the environment out there.

Experiential phenomenology can only be accounted for in terms of a description of person/environment interaction. The specifics of the external context as it is interacted with, are necessary ingredients in any attempt to make sense of the mental, as well as the neurophysiological. This can be illustrated with respect to the phenomenology of veridical experience. Veridical experience has the phenomenology of being confronted with a real world because it is a specific kind of interaction with that environment. Two crucial aspects necessary to account for this feeling of "presence" are what have been called "bodiliness" and "grabbiness" (Myin & O'Regan 2002; O'Regan & Noë 2001; O'Regan et al., in press). "Bodiliness" refers to the fact that, in perception, every change in bodily position gives rise to perceptual changes, whereas "grabbiness" refers to the complementary aspect – that is, in the prototypical perceptual situation, every change in what's being perceived will attract the perceiver's attention. Bodiliness and grabbiness thus define the uniquely perceptual condition in which a perceiver and the perceived environment are so closely knit together that any change in the one has immediate effects on the other. Thus, the notions of bodiliness and grabbiness provide for an explanation where the authors have none; yet, unlike the rather shallow cognitivist explanation, this explanation crucially involves the specific ways in which the perceiver interacts with the environment.

Now, to get a real grip on hallucination, on how precisely it is similar to and differs from veridical perception: hallucinations should likewise be taken seriously as contextually situated in and constitutively articulated (rather than merely *constrained*!) by that context. In an ongoing research effort, one of us (I. M.-G.), is showing how fruitful the contextually situated study of subjective experience in psychopathology can be. The Experience Sampling Method (ESM), a structured diary technique to assess thoughts, mood, and context in daily life, is being used to study the interaction between context and psychopathology (Myin-Germeys et al. 2001b). It has been demonstrated that small daily stresses in everyday life have a direct effect on psychosis intensity (both hallucinations and delusions) in subjects at increased risk for onset (first-degree relatives) and relapse (patients in a clinical state of remission) of psychosis (Myin-Germeys et al., submitted). In a study of hallucinations and delusions in currently ill patients with psychosis, it was found that the intensity of both delusions and hallucinations changes from moment to moment (Delespaul et al. 2002). These changes were directly related to contextual features. For hallucinations, it was clear that the specifics of the context modified hallucination intensity. Social withdrawal resulted in a decrease of hallucinatory intensity, whereas social engagement slightly raised intensity levels. Not being involved in an activity at all or doing work-related activities led to decreases in intensity over time, whereas passive leisure activities such as watching TV resulted in increases in intensity levels of hallucinations. For delusions, again several very specific contexts were found that were involved in the onset of a delusional moment (Myin-Germeys et al. 2001a). The presence of family or acquaintances decreased the risk of subsequently experiencing a delusional moment, whereas withdrawal from activities increased the risk of experiencing a delusional moment. These results suggest that psychopathology is deeply contextual, and, rather than unexplainedly arising from strictly neural dynamics, is a function of the sense or meaning of the situation a person finds herself faced with.

In other words, we claim that only a contextually sensitive method such as ESM is able to provide a grip on the phenomenology in all its variability and real complexity. The context of experience is richly *articulate*d – indeed it has the richness of the world, as it *is* the world – and it is richly *articulating*, as testified by the ESM results on the impact of the nature of the task involved and the identity of the persons present on delusions. Reducing the environmental influence to that of a "mere constraint" seems unhelpful and of breathtaking simplicity.

Finally, it should be noted that studying experience in its worldly context provides the framework without which it is impossible to understand neurophysiological data. Purely neuroscientific description can only be meaningfully interpreted and seen as relevant to the study of psychopathology in terms of the role neurally described events play in specifics of the person/environment interaction. Psychopathology is primarily a problem that we care about because it affects a person's abilities to deal with his or her environment, rather than because it is some way in which neural processes go astray. We should not exclusively try to understand the personal in terms of the neural, but often, rather, the other way around (Myin 2004).

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Belief in the primacy of fantasy is misleading and unnecessary

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Abstract: We can live in fantasy only if we survive in reality. Visual experience that carries information about the real world – that is, normal perception – serves that goal. Normal perception is not merely constrained hallucination, and it can usually be distinguished from internally generated images, with which it is rarely confused. Modulatory processes, such as attention, do indeed affect most levels of perceptual processing, but they do so without invalidating the transmission of the signals that they modulate.

The only hallucination of which I have much personal knowledge is dream imagery. Upon waking, it does sometimes seem to me

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