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Segmenting Everyday Actions: an Object Bias?

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Introduction

Recognizing and understanding observed actions is critical to effective social interaction. To do this, observers must segment complex and continuous human behavior into discrete events. Newtonson (1973) developed a paradigm for measuring behavior segmentation, in which participants observed films of everyday behavior and used a key to mark off separate events. Zacks, Tversky and Iyer (2001) showed that people segment observed action according to a *hierarchical* structure: larger (coarse) action units were defined by changes in the object being manipulated, whereas smaller (fine) units were defined by changes in actions performed upon the same object. Zacks et al. suggested that this organization reflected a cognitive bias to relate objects to goals and actions to subgoals. Because Zacks et al.'s findings could be due to the organization inherent in their stimuli, the present study examines the possibility of an object bias by asking observers to segment differently organized tasks.

Methods

We filmed two familiar activities: packing a suitcase and washing dishes, according to two different organizations. One version organized larger goals by object changes and subgoals by action changes (*object* films), and the other organized larger goals by action changes and subgoals by object changes (*action* films). Participants viewed both object films or both action films and segmented them according to the Newtonson paradigm. In Experiment 1, thirty-two participants viewed the films twice, marking off coarse units on one viewing and fine units on the other. In Experiment 2, sixteen participants segmented the same films into whatever events felt natural.

Results and Discussion

For Experiment 1, linear regression analyses revealed that observers changed their segmentation criteria based on the organization of the films they observed. For *object* films, changes in objects were the best predictor of coarse event boundaries, $F(1,560) = 76.2, p < 0.001$, and changes in actions on the same object were the best predictor for fine

boundaries, $F(1,560) = 96.2, p < 0.001$. For *action* films, this pattern reversed: changes in actions predicted coarse segmentation, $F(1,552) = 125.8, p < 0.001$, and changes in objects predicted fine segmentation, $F(1,552) = 27.5, p < 0.001$. Although segmentation followed event organization by action or object, there was greater agreement on segment boundaries and greater hierarchical alignment for events organized by objects than events organized by actions (Fig 1). To further test whether objects bias segmentation, participants in Experiment 2 segmented the films into natural units. Object changes were the best predictor of event boundaries for both *object*, ($F(1,560) = 51.068, p < 0.001$) and *action* conditions ($F(1,552) = 72.244, p < 0.001$). Furthermore, participants in the object condition produced segmentation patterns suggesting that they monitored both coarse and fine levels of action. Participants in the action condition did not show this pattern, suggesting poorer identification of hierarchical structure. Taken together, these data suggest that while observers are adept at uncovering the structure in different task organizations, there is a bias towards object-based segmentation

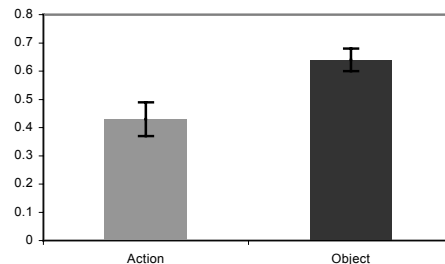


Figure 1: Hierarchical Alignment for *action* and *object* films.

References

- Newtonson, D. (1973). Attribution and the unit of perception of ongoing behavior. *Journal of Personality and Social Psychology, 28*, 28-38.
- Zacks, J.M., Tversky, B., & Iyer, G. (2001). Perceiving, remembering, and communicating structure in events. *Journal of Experimental Psychology, 130*, 29-58.