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EDITORIAL

Editorial note – introduction to the special issue, "Teaching Sensation and Perception"

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"Sensation and Perception" is a core course in many undergraduate Psychology departments that addresses how we process sensory information and interpret it in light of our knowledge and previous experiences. The content of Sensation and Perception draws on subfields of Psychology and other sciences including cognition, neuroscience, chemistry, biology, and physics. For example, understanding visual perception requires knowledge of the physics of light, principles of neural communication, and how context and expectations affect perception. This multidisciplinary approach helps students appreciate how multiple perspectives can contribute to understanding complex phenomena.

In addition to describing how sensory and perceptual processes operate generally, the course often includes content about individual differences, including how perception is affected by genetic factors (e.g., colour vision atypicalities), age (e.g., changes in gustatory thresholds across the lifespan), culture (e.g., how experience shapes food preferences), and cognitive variables (e.g., how attention affects perception). This facet of Sensation and Perception aligns closely with one of the American Psychological Association's integrative themes in the guidelines for the undergraduate major (American Psychological Association, 2023): "Our perceptions and biases filter our experiences of the world through an imperfect personal lens." By recognizing that perception is shaped by a host of factors that may differ across individuals, students may be better equipped to interrogate their own perceptual experiences and appreciate why others' may differ.

Sensation and Perception has been a mainstay of the undergraduate curriculum for many years. However, considerable changes in higher education have taken place globally over the last several years that affect how this course and others are taught. Our goal in organizing this special issue is to facilitate sharing of instructional resources and approaches for Sensation and Perception courses in light of these changes. Many of the articles within the issue present timely resources in response to recent shifts in university instruction.

In particular, given the move to online instruction during the COVID-19 pandemic, many universities have expanded their online course offerings. This presents both opportunities and challenges for instructors who teach Sensation and Perception. For example, interactive classroom demonstrations have historically served as practical tools for students to experience perceptual phenomena firsthand. Often, these require specific classroom props or tools that may be difficult for students to access at home. This presents a greater need for demonstrations and activities that can be done across a range of delivery formats, including remote and asynchronous instruction. These can open up new avenues that allow "do-it-yourself" approaches to these demonstrations or opportunities to create different forms of assessments.

Alongside the shift to online learning, the last several years have also seen greater discourse around diversity, accessibility, and inclusion considerations in course design. These range from the application of universal design principles in the classroom to adopting strategies to minimize unconscious bias. Particularly for instructors of Sensation and Perception courses, there is increased

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discussion around reducing barriers to learning for students with sensory impairments, as well as ways to incorporate material that highlights diversity in sensory function.

Moreover, the widespread availability of generative artificial intelligence (AI) applications have altered learning in significant ways, again presenting challenges and opportunities for instructors to navigate when developing their courses. Alongside the significant debate around the use of these applications, there is also a need for timely resources and assessments to address these technological advancements.

Together, these substantial shifts in higher education highlight the need for sharing materials, assessments, and demonstrations to meet the needs of both instructors and students. In the spirit of the movement towards open science and greater resource-sharing among the scientific community, we hope that this issue offers a timely set of resources for instructors as well. The articles in the Special Issue (SI) cover three broad themes, with many individual contributions incorporating elements from each.

First, *Demonstrations of Visual Phenomena* are often a fundamental component of courses in Sensation and Perception. These may include the presentation of visual illusions, or structured observations of ordinary visual processing. Several articles in the SI focus on the pedagogical use of such demonstrations. Balas and McCourt (2024) describe a method for observing the inverted image on the retina using cast shadows of collimated light that are themselves not inverted. This technique requires very basic materials but nonetheless provides students with a powerful and counter-intuitive visual experience that makes an otherwise abstract concept concrete. Both Röer et al. (2024) and Aivar (2024) present collections of classroom demonstrations for use in Sensation and Perception instruction, in each case accompanied by complementary materials that include readings, discussion questions, and other instructor resources. In both cases, the authors discuss their process for adapting these materials for remote instruction (as necessitated by pandemic teaching conditions) and include insights accumulated over multiple iterations of these courses and ongoing refinement of the materials and teaching strategies described therein. A key feature of these articles is the consideration of how to adapt these exercises for different groups of students, whether this means the inclusion of materials in multiple languages (Röer et al. 2024) or evaluating how students' cultural backgrounds should be incorporated into the instructional approach.

These latter points are highly relevant to our second unifying theme, *Diversifying Sensation and Perception Instruction*. Three of the articles in the Special Issue speak to this topic, whether through consideration of how to increase the accessibility of Sensation and Perception material or by developing novel frameworks that take a broader view of the content domain. Wijntjes and Middelkoop (2024) present such a framework in their article, describing how they teach visual perception via direct connections to the visual arts. This approach links pictorial analysis to human vision in a manner that can support a range of activities including both quantitative and qualitative analysis, of form and content, all scaled to the interests and background of student groups. Moore et al. (2024)'s approach to increasing diversity and accessibility in Sensation and Perception instruction focuses on the challenges associated with learning neuroanatomy content in these courses. Mastering the vocabulary and geography of the visual system often proves difficult for students, weakening their understanding of subsequent instruction that builds on anatomical knowledge. To promote inclusive pedagogy and support better learning outcomes across a diverse group of students, the authors describe their use of "Creative Projects" across two semesters. This refers to an open-ended approach to evaluation in which students develop a course artifact like a puzzle, model, animation, or any other creative work to demonstrate their understanding of neuroanatomical content. The authors describe the utility of this approach and also comment on some of the more challenging aspects of implementing such an assignment from an instructional and evaluation standpoint. Finally, Harris et al. (2024) comment directly on the difficulties associated with diversifying Sensation and Perception instruction. Their article focuses specifically on characterizing the diversity of instructors and students in the UK, and how to use instruction that emphasizes individual and participant group differences to foster engagement across a diverse population of students. Their discussion is supported by examples of how to

incorporate such topics into Sensation and Perception classrooms.

Our last unifying theme is *Assessment and Evaluation in Sensation and Perception Classes*. Regardless of our approach to instruction, at some point all of us must consider how best to evaluate our students' progress towards learning goals. The remaining articles in the Special Issue each provide unique approaches to evaluation that emphasize different skills, each of which are important assays of students' understanding of complex material. Utochkin (2024) describes a set of exercises designed as a means of exploring psychophysics, with an emphasis on modelling as the gateway to deeper insights into the theoretical basis for psychophysical testing. Cacciamani (2024) takes a design-based approach that requires students to link course content to a real-world problem. This approach to assessment requires that students consider how to generalize what they have learned about a particular topic (e.g. colour blindness) to a complex and ecologically valid setting, while also emphasizing effective communication of the resulting design strategies. Finally, Graham (2024) describes the use of a set of open-ended written assignments modelled after J.J. Gibson's famous "Purple Perils." These assessments are intended to provoke extended discussion of specific topics as a way to evaluate critical thinking without the need for high levels of mathematical sophistication.

Together, these articles suggest a range of thoughtful and creative approaches to instruction as well as evaluation of students' mastery of the material presented in Sensation and Perception courses.

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