**Coding scheme overview:**

Our coding scheme is in an excel spreadsheet in this repository. Note- we have hidden non-visualization request rows in the spreadsheet, because our focus was on visualization requests in our coding scheme. So non-visualization request rows and scenes are not addressed in our coding scheme.

Column A: Participant identifier

Column B: Scene number

Column C: Description of the scene

Column D: Is the scene a visualization request, or a layout request, or a non-actionable request

Column O,P,Q,R: Select one for each request: Direct request, referential request, selection request, and unclear.

Column T, U, V, W, X: Just for Direct requests, select one of Target, Browse, Compare, Complex

Column Z, AA, AB: For referential requests, select how many views are targeted (one or many) how many operations are expressed (one or many) and how many outcomes are produced (one or many)

Column AD: What the referential pivot changes (eg. change of filter). Not used in our analysis

Column AF, AG, AH, AI: Just for Referential requests, select one of Target, Browse, Compare, Complex

Column AK, AL, AM, AN: Just for Referential requests, select one of Target, Browse, Compare, Complex

The remaining columns are not used in our analysis.

**Description of scenes and coding protocol:**

As described above, we focused in our coding scheme on the participant request and how they utilized views on screen, not on how the mediator responded to this request. The description column will include information about how the mediator (who we nicknamed the ‘DAE’ for ‘Data Analysis Expert’) responded, because these were created early in our analysis process.

The order of scenes:

Participants generally posed a request, and while they waited for the response were either silent or expressed insights about the views that were on screen. Then they got the response, and described the views and their thoughts on these views.

So the structure in the videos would be:

Ask for new views of the data

Wait, or discuss views already onscreen

Receive new views

Discuss these views

Pose a new visualization request.

We would divide these actions into scenes as follows:

Scene 1: Ask for new views of the data

Scene 2: Wait, or discuss views already onscreen

Scene 1: Receive new views

Scene 3: Discuss these views

Scene 4: Pose a new visualization request

Note that the request and response are always grouped together, and intervening think-aloud discussion is isolated in a separate scene. We marked these in the comments boxes in non-actionable scenes.

**Codes:**

1. Was it a visualization request or another kind of request, and the order of scenes:

The main criteria here was to look at whether they explicitly asked to create views or explore a new portion of the data attribute space in their speech.

2. Direct vs Referential vs Selection

A complete description of these requests is in the paper, however, we add some details about how we divided these requests into these categories.

Direct requests are ones that appear to make no reference to existing views on screen. Referential requests duplicate and pivot existing templates, conserving either the subset of the data in the filter for the target view or the data attributes. Selection requests isolate one entity or region from the view, and ask for new views to drill down into that region. There are some complexities in assigning these labeles.

1. Reference and selection are not always explicit. An explicit referential request would use a form of ‘can I see this (pointing), but with x’. Other times, participants would underspecify their request in a way that clearly assumed the mediator would use the existing view or views as a default starting point for their new request. For instance they might be looking at a view of thefts and say ‘now can I see assault?’ We initially divided the explicit and implicit cases, but found this to be complex to cleanly delineate.

2. Are repeated uses of a single filter criteria a referential request?

Another complicated case: Frequently participants would isolate a filter of interest from the data and ask many questions about this region of the data. The question this raised: if participants asked a series of questions about thefts, should we treat all of these as referential requests, because they are conserving a filter across many requests?

A good example of this pattern is in participant 8.

In this case, we opted to code these requests as direct. We felt that referential requests should be reserved for cases where a view is used as a shortcut for conserving a complex template or filter, and that the conservative approach to this situation is to focus on these cases as referential, because lumping all these cases together as referential would dilute the category.

If a participant explicitly referenced a view to conserve it’s filter, particularly if they referenced a complex filter (eg. thefts in 2014 on Mondays) by saying ‘can I see this, but…’, we did label this as referential, because it was a clear case of duplicating and pivoting a view.

3. Once a participant made a selection, if they use the selected region again, is it another selection?

Once a subset had been selected, if it was used again we did not code it as selected.

4. If a participant noticed that theft was the most common crime type, and then 30 minutes later remember this fact and ask a question just about theft, when this view was no longer active, is it a selection?

We did not code these as ‘selection’ actions, because they weren’t acting on a view to express their intentions, but recalling an insight.