

# Overview of work focus coding **res2A**

Seeing the world differently

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*2018-01-27*

The *Seeing the world differently* workshop comprised 3 phases: the “research phase”, “conference phase”, and “publication phase”. The data explored here is from the research phase.

In the research phase, participants formed small work-groups and were tasked by a facilitator to work with a target phenomenon for about 20 minutes, with directions to “describe what you see and explain why it happens” using pencil and semi-structured forms called “flipbooks”. When time was called, all groups moved to a new round of work using a different phenomenon. This effort by a group to “describe and explain” a simple phenomenon is one of the basic academic tasks being studied.

Workshop participants formed three groups, identified in the study databases as “A”, “B”, and “C”. There were three physical phenomena to explore: a stuffed toy being swung on a string (“Bear”), a half-filled bottle of ketchup (“Ketchup”), and a marble in a box (“Ball”). The groups went through two rounds together, giving six task engagements, or “sessions”. Since there were two work rounds, each group worked with two different phenomenon.

Table 1: Overview of the six research-phase sessions

Round	Group	Phenomenon	Mins
1	A	Bear	14
1	B	Ketchup	15
1	C	Ball	15
2	A	Ball	17
2	B	Bear	17
2	C	Ketchup	17

## Method for Coding Facilitation and Focus

Group work was coded in two rounds, or “tiers”: first for whether a group was engaged with the facilitator during work (“facilitation coding”), and second for the focus of the group as it worked (“focus coding”).

**Tier 1:** *Facilitation coding* uses two codes: **Independent** or **Facilitated**. During facilitated work, the group worked with the facilitator, while in independent work, it did not. The facilitation coding scheme is *exhaustive*, meaning that no point in a session isn’t in a coded interval, and is *exclusive*, meaning no point can have two work codes.

**Tier 2:** *Focus coding* had six codes: Reading, Doing, Representing, Discussing, Other on-task work, or Off-task work. These codes are explained below. The focus coding scheme is exhaustive but not exclusive.<sup>1</sup>

Facilitation and focus were coded by the investigator from video. During the workshop, each group’s activities were videorecorded by an assistant dedicated to that group. For each session, the recording was trimmed to the beginning and end of session work and standardized to a display resolution of 960x540 pixels (qHD) at 25 frames per second (fps). These trimmed videos were viewed using Adobe’s Premiere Pro, which allowed forward and backward, slow- and high-speed, and frame-by-frame viewing. A code was applied with Premiere Pro over a “code interval” by marking the beginning (In) and end (Out) points for text that overlaid the code on the image (Figure 1).

<sup>1</sup>Exclusive: i.e, facilitation code intervals can’t overlap, Not exclusive: focus code intervals can overlap

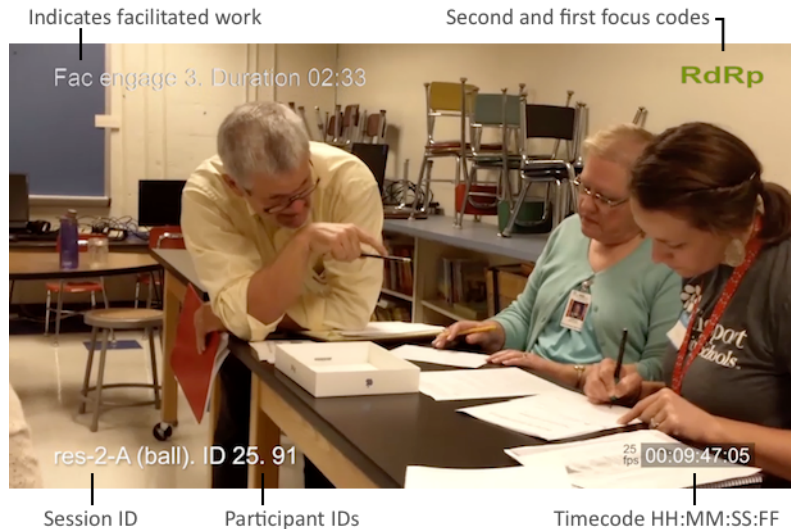


Figure 1: Example frame of a coded video showing overlaid information.

Coding information appears as title text overlaying the videorecording of the session. The timecode (lower right) gives minutes and seconds from the beginning of the trimmed recording. The last two digits give the number of video frames passed since the last tick of the seconds timer. All coding videos are encoded at 25 frames per second. This allows synching with other coding software to within 40 ms.

If work was facilitated, a white marker appears in the upper left of a coded video. Focus codes display in the upper right corner. Focus codes during independent work display in orange and those applied during facilitated display in green. The round, group, and phenomenon being explored display in the bottom left along with the study participant IDs. A running “timecode” marking the position of the video from the beginning of the session displays in the lower right.<sup>2</sup>

## Focus codes

Focus codes were defined by the investigator initially to capture whether a group was working on their representations or with materials. After several coding passes, it was clear that groups focused on other things as well, for example, working to understand if they were “doing it right” or getting materials for their representations.

The focus code set was finalized, after repeated coding passes, on the seven codes defined below:

Code	Name	Meaning
Rd	Reading	A focus on reading instructions, getting clarification from the facilitator, or discussing the instructions.
Do	Doing	A focus on manipulating the materials related to the phenomenon under study, or manipulating other materials to facilitate working with the phenomenon, or measuring some aspect of the phenomenon.
Rp	Representing	A focus on group members’ capturing on paper their thinking about the phenomenon.
Ds	Discussing	A focus on talk among subjects about what happened, why it happened, or explanations of what happened without directly manipulating the materials and without a focus on representing group members’ thinking.

<sup>2</sup>Because a group’s focus can be split, there may be one or two focus codes displayed. Whether a code is first or second depends on the way codes were applied and carries no meaning.

Code	Name	Meaning
O	Other on-task	A focus on working on the task at hand (describing and explaining the phenomenon) not covered by the other on-task codes. For example, organizing or getting new flipbook pages.
Of	Off-task	A focus on something not to do with the task at hand (describing and explaining the phenomenon)

## Focus Code Dataset

The observational unit in the dataset is a “codestamp”, seven variables describing a single code interval. A codestamp comprises: two variables (**Code**, **Type**) giving the code and it’s type, two variables (**In**, **Out**) giving beginning and end timestamps of the code interval relative to the start of the video, two (**Round**, **GID**) identifying the round and group that was coded, and one (**Bin**) identifying the facilitation level at the time.

The overlaid code texts and the In / Out markers for each coded video were exported from the Premiere Pro project files to editable text files. These were manipulated using the *R* statistical language (a) to recode the complex video timecodes into numeric “timestamps”, and (b) to add context information to each coded interval. This augmented data was then saved as *R* dataframe tables. The tables for each session were then combined into a single dataset. This final focus codeset contains 205 codestamps covering all groups for both rounds.

Table 3: Random sample from dataset  
res2A\_focus\_hand\_mdg\_20180104\_cstamp

Coder	Bin	Code	In	Out	Round	GID	Type
mdg	Ind	Do	2016-08-16 00:01:46	2016-08-16 00:01:48	2	A	focus
mdg	Fac	Rp	2016-08-16 00:10:42	2016-08-16 00:11:47	2	A	focus
mdg	Ind	Do	2016-08-16 00:06:47	2016-08-16 00:06:57	2	A	focus
mdg	Ind	Rd	2016-08-16 00:09:50	2016-08-16 00:09:53	2	A	focus
mdg	Ind	Rp	2016-08-16 00:07:54	2016-08-16 00:09:09	2	A	focus

The **In** and **Out** variables show the timestamps for a code interval. The timestamp have the date of the workshop prepended to the session time to facilitate analysis with *R*, but only the time (HH:MM:SS) portion is interpretable. These are the original offsets from the beginning of a video recording of the session. Since sessions likely began at differing times, these In/Out timestamps cannot be used to align work *between* sessions.

Timecodes, timestamps, and codestamps are not the same thing. Due to the nature of videorecording, the *timecodes* overlayed on the recording count time to the second, and then append the number of video frames since that second. The *timestamps* computed by *R* convert the frame count into an elapsed fraction of a second and adds that to the time. *Codestamps* are the observational unit of the dataset, and include the code and the timestamps plus the other contextual information.<sup>3</sup>

<sup>3</sup>For example, in Figure 1, the timecode displays 00:09:47:05, representing 9 min, 47 sec, and 5 frames. At 25 fps, the elapsed frames are equivalent to 0.2 seconds, and the elapsed time at that frame is 9 min, 47.2 sec. This would be rounded to produce the timestamp 00:09:47.