Hierarchical control:
beyond dual process theory

C. D. Jennings

Assistant Professor of Philosophy and Cognitive Science
University of California, Merced
What is dual process theory?
Dual process theory splits psychological phenomena into two separate processes. There are many distinct types:

- implicit/explicit
- reflexive/intentional
- bottom-up/top-down
- involuntary/voluntary
- unconscious/conscious
- automatic/controlled
- primary process/secondary process (Freud)
- system 1/system 2 (Kahneman)
Intentional Automaticity

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Consider an instance of your most skilled behavior
  e.g. dancing, mountain biking, writing philosophy
While performing that skilled behavior, were you in control?
Would you describe your skilled behavior as intentional action?
Here is a puzzle about skilled behavior:

Intentional actions are those behaviors properly attributed to an agent. But skilled behavior seems both more and less agent-involving than other behaviors.
Someone ‘chokes’ when she is engaged in a skilled behavior but suddenly finds herself unable to continue. While it matters deeply to the agent that she continue, she cannot.
You better lose yourself in the music, the moment
  You own it, you better never let it go (go)
You only get one shot, do not miss your chance to blow
  This opportunity comes once in a lifetime (yo)
–Eminem
Some say that skill should count, and that it is even necessary for intentional action (e.g. Mele and Moser 1994).

Others say that skill shouldn’t count, at least insofar as it proceeds without the involvement of the agent (e.g. Heuer 2014).
In my view, behavior should count as intentional action if it makes use of either of two competing forms of control: rational control or expert control. Skilled behavior uses expert control, and so should count as intentional action.
1. A Closer Look at Skilled Behavior

2. Some Possible Solutions

3. A New Solution
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Skilled Behavior

While attention is necessary for novice behavior, as one becomes more skilled in a behavior it uses less attention, until that behavior is fully automatic. At that point attention is no longer required for the performance of that behavior.

In other words, skill allows one to simultaneously perform the skilled behavior alongside other behaviors without much cost to either behavior (e.g. Schneider & Chein 2003)
Beilock et al. 2002

Mean distance from target (cm)

Pre-Test  Single-Task  Dual-Task

Putting Condition

- NR
- NF
- ER
- EF
“Whereas novices and the less-proficient performances of experts benefit from online attentional monitoring of step-by-step performance, high-level skill execution is harmed” (Beilock et al. 2002).
Attention away from a task hurts novices and helps experts (dual-task behavior).

Attention to a task helps novices and hurts experts (due to choking).

So attention may be necessary for novices, but not experts.

Why is this a problem? Some say that attention is necessary for intentional action (e.g. Wu). In that case experts would not be acting intentionally when they act without attention. Yet, experts seem to act intentionally even without attention.
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The Gain Approach

“The level of skill that one possesses is in direct proportion to the amount of control that one exerts over the performance of one’s own actions” (Fridland 2014)

Specifically, a gain in new abilities, such as automatic attention, leads to an overall gain in control. This approach leaves out the loss of control, exemplified by choking.
“A violinist or a surgeon controls the very precise movements of her fingers, but they are intentional only at a general level” (Heuer 2014)

The expert loses control only at the detailed level in this view, retaining control at higher levels. This approach leaves out gains in control, such as the new abilities of the expert, exemplified in dual-task behavior.
“The control found in skillful action is that by automatizing a host of basic features, the skilled agent opens up behavioral possibilities that were not available before” (Wu 2013)

This approach, in which loss of attention/control at one level leads to more attention/control at another, has a promising explanation of choking (Papineau’s ‘basic’ vs. ‘component’ actions). But it cannot explain why evidence points to an overall loss of attention for experts (e.g. Beilock et al. 2002; Poldrack et al. 2005).
Outline

1. A Closer Look at Skilled Behavior
2. Some Possible Solutions
3. A New Solution
Hierarchical Control

The puzzle of skilled behavior calls for us to distinguish two competing forms of control. These two types of control are both agent-involving, and so both count as contributing to intentional action.

**Rational control** allows for more flexibility and oversight, which might make us *feel more in control* of the behavior. This form of control may be required to select between and initiate skilled behaviors, but not to maintain them.

**Expert control** involves tasks that are more familiar to us, which might allow us to *feel more ownership* over them. To allow for this form of control, we simply have to prevent interruption by other thoughts or tasks.
Rational Control

Expert Control
Importantly, this approach rejects the dual-process theory. Hierarchical control can be understood as a “middle management” theory of control—instead of all behavior lying on a spectrum from automatic or reflexive behavior to rational or controlled behavior, we should introduce a secondary type of control, which leads to behavior that is both controlled and automatic, but neither rational nor reflexive.
Back to Skill

The hierarchical control approach delivers the requisite tension that we see in the puzzle of skilled behavior. That is, it explains why we choke: we can control our behavior using rational control or expert control, but not both at the same time, in the same way. It also shows how skilled behavior counts as intentional action.

Other work: our skilled behaviors belong to us, and so we can and should be held responsible for them, but not in the same way that we should be held responsible for those behaviors that are under our rational control.
In sum
To account for evidence on skilled behavior we should move beyond the dual process theory of behavior, with a single form of control, to a hierarchical theory of control that includes both rational control and expert control.
Thank you.