There are problems with both the theoretical logic and the interpretation of data in Christie and Barresi’s (2002) interesting article. The general pattern of results (described as Orwellian) is easily incorporated into an information-processing framework compatible with Dennett’s analysis. In particular, different aspects of the illusory motion event are queried at different times and these aspects (line extent and manner of appearance) are not in conflict, so no revision of conscious content is necessary. Second, too much interpretive weight is placed on an anomalous pair of data points (described as Stalinesque) that do not seem fully interpretable within the author’s framework and are probably susceptible to one of several alternative interpretations proposed here, though further investigation is necessary.

One day my oldest (teenage) son told me that he had figured out a way to build a perpetual motion machine. I told him they were impossible to the best of anyone’s knowledge. He assured me that his idea would definitely work. I am glad that he is willing to buck against scientific authority because, though often foolish, it is probably how some of the most important scientific discoveries are made. I similarly admire the work of Christie and Barresi (2002) because they are making a valiant effort to establish a means of doing something wonderful—establish the (fleeting) conscious underpinnings of an illusory percept. They believe they have succeeded in empirically distinguishing distinct types of illusory content formation in consciousness. I disagree, though I think their data is interesting for other reasons.

Since they accuse proponents of the information processing view of hiding their “heads in the sand” when it comes to consciousness, let me counter with the metaphors that (1) their theoretical discussion mixes apples and oranges and that (2) their data interpretation makes a mountain of a molehill. Although I will try to make good on those metaphors below, I actually hope that the reader will avoid “caving in” to cliches and metaphors. I use them here tongue in cheek.

More seriously, I happen to think the information-processing view (which is compatible with Dennett’s, by the way) is a very important one. Because Christie and Barresi (2002) explain and dismiss the “information-processing view” in a few sen-
tences at the beginning of their General Discussion, I begin by explaining how that view is motivated precisely by the kind of data they have collected.

**Apples and Oranges**

Let us consider the “Orwellian” case. This, by hypothesis, is the situation that occurs when visual consciousness first registers the simultaneous onset of the line, but then forgets this in favor of the illusion that the line extended from one end to the other over time. The alternative scenario, we are told, is the “Stalinesque” case, in which the whole visual event is only trooped through consciousness as a (supposed) reenactment of the (actually) illusory motion. Dennett claims these are empirically indistinguishable (and philosophically bankrupt), whereas Christie and Barresi (2002, following Cowan and Greenspan, 1995) suggest that they are completely distinguishable. Indeed, they claim to have strong evidence that the Orwellian scenario has been played out: There really was a moment, they claim, when the line was consciously registered as coming on at once, but that moment expired and the memory was overwritten by a later interpretation. Seem compelling?

Here’s the information-processing analysis: In order to decide when the “growing” line has reached a certain point, I have to know whether it has reached that point, not how. In the case of the lines that are presented all at once, this information ought to be available immediately—not necessarily as a conscious percept, mind you, but as a piece of perceptual content or information. The information processing analysis is intentionally agnostic about consciousness because it is designed to give an account of the informational requirements of a cognitive task. What it says, though, is that the information necessary to make a response in this task does not include content concerning the manner in which the line appears. Even IF the content is stipulated to be conscious because it informed a rational decision (to press the button), it is still not evidence that there was an Orwellian event of conscious line-appearing-all-at-once seeing. You see, the content “long enough,” upon which the decision was made, and the content “generated over time,” which is the basis of the illusion, are completely different contents (apples and oranges!). They are, in fact, compatible with the same overall perceptual conclusion, and, because the second does not contradict the first, both could figure in as “evidence” of the final percept within a constructivist framework (including a multiple drafts model, for example).

Different aspects of an event may be available for speeded decision making at different times. I may detect the onset of an event before I can determine its identity (Fehrer & Raab, 1962). I may be able to determine the length of a line (or its intersection of a location) before I can say how it came to be (all at once or left-to-right). Thus, from an information-processing point of view, data that purport to be Orwellian are also consistent with a much weaker claim—that relevant information was available for decision making at the time when such information was presented. To make the further claim that a conscious percept of the entire event was therefore experienced along with that information appeals to a view of consciousness (continuous, with millisecond timing) that is not well motivated except by naïve conceptions of folk psychology. Indeed, there is a large literature on change-blindness which sug-
gests that folk psychology is wanting when it comes to the nature of visual consciousness (cf. Lachter, Durgin, & Washington, 2000). Thus, asking about different aspects of a stimulus at different times (i.e., length vs manner of appearance) and showing apparently contradictory timings is inadequate to demonstrate Orwellian consciousness unless we know that consciousness is a continuous plenum. But we do not know that, and there is good reason to believe the opposite (e.g., Durgin, 2002).

But what if we ask about identical content at different times? Joel Lachter and I examined the fading availability of information with backward masking (Lachter & Durgin, 1999; Lachter, Durgin, & Washington, 2000). We set up a two-alternative forced choice task in which a ring was presented on one side of fixation and a disk on the other. Both were quickly followed by rings, which frequently masked the initial stimuli (depending on delay between them). Subjects had to indicate the side that the disk had appeared on for each trial. The task was therefore an identity task only (since onset information was identical), but we varied the timing of their response by requiring our subjects to respond rapidly (within 500 ms) or slowly (after at least 750 ms) in different blocks of trials. Normally, faster responding leads to greater error because of a speed–accuracy trade-off, but we reasoned that faster responding might instead reveal premasked content that would be gone by the time the later response rolled around. Indeed, we found that speeded responding reduced masking and actually improved performance for stimuli most susceptible to masking. Our conclusion, however, was not Orwellian because we saw no grounds for claiming that the conscious experience itself was changing within a trial. Instead it seemed that conscious content (insofar as this is reflected by the button chosen) was affected by when you forced the person to make a decision. In other words, in this unusual case, people saw things more accurately on a fast trial because we forced them to respond quickly before backward masking processes were complete. As we see it, we were not sampling different stages of conscious perception. We were forcing decisions to be made based on different stages of information processing.

An educated observer might at this point throw up his hands and say, “Christie and Barresi are right; this is like sticking your head in the sand! How else, but by conscious awareness could the response be initiated?”

The problem of understanding where consciousness sits between perception and action is an old one. In these sorts of experiments, the initiation of the button press is a mysterious act. Perhaps it is not so complicated as a novel speech act, but the impenetrability is similar. Do you have any idea, on millisecond-level basis, how the words you choose to say are chosen? Do you have any subjective awareness of millisecond timing differences in responses? Of course not! Consciousness seems to occur at a different grain level than does neural information processing. The tasks that we accomplish are apparently willed by us, but they need not be micro-managed by consciousness. There are clear speed advantages for semiautomatic, semiautonomous specialized processes over centrally controlled general-purpose ones. Thus, conscious choice may have set up the conditions so that evidence of a long-enough line would be sufficient to cause a button press, but consciousness need not sit there as a homunculus monitoring the process millisecond by millisecond.

If the information-processing view is sticking its head in sand, it is the shifting sand of argumentation based on the conscious homunculus running the show while
watching a Cartesian theater. And the reason it is sticking its head there is to blow the sand away and reveal the more stable foundation beneath of the information-processing analysis. All of the data described by Christie and Barresi as “Orwellian” are a direct prediction of the information-processing view. The information necessary to make the decision about line length is available all at once, in the illusory line condition, even when the conscious perception is of a line that unfolds over time.

Mountain of a Molehill?

There is, however, in Christie and Barresi’s data one anomalous pair of data points, which they interpret as a Stalinesque result. Examination of Fig. 5 shows that both the Real Drawing and the Illusory Drawing conditions reflect a sharp upward shift in reaction time in the case of 4-degree lines. As Christie and Barresi concede, this unusual case may have something to do with the fact that the 4-degree point is right at fixation. They nonetheless go on to argue that the similarity between the Real and Illusory drawing conditions shows that this cell of the data is Stalinesque—the perception of the illusory line was somehow “held up” until the “over-time” version was rendered for consciousness (or something).

But there are several problems with this view. One is theoretical: Why should Stalin only get to rule in this one case? For this there is only hand-waving in the discussion (because the illusion can be generated more quickly? But it slows RT!) and not a lot of clarity (Why is there also a slowdown in the Real Drawing condition—should not attention in this case speed things up?). How (unless an Orwellian preperception event occurred) did the brain know to let Stalin have this one, and not render it into consciousness right away? Many of the notions that Christie and Barresi appeal to are consistent with information processing considerations, but are not consistent with their simplistic model of real-time consciousness required for the claim of Orwellianism in the other cases.

But what if we try an information-processing explanation? Within such an explanation, information accrues over time and that information uptake may be faster at some loci than others. One thing to consider right away is that since Fig. 5 is showing difference scores, the apparently correlated delay in the two conditions may be partly due to a common subtraction of a smaller RT in the simultaneous condition. However Fig. 6 indicates this speed up of the simultaneous condition (though present for 4 degrees relative to 6 or 8 degrees, for example) is not sufficient to account for the entire effect.

As Christie and Barresi suggest, there may be a speed up in the simultaneous condition because that location is near fixation. But why, apart from their similar appearance of growing, does this lead to such an apparent slowdown for the Real and Illusory drawing conditions? One possibility is inhibition of return (e.g., Klein & MacInnes, 1999). What the illusory and real drawing conditions have in common is that both begin with onsets away from fixation. Although the onset in the Real Drawing condition is only about 30 ms before the 4-degree line is completed, this may be enough to begin to draw attention away from fixation. After all, on illusory trials the initial onset cue is a reliable alerting cue, and attention may therefore be prepared to shift. Inhibition of return is a complex phenomenon and ill-understood, but there
are plenty of examples suggesting that a shift of attention away from an attended location can lead to a processing cost at that location.

Other possible factors include strategic decision making. The design of the experiment is meant to provide for lines that reach, pass, or fall short of each marker. (Note that ‘reach’ trial RTs are found to be slower than ‘pass’ trial RTs, consistent with decision criteria and discriminability considerations.) However, the observer’s task can be simplified for each marker by choosing a length criterion that cuts the stimuli into YES and NO. For example, as I understand it, the 6- and 8-degree cases may be decided by determining whether the line goes past the fixation mark, whereas the 4-degree case has to cut the possible stimuli up differently. A slight draw of attention to the left may be all it takes to render the 4-degree case more difficult in precisely the condition where it just reaches the marker because here the decision must be made more cautiously. A slight loss of location calibration at fixation may be the source of the delayed decision in the 4-degree ‘reach’ cases.

Obviously, more empirical work would need to be done to test these kinds of ideas. I agree with the authors that the 4-degree location is evidently special but suspect this is more of an artifact of some aspect of the design than a window on the soul. To advance my promised metaphor, this odd pair of data points currently appears more like a mole on the face of the data (one pair of conditions of seven), rather than a mountain of evidence for Stalinism in consciousness.

Conclusions

I am a constructivist (cf. Durgin, 2002), but I am not a Stalinist constructivist. I do not think that the conscious experience of an (illusory) line growing over time requires an internal rendering of a growing line, merely the perceptual registration of directional movement which may be bundled up with various bits of other evidence that form the informational basis for the complete perceptual experience.

As for Dennett’s (1991) claim that you cannot discriminate between Orwellian and Stalinesque causes of cognitive error: I am still convinced of the merit of his point of view (cf. Lachter, Durgin, & Washington, 2000). Although we can speak confidently about shifts in the availability of certain pieces of visual information over time, it is more difficult to be sanguine about the temporal granularity of consciousness itself (see Durgin & Sternberg, 2002). Although I think the work of Christie and Barresi is an excellent effort (following Cowan & Greenspahn, 1995) at trying to capture consciousness in action, it falls short of the mark.

REFERENCES


Durgin (2002). The Tinkerbell effect: Motion perception and illusion. *Journal of Consciousness Studies*


