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# Ground continuity and distance perception: An investigation of the effect of texture discontinuity on perceived distance

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# Ground continuity and distance perception: An investigation of the effect of texture discontinuity on perceived distance

## **Abstract**

Paper presented at the Australasian Experimental Psychology Conference 2015, 8-11 April 2015, Sydney, Australia.

## **Keywords**

perception, investigation, effect, texture, ground, continuity, discontinuity, distance, perceived

## **Disciplines**

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## **Selective spatial enhancement: Attentional spotlight size impacts spatial but not temporal perception**

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Spatial attention is a core visual mechanism that selects certain aspects of a visual scene for preferential processing while minimising the processing of others, so as not to overwhelm our limited-capacity processing resources. An important but often neglected aspect of attention is how changes in the attentional spotlight size impact perception. The zoom-lens model predicts that a small ('focal') attentional spotlight enhances all aspects of perception relative to a larger ('diffuse' spotlight). However, based on the physiological properties of the two major classes of visual cells (magnocellular and parvocellular neurons), we predicted trade-offs in spatial and temporal acuity as a function of spotlight size. Contrary to both of these accounts, however, across two experiments we found that attentional spotlight size affected spatial acuity, such that spatial acuity was enhanced for a focal relative to a diffuse spotlight, whereas the same modulations in spotlight size had no impact on temporal acuity. This likely reflects the function of attention: to induce the high spatial resolution of the fovea in periphery, where spatial resolution is poor but temporal resolution is good. It is adaptive, therefore, for the attentional spotlight to enhance spatial acuity, whereas enhancing temporal acuity does not confer the same benefit.

## **Ground Continuity and Distance Perception: An Investigation of the Effect of Texture Discontinuity on Perceived Distance**

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The ground plane is thought to be important in perceiving intermediate distances (2-25m). Sequential Surface Integration Process (SSIP) theory proposes that a continuously textured ground surface is needed to accurately localise objects at such distances (especially as distance increases). There are a number of ways to manipulate texture continuity of the ground plane, many of which have been empirically tested and shown to result in systematic distance underestimation. In the current experiment, observers were instructed to indicate the distance to an object located at ground level using a modified blind-walking task. We manipulated ground plane texture discontinuity using a simple, yet effective approach; by placing a strip of material level with the grass covered ground plane, effectively occluding the grass texture between the viewer and the target. Contrary to the predictions of SSIP theory, we found no performance advantage associated with viewing targets across a continuous ground surface, as compared to when we occluded the texture of the ground surface. To further explore the effects of texture continuity, we attempted to replicate another ground manipulation that has previously been shown to affect distance perception by occluding the ground surface with a rectangular box.

## **Investigating the role of perceptual assimilation in the effectiveness of second-language perceptual training**

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The Perceptual Assimilation Model of Second Language Speech Learning (PAM-L2) predicts that a new second-language (L2) phoneme category is more likely to be formed when learners detect a goodness-of-fit difference between similar-sounding non-native phonemes (a category-goodness assimilation) than when the phonemes sound similar to each other (a single-category assimilation). Although PAM-L2 was devised to account for L2 acquisition in a naturalistic setting, the same predictions should apply to perceptual training in the laboratory. To test this, Australian-English listeners were assigned to one of two training conditions, single-category or category-goodness, and completed discrimination tasks with Arabic fricative contrasts: a pre-training AXB discrimination task with a single speaker and no feedback, six blocks of training on AX discrimination with feedback using three different speakers, and a post-training AXB discrimination task with the single speaker. Performance improved on AXB discrimination from pre- to post-training, but there was no interaction with assimilation type. This suggests that training is equally effective for category-goodness and single-category assimilations. However, performance did not improve