Meaningful Gesture Imitation Coding Rules
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For data relevant to task validity, see e.g., Metzgar, Stoll, Grafton, Buxbaum, & Garcea, 2022; Isaacs, Buxbaum, & Wong, 2022; Tarhan, Watson, & Buxbaum, 2015; and Buxbaum, Shapiro, & Coslett, 2014. All coders are trained to > 85% inter-rater agreement (Cohen's Kappa).

General Coding Instructions
If subject performs gesture more than once, code for the best iteration of each item. Therefore, if there is an error that is corrected for at least one iteration, give full credit. The exception is if the correct component was only a 'fleeting' part of the overall gesture.

Below are item-level elements that are required for gesture production to be scored as accurate.

Video 0, Item 1 (comb)
Hand Posture (HP):
- Hand should resemble a fist, cannot be held flat

Kinematics (KIN):
- Hand movement between 2-6" from head
- Forearm should face body
- Hand should move about 3 – 14"
    - Be lenient, rarely is movement too large
    - Movements < 90 degrees (i.e., arm ends parallel to table or tilted down) are given credit
- 2-4 movements

Video 1, Item 2 (eraser)
HP:
- Hand must resemble a fist, cannot be flat/straight
- No wrist movement
- Thumb should not stick out

KIN:
- Forearm should face table
- Hand should be within 1- 6" of table
- Hand should move side to side in diagonal movement
- Hand should move about 6 – 12"
- 3-5 movements

Video 2, Item 3 (fork)

HP:
- Hand should resemble a closed fist
- Little wrist movement

KIN:
- Hand should get within 2" to 6" of table and 2" to 6" of mouth (if hand touches face this is a KIN/amplitude error)
- Forearm should be facing table, then towards body
- Hand/arm should follow pattern/ "stab" at beginning, but does not need to return to the center of the table at the end
- Hand should remain at midline
- Hand should not go above nose or below chin
- 1-2 movements

Video 3, Item 4 (lighter)
HP:
- Fingers should be curled, thumb sticking up with 1-2 movements downward
- No wrist movement
- Thumb can move pass knuckles

KIN:
- Hand should be positioned at or close to midline
- Hand should not be more than 6" to 10" from table or closer than 2" to 4" to table
- Forearm should face body
- Arm should be static after it is in position at midline, most of the lighting movement should be in the thumb
- At least 1" thumb movement
- Excessive arm movement is a KIN/amplitude error
- 1 or 2 movements
- Must hold lighter, then press (not squeeze whole hand in one movement)

Video 4, Item 5 (nail clippers)
HP:
- Hand closed with fingers bent and thumb on top
- All fingers except thumb must be tucked to some degree
- Little to no wrist movement
- Thumb should move at least an inch; no movement is HP error

KIN:
- Forearm must face body
- Arm must rotate inward or diagonally; be lenient (any general rotation or diagonal movement should be ok)
- Some up/down arm movement allowed, but more than 3" is a KIN error
- Up/down arm movement not needed
- Arm must mostly move in the correct direction
  - Movement in the opposite direction more than once is an error
- Arm should not rotate more than 4" to 6" between clips

- No rotation/movement of arm is a KIN/amplitude error
- Arm should not move vertically more than 4" to 6"
- 4 to 6 movements
- Arm movement must be in sync with clipping

Video 5, Item 6 (razor)
HP:
- Hand must be in closed fist; thumb can be tucked or slightly extended
- No/little wrist movement
- Wrist should be straight, not bent
- Excessive wrist movement is HP error

KIN:
- Forearm should face body
- Hand should be within 1 - 6" of face
  - If closed hand touches face this is a HP error (not body-part-as-object error; however, if open hand is used as the 'blade' of razor this is a body-part-as-object error)
- Must have vertical movement, though too much or too little movement is a KIN error
- Hand should move about 3 – 8"
- No vertical movement is a KIN error
- No more than 3 movements on each side of the face

Video 6, Item 7 (scissors)
HP:
- Cutting with pointer/middle is a HP/body-part-as-object error
- Hand must open and close at least 2"
- Little/no wrist movement
- Thumb on top touching curled fingers
  - All fingers must be curled

KIN:
- Forearm should face correct position
- Hand should be at least 3" to 5" from table and no higher than 12" above
- Arm must move forward, in correct plane
  - If arm moves back/forth this is an error
- Between each cut, arm should move between 2 – 6"
- 2 to 4 movements
- Cuts must be in sync with arm movement

Video 7, Item 8 (toothbrush)
HP:
- Hand must be in closed fist
- Small amount of wrist movement ok, as long there is arm movement as well
- Thumb can stick out a small amount

- Excessive wrist movement is HP error since wrist should be static

KIN:

- Forearm does NOT need to face camera
- Hand should be within 4" to 6" of face
- Hand should be off to the left
- Arm should oscillate
- Arm should not move much horizontally
- Arm should be held up, but be lenient
- Hand should move about 2-4"
- 4-6 movements

Video 8, Item 9 (watch)

HP:

- Give credit if HP mostly resembles video;be lenient
- No pinching
- No wrist movement
- No thumb movement or any wrist movement is HP error

KIN:

- Forearm should face body
- Hand should be at least 2" above table but not more than 8"
- Hand should be at or close to midline
- Arm should remain still after in position
- Thumb should move at least 1" but no more than 3"
- Any arm movement during winding is a KIN/amplitude error
- 2 to 4 movements

Video 9, Item 10 (bottle opener)

HP:

- Hand should be in fist with thumb sticking out
- There should be some wrist movement in the correct plane
- No wrist movement is HP error

KIN:

- Forearm should face body
- Hand should be roughly at midline
- Should have some movement in the correct plane
- No arm movement is a KIN/amplitude error
- Movement should be between 3"-12"
- 2 to 3 movements

Video 10, Item 11 (cup)

HP:

- Hand should be cupped like a "C" with spacing between fingers (be lenient with finger spacing, give credit if there is some spacing between any fingers)
- Wrist should be static (not flop back and forth), movement is in forearm

KIN:
- Arm should move in correct plane, bringing hand from center of table up to mouth
- If cup goes past mouth this is KIN/amplitude error
- If cup does not make it to mouth this is KIN/amplitude error
- 1 to 2 movements

Video 11, Item 12 (hammer)
HP:
- Hand should be in fist
- Some wrist movement is ok but not required.
KIN:
- Forearm should face correct direction
- Needs vertical arm movement
- Hand should move between 8 – 14"
- 2 to 4 movements