Salient Feature Coding in Response Selection

Circularity?

Proctor: As long as there is independent evidence to indicate that one feature is more salient than another, predictions can be derived for specific stimulus-response assignments from the concept of salient-features coding.
Mediating processes that determine the response to make to a stimulus.

They operate on **coded** representations of the stimulus and response sets.

The contribution of the translation stage to reaction time is greater when a direct physical/conceptual correspondence between S and R is lacking.
Figure 2. Compatible (a) and incompatible (b) mappings of stimuli to responses in the two-choice spatial-compatibility task.

Figure 3. Examples of displays from horizontal (a) and vertical (b) spatial-precuing tasks. The warning (1) indicates all four locations, the precue (2) two locations, and the target (3) a single location.
With normal, adjacent-hand placement (4a), responses are fastest when the two left or two right locations are cued, and slowest when either pair of alternate locations is cued.

Figure 3. Examples of displays from horizontal (a) and vertical (b) spatial-precuing tasks. The warning (1) indicates all four locations, the precue (2) two locations, and the target (3) a single location.

Figure 4. Adjacent (a and c) and overlapped (b and d) hand placements for the horizontal and vertical spatial-precuing tasks.
Anatomical coding?

No — the same pattern is obtained when specific fingers are dissociated from response locations by using overlapping hands (4b).

A similar benefit for precueing either the two top or two bottom locations is obtained when the stimulus and response sets are oriented vertically (4c).
Codes used for translation:

Position relative to the centre of the stimulus and response arrangements.

Horizontal: Two locations to the left or right of centre. Translation is faster when the pre-cue is consistent with the relative-location coding than when it is not.

Translations do not depend on orientation.
Translations do not depend on orientation.

Figure 3. Examples of displays from horizontal (a) and vertical (b) spatial-precuing tasks. The warning (1) indicates all four locations, the precue (2) two locations, and the target (3) a single location.
Symbolic coding

Letter identity and size

\[ O \quad O \quad z \quad Z \quad \text{faster than} \quad O \quad z \quad o \quad Z \]
Sometimes, coding is based on anatomical distinctions.

The pre-cuing advantage for the two top and two bottom locations is accentuated when the distinction between the left and right hands coincides with the salient spatial distinction. Apparently, turning the hands inward increases the salience of the hand distinction in the spatial pre-cuing task.
Movement pre-cuing tasks

Parameters of the movement are specified in advance of a target signal (e.g. Arm, Direction, Extent). Effects have been attributed to the motor system.

Alternative: movement pre-cuing benefits may be due to translation processes.

How to distinguish between these alternatives?

Motor representations presumably have a hierarchical structure: We plan the direction of a movement before planning whether we use the left or right arm to produce the movement.
Larish and Frekany found that subjects were faster to respond when direction rather than arm was precued.

Assume: translation was equivalent for the two pre-cue conditions.

If this assumption is correct, then it follows that the cueing effect is more likely due to motor processes rather than SR translation.
Comment by Proctor: In Larish and Frekany’s experiment, the arm was signalled by stimuli in left or right locations, while direction was signalled by stimuli in above/below locations.

Rival experiment: All four response target aligned in a horizontal row.

Now, no difference found for pre-cuing arm or direction.

Inference: Effects are due to translation processes rather than motor processes.
Another example of motor versus translation processes.

Michaels (1988) had subjects respond to the destination of an apparently moving target.

Responses were faster at the destination location than at the opposite location.

Michaels attributed this destination compatibility effect to direct perception of “catchability”.

Alternative: The effect is due to coding of direction of motion as a salient feature designating location.
Another example of motor versus translation processes.

Proctor: The destination compatibility effect occurs for a variety of display and response conditions, in which “left” and “right” are specified through changes other than optical expansion.

The catching-affordance notion is too specific.
Gordon and Meyer (1984) found that responding was faster when a speech stimulus shared a voicing feature with a speech response (e.g. “puh” and “tuh” are both unvoiced) than when this was not the case (e.g. “puh” and “duh”).

Is this due to the direct activation of motor features by speech features?

Proctor, Weeks and Kelly (1991): similar results are obtained when the speech stimuli are assigned to keypress responses, when spatial-location are assigned to the speech responses, and when two-dimensional symbolic stimuli presented visually are assigned to the speech responses.

So — the speech-compatibility effect does not reflect any special relation between the stimuli and responses.

The overall pattern is more consistent with predictions of the salient-features coding account.