

Supplementary material to

Dael, N., Mortillaro, M., & Scherer, K. R. The Body Action and Posture coding system (BAP):

Development and reliability. *Journal of Nonverbal Behavior*

Downloaded from http://www.affective-sciences.org/gemep/BAP_coding

Coding principles

- Observer bias. Keep the coding manual at hand during the entire coding period and consistently follow the definitions at all times so as to avoid observer bias.
- Unclear. Refrain from coding if a behavior is unclear, invisible or too small to categorize. If a behavior is clearly pronounced but difficult to code (e.g. if two movements overlap), focus solely on the category of interest, and make notes for future reference.
- Time coding. The onset is frame where subsequent frame shows difference in position of the articulator, i.e. start of movement. The offset at frame where subsequent frame shows no difference in position of articulator, i.e. no movement
- Multi-articulation and -directionality. Often several articulations occur simultaneously, e.g. head and trunk, head rotation and head tilt. Focus on one articulation at a time. Often a single movement involves changes in multiple directions, e.g. left and down. When coding posture, separate the overlapping transition and configuration phases.
- Order of coding.
 1. Focus each time on one *body part* – head, neck, trunk, arms, eyes, lower limbs, whole body
 2. Distinguish actual *articulation* of that body part *from artifact* (i.e. movement due to other body movement). Only proceed if articulation.
 3. Distinguish between *posture or action*

4. Define the *anatomical* articulation (lean, extension, tilt, rotation, etc.)
5. Define the movement *direction(s)* separately
6. After the previous steps have led to the selection of a behavior category, determine the onset and offset *time-points*
7. If applicable, define the action using a functional code

Additional guidelines

- Code *movement direction* relative to the body of the expresser (the anatomical axes) and never relative to the angle of the camera(s). Inverse left – right from frontal view, which is opposite to the expresser. Pay special attention to this reference frame when the expresser is not facing the camera.
- *Anatomical standard position*
 - o Always code postures relative to the anatomical standard position: head straight on trunk and trunk straight on lower body. In contrast, actions are coded only on the basis of the movement characteristics (both using the anatomical reference frame).
 - o Do not code anatomical standard posture of head and trunk, except when there is a transition movement towards the standard ('middle') position, so when previously there was a non-standard posture (e.g. HTuR_PC is broken off by a movement HTuM-PT resulting in HTuM-PC).
 - o If no movement is observed and the trunk is rotated compared to the hips (TRL or TRR), then refrain from coding head rotation (HTuL or HTuR or HTuM). In the absence of movement articulation, one cannot distinguish whether this alignment occurred due to trunk rotation or head rotation in the opposite direction, and thus only code trunk rotation.

- Any movement coded needs to be caused by the indicated articulator in order to exclude artifact movement, e.g. hand movement due to shoulder articulation (upper arm), head movement due to trunk lean, etc. Only when coding leg and whole body movement the exact articulators do not need to be indicated.
 - Only repetitive actions can be coded while holding an anatomical standard posture of head or trunk. Any other kind of movement either marks the beginning of a new posture unit or is too small to distort the obtained position (or uncodable).
- *Posture configuration & transition*
- During the configuration phase of a posture unit, the coded articulator does not need to be static (e.g. TRR-PT during TLF-PC). Clearly separate the observation of each direction (step 5 in *order of coding*).
 - If movement during the configuration phase of a posture unit does not distort the end position, it is part of the same posture unit. Every posture unit can have only one transition phase, occurring before only one configuration phase. The movement distorts the end position only if it can be considered as the transition phase of a new, different posture unit.
 - In the case of postural movement resulting in the same end position as the previously coded configuration phase (e.g. forward trunk lean configuration, followed immediately by forward trunk postural movement), the end position (forward trunk lean) is not distorted so this movement is included in the configuration phase and no new transition phase is coded.
 - Code the offset of a posture transition only when there is a clear stopping of the transition movement for the coded direction. After onset of the posture

configuration phase, the little movement that does not distort the end position is included in this phase. Only when it distorts the current posture for that direction, the movement is coded as a transition of a new posture.

- If a non-standard posture is already attained at the start of the video, the configuration phase starts at the first frame.

Lower limbs

- When coding movement of the lower limbs, do not differentiate between action or posture. Code knee bend and leg movement as long as they are bent or moving (bending or stretching). If knee bend coincides with other leg movement, only code leg movement to limit possible confusion. Always code lower limb movement when coding whole body movement, but not vice versa.

Action & posture

- Code as posture if one cannot exclude that the movement is part of the transition (posture change) or configuration phase of a posture (slight movement that does not distort the posture).
 - The retraction phase of an action overlaps with the transition phase of a posture.
 - If the video ends while an articulator is moving, only code posture transition or action retraction if the end position is almost completed. Also only code retraction when it is clear that it is followed by a posture.
 - One body part can be involved in both action and posture simultaneously if there is no distortion of the general resting position (e.g. arms crossed) and there is an excursion (e.g. wrist action) since different articulations are involved
- The posture hand(s) in the pocket is also coded if only part of the hand, such as fingers, is in the pocket. This code does not apply if the hands are hooked behind the belt, trousers etc.

- Only code posture symmetry when both arms are in the configuration phase.
- Only code action symmetry when both arms are in action. The same articulators have to move for both arms in a symmetrical fashion. Do not code action symmetry when only the wrist (hand) or fingers move. Do not include the finger or wrist movement or hand configuration in this code.
- Disregard movement of the lower jaw due to talking when coding vertical head movement.

Wrist and finger action

- o Even though lateral wrist rotation the articulation includes the forearm, the elbow is not involved so this is coded as wrist articulation.
- o The direction of finger and wrist articulation is not coded. Only code direction when the lower and/or upper arm is involved in the movement. If only the fingers and/or wrist move, then an action is coded indicating finger or wrist articulation. Such action is therefore coded as one unit and not further segmented. A hand configuration change cannot influence the segmentation, which is based on direction.

Action hold

- o Code action hold only if the articulator is held static for at least 200 ms (considered large enough for view at normal speed). If less than 200 ms, then these frames are included in the previous unit.
- o Do not code action hold for trunk or head actions. When there is a hold of at least 200 ms it should be coded as a posture.
- o In order to find the correct time of onset and offset of the hold phase, first code the adjacent segments, then see if there are at least 200 ms in between the offset of the

previous segment (when the movement stops going in that direction) and the onset of the subsequent segment.

- During the hold phase of an arm action the elbow or shoulder are held static, this is not affected by changes in hand configuration, finger or wrist articulation.

Thus during a hold segment no attributes can be coded except articulation of the fingers or wrist.

- Action repetition (e.g. vertical) is coded as one element or segment. In this segment, several articulators and directions can be involved but they need to be present in every repeated segment. Do not code its directions proper to the repetition (up, down), except if during the repetition segment there is additionally other direction movement (general upward, left, etc).
- The rules for action segmentation imply that an action subunit represents a continuous movement with no sudden direction change and no hold of at least 200 ms. An ongoing or gradual change in direction cannot be segmented and is thus coded as one segment with varying non-linear directions. A sudden stop of directed movement can also be considered as an action break and defines the offset of a unit or subunit. Within each action subunit, code all present directions and articulations.
- The direction and articulators during the action retraction are not coded. Code retraction only when the movement purely consists of taking a new posture or going back to the previous posture, without any other excursion. If the movement during retraction is more than just what is needed to obtain the posture, then do not code as retraction but consider as an action element where the rules for segmentation apply. For head and trunk action, the attribute retraction is not included. The retraction of a head and trunk action is coded as a separate element where no attributes are coded (leave all boxes blank). This way the action segmentation and retraction rules are not violated.

- An arm action subunit is coded as towards or away of from the body if the articulation results in an arm configuration or displacement that is generally either closer or further away from the body than before. The direction in which this occurs (frontal, lateral, vertical) is of no importance for this category.
- Always code illustrator when deictic or beat, but not vice versa; illustrators can be coded that are not deictics or beats, for example iconic gestures. Thus an illustrator does not have to have the same onset and offset as beat or deictic if those are present, before or after a beat there can be other kinds of illustration. Beat and deictic are always nested within illustrator.
- Do not code self-touch when the body part (usually hand) touches itself, or when the touching is part of the posture. If manipulator is coded, then self-touch is also coded except if the manipulation is on the same body part. Self-touch does not always have a manipulating function.