

## Appendix A

### *Development process of CAT*

#### **Motivation to develop CAT**

We developed CAT for a field research project that aimed to examine how multi-professional teams diagnose rare diseases. All co-authors had been involved in field research projects focusing on team or dyadic communication (references for these projects are blinded for review purposes) and were keen to support methodological innovation in team dynamics research. In the early stages of the research project, we had the opportunity to observe team meetings of health care professionals when they discussed rare disease patients. It was unclear whether we were going to be able to video-record those meetings, hence, we were looking for a solution to collect time-stamped behavioral data in real-time.

#### **Step 1: Review and evaluation of existing tools**

The first author reviewed and tested various existing apps/tools that are available for behavioral analyses<sup>1</sup> (e.g., „Behavior Tracker“; ABC Video Pro; BehaviorSnap and various others). The first author also had about seven years of experience working with one of the common commercial software solutions (i.e., INTERACT from Mangold International) within multiple research projects (Citation blinded for review) and had tested the commercial live coding app (Obanysis<sup>2</sup>) from this commercial supplier. After reviewing, testing and discussing these options amongst the team of authors (F.K., S.P., & G.H.), the team decided that none of the existing tools had sufficient flexibility for use in our intended context.

#### **Step 2: Goals for the software**

We had multiple goals for CAT. First, we wanted a tool that could be used for coding of both live observations and that could annotate video/audio-recorded data. This was important because we expected recordings to be impossible in the early stages of the project, but hoped they might be possible at a later stage. Second, the tool had to be compatible with tablet, phone and laptop. Third, the tool had to provide some basic feedback functions (i.e., summary statistics of the meeting/session, Gantt charts to display participation over time). This was important for motivating the teams to allow us to be present. Fourth, the tool had to be free to use for research purposes. Fifth, the tool had to be sufficiently flexible to incorporate a variety of different *coding schemes* (i.e., varying number of codes, possibility to edit the names of codes/enter full code names and code descriptions instead of only letters; inclusion of rating scales). Furthermore, the tool had to allow researchers to adapt and change names of existing schemes. Sixth, the tool had to allow easy exchange for data (and templates for coding schemes) across labs internationally.

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<sup>1</sup> We used a list of behavior analysis apps provided by <https://batechsig.com/2015/03/09/apps-for-behavior-analysts/>

<sup>2</sup> <https://www.mangold-international.com/en/products/software/mobile-observation-with-obanysis>

**Step 3: Programing the software**

A first prototype of CAT was developed in May 2017. After a positive evaluation of this prototype, we further developed the software in iterative steps involving biweekly meetings over about 8 months involving the programmer and authors. Overall, the tool involved about 585 hours of IT development (i.e., about 15.5 weeks full-time work just for our programmer).