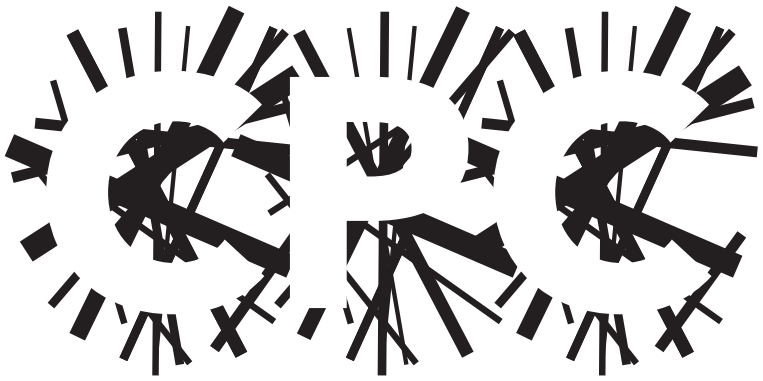
PALAIS DES CONGRÈS DE MONTRÉAL

Montréal, Québec, Canada



2019

Configural Processing Consortium

www.configural.org

Wednesday, November 13, 2019

8:30am – 5:00pm

Room 514B

Meeting Overview

MORNING

8:30 – 8:55 Arrival

Coffee and tea

8:55 – 9:00 Opening Remarks

9:00 – 9:55 Keynote I: Ami Eidels

Workload Capacity in Collaborative and Competitive Group Performance

9:55 – 10:00 Brief break

10:00 – 11:00 SESSION I

10:00 Figure-Ground Perception: Simply One Outcome of an Interactive Hierarchical Bayesian Predictive Perceptual Process

Mary A. Peterson

10:20 More than mere association: Are some figure-ground organisation processes mediated by perceptual grouping mechanisms?

Joseph L. Brooks

10:40 Interindividual differences in configural phenomena may help us understand the underlying mechanisms

Timothy J. Vickery and Anton Lebed

11:00 – 11:10 BREAK

11:10 – 12:10 SESSION II

11:10 Effects of spatial configuration on interpreting colormap data visualizations

Karen B. Schloss, Shannon Sibrel, Ragini Rathore, and Laurent Lessard

11:30 Configural processing in consumer choice? Holistic vs feature-based representations of alternatives

Gavin J. Cooper, Ami Eidels, and Guy E. Hawkins

11:50 Evidence for a Two-stage Model of Contour Interpolation in Visual Object Formation

Susan B. Carrigan and Philip J. Kellman

12:10 – 2:00 LUNCH BREAK

AFTERNOON

2:00 – 2:55 Keynote II: Frédéric Gosselin

Is configural processing important for face recognition?

2:55 – 3:00 Brief break

3:00 – 4:00 Session III

3:00 The cross-cultural difference in face perception and the other-race effect

Mario Fific, Daniel R. Little, Cheng-Ta Yang

3:20 Emotional and Spatial Parameters in Global – Local Processing

Ahu Gokce

3:40 Audiovisual configural processing and effects of film music

Annabel J. Cohen

4:00 – 4:10 BREAK

4:10 – 4:30 General Discussion

4:30 – 5:00 Business Meeting

6:30 Dinner at Holder

407 Rue McGill #100a

Montréal, QC H2Y 2G3

www.restaurantholder.com/en/

CPC 2019 Meeting Information

ABOUT CPC

The Configural Processing Consortium (CPC) is an annual workshop bringing together researchers in the field of configurality research. We aim to tackle deep issues underpinning perceptual organization, cognition, and action as well as the most cutting edge theoretical and experimental research on configural topics. Although vision typically dominates, our interests include all modalities. Each year, we seek to both define the major problems underlying the field of configural processing and to develop more unified ways of approaching these problems.

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CPC is grateful for generous support from the Psychonomic Society and the Université de Montréal.

Abstracts

KEYNOTE I

Workload Capacity in Collaborative and Competitive Group Performance

Ami Eidels and Murray Bennett
University of Newcastle, Australia

Modern-life tasks become increasingly complex, often requiring team work. How is the performance of the individual affected by the team? Investigators of Gestalt and configural processes suggest that the whole is different the sum if its part. This moto is commonly assessed by comparing processing of simple visual features (we will leave aside the debate on what constitutes a feature) versus the processing of 'wholes', such as objects or faces, that are made up of specific combinations of features. Pomerantz and Portillio (2011), among others, have shown that combining features in a felicitous way can lead to new, emergent features that affect the latency and accuracy of cognitive processes. For example, combing two dots adds information about distance and orientation that is not available when only one dot was presented. We propose that similar effects could be observed at a more macroscopic level, where numerous observers combine forces (or compete) to perform a group challenge. In our experiments, participants must prevent virtual balls from hitting the ground. We compare performance of individual players to the performance of dyads sharing the load. We also asses cognitive workload, using the Detection Response Task, to evaluate the division of labour across team-members.

KEYNOTE II

Is configural processing important for face recognition?

Frédéric Gosselin
Université de Montréal

According to an influential view, based on studies of development and of the face inversion effect, human face recognition relies mainly on the treatment of the distances among internal facial features. We have recently challenged this idea by showing that real-world interattribute distances are not very informative for face recognition, and that previous studies of interattribute distances generated face stimuli that greatly exaggerated this information compared to real-world faces. We have also shown that when human observers are required to recognize faces solely on the basis of real-world interattribute distances, they perform poorly across a broad range of viewing distances whereas recognition is almost perfect when observers recognize faces on the basis of real-world information other than interattribute distances such as attribute shapes and skin properties. However, it remains possible that humans are highly tuned to interattribute distances but that the information conveyed by these cues is scarce. We have also refutated this idea by showing that efficiencies—a measure of performance that factors out task difficulty—for faces that varied only in terms of their interattribute distances were an order of magnitude lower than efficiencies for faces that varied in all respects, except their interattribute distances, or in all respects. These results provide a definitive blow to the idea that real-world interattribute distances are critical for upright face recognition.

SESSION I

Figure-Ground Perception: Simply One Outcome of an Interactive Hierarchical Bayesian Predictive Perceptual Process

Mary A. Peterson
University of Arizona

Visual perception researchers have long considered perceptual organization and figure-ground perception special, in part because of claims by the Gestalt psychologists. On a Hierarchical Bayesian predictive processing approach, figure-ground perception is not special; it is simply one possible local outcome.

More than mere association: Are some figure-ground organisation processes mediated by perceptual grouping mechanisms?

Joseph L. Brooks
Keele University

Figure-ground organisation and perceptual grouping are classic topics in Gestalt and perceptual psychology. They often appear alongside one another in introductory textbook chapters on perception and have a long history of investigation. However, they are typically discussed as separate processes of perceptual organisation with their own distinct phenomena and mechanisms. Here, I will propose that perceptual grouping and figure-ground organisation are strongly linked. In particular, perceptual grouping can provide a basis for, and may share mechanisms with, a wide range of figure-ground principles. To support this claim, I will describe a new class of figure-ground principles based on perceptual grouping between edges and demonstrate that this inter-edge grouping (IEG) is a powerful influence on figure-ground organisation. I will also draw support from our other results showing that grouping between edges and regions (i.e., edge-region grouping) can affect figure-ground organisation (Palmer & Brooks, 2008) and that contextual influences in figure-ground organisation can be gated by perceptual grouping between edges (Brooks & Driver, 2010). In addition to these modern observations, I will also argue that we can describe some classic figure-ground principles (e.g., symmetry, convexity, etc.) using perceptual grouping mechanisms. These results suggest that figure-ground organisation and perceptual grouping have more than a mere association under the umbrella topics of Gestalt psychology and perceptual organisation. Instead, perceptual grouping may provide a mechanism underlying a broad class of new and extant figure-ground principles.

Interindividual differences in configural phenomena may help us understand the underlying mechanisms

Timothy J. Vickery and Anton Lebed
University of Delaware

Interindividual differences are scarcely studied in perceptual organization. Among other reasons for this may be that we do not typically think of such processes as idiosyncratic, since observers normally agree about perceived structure. However, we have found that some indirect measures of perceptual organization do vary significantly across individuals, while they are reliable within the individual. For instance, in a repetition discrimination task (RDT; Palmer & Beck, 2007), participants look for repetitions of a property among items grouped by an irrelevant factor (e.g., find a shape repetition among items grouped pairwise by color). Target repetitions are detected much faster if the repetition occurs within a group as opposed to spanning two groups, and this difference is proportional to the strength of irrelevant grouping. We find that this measure of organization exhibits moderate to strong split-half correlations, implying that interindividual differences are robust. To demonstrate the potential of these differences to illuminate mechanisms, we manipulated the type of grouping cue in an RDT experiment – pairs were defined by common region, element connectedness, color similarity, or proximity. RDT effects (between – within response time) were calculated for each type within individuals, then correlated. Consistent with the notion that common region and element connectedness belong to a distinct class of grouping cues ("extrinsic" cues, Palmer, 1999), RDT effects associated with those cues had a stronger correlation than any other pairwise correlation. We argue that long-overlooked

interindividual differences can serve an important role in revealing mechanisms as shared and distinct amongst configural phenomena.

SESSION II

Effects of spatial configuration on interpreting colormap data visualizations

Karen B. Schloss, Shannon Sibrel, Ragini Rathore, and Laurent Lessard
University of Wisconsin–Madison

To interpret colormap data visualizations, people must determine how dimensions of color map onto quantities in data. This process is easier when encoded mappings in visualizations match people's expectations, called inferred mappings. The question is, what determines people's inferred mappings? Previous research demonstrated people have a dark-is-more bias, inferring that darker colors map to larger quantities in colormaps (Cuff, 1973; McGranaghan, 1989; Schloss, et al., 2019). People also have an opaque-is-more bias that only operates when colormaps appear to vary in opacity (Schloss et al., 2019). However the visualizations tested in prior studies did not contain spatial cues to specify where "more" was located in the image, so the only information available concerned color appearance. Schott (2010) proposed that when there are clear spatial cues to "more," such as concentric hotspots, those spatial cues might override the dark-is-more-bias. We conducted four experiments to investigate the role of spatial configuration on the dark-is-more bias by testing visualizations with obvious hotspots. The results indicated that spatial configuration does have an effect, but only when the hotspot was a reliable cue to "more" during the task. Still, under conditions in which the hotspot indicated "more," the dark-is-more bias prevailed. The results suggest that inferred mappings between colors and quantities are robust to variations in spatial configuration.

Configural processing in consumer choice? Holistic vs feature-based representations of alternatives

Gavin J. Cooper, Ami Eidels, and Guy E. Hawkins
University of Newcastle

When making a choice about a product or service, consumers must consider multiple features -- such as consumer rating scores, perceived quality and price. Choice strategies proposed range from simple heuristics (conjunctive strategy; Coombs & Kao, 1955) to more complex strategies involving the integration of feature information (weighted additive models; Tversky, 1969). To overcome limitations of existing methods of investigation we have classified 15 extant theories into a smaller set of classes on the basis of each theory's assumed processing architecture and stopping rules. Some classes exhibit self-terminating stopping rules and serial processing architectures, suggesting feature-based processing. Others are notable with exhaustive stopping rules or coactive architectures, suggesting more holistic representations of the alternatives in the decision process. To discriminate between the classes in data we developed an adaption of a Discrete Choice Experiment using the requirements of Townsend's Double Factorial Paradigm. Results from two experiments show that simplified representations of consumer product features (star ratings for one experiment vs numerical rating scores in a second experiment) increased the likelihood of participants processing multiple features simultaneously.

Evidence for a Two-stage Model of Contour Interpolation in Visual Object Formation

Susan B. Carrigan & Philip J. Kellman
University of California, Los Angeles

Contour interpolation processes are crucial in ordinary object perception but have proven difficult to encompass in a single theoretical account. Many difficulties can be resolved by a view of contour interpolation as a two-stage process. The initial stage links automatically all pairs of edge fragments that satisfy geometric constraints of contour relatability. This first stage produces an intermediate representation, however, not the edges that appear in the final percept or scene description. The second stage takes the output of the first and implements a variety of scene constraints that determine the strength and appearance of interpolated contours in the final scene description. The two-stage model coheres with a great deal of evidence and explains important and heavily studied phenomena that remain puzzling on other accounts. One concern with a two-stage account is that the first stage has been precisely modeled (e.g., Kalar et al, 2010) but the second stage has been vague. Using character recognition as in the classic display devised by Bregman (1990), we developed a task that should access Stage II representations and used it to quantify the interactions of a number of scene constraints, including border ownership, presence or absence of an occluder between visible fragments, luminance contrast polarity, and effects of contour information at different spatial scales. Results revealed that scene constraints combined according to a simple additive model. The sole exception was an interaction between partially mismatched spatial frequencies and the absence of an occluder, which led to complete deletion of contour connections in Stage II. These systematic results support the two-stage model, place several Stage II factors on a clear quantitative footing, and explain many phenomena that are otherwise unexplained.

SESSION III

The cross-cultural difference in face perception and the other-race effect

Mario Fific[1], Daniel R. Little[2], and Cheng-Ta Yang[3]
[1]Grand Valley State University, [2]The University of Melbourne, [3]National Cheng Kung University

The other-race effect refers to the difficulty of discriminating between faces from ethnic and racial groups other than one's own. Researchers mostly agree that a major culprit behind the other-race effect is the inability to utilize a fast holistic face perception. It is hypothesized that perception of other race faces uses a slow analytic perception of facial features. In the cross-cultural study we compared both Asian (Taiwanese) and Caucasian (US) participants' face discrimination of both own-race and other-race faces (Taiwanese and Caucasian woman), according to their nose-to-mouth separation and eye-to-eye separation. However, one of the possible confounding factors in understanding the other-race effect could be a possible cross race facial features' discrimination rates. To control for the facial feature discrimination rate across racial groups we adjusted individual participants' facial feature discriminability using psychophysical methods and created face sets so that the facial perceptual effects are constant, for both the own- and other-race faces. Then we employed factorial design using the psychophysically adjusted configural facial features in a face categorization task. The computational modeling results failed to support the other race effect: all subjects processed the both face types using the same cognitive model. Also, the Taiwanese subjects demonstrated a higher level of holistic processing, than the US participants. Finally, almost all of the subjects of both races used parallel processing of the facial features while some subjects, utilized facilitatory parallel processing showing the across-feature dependency (parallel facilitatory model) which supports a strong form of holistic hypothesis in face perception.

Emotional and Spatial Parameters in Global – Local Processing

Ahu Gokce
Kadir Has University

This talk will focus on how emotional and spatial attention parameters affect the global and local processing mechanisms. Navon (1997) put forward the global precedence effect where global configurations have priority in processing compared to local features within that configuration. In this study, global and local precedence effects are investigated by manipulating the attentional and emotional factors. Local and global symbolic arrow cues were used to bias attention in local and global levels respectively. In addition, emotional effects on global and local processing were investigated. Previous studies showed that positive and negative emotions influence global and local processing differently. While positive emotions facilitate global processing, negative emotions facilitate local processing. Based on these, aim was to investigate the effect of emotions on global-local bias and to examine to what extent do the symbolic cues modulate these processes by simultaneously presenting cue and the emotional picture. Using Navon figures, participants were presented with (in)congruent displays. Prior to the presentation of displays, symbolic arrow cues were presented in the center of the screen and shortly accompanied by an emotional picture. Performance was evaluated on the basis of reaction time and global-local preference measurements. Results revealed divergent patterns on the precedence effect caused by the cue type and emotion factors. Discussion will be based on the differences on the modulation of the precedence effect.

Audiovisual configural processing and effects of film music

Annabel J. Cohen
University of Prince Edward Island

Music is integral to the typical experience of film and video, setting the mood and establishing context. Associations brought to mind by the music can account for these roles. This perspective however overlooks the configural aspects of the modalities contributing to the film, for example, the patterning of visuals, speech, sound effects, and music. Cross-modal structural regularities offer another basis (i.e., besides associations) by which film music operates. Cross-modal configural processing, in fact, may be necessary to account for unique effects of film music on the interpretation of different simultaneously present characters on the screen. Incorporating both configural and association aspects of film music, the Congruence-Association Model with Working Narrative (CAM-WN) proposes that cross-modal congruencies serve to focus attention, such that associations from the film (including musical associations) can be directed to the attentional focus (Cohen 2013). CAM-WN assumes that the audience member engages in creating a working narrative arising from the best match between bottom-up analysis of audiovisual information provided by the film and top-down expectations based on experience held in long term memory (with application of a simple conception of adaptive resonance theory of Carpenter & Grossberg, 2016). The working narrative is the conscious dynamic experience of the film. Structural crossmodal configurations and congruencies tell the audience where and when to look (or how and when to listen, e.g., in music video, Boltz, 2013) while associations offer clues to meaning. The presentation raises the question of how best to further specify the configural aspect of the CAM-WN model.

NOTES