SUPPLEMENTARY MATERIAL

A Subarachnoid Haemorrhage-Specific Outcome Tool

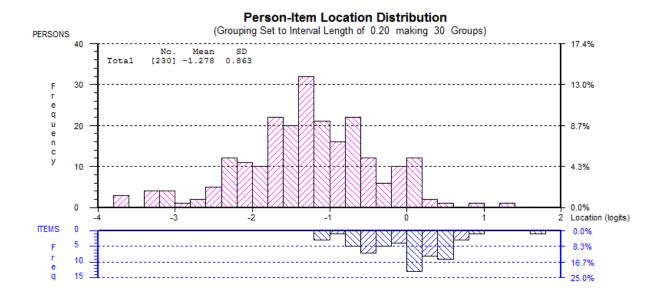
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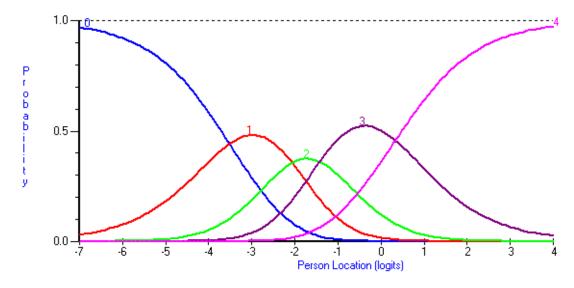
[#] Joint senior authors

Supplementary Figure 1. Person-Item Location Distribution Map

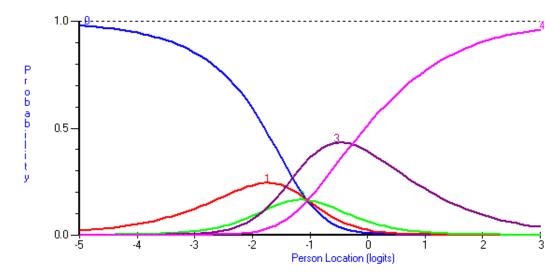


Relative distribution of location estimates for participants with non-extreme scores (upper red histogram) and the 60 SAHOT items (lower blue histogram) mapped on the same continuum of SAH impact. The height of each histogram bar reflects the number of persons or items whose location estimates fall in the same region of the continuum. In this graph, the grouping function for such regions is set to intervals of 0.20 logits.

Supplementary Figure 2A. Expected ordering of HASH-OT response categories

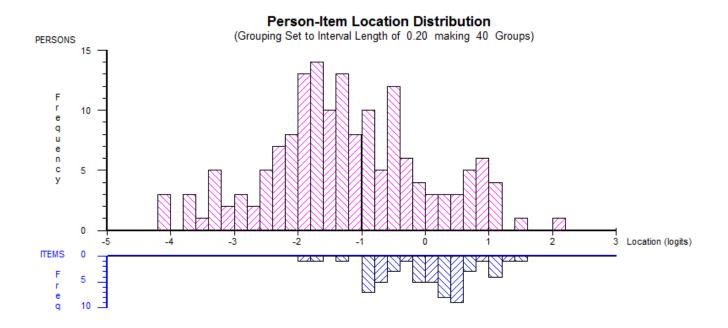


Supplementary Figure 2B. Observed ordering of HASH-OT response categories



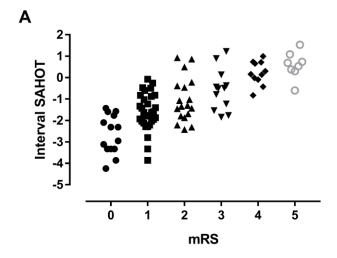
Category Probability Curves (CPCs) depict the probability (y-axis) of being graded in consecutive response categories (coloured lines) with increasing strength (x-axis). Figure 2a shows how the probability of being graded in each of the 5 HASH-OT categories should follow a logical ordered sequence from less to more. Figure 2b shows that in this item, response category 1 (red curve) and 2 (green curve) are never the most likely category for a patient to be graded in, at any level of SAH impact. Thus, the sequential ordering of the 5 categories did not work as intended.

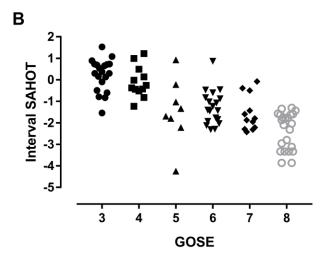
Supplementary Figure 3. Person-Item Location Distribution Map (Aneurysmal-only SAH)



Relative distribution of location estimates for participants with non-extreme scores (upper red histogram) and the 56 SAHOT items (lower blue histogram) mapped on the same continuum of SAH impact. The height of each histogram bar reflects the number of persons or items whose location estimates fall in the same region of the continuum. In this graph, the grouping function for such regions is set to intervals of 0.20 logits.

Supplementary Figure 4. Discrimination between individuals (aneurysmal cases only). SAHOT versus mRS (A) and GOSE (B).





 $\textbf{Supplementary Table 1. Baseline characteristics of patients-aneurysmal cases only.} \ \ \text{Mean and range}^{a}, \ \text{median, number and } \%^{b}$

| Number | 82 |
|---------------------------|-----------|
| Age (years) ^a | 58, 21-84 |
| Fisher grade ^b | |
| 1 | 2, 3% |
| 2 3 | 5, 6% |
| | 25, 30% |
| 4 | 50, 61% |
| Median, range | 4, 1-4 |
| WFNS ^b | |
| 1 | 47, 57% |
| 2 | 16, 19% |
| 3 | 3, 4% |
| 4 | 12, 15% |
| 5 | 4, 5% |
| Median, range | 1, 1-5 |

| Gender | |
|--------|---------|
| male | 16, 20% |
| female | 66, 80% |

Table 2. Rasch-based scale properties of the 56-item SAHOT (3 item-scoring categories) in aneurysmal-only cases

| Scoring range | 0-112 |
|------------------------------|---|
| Person separation index | 0.945 |
| Mean person location (SD) | -1.25 (1.25) |
| Item category thresholds | 46/56 ordered (82%) |
| Item fit | Fit residuals >±2.5 in 10.7% |
| | X ² probability <bonferroni 56="" 6="" adjustment="" in="" items<="" th=""></bonferroni> |
| Excess correlation | |
| between item | 1.8% |
| residuals (>0.30) | |

Supplementary Table 3. Convergent and discriminant validity of the SAHOT – aneurysmal cases only

A. Convergent validity: outcome

| mRS | |
|--------|--|
| GOSE | |
| CLCE24 | |

| Correlation coefficient | p |
|-------------------------|---|
|-------------------------|---|

| 0.743 | <10 ⁻⁴ ** |
|--------|----------------------|
| -0.749 | <10 ⁻⁴ ** |
| 0.640 | 0.003 ** |

A. Convergent validity: prognosis

| WFNS |
|---------------------------------|
| Fisher score |
| Blood clot volume: total |
| Blood clot volume: subarachnoid |

| 0.444 | 0.026 * |
|-------|---------|
| 0.217 | 0.296 |
| 0.419 | 0.074 |
| 0.339 | 0.156 |

B. Discriminant validity

| BICRO39 | | |
|---------|--|--|
| Age | | |

| 0 | 321 | 0.180 |
|----|-----|-------|
| 0. | 187 | 0.371 |

Supplementary Table 4. Responsiveness of the SAHOT – aneurysmal cases only

| Tool | 3 month score | 6 month score | p | Effect size | |
|----------------|--------------------|--------------------|-------|-------------|--|
| | median (range) | median (range) | | | |
| | | | | | |
| Interval SAHOT | -1.1 (-2.2 to 1.2) | -1.3 (-3.3 to 0.9) | 0.03* | 0.28 | |
| mRS | 1.5 (0 to 4) | 1 (0 to 5) | 0.89 | 0.05 | |
| GOSE | 5 (3 to 8) | 5.5 (3 to 8) | 0.19 | 0.36 | |

The 60-item development questionnaire follows next

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Subarachnoid Haemorrhage Outcome Assessment

This form is designed to assess recovery following subarachnoid hemorrhage at this moment in time. The patient and their next of kin should fill in separate forms without consulting each other.

Please think back to how things were before the bleed, and compare this to how the bleed has <u>IMPACTED</u> on the following aspects of daily life <u>NOW</u> (i.e. this week). Please circle the correct response. If a question is not relevant, please circle "N/A" (Not Applicable).

1. General Aspects of Daily Life

| OVERALL FUNCTION | No | Small | Moderate | Large | Complete | N/A | Better |
|--|--------|--------|----------|--------|----------|------|--------|
| OVERALL FUNCTION | Change | Change | Change | Change | Change | IN/A | Worse |
| | | | | | | | |
| Physical activities of daily life | No | Small | Moderate | Large | Complete | N/A | Better |
| (e.g. walking, climbing stairs) | Change | Change | Change | Change | Change | IN/A | Worse |
| | | | | | | | |
| Work | No | Small | Moderate | Large | Complete | N/A | Better |
| (i.e. number of working hours and how much one can do at work) | Change | Change | Change | Change | Change | IN/A | Worse |
| | | | | | | | |
| Income | No | Small | Moderate | Large | Complete | N/A | Better |
| (gross income) | Change | Change | Change | Change | Change | IN/A | Worse |

| | | | | | S | | |
|--|--------------|-----------------|--------------------|-----------------|--------------------|-----|-----------------|
| Driving | No Change | Small Change | Moderate Change | Large Change | Complete Change | N/A | Better Worse |
| | Onlange | Onange | Onange | Onlange | orange | | VVOISC |
| Socializing | No | Small | Moderate | Large | Complete | N/A | Better |
| | Change | Change | Change | Change | Change | | Worse |
| Pursuing previous hobbies | No | Small | Moderate | Large | Complete | N/A | Better |
| | Change | Change | Change | Change | Change | | Worse |
| Household chores | No Change | Small Change | Moderate Change | Large Change | Complete Change | N/A | Better Worse |
| | | . 10 | C | | | | 1.0.00 |
| Days / evenings out | No Change | Small Change | Moderate Change | Large Change | Complete Change | N/A | Better Worse |
| | Onlange | Juliango | Tonango | <u> </u> | Onlango | | 11000 |
| Quality of relationship with those closest | No Change | Small Change | Moderate Change | Large Change | Complete Change | N/A | Better Worse |
| | - Change | <u> </u> | Griarigo | <u> </u> | Onlange | | 1 110100 |
| Quality of relationships with others | No Change | Small Change | Moderate Change | Large Change | Complete Change | N/A | Better Worse |
| | 1 | <u>January</u> | | | <u> </u> | | 110.00 |
| Doing things on one's own | No Change | Small Change | Moderate Change | Large Change | Complete Change | N/A | Better Worse |
| (e.g. shopping, going out) | Orlange | Onange | Onange | Onange | Onange | | V V U I S C |
| Tolerance of crowded, busy or noisy places | No Change | Small Change | Moderate | Large | Change | N/A | Better Worse |
| | Change | Change | Change | Change | Change | | vvoise |
| Sleep pattern | No | Small | Moderate | Large | Complete | N/A | Better |

| (day or night) | Change | Change | Change | Change | Change | | Worse | | |
|-------------------------------|--------|--------|----------|--------|----------|------|--------|--|--|
| (day or ringing) | Change | Change | Change | Change | Change | | VVOISE | | |
| | | | | | | | | | |
| Covilifo | No | Small | Moderate | Large | Complete | N/A | Better | | |
| Sex life | Change | Change | Change | Change | Change | IN/A | Worse | | |
| | | | | | | | | | |
| Basic self care | No | Small | Moderate | Large | Complete | N/A | Better | | |
| (e.g. ability to wash, dress) | Change | Change | Change | Čhange | Change | IN/A | Worse | | |
| | | | | | | | | | |
| Exercise | No | Small | Moderate | Large | Complete | N/A | Better | | |
| (e.g. sporting activities) | Change | Change | Change | Change | Change | IN/A | Worse | | |

2. Physical Aspects

| Physical fatigue / tiredness | No | Small | Moderate | Large | Complete | N/A | Better |
|--|--------|--------|----------|--------|----------|------|--------|
| (i.e. how much one can do before needing to stop to rest) | Change | Change | Change | Change | Change | IN/A | Worse |
| | | | | | | | |
| Balance when walking | No | Small | Moderate | Large | Complete | N/A | Better |
| Dalance when walking | Change | Change | Change | Change | Change | 19/7 | Worse |
| | | 7 | | | | | |
| Clumsiness | No | Small | Moderate | Large | Complete | N/A | Better |
| (change in handwriting, difficulty with cutlery, knocking things over) | Change | Change | Change | Change | Change | IN/A | Worse |
| | | | • | | | | |
| Falls | No | Small | Moderate | Large | Complete | N/A | Better |
| (including trips / stumbling) | Change | Change | Change | Change | Change | IN/A | Worse |
| | | | | | | | |
| Strength / coordination in arms and hands | No | Small | Moderate | Large | Complete | N/A | Better |
| | | | | | | | |

| | | | | | (S) | | |
|---------------------------------|--------|--------|----------|--------|----------|----------|--------|
| | Change | Change | Change | Change | Change | | Worse |
| | | | | | | | |
| Ctrongth / goardination in lago | No | Small | Moderate | Large | Complete | Ν1/Λ | Better |
| Strength / coordination in legs | Change | Change | Change | Change | Change | N/A | Worse |
| | | | | | | | |
| Pain | No | Small | Moderate | Large | Complete | N/A | Better |
| raiii | Change | Change | Change | Čhange | Change | IN/A | Worse |
| | | | X | 7 | | | |
| Headaches | No | Small | Moderate | Large | Complete | N/A | Better |
| lieadacties | Change | Change | Change | Change | Change | 14/7 | Worse |
| | | | | | | | |
| Urinary continence | No | Small | Moderate | Large | Complete | N/A | Better |
| | Change | Change | Change | Change | Change | | Worse |
| | | | | | | | |
| Eyesight | No | Small | Moderate | Large | Complete | N/A | Better |
| Lycsignt | Change | Change | Change | Change | Change | 14// (| Worse |
| | | | | | | | |
| Hearing | No | Small | Moderate | Large | Complete | N/A | Better |
| ricaring | Change | Change | Change | Change | Change | 1 1// 1 | Worse |
| | | | | | | | |
| Smell / taste | No | Small | Moderate | Large | Complete | N/A | Better |
| Smell / taste | Change | Change | Change | Change | Change | 111/71 | Worse |
| | | | | | | | |
| Swallowing food or water | No | Small | Moderate | Large | Complete | N/A | Better |
| Swallowing lood of water | Change | Change | Change | Change | Change | 1 11// 1 | Worse |
| | | | | | | | |
| Word finding when speaking | No | Small | Moderate | Large | Complete | N/A | Better |
| Word infoling when speaking | Change | Change | Change | Change | Change | 1 W/ /T\ | Worse |

| Recognising faces | No | Small | Moderate | Large | Complete | N/A | Better | | |
|---|--------|--------|----------|--------|----------|-------|--------|--|--|
| recognising faces | Change | Change | Change | Change | Change | IN//A | Worse | | |
| | | | _ | | | | | | |
| Ability to get a point across in conversation | No | Small | Moderate | Large | Complete | N/A | Better | | |
| | Change | Change | Change | Change | Change | IN/A | Worse | | |
| | | | | | | | | | |
| Ability to compromise in discussion with others | No | Small | Moderate | Large | Complete | N/A | Better | | |
| Ability to compromise in discussion with others | Change | Change | Change | Change | Change | IN/A | Worse | | |
| | | | | | | | | | |
| Ability to recognise danger | No | Small | Moderate | Large | Complete | N/A | Better | | |
| Ability to recognise danger | Change | Change | Change | Change | Change | IN/A | Worse | | |
| | | | | | | | | | |
| Navigational skills | No | Small | Moderate | Large | Complete | N/A | Better | | |
| (i.e. getting lost) | Change | Change | Change | Change | Change | IN/A | Worse | | |

4. Behavioural / Psychological Aspects

| Low mood | | No | Small | Moderate | Large | Complete | N/A | Better |
|----------------------|------------|--------|--------|----------|--------|----------|------|--------|
| LOW IIIOOU | LOW ITIOOU | Change | Change | Change | Change | Change | IN/A | Worse |
| | 2 (| | | | | | | |
| Mood ewings | | No | Small | Moderate | Large | Complete | N/A | Better |
| Mood swings | | Change | Change | Change | Change | Change | IN/A | Worse |
| | | | | | | | | |
| Strength of emotions | | No | Small | Moderate | Large | Complete | N/A | Better |
| Strength of emotions | | Change | Change | Change | Change | Change | IN/A | Worse |

| Easily moved to tearfulness or laughter | No Change | Small Change | Moderate Change | Large Change | Complete Change | N/A | Better Worse |
|---|--------------|-----------------|--|-----------------|--------------------|-------|-----------------|
| | Change | Change | Change | Change | Change | | vvoise |
| Ability to control one's reactions | No | Small | Moderate | Large | Complete | N/A | Better |
| | Change | Change | Change | Change | Change | | Worse |
| | | | | | | | |
| Irritability | No | Small | Moderate | Large | Complete | N/A | Better |
| | Change | Change | Change | Change | Change | | Worse |
| | | | | | | | |
| Anxiety | No | Small | Moderate | Large | Complete | N/A | Better |
| AllAlety | Change | Change | Change | Change | Change | | Worse |
| | | | . \ | | | | |
| Feelings of fear | No | Small | Moderate | Large | Complete | N/A | Better |
| r eemigs or lear | Change | Change | Change | Change | Change | IN/A | Worse |
| | | | | | | | |
| Ecolings of paranois | No | Small | Moderate | Large | Complete | N/A | Better |
| Feelings of paranoia | Change | Change | Change | Change | Change | IN/A | Worse |
| | | | | | | | |
| Acitation | No | Small | Moderate | Large | Complete | NI/A | Better |
| Agitation | Change | Change | Change | Change | Change | N/A | Worse |
| | | | | | | | |
| Restlessness | No | Small | Moderate | Large | Complete | N/A | Better |
| (Inability to stand still) | Change | Change | Change | Change | Change | 14/14 | Worse |
| | | <u></u> | <u>, </u> | | , | | |
| Self-confidence | No | Small | Moderate | Large | Complete | N/A | Better |
| 2011 301111301133 | Change | Change | Change | Change | Change | | Worse |

| | | | | | (S) | | |
|--|--------|--------|------------|--------|----------|--------|--------|
| Awareness of others' thoughts, feelings and/or | No | Small | Moderate | Large | Complete | | Better |
| needs | Change | Change | Change | Change | Change | N/A | Worse |
| 110000 | | | 1 21101191 | 3 | | | |
| Mativation | No | Small | Moderate | Large | Complete | N1/A | Better |
| Motivation | Change | Change | Change _ | Change | Change | N/A | Worse |
| | | | | | | | |
| Placidity | No | Small | Moderate | Large | Complete | N/A | Better |
| (e.g. remaining calm in situations when previously would have not) | Change | Change | Change | Change | Change | IN/A | Worse |
| | | | | | | | |
| Feeling comfortable in new environments | No | Small | Moderate | Large | Complete | N/A | Better |
| r centing contributable in new crivitoriments | Change | Change | Change | Change | Change | 14// (| Worse |
| | | | | | | | |

The final 56-item questionnaire follows next

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SAHOT

SubArachnoid Haemorrhage Outcome Tool

This form is designed to assess recovery following subarachnoid hemorrhage <u>at this moment in time</u>. The patient and their next of kin should fill in separate forms without consulting each other.

- Please think back to how things were <u>BEFORE</u> the bleed, and compare this to how the following aspects of daily life are <u>NOW</u> (i.e. this week).
- Please circle the response that best describes this <u>CHANGE</u> for each aspect.
- If you have not yet tried an activity, or are unsure if you would be able to undertake a
 task, circle "large/severe change" for the purposes of this questionnaire.
- If you did not do an activity before the bleed, please select "N/A".



1. General Aspects of Daily Life

| OVERALL FUNCTION | No change | Some change | Large or severe change | N/A |
|---|---------------------|-------------------|------------------------|-----|
| Physical activities of daily life (e.g. walking, climbing stairs) | No change | Some change | Large or severe change | N/A |
| Socializing (with people other than colleagues/family) | No change | Some change | Large or severe change | N/A |
| Pursuing previous hobbies | No change | Some change | Large or severe change | N/A |
| Household chores | No change | Some change | Large or severe change | N/A |
| Days / evenings out | No change | Some change | Large or severe change | N/A |
| Quality of relationship with those closest | No change | Some change | Large or severe change | N/A |
| Tick if relation | onship is now bette | er [] or worse [] | | |
| Quality of relationships with others | No change | Some change | Large or severe change | N/A |
| Doing things on one's own (e.g. shopping, going out) | No change | Some change | Large or severe change | N/A |
| Coping in crowded, busy or noisy places | No change | Some change | Large or severe change | N/A |
| Sleep pattern (day or night) | No change | Some change | Large or severe change | N/A |

| Sex life | No change | Some change | Large or severe change | N/A |
|--|-----------|-------------|------------------------|-----|
| Basic self care (e.g. ability to wash, dress) | No change | Some change | Large or severe change | N/A |
| Recreational exercise | No change | Some change | Large or severe change | N/A |

2. Physical Aspects

| Physical fatigue / tiredness (i.e. how much one can do before needing to stop to rest) | No change | Some change | Large or severe change | N/A |
|--|-----------|-------------|------------------------|-----|
| Balance when walking | No change | Some change | Large or severe change | N/A |
| Clumsiness (change in handwriting, difficulty with cutlery, knocking things over) | No change | Some change | Large or severe change | N/A |
| Falls (including trips / stumbling) | No change | Some change | Large or severe change | N/A |
| Strength / coordination in arms and hands | No change | Some change | Large or severe change | N/A |
| Strength / coordination in legs | No change | Some change | Large or severe change | N/A |
| Pain | No change | Some change | Large or severe change | N/A |
| Urinary continence | No change | Some change | Large or severe change | N/A |



| Vision (excluding changes in prescription of glasses) | No change | Some change | Large or severe change | N/A |
|---|-----------|-------------|------------------------|-----|
| Hearing | No change | Some change | Large or severe change | N/A |
| Smell / taste | No change | Some change | Large or severe change | N/A |
| Swallowing food or water | No change | Some change | Large or severe change | N/A |
| Word finding when speaking | No change | Some change | Large or severe change | N/A |

3. Cognitive Aspects

| Mental fatigue (i.e. tiredness with mental tasks) | No change | Some change | Large or severe change | N/A |
|--|-----------|-------------|------------------------|-----|
| Short-term memory | No change | Some change | Large or severe change | N/A |
| Long-term memory (i.e. remembering things that happened years ago) | No change | Some change | Large or severe change | N/A |
| Learning a new skill | No change | Some change | Large or severe change | N/A |
| Concentration | No change | Some change | Large or severe change | N/A |
| Distractibility | No change | Some change | Large or severe change | N/A |



| Multitasking (i.e. doing two or more things at the same time) | No change | Some change | Large or severe change | N/A |
|---|-----------|-------------|------------------------|-----|
| Remembering names of familiar people | No change | Some change | Large or severe change | N/A |
| Recognising faces | No change | Some change | Large or severe change | N/A |
| Ability to get a point across in conversation | No change | Some change | Large or severe change | N/A |
| Ability to compromise in discussion with others | No change | Some change | Large or severe change | N/A |
| Ability to recognise danger | No change | Some change | Large or severe change | N/A |
| Navigational skills (i.e. getting lost) | No change | Some change | Large or severe change | N/A |

4. Behavioural / Psychological Aspects

| Low mood | No change | Some change | Large or severe change | N/A |
|---|-----------|-------------|------------------------|-----|
| Mood swings | No change | Some change | Large or severe change | N/A |
| Strength of emotions | No change | Some change | Large or severe change | N/A |
| Easily moved to tearfulness or laughter | No change | Some change | Large or severe change | N/A |



| Ability to control one's reactions | No change | Some change | Large or severe change | N/A |
|--|-----------|-------------|------------------------|-----|
| Irritability | No change | Some change | Large or severe change | N/A |
| Anxiety | No change | Some change | Large or severe change | N/A |
| Feelings of fear | No change | Some change | Large or severe change | N/A |
| Feelings of paranoia | No change | Some change | Large or severe change | N/A |
| Agitation | No change | Some change | Large or severe change | N/A |
| Restlessness (inability to stand still) | No change | Some change | Large or severe change | N/A |
| Self-confidence | No change | Some change | Large or severe change | N/A |
| Awareness of others' thoughts, feelings and/or needs | No change | Some change | Large or severe change | N/A |
| Motivation | No change | Some change | Large or severe change | N/A |
| Feeling comfortable in new environments | No change | Some change | Large or severe change | N/A |
| Apathy | No change | Some change | Large or severe change | N/A |

