

## Application for TDLC Training Committee Small Grant

Recent work suggests that the development of perceptual organization abilities, particularly in terms of grouping disparate elements to perceive a global shape, continues to develop into adolescence (Scherf et al., 2008). This is an essential ability for the execution of fast and efficient object recognition and identification, especially for classes of visual stimuli that are primarily differentiable based on the organization of the local elements rather than on differences in the local elements themselves. Faces are the paradigmatic example of such stimuli and there are mixed results about the developmental trajectory of face recognition abilities and whether this trajectory is limited by the ability to perceive subtle differences in the configural organization among facial features.

**Aim: Evaluate whether developmental limitations in basic visuoperceptual organization abilities are related to developmental changes in face processing skills, particularly in terms of detecting subtle differences in the configural organization of facial features.**

We will adopt the microgenetic priming paradigm approach (MPP) used by Scherf and colleagues (2008) to evaluate the emergence of face percepts on *two temporal scales*, over the course of a single trial and across development from childhood through early adulthood. The MPP is powerful because it reveals how the internal representation of a visual stimulus develops over time by varying the duration of the prime to tap earlier and later internal representations. In this particular task, participants view (but ignore) a prime face (always the same prime on all trials) with a particular eye shape and interocular distance, followed immediately by a pair of test faces, which they judge to be same or different. Each trial includes two test faces from one of two conditions, defined by their similarity to the prime stimulus. In the *element-similarity* (ES) condition, test faces are similar to the prime face in their elements (eye shape), but differ in their element configuration (interocular distance). In the *configuration-similarity* (CS) condition, test faces are similar to the prime in their global configuration (interocular distance), but differ in their local elements (eye shape). The prime is presented at several durations, providing multiple temporal windows over which the representation evolves prior to the onset of the probe, and behavioral responses are compared across the prime durations. In our previous study (Scherf et al., 2008), children and adolescents were always faster to discriminate the test stimuli when they shared similar elements with the prime stimulus compared to when they shared a similar configuration, especially at the shortest prime durations (40, 90 ms) when the adults showed the strongest bias to encode the global shape of the prime stimulus. Our prediction for the current study is that if similar perceptual organization abilities are implicated in face processing, children and adolescents will be much faster when judging test faces that share eye shape with the prime face as compared to when they share interocular distance with the prime face.

This project is a collaboration between myself, Marlene Behrmann, and Jim Tanaka, who are all in PEN. We intend to collect these data during one of Dr. Tanaka's Face Camp sessions in July 2008 at the University of Victoria in British Columbia, Canada. Sponsored by the TDLC, Face Camp is an innovative model that blends science education with scientific research (<http://web.uvic.ca/~jtanaka/facecamp/index.html>). Children participate in an engaging science program on face recognition that also allows researchers to conduct basic research related to the development of face processing. The grant money will be used for travel expenses so that I can visit Dr. Tanaka's lab to help collect these data and learn how to organize and execute a Face Camp session. The goals of this project relate to the fourth (what general principles explain the dynamics of learning across multiple scales and domains) and sixth (integrating research and education) initiatives of the TDLC. This project brings together two PEN investigators who have not collaborated previously. Additionally, the study has the potential to lay the foundation for a future synergistic interaction between these researchers and also serves as a model for other collaborative enterprises

within- and between-networks with a post-doc serving as the medium for the interaction. Finally, this project will establish a mechanism for other researchers in the TDLC network who might want to participate in future Face Camps to collect data and shared science with the broader community.

**Budget**

Air Fare	\$800
Hotel	\$200
Total:	\$1000