Name: Rebecca Keller

StudentEMPLID: 23714818

Doctoral Level: 3

Doctoral Program: Philosophy

Title of Proposal: Anticipatory Perception

Name of Dissertation Adviser who will write a letter of recommendation: David Rosenthal

Names of Dissertation Committee members: Eric Mandelbaum; Rachel Denison (external)
Project Proposal for Anticipatory Perception

Abstract. There is much evidence—empirical and commonsensical—to the effect that our expectations about the world can alter what we see. However, there is very little theorizing that unifies this evidence into an overarching explanation. This dissertation will bring work in psychology and neuroscience together with contemporary philosophy of mind to thoroughly characterize, defend, and explore the consequences of, a particular explanation of this phenomenon. This view proposes the existence of a novel kind of psychological representation: perceptual expectation. It argues for the existence of perceptual expectations, characterizes them in terms of perceptual contents, differentiates them from similar attentional states, and, finally, explores their consequences for the epistemology of perception and the architecture of mind.

Introduction. We have likely all experienced something like the following: laying in bed, perhaps after waking from a nightmare or having watched a particularly scary horror film, you look up and jolt back in fear – there seems to be a human figure hovering at your bedroom door. After a moment, though, you relax: it was just your bath towel, hanging from a hook on your doorframe. That is, we have likely all had the experience of our expectations seeming to alter what we see. In psychology and neuroscience, there is a fairly widely shared acceptance that this is in fact what happens: expectations can alter perception.¹ Your fear is not simply because you mistakenly believed that the bath towel was a lurking specter, but because you actually perceived it as such. Philosophy, on the other hand, tends to make the reasonable assumption that visual perception contains only what is in fact visible,² such that the possibility that you might actually perceive differently in these cases, rather than merely believe falsely, is ruled out by fiat. Only towel features—not lurking specter features—were visible, and so only towel features were what you perceived.

However, the psychological and neuroscientific research relies on a broad, statistical notion of expectations, which applies to everything from low-level processing heuristics in the visual

system (such as the heuristic that zero-crossings—points at which a function changes from positive to negative or vice versa—indicate object boundaries) to high-level conscious predictions (such as the thought that THERE WILL BE MILK IN THE FRIDGE). And much philosophy, for its part, explicitly excludes expectations from the class of perceptual representations in the first place.\(^3\) In some areas of research on the mind such as research on consciousness, philosophy and science share an intimate, productive relationship; but here, the two are divorced from each other. As a result, the sciences miss out on the conceptual rigor that could isolate the unitary kinds of expectations that would function in a full-fledged explanation of any given sort of expectational phenomenon, including the apparently perceptual one you experienced with your bath towel. And philosophy misses out on the theoretical import that the scientific findings have for understanding the function and contents of perception, and the consequences this might in turn have for philosophy of mind generally.

My dissertation, tentatively titled *Anticipatory Perception*, will close this gap from both directions. I apply the conceptual tools from extant philosophical work on the contents of mental states to the scientific findings on expectations. In turn, I apply the thus-clarified scientific findings to several contemporary questions from the philosophy of mind, focusing especially on the ontology of perceptual representations, the nature of the contents of perception, and the epistemological upshots these have. I am applying for the Graduate Center Dissertation Fellowship to finish this dissertation in the 2022-2023 academic year, with the additional aim of publishing a significant amount of the dissertation.

**Project.** The primary aim of the dissertation is to provide a thorough exploration—a novel characterization, and an application of this to questions in the philosophy of mind—of a variety of

expectation that I call ‘perceptual expectation.’ I plan to divide the dissertation into three overarching sections: Sections I and II will clarify the nature of perceptual expectation, and Section III will include at least two chapters applying the results of Sections I and II to a discussion of the contents of perception and the consequences for perceptual epistemology and architecture of mind.

Section I isolates perceptual expectations from the deflationary scientific notion of expectation. First, while the deflationary notion of expectation is that expectation is just any sort of regularity-sensitive processing, I argue that perceptual expectations are those expectations associated with experimental findings that expecting a certain visual property causes the next item that appears to be perceived as having that property.4 Second, I analyze perceptual expectations in terms of perceptual representational content: I characterize perceptual expectations as a novel kind of what the literature calls ‘singular when filled’ (SWF) perceptual content. In order for a mental state to have content that is about something in the world, it must stand in an appropriate causal relationship to that thing; SWF contents can either successfully refer to something or have only a content placeholder or ‘gap’ and fail to refer to anything.5 I claim that perceptual expectations’ contents are ‘gappy’ before the next item appears but, unlike on the received view of SWF content, can come to refer to the next appropriately-related item. Lastly, I discuss how perceptual expectations come to have their content on the basis of perceptual memory, and how perceptual expectations function to contribute that content to perception via competition with incoming perceptual information. Evidence for these claims comes from what the sciences call ‘perceptual templates,’ which are visual representations of the properties one expects that arise before any item


Section I is complete and was submitted to *The Journal of Philosophy* on September 1, 2021. It is currently under review.

Section II will differentiate perceptual expectation from its close cousin, attention. Attention and expectation are often insufficiently distinguished in the literature both because of their conceptual similarity (if one is attending for something because it is relevant, then surely one also expects it to appear) and because of their similarly enhancing effects on perception. Moreover, although the two are operationalized differently—they are manipulated by different cues and produce dissociable, if similar, effects on behavior—an explanation of what underlies the operational difference is not forthcoming, perhaps because they are so often run together. This issue requires clarifying our concepts of attention and expectation; there is intuitively some difference between the two, it just needs to be located.

More challenging for my view, however, is distinguishing perceptual expectations from *feature-based* attention (FBA) in particular. A form of attention like visual spatial attention enhances processing at some location in the visual field, regardless of the features of the items in that location. FBA, on the other hand, is the selective enhancement of processing for certain features like color or shape of a target (where a ‘target’ is the task-relevant item). Moreover, FBA, like perceptual expectation, is associated with a visual ‘attentional template’ of the task-relevant features, a visual representation that arises before participants are shown the display through which they must search. Thus, FBA is apparently highly similar to perceptual expectation, and some

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argument is needed for the claim that the latter is more than a renaming of the former. I anticipate that Section I’s characterization of perceptual expectations will allow me to differentiate the two in a novel way. Whereas perceptual expectation is apt to come to refer to—to have the placeholder in its content filled by—the next appropriately causally related object regardless of that object’s relevance to the subject, FBA involves a causal relationship to the next appropriately related relevant (target) object. I plan to substantiate these different functional profiles by way of the empirical differences between the neural behaviors of perceptual expectations and attention. In particular, perceptual expectations increase neurons’ baseline firing rate: if one perceptually expects something red, then one’s red-preferring neurons begin to fire more rapidly than usual. Attention, however, makes neurons’ firing more selective to neurons’ preferred features: if you attend to vertical lines, your vertical-preferring neurons will fire more rapidly than usual for vertical lines, and less rapidly than usual for lines that are close to, but not quite, vertical.\(^\text{10}\) I have completed preliminary research for Section II, and plan to submit an early draft of it to the upcoming meeting of the Association for the Scientific Study of Consciousness, and the joint meeting of the Society for Philosophy and Psychology and the European Society for Philosophy and Psychology.

Section III will turn this empirical discussion back to issues in contemporary philosophy of mind. I have two planned chapters for Section III with the potential for more. The first planned chapter discusses the debate over conceptual content in perception. It argues first that perceptual expectations provide evidence, against philosophical orthodoxy, that certain perceptual states can be produced voluntarily. It then argues that, in order for a subject to voluntarily produce a mental state, that subject must understand the concepts that describe the contents of that state. For instance,

\(^{10}\) Wyart, Nobre, and Summerfield, “Dissociable Prior Influences of Signal Probability and Relevance on Visual Contrast Sensitivity.”
I could not choose to think about pink elephants if I did not have the concepts PINK and ELEPHANT. It follows that voluntary perceptual states will also depend on a subject possessing the describing concepts. There are thus at least some perceptual states that a subject cannot be in without also possessing the concepts that describe them. I argue that this sort of conceptuality in perception demonstrates that at least a basic sort of concept possession is constituted by the functional feature of voluntary producibility by the subject. This discussion in turn touches on the debate over ‘doxastic involuntarism,’ roughly, the claim that belief is never voluntary: one can never just decide to believe some proposition.\(^1\) In supporting my claim about voluntary producibility, I make the novel argument that, if we look to the literature on voluntary action,\(^2\) we will see that doxastic involuntarism does not actually rule out believing voluntarily but only believing intentionally; that is, it only rules out consciously deciding to believe on the basis of reasons. I am considering expanding this argument, perhaps into a separate chapter, and so I plan to submit a more developed version of this section of the article to the upcoming Joint Session of the Aristotelian Society and the Mind Association.

Finally, this chapter explores three possible consequences of this view of conceptuality for the perception-cognition boundary: (i) that voluntary conceptuality only applies to perceptual concepts, and perception and cognition are separable by content; (ii) that it applies to perception and cognition both, and therefore all perceptual states are thoroughly conceptual; and (iii) the functional difference in voluntariness constitutes a difference in content between voluntary and involuntary states. A version of this chapter is fully drafted and received feedback from two

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conferences in the summer of 2021; however, this final section may ultimately deserve its own chapter to discuss it sufficiently.

The second planned chapter of Section III discusses the justification of perceptual beliefs in light of voluntary-conceptual perceptual states. There is a puzzle about how perceptual beliefs are justified: surely my belief that THE SKY IS GREY is justified by my seeing the grey sky. If my percept of the grey sky is fully conceptual, its rational relationship of providing evidence for my belief is straightforward, because they share a content. But if the contents of my perception are already conceptual, then my possession of the concept GREY cannot be explained by way of my having perceived grey things: if the perceptual content were conceptual, then I could only perceive grey things if I already had the concept GREY. On the other hand, if perceptual content is not conceptual, it is not at all clear how it could justify, rather than merely cause, my perceptual beliefs.

I propose that my view of conceptual content set out in the first chapter of this section could ease this tension. If conceptual and nonconceptual contents differ in only a small functional difference—namely, that conceptual states are voluntary and nonconceptual states involuntary—then this could make the justificatory relationship between perception and belief straightforward while still maintaining the distance that would allow perception to explain concept possession. I further propose that working memory is another paradigm voluntary perceptual state and, given its frequent classification as the boundary between seeing and thinking, is plausibly involved in the rational, justificatory relationship between perception and belief. This final chapter is the least developed part of the project.

Through this marriage of science and philosophy, my dissertation also advances several overarching arguments. First, anticipatory perceptual states are necessary to include in our perceptual representational ontology to understand how everyday perception works and what it represents. Second, perception is significantly more heterogeneous in terms of varieties of representations and contents than previously appreciated. Third, and more speculatively, is the methodological argument that countenancing such heterogeneity in perception is a productive move in approaching questions that arise at the hotly-contested borderline of perception and cognition.

**Conclusion.** Receiving a Graduate Center Dissertation Fellowship would allow me the time necessary to complete this project by spring of 2023. Moreover, it would mean that I could dedicate the time needed not just for completing the dissertation, but also for the many rounds of revision involved in publication. Given the high caliber of philosophy graduates, having publications would make me a significantly more competitive applicant for postdoctoral fellowships, where I could transform this project into both a research program and a manuscript for publication by an academic press.

I look forward to the prospect of a full academic year dedicated to my research. I expect my dissertation to be a novel contribution to entrenched debates in philosophy on the ontology and architecture of mind, and the nature of perception and cognition. I hope as well that it can provide an expansion of concepts, and possibilities for future research, at the cutting edge of the perceptual and cognitive sciences.

**Project timeline**

Jan. - Feb. 2022: First draft of Section II; submit to ASSC and SPP-ESPP joint meeting. Draft based on the doxastic involuntarism argument of Section III Ch. 1; submit to the Joint
Session.

Mar. - Apr. 2022: Anticipated return of Section I from *J. Phil*; revise and resubmit. Complete revisions of Section III Ch. 1 and submit for publication.

May - Jun. 2022: Complete draft of Section III Ch. 2 on voluntary perception and perceptual belief.

Jul. - Aug. 2022: Use feedback from conferences to begin revising Section II draft. Anticipated return of Section III Ch. 1 from journal; revise and resubmit.

Sept. - Oct. 2022: Complete Sections II and III Ch. 2 and submit for publication.

Nov. - Dec. 2022: First draft of Introduction and Conclusion.

Jan. - Feb. 2023: Anticipated return of Section II; revise and resubmit.

Mar. - Apr. 2023: Anticipated return of Section III Ch. 2; revise and resubmit. Complete Introduction and Conclusion.

May 2023: Polish final version and defend dissertation.
Bibliography *(NB: does not include works cited in the Proposal)*


REBECCA KELLER
DEPARTMENT OF PHILOSOPHY | THE GRADUATE CENTER, CUNY
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EDUCATION
THE GRADUATE CENTER, CITY UNIVERSITY OF NEW YORK
Ph.D. Program in Philosophy, 2017 —
M. Phil. in Philosophy, September 2020
Committee: David Rosenthal (chair), Eric Mandelbaum, and
Rachel Denison (external)

AREAS OF SPECIALIZATION
Philosophy of mind: perception, cognition, attention

AREAS OF COMPETENCE
Experimental psychology (vision science, consciousness science);
metaphysics; philosophy of language

PRESENTATIONS
• (Endogenous) Perceptual States are Conceptual
  July 2021: Fourth Bochum Early Career Researchers Workshop
  in Philosophy of Mind and Cognitive Science
  June 2021: Virtual Vision Futures, York University Centre for
  Vision Research
• Expectation in Perception
  July 2021: 95th Joint Session of the Aristotelian Society and the
  Mind Association
  June 2021: The Association for the Scientific Study of
  Consciousness 24th Meeting (poster)
• Invited Commentary on Denis Buehler, Inattentive Vision
  February 2021: APA Central Division, Submitted Colloquium:
  Perception
  Paper withdrawn
• Attention, Expectation, and Subjective Inflation
  June 2021 (postponed from July 2020 due to COVID-19): The
  Society for Philosophy and Psychology 46th Meeting (poster)
  October 2019: CUNY Cognitive Science Speaker Series
• Fragile Memory and Overflow: Reinterpreting Phenomenal
  Sparseness
  July 2019: The Society for Philosophy and Psychology 45th
  Meeting (poster)
  June 2019: The Association for the Scientific Study of
  Consciousness 23rd Meeting

TEACHING
PRIMARY INSTRUCTOR, BROOKLYN COLLEGE CUNY
• Introduction to the Problems of Philosophy: F2018, S2019,
  F2020, S2021
• Moral Issues in Business: S2020
• Philosophical Issues in Literature: F2019
Teaching Assistant, New York University

- Philosophy of Mind; Prof. Ned Block: F2020
- Consciousness; Prof. Ned Block: S2020
- Central Problems in Philosophy; Prof. Gabbrielle Johnson: F2019

Fellowships & Grants

CUNY Writing Across the Curriculum Fellowship
Kingsborough Community College CUNY, F2021 – S2022

CUNY Doctoral Students Research Grant
Awarded $880 for Bringing Philosophy to and from the Vision Sciences Society, June 2022

Society for Philosophy and Psychology Diversity Travel Award
Awarded $300 for travel and lodging to increase diversity of meeting attendees, June 2019

Service

Conferences, Talk Series, & Workshops

- Co-Organizer, CUNY Minorities and Philosophy Workshop, “Nonacademic Careers”: December 2021
- Co-Organizer, CUNY Cognitive Science Speaker Series: F2020; F2021 —
- Abstract referee, Society for Philosophy and Psychology 46th Meeting: January 2020
- Co-organizer, The Graduate Center CUNY 23rd Annual Graduate Student Conference, “Intersubjectivity and Interpretation”: May 2019

The Graduate Center CUNY Committees

- Member, Minorities and Philosophy CUNY Chapter: F2017 —
- Student Member, Student and Alumni Affairs Committee: F2021 – S2022
- Student Member, Placement Committee: S2020 – S2022
- Student Member, Colloquium Committee: S2019 – S2021
- Student Member, Library Committee: S2019 – S2020

Professional Development

- Canadian Institute for Advanced Research (CIFAR)
  Neuroscience of Consciousness Winter School: January 2022
- CUNY Online Teaching Essentials Workshop: July 2020
- Teach@CUNY Summer Institute: August 2018

Memberships

The American Philosophical Association; The Mind Association; The Association for the Scientific Study of Consciousness; The Society for Philosophy and Psychology
Name: Rebecca Keller
Student ID: 23714818

Birthdate: 03/08
Student Address: 160 Quincy Street Apt 4R
Brooklyn, NY 11216-4936
Print Date: 10/29/2021

Other Institutions Attended:

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#### 2020 Spring Term
 Philosophy Major

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| PHIL 77000 | ST: Metaphysics & Epistemology | 4.00 | A | 4.00 |
| PHIL 79000 | Readings in Philosophy | 1.00 | A | 1.00 |
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 Philosophy Major

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| PHIL 80100 | Prospectus & Dissertation Sem | 0.00 | AUD | 0.00 |
| PHIL 90000 | Dissertation Supervision | 1.00 | SP | 1.00 |
| Term GPA: | 0.000 | | | 1.00 |
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| PHIL 90000 | Dissertation Supervision | 1.00 | SP | 1.00 |
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### Degrees Awarded

Degree: Master of Philosophy
Confer Date: 09/30/2020
Plan: Philosophy

### Cumulative Totals

| Cum GPA: | 3.978 | Cum Total: | 63.00 | 62.00 |
| Transfer Cum GPA: | 0.000 | Transfer Total: | 0.00 | 0.00 |
| Comb Cum GPA: | 3.978 | Comb Total: | 63.00 | 62.00 |

### Non-Course Milestones

Passed First Exam
Status: Completed
Date Completed: 03/26/2020
Date Attempted: 03/26/2020
Completed -
Passed Second Exam
Status: Completed
Date Completed: 08/18/2020
Date Attempted: 08/18/2020
Completed -
Advanced to Candidacy
Status: Completed
Date Completed: 08/25/2020

Page 1 of 2
Name: Rebecca Keller
Student ID: 23714818
Date Attempted: 08/25/2020
Completed -

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