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PROSOPAGNOSIA
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FACE TO FACE

Prosopagnosia Research & Community

Welcome to our newest edition of Face to Face! In these issues, we present information on improving prosopagnosia and face perception research. As always, we look forward to hearing your feedback and questions, and hope that you will enjoy this issue's content and science!

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Future Directions in the Field of Prosopagnosia Research

Joe DeGutis studies prosopagnosics and potential approaches on improving their face processing. Here's what he has said about prosopagnosic research and future directions:

On one hand, some researchers have argued against the capacity to improve face recognition ability any appreciable amount. They suggest that the ability to recognize faces is determined mostly by genetics and, because of all the experience we have to faces throughout our lifetime, nearly everyone has reached their 'face recognition potential.' On the other hand, several researchers (including myself) believe that prosopagnosics' face processing strategies are far less than ideal, and these sub-optimal strategies may not allow prosopagnosics to benefit as much from their day-to-day face experiences. This perspective leaves open the possibility that targeted training could improve prosopagnosics' face processing strategies and their face recognition abilities. Consistent with this idea, cognitive training studies from the last 10 years have found some modest but promising improvements in face processing in prosopagnosia. In this article, I briefly review general approaches to improving face recognition in prosopagnosia and then focus on cognitive training programs and

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is one of the co-founders of the Boston Attention and Learning Laboratory. He is an investigator at the VA Boston Healthcare System and an Assistant Professor of Medicine at Harvard Medical School. He earned his PhD in experimental psychology specializing in cognitive neuroscience from the University of California, Berkeley. His dissertation focused on the neural mechanisms of visual learning in healthy controls and cognitive rehabilitation of developmental prosopagnosia. He is the leading authority on interventions aimed at improving face recognition in developmental prosopagnosia and has received several grants from the National Institute of Health for this work.

exciting future directions in this field of research. Attempts to improve prosopagnosia have been varied in their goals and methods. Remediative approaches seek to train prosopagnosics to process faces more like those without face recognition deficits, such as training prosopagnosics to perceive faces more as a 'whole' than a collection of parts. Alternatively, other methods have tried to work around or compensate for prosopagnosics' face recognition deficits using other intact abilities, such as trying to remember a face verbally (e.g., George has thin eyebrows and a scar on his left cheek). Another potentially useful compensatory approach is face recognition technology, which has advanced substantially in the last 5 years. Though it is currently more suitable for recognizing face images on one's computer or phone than for in-person face recognition, with more streamlined technology this could significantly progress in the upcoming years.

Another issue for both remediative and compensatory approaches is that some methods may be better suited to improving general face processing abilities whereas others may be more appropriate for improving prosopagnoiscs' ability to recognition particular faces, like family members or friends. Cognitive training is a treatment approach that entails repeatedly performing computer-based tasks targeting specific cognitive processes, often for many hours over multiple weeks. Two cognitive training programs that have shown some success in prosopagnosics are holistic training and face morph training. Holistic training aims at improving prosopagnosics' difficulty in taking in information from the whole face by training to make fast decisions about the positions of features across the face (e.g., eyebrows and mouth). We found that after three weeks of training, prosopagnosics improved on some, but not all, face processing tests, improved holistic processing,

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and reported increased face recognition confidence in everyday life. On the other hand, face morph training has been used to improve prosopagnosics' ability to make fine discriminations between progressively more similar face morphs. This has helped improve discrimination of the faces used in training, including new viewpoints and novel emotions of those faces, and may be especially useful for learning the faces of particular individuals. The effects of both of these training programs have shown to last for several weeks and months after training.

One drawback to both of these programs is that they have focused on face perception and have largely ignored memory deficits, which may be quite prevalent in prosopagnosics. Recently, we found that prosopagnosics have a specific deficit in face recollection, the retrieval of qualitative information associated with faces, including context (e.g., where and when you met them) and semantic details (e.g., name, profession). Automatically retrieving this information when presented with a previously-seen face provides a large confidence boost in face recognition.

Unfortunately, we find that prosopagnosics rarely have this 'recollection' experience when shown a face and instead rely more on familiarity, a "feeling of knowing" that does not have come along with any associated contextual or semantic information. Unfortunately, familiarity is much less useful for identification and many prosopagnosics are only left with a vague hunch that they know someone by their face. Interestingly, several studies have shown that recollection can be successfully improved through cognitive training, even in individuals with severe memory impairments, such as Alzheimer's Disease. These previous studies trained participants using words and we are currently testing whether a face version of this training program can improve face recollection deficits in prosopagnosia.

In addition to this novel approach to training memory in prosopagnosics, there are also potential new training programs that could be applied to prosopagnosia from the field of training 'below-average face recognizers'. For example, in those with below-average face matching abilities it has recently been shown that simply providing feedback during face matching can, over time, improve face matching performance, generalizing to new faces. Perhaps providing feedback to prosopagnosics during face matching while attempting a range of different discrimination strategies could help them adopt more effective approaches to differentiating faces.

Though cognitive training treatments for prosopagnosia are still in their early stages of development and most have only been studied in the lab, it is hopeful that these treatments can be made available over the web. In the not-so-distant future, it is possible that prosopagnosics from all over the world could participate in cognitive training studies, essentially participating in their own treatment development. With enough prosopagnosics, the effectiveness of several different training programs could be openly compared. Further, this could also enable progress towards determining what programs work best for what types of prosopagnosics, leading to more individualized treatment approaches.

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