

A New Scale to Assess Near-Death Experiences – Commentary

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Abstract: An expanded scale, the Near-Death Experience Content (NDE-C) scale, has been developed by Charlotte Martial and colleagues (2020) to assess near-death experiences (NDEs). The scale was modeled after the existing NDE Scale (Greyson, 1983), using reworded scale items, and added five additional items, notably items about a gateway or tunnel and a feeling of non-existence or fear. NDE-C uses a rating scale of 0–4 for each item and thus ranges from 0 to 80. In this article, we raise concerns that several of the reworded items appear to have changed the meaning of NDE Scale item and appear to be significantly more prevalent or less prevalent than the original item, as demonstrated in a Rasch statistical analysis of the NDE-C results. We suggest wording changes for these items so that they return to their original context and meaning.

Introduction

An article describing the development of **an expanded scale to assess NDEs**, “The Near-Death Experience Content (NDE-C) scale: Development and psychometric validation,” was published recently in *Consciousness and Cognition* by researcher Charlotte Martial and colleagues (2020) of the Coma Science Group at the University of Liège in Belgium. Because the current NDE Scale, developed nearly 40 years ago by Bruce Greyson (1983), has been so widely used in NDE research, the Martial et al. article is likely of significant interest to researchers in the field of near-death studies. Greyson is one of the co-authors of the Martial article.



Charlotte Martial
University of Liège

Martial and colleagues followed a three-phased strategy to evaluate the current NDE Scale and develop a revised scale. Several improvements were needed, for example: (a) to **include additional content items** that are now known to be characteristic of the NDE phenomenon, such as negative emotions experienced in “distressing” NDEs, the decision to come back to the body and physical life, and a gateway or tunnel; (b) to **expand the number of responses** using a Likert-type response (0 to 4) to each scale item; and (c) to **simplify and clarify the wording of the items** to make them easier to understand. The result was the Near-Death Experience Content (NDE-C) Scale. The two scales differ in the following ways:

Feature	Original NDE Scale	NDE-C Scale
Number of items	16	20
Scale response range	Likert-type, 0–2	Likert-type, 0–4
Response format	Multiple-choice format; the meaning differs for each item	Same meaning for each item, specifying the item intensity, ranging from 0 (Not at all) to 4 (Extremely; more than at any other time in my life)
Scale range and cut-off score for an NDE	0–32, NDE \geq 7	0–80, NDE \geq 27

In both scales, the cutoff score for an NDE represents one standard deviation below the mean.

Of the original NDE Scale items, 15 are included in NDE-C but are reworded ostensibly to be clearer and more specific. The original items #5 (Feeling of peace or pleasantness) and #6 (Feeling of joy) were considered redundant, so #6 was dropped. Conversely, the following five new NDE-C items were added:

- 15. Feeling of non-existence, of being in a total void, and/or of fear.
- 17. Made the decision, or was forced, to come back from the experience.
- 18. Feeling of dying and/or being dead.
- 19. Saw or entered a gateway (for instance a tunnel or a door).
- 20. The experience cannot be described adequately in words.

The research group found that the NDE-C Scale differentiated NDEs from experiences associated with hallucinogenic drugs, meditation, and cognitive trance. However, they found that the scale does *not* differentiate NDEs that occurred in life-threatening situations from NDE-like experiences (NDLEs) that occurred in *non*-life-threatening situations such as falling asleep, high anxiety, fainting, or occurring spontaneously. This is the same conclusion that Charland-Verville et al. (2014) reached regarding the original NDE Scale. The features or elements in both NDEs and NDLEs appear to represent a shared common ‘core’ experience. “The NDE-C scale thus aims to identify the content of an NDE, whatever the context in which it has been experienced” (Martial et al., 2020, p. 19).

We found it noteworthy that Bruce Greyson, developer of the original NDE Scale, is a co-author of the Martial et al. (2020) article. His original scale certainly has served the field of near-death studies well—indeed, indispensably. And now his presence among the Martial et al. group seems to indicate his endorsement of the NDE-C Scale.

Commentary by Robert and Suzanne Mays, NDE researchers

Due to its more robust psychometrics, NDE-C would now seem to be researchers’ instrument of choice going forward in the field of near-death studies. However, we would caution that the new scale first needs to be validated with a Rasch analysis equivalent to the analysis done by Lange, Greyson, & Houran (2004). The 15 scale items from the NDE Scale were reworded in NDE-C to be clearer and more specific. Even though the changes were reviewed by external NDE experts and the item wording was revised, the reworded NDE-C items should be validated that they preserve the original meaning from the NDE Scale. **In particular, we would expect that the reworded scale items in NDE-C would preserve the item hierarchy** consistent with the NDE Scale when administered to an equivalent group of experiencers (NDErs), ideally to the *same set* of NDErs taking both the NDE Scale and the NDE-C Scale.

The Rasch model is a psychometric statistical tool for analyzing responses to questionnaires. In particular, a Rasch analysis provides a measure of the relative “difficulty” of the questions. In the case of NDE scale questions, the analysis provides a measure of the *relative prevalence* of the scale item responses in the form of a *hierarchy*, in which the least prevalent items are listed first, down to the most prevalent or common item responses. Lange et al. (2004) applied the Rasch model to a set of NDE Scale responses from 203 NDErs. The item hierarchy for their NDE set is shown here (Figure 1). In Rasch analysis, the value of an item measure is expressed in a logarithmic metric called *logit*, which converts the measure to a linear form for ease of comparison of two values. A difference greater than about 0.3 logits is considered statistically significant at $p < 0.05$.

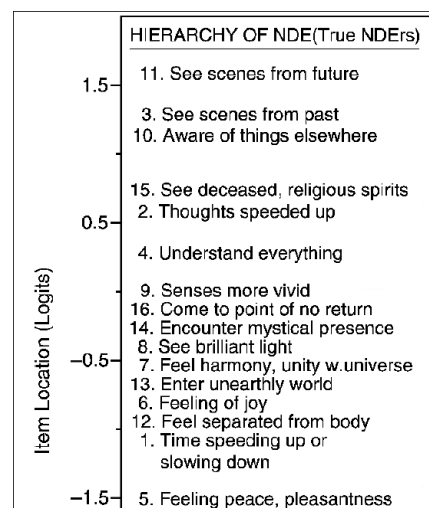


Figure 1. NDE Scale hierarchy, with item locations in logits, Lange et al. (2004, p. 167)

Rasch analyses of NDE rating scales

Lange et al. asserted that the NDE Scale items form a hierarchy that is preserved “regardless of demographic differences and extreme variation in the intensity of NDE” and that “NDEs indeed appear to form a ‘core’ experience whose basic structure and semantics are preserved.” (p. 173). In our study of Rasch analyses of NDE rating scales, we found that *within a set of NDE responses*, the hierarchy is indeed preserved, as Lange et al. stated, regardless of demographic differences and variation in NDE intensity.

However, we found that there are hierarchical shifts of one or several pairs of scale items between NDE scale results from *different* sets of NDE cases. For example, we compiled a set of NDE Scale results from 215 NDErs from the Experience Registry database maintained by the International Association for Near-Death Studies (IANDS, n.d.). The item hierarchy from the IANDS data differed when different subsets of the 215 cases were compared. The differences occurred primarily in the *middle section* of the hierarchy, from items N15 through N13. In our study, a total of three scale items shifted, namely, N9, N16, and N7. These shifts were due to differences in the specific NDEr responses in the three sets of NDE cases. See Appendix A for more details of our analysis comparing Rasch hierarchies from subsets of the IANDS database.

We concluded that the Rasch item hierarchy for any set of NDE responses is potentially different. The hierarchy of the middle items can shift based on the mix of the NDEs which are included. However, if the *same NDEs* are measured on two different NDE rating scales, the Rasch hierarchies of the corresponding scale items *should be equivalent*. If the item hierarchy from the NDE Scale is preserved in NDE-C for the same NDEs, the two scales can be considered equivalent measurements of the ‘core’ experience. Subsequent NDE-C results can then be compared with earlier NDE Scale results on the basis of the 15 common scale items.

Initial evaluation of NDE-C using estimated hierarchical placement

The order of the Rasch hierarchy of a rating scale can be roughly estimated by the number of NDEs who responded "0" to each item. In our initial analysis, using this rough measurement, we noted several NDE-C items that most likely deviated from the Lange NDE Scale hierarchy.

We studied the structure of NDE-C and how the item wordings from the NDE Scale were adjusted, ostensibly to make them clearer, more specific, more representative, and more relevant. We became concerned that some of the “translated” NDE Scale items seemed to show a *different* relative prevalence in NDE-C (Mays & Mays, 2020). For example, the NDE Scale item N14 (Encounter mystical presence) is relatively *commonly* reported in the NDE Scale whereas the corresponding NDE-C item C3 (Heard voices) is *quite rare*—only a little more common than N3 (Scenes from the past). C3 would therefore appear as the *third item* in the NDE-C item hierarchy, rather than the *ninth item* as N14 appears in the Lange NDE hierarchy.

When we checked the rewording of C3 versus N14, we found that the meaning of N14 was significantly altered in the new scale:

- **N14.** Did you seem to encounter a mystical being or presence, or hear an unidentifiable voice?
 - 1 = I heard a voice I could not identify.
 - 2 = I encountered a definite being, or a voice clearly of mystical or unearthly origin.
- **C3.** You heard one or several voices which did not have any material incarnation.

To us, the essential concept of encountering a “mystical being or presence” in N14 has been lost and has transformed into “hearing voices” in C3. From the published results, C3 is clearly *less prevalent* in the NDE-C results (having the *third highest* number of “0” ratings). This means that many NDEs who reported “encountering a mystical presence” on the NDE Scale did *not* report “hearing voices” on NDE-C, despite there being a *77% overlap of NDEs* who were rated on *both* scales (Martial et al., 2020, p. 10).

This apparent shift of the C3 item’s results is genuinely concerning to us because we would expect that the rewording of the scale item would preserve the *meaning of the item* in the new scale, and indeed “represent the construct of interest,” as the authors sought. The authors described their process of rewording the scale items:

[S]ubstantial wording modifications were made to the initial items. Indeed, all statements of the NDE-C scale were worded in an affirmative manner. We sought to write clear, unambiguous items in a language that respondents could easily understand and that represent the construct of interest. We were careful not to use a vocabulary that could be considered too vague or difficult to understand. The sentences were written to take into account the great variety of elements experienced in the NDE and to minimize the risk of misunderstanding or misinterpretation. These modifications were based on our experience in the field and on feedback from experiencers about the NDE scale items. (pp. 7–8).

In addition, the authors engaged a panel of three “internationally known NDE experts”:

An appraisal of content validity was performed to assess the NDE-C scale for clarity, specificity, representativity and relevance A panel of three internationally known (external) experts from the field of NDEs reviewed and rated the relevance of the complete scale. ... Items were subsequently revised based on external experts’ relevant feedback. (p. 8).

We questioned whether the criterion of “representativity” really meant that the new wording is actually *representative* of the original meaning of the item. If so, it appears the authors failed to achieve representativity, based on the comparative hierarchical positions—and also on its face—when the meanings of the two items are compared side by side, despite the relevant feedback from the external NDE experts.

It seemed to us that a scale item *rarely reported* (such as C3 – Hearing voices), which replaces an item *commonly reported* (in this case, N14 – Encountering a mystical presence) can hardly be claimed to be more specific, more representative, and more relevant than the item it is replacing. If the new item shifts in hierarchical order compared to the existing item, the item is most likely a *different* item altogether.

Three phases of the Martial et al. project

Martial and colleagues (2020) conducted their development and validation of NDE-C in three phases, each driven by a study (Figure 1, p. 5). The first phase involved the psychometric analysis of the original NDE Scale and Study 1 examined the internal consistency, reliability, concurrent validity, and the factor structure of the scale, based on administering the original scale to 403 NDErs (pp. 5–7).

The second phase involved the development of the new NDE-C Scale and a similar psychometric analysis of NDE-C in Study 2, based on administering the new scale to 161 NDErs (pp. 7–15). There was an overlap of 77% of the NDErs who were administered both scales (p. 10). The third phase, in Study 3, involved evaluating the discriminant validity of NDE-C in distinguishing NDEs from experiences associated with hallucinogenic drugs, meditation, and cognitive trance (pp. 15–18).

Rasch analyses of simulated NDE rating scale data

Given our concerns, we did a Rasch analysis of the reported results from the Martial et al. paper (using Supplementary Material G provided by the lead author). We used the *Winsteps* software (Linacre & Wright, 1998)—level 4.8.0—to estimate the *logit* values of the scale item measures and the item hierarchies for each scale. Because we did not have access to the individual NDEr ratings for several scale results, we *simulated* the answers that the NDErs gave based on the total number of answers reported for each scale item (0, 1, and 2 for NDE Scale results and 0, 1, 2, 3, and 4 for NDE-C results).

In a simulation of—for example—NDE Scale results, hypothetical NDEr responses are distributed across the 16 scale items based on two constraints: (a) that each scale item has so many responses of 0, 1, or 2, and (b) that the distribution of NDE Scale scores (7–32) follow the distribution of scores from actual or typical NDE results, for example, 22% score in the range 7–10, 32% score 11–14, etc.

We validated this method of simulating NDEr rating scale responses by running a test comparing the Rasch analysis of the IANDS NDE Scale data (N=215) with a corresponding set of *simulated* NDEr responses for that data. We found that the Rasch analysis of the simulated responses was nearly identical to the same analysis on the actual NDEr responses. See Appendix B for further details.

Rasch analysis of the Study 1 NDE Scale data

NDE Scale	Description	Study 1 hierarchy	Lange item values
N11	See scenes from future	1.55	1.69
N3	See scenes from past	0.78	1.30
N10	Aware of things elsewhere	0.62	1.17
N15	See deceased, religious spirits	0.52	0.68
N2	Thoughts speeded up	0.37	0.64
N4	Understand everything	0.27	0.32
N14	Encounter mystical presence	0.26	-0.20
N16	Come to point of no return	-0.13	-0.11
N7	Feel harmony, unity with universe	-0.18	-0.55
N6	Feeling of joy	-0.28	-0.70
N8	See brilliant light	-0.37	-0.30
N13	Enter unearthly world	-0.40	-0.61
N9	Senses more vivid	-0.42	-0.06
N12	Feel separated from body	-0.67	-0.74
N1	Time speeding up or slowing down	-0.77	-1.07
N5	Feeling peace, pleasantness	-1.15	-1.47
	N6 is included	Simulated	

In Study 1, Martial and colleagues evaluated the original NDE Scale by administering the scale to 403 NDErs (Martial et al., 2020, pp. 5–7). Because we did not have access to the individual NDEr ratings, we simulated the answers that the 403 NDErs gave to the NDE scale items in Study 1 as described above and in Appendix B. See Table 1 and the corresponding Figure 2. When Rasch measurements are compared between two sets of NDE results, the hierarchy of one set becomes the reference hierarchy and the values of the other scale can be compared to that reference set. In this case, the graph in Figure 2 depicts the Study 1 data as the reference hierarchy.

We noted that the Study 1 item hierarchy matches the Lange et al. hierarchy at the extremities. In fact, the first seven scale items and the last three items appear in the same hierarchical order in both sets of results. This result corroborates our conclusions that (a) the Rasch item hierarchy for any set of NDE responses is potentially different; (b) the items at the extremities of the hierarchy—the *least* prevalent and *most* prevalent items—typically do not shift hierarchical order; and (c) the items in the *middle* of the hierarchy will shift with different sets of NDE cases.

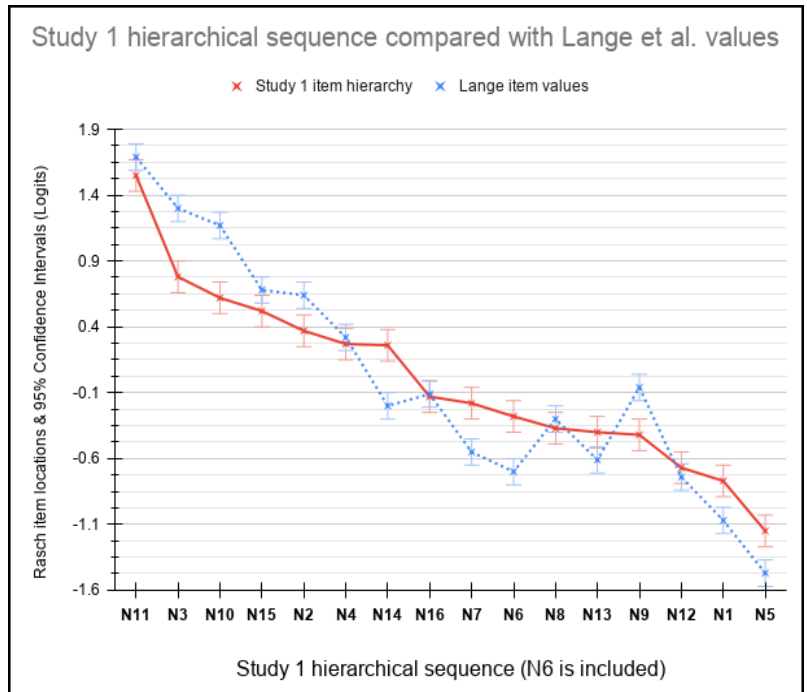


Figure 2. Study 1 item hierarchy compared with the Lange et al. values

Rasch analysis of the Study 2 NDE-C data

In Study 2, Martial and colleagues developed and validated the new NDE-C Scale by adjusting the NDE Scale items as described earlier (eliminating item N6; adding new items C15, C17, C18, C19, and C20; simplifying and clarifying the wording of items; and using Likert-type 0–4 responses). The Martial team administered the NDE-C to 161 NDErs (Martial et al., 2020, pp. 7–15).

In our Rasch analysis of the Study 2 data, we again simulated the NDEr response data as described above and in Appendix B. The results are summarized in Table 2, comparing their values with the corresponding NDE Scale values from Study 1. In this table, the Study 2 NDE-C is the reference hierarchy and the corresponding NDE Scale values are compared to the NDE-C set. The comparison of these two scale results is particularly valid because 77% of the NDErs who filled out the NDE-C Scale in Study 2 (124 of the 161 participants) also filled out the Study 1 NDE Scale.

The NDE-C item distribution differs from the NDE Scale distribution in two ways. The overall item range is reduced (0.49 to -0.44 versus 1.55 to -1.15) and the difference between adjacent items is considerably narrower. The relative compression of the NDE-C item distribution is due to the use of a finer-grained 5-item Likert-type rating scale (0–4). In Rasch modeling, Likert rating scales are modeled with each interval (0 to 1, 1 to 2, 2 to 3, and 3 to 4) having its own item-level “difficulty.” The NDEr must decide, for example, whether a particular item meets the level of 3 “Strongly; equivalent in degree to any other strong experience,” or 4 “Extremely; more than any other time in my life and stronger than 3.” These rating scale factors effectively broaden the spread of the possible answers to each item (see Bond & Fox, 2001, pp. 203–205) and cause closer logit values. The items at the top and bottom of the hierarchies appear to have similar relative hierarchical positions. For example, C10–N11 and C13–N3 correspond at the top of the hierarchies; C5–N5, C11–N12, and C1–N1 correspond at the bottom of the hierarchies.

In Table 2, we immediately noted that four of the NDE Scale items shifted considerably when placed in the NDE-C hierarchical order, namely: N14–C3, N9–C8, N16–C16, and N10–C9. These apparent hierarchical shifts need to be evaluated from the perspective of the *NDE Scale* as the reference hierarchy, since (a) the NDE-C has been derived from the NDE Scale and (b) the corresponding NDE-C items are purported to be equivalent to the corresponding NDE Scale items but have greater “clarity, specificity, representativity and relevance” (Martial et al., p. 8).

Study 2 – NDE-C Scale			Study 1 - NDE Scale		
NDE-C Item	Description	Study 2 hierarchy N=161	NDE Scale Item	Description	Study 1 hierarchy N=403
New C15	Non-existence, void, fear	0.49	----	----	----
C10	Knowledge about the future	0.46	N11	See scenes from future	1.55
C13	Relived events from your past	0.45	N3	See scenes from past	0.78
C3	Heard voices w/o material incarnation	0.32	N14	Encounter mystical presence	0.26
New C18	Feeling of dying or being dead	0.16	----	----	----
C8	Unusual sensations (sight, etc.)	0.14	N9	Senses more vivid	-0.42
C14	Encountered a presence or entity	0.08	N15	See deceased, religious spirits	0.52
C2	Thoughts speeded up	0.07	N2	Thoughts speeded up	0.37
C16	Came close to a border or point of no return	0.05	N16	Come to point of no return	-0.13
C4	Understanding everything	-0.04	N4	Understand everything	0.27
New C17	Decided or were forced to come back	-0.05	----	----	----
New C19	Entered a gateway, tunnel, or door	-0.10	----	----	----
New C20	Experience was ineffable	-0.10	----	----	----
C7	Surrounded by a bright light	-0.16	N8	See brilliant light	-0.37
C9	Aware beyond usual perceptions	-0.24	N10	Aware of things elsewhere	0.62
C6	Sense of harmony or unity	-0.24	N7	Feel harmony, unity with universe	-0.18
C1	Perception of time was altered	-0.25	N1	Time speeding up or slowing down	-0.77
C12	Entering a new dimension or environment	-0.28	N13	Enter unearthly world	-0.40
C11	Outside of or separated from body	-0.31	N12	Feel separated from body	-0.67
C5	Feeling of peace or well-being	-0.44	N5	Feeling peace, pleasantness	-1.15
		Simulated		N6 is omitted	Simulated

To evaluate the Study 2 NDE-C results relative to the Study 1 NDE Scale hierarchy, the NDE-C items need to be arranged in the Study 1 hierarchical order. Table 3 below shows the Study 1 hierarchy as the reference hierarchy compared with Study 2 NDE-C values. For the purposes of comparison with the NDE Scale results, we have omitted the new NDE-C items.

In Table 3, in order to match the NDE-C items that do not initially fit the reference hierarchy, the *expected values* for those items need to be calculated. For example, C9 (actual measurement -0.24) does not fall in the reference hierarchical order between C13 (0.45) and C14 (0.08), so an expected value needs to be determined.

Table 3. Study 1 NDE Scale hierarchy compared with corresponding Study 2 NDE-C values. Expected NDE-C values in blue are based on interpolation.

NDE Scale Study 1 (N=403)			NDE-C Scale Study 2 (N=161)					
NDE Scale	Description	Study 1 hierarchy	Item mapping	Mapped NDE-C	Description	Expected value	Actual value	Hierarchy shift
N11	See scenes from future	1.55	N11-C10	C10	Knowledge about the future	0.56	0.46	
N3	See scenes from past	0.78	N3-C13	C13	Relived events from your past	0.45	0.45	
N10	Aware of things elsewhere	0.62	N10-C9	C9	Aware beyond usual perceptions	0.22	-0.24	-0.46*
N15	See deceased, religious spirits	0.52	N15-C14	C14	Encountered a presence or entity	0.08	0.08	
N2	Thoughts speeded up	0.37	N2-C2	C2	Thoughts speeded up	0.07	0.07	
N4	Understand everything	0.27	N4-C4	C4	Understanding everything	-0.04	-0.04	
N14	Encounter mystical presence	0.26	N14-C3	C3	Heard voices w/o material incarnation	-0.05	0.32	0.37*
N16	Come to point of no return	-0.13	N16-C16	C16	Came close to a border or point of no return	-0.18	0.05	0.23
N7	Feel harmony, unity with universe	-0.18	N7-C6	C6	Sense of harmony or unity	-0.20	-0.24	-0.04
N8	See brilliant light	-0.37	N8-C7	C7	Surrounded by a bright light	-0.27	-0.16	0.11
N13	Enter unearthly world	-0.40	N13-C12	C12	Entering a new dimension or environment	-0.28	-0.28	
N9	Senses more vivid	-0.42	N9-C8	C8	Unusual sensations (sight, etc.)	-0.29	0.14	0.43*
N12	Feel separated from body	-0.67	N12-C11	C11	Outside of or separated from body	-0.31	-0.31	
N1	Time speeding up or slowing down	-0.77	N1-C1	C1	Perception of time was altered	-0.36	-0.25	0.11
N5	Feeling peace, pleasantness	-1.15	N5-C5	C5	Feeling of peace or well-being	-0.54	-0.44	
Item N6 is omitted		Std Err 0.06			Interpolated expected hierarchical value		Std Err 0.05	* p < 0.05

Scale items were estimated using simulated ratings. Hierarchy values expressed in logits. NDE Scale item NDE-6 – “Feeling of joy” is omitted.

To determine the list of expected values, the NDE-C item values that *match* the reference hierarchical order can be taken as the expected values for NDE-C, for example, C14, C2, and C4. Where NDE-C item values do *not* match the reference hierarchy, an expected value can be *interpolated* based on the proportional difference that is observed in the *Study 1* reference hierarchy. For example, C9 should fall between C13 and C14 *in the same proportion* as N10 falls between N3 and N15. The interpolated value for C9 is thus calculated as 0.22. A linear interpolation is valid to apply to Rasch measurement values, since the Rasch logit values are linear.

A total of seven of the 15 items required an interpolated value in Table 3. The interpolated values are highlighted in blue and the shifts that occurred are listed in the rightmost column. Four of these items have a large shift of about ≈ 0.3 logits or more, indicated by the green-highlighted hierarchical shift. These four items are the same item pairs noted in Table 2. If the apparent shift in the item’s value is greater than about 0.3 logits, the difference is significant at $p < 0.05$ (Lange et al., 2004, p. 166).

Figure 4 shows graphically the results contained in Table 3. The blue line is the Study 2 NDE-C expected hierarchy. Blue stars indicate interpolated expected values. The green line is the actual NDE-C values with the green diamonds indicating hierarchical shifts greater than ≈ 0.3 logits. The 95% Confidence Intervals (CI) are shown as error bars. The CI bars for the four green diamonds do not overlap with the corresponding expected value intervals. The red line is the Study 1 NDE Scale reference hierarchy. With the interpolated NDE-C expected values, the shape of the reference hierarchy is mirrored in the blue NDE-C expected hierarchy.

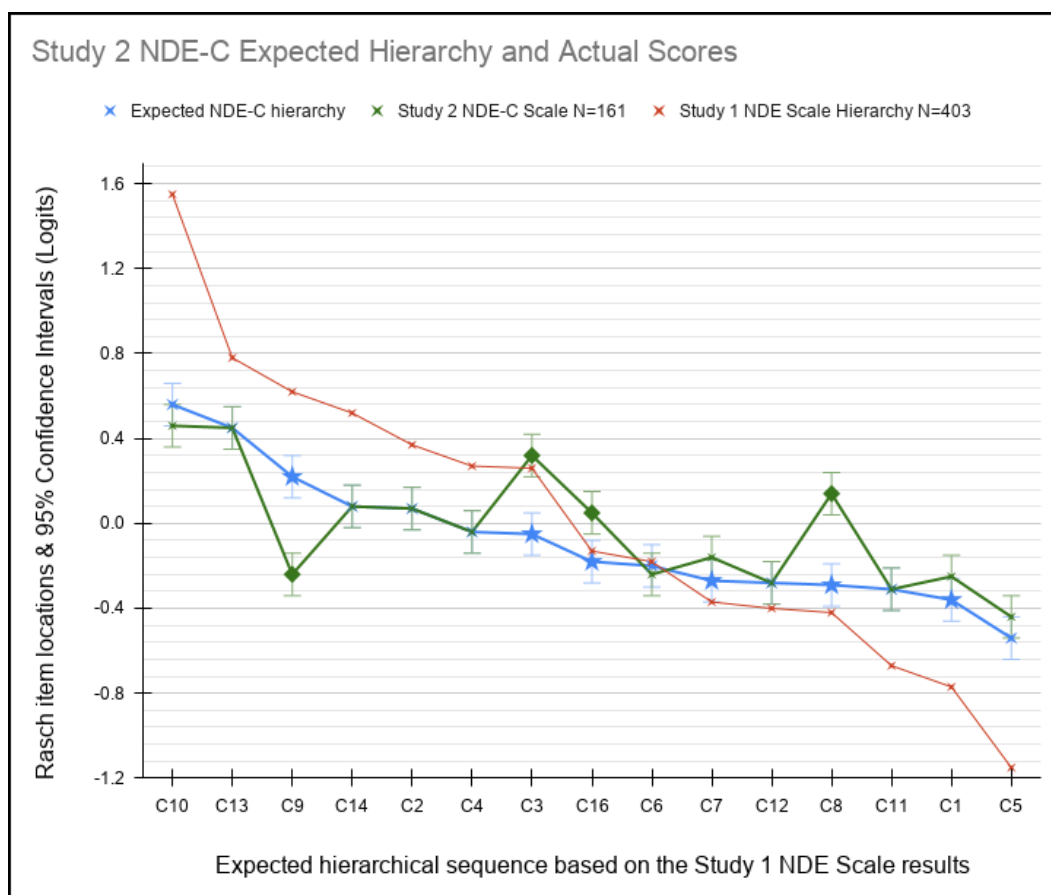


Figure 4. Study 2 NDE-C expected hierarchy (blue) with actual NDE-C values (green). Blue stars indicate interpolated expected values. Green diamonds indicate hierarchical shifts greater than ≈ 0.3 logits. The 95% Confidence Intervals are shown as error bars. The Study 1 NDE Scale hierarchy (red) shows the reference hierarchy whose shape is mirrored in the NDE-C expected hierarchy (blue).

Comparing the wording of NDE Scale items with the corresponding NDE-C item

In Study 2, Martial and colleagues administered the NDE-C to 161 participants of whom 124 or 77% had also participated in the Study 1 NDE Scale (Martial et al., 2020, p. 10). For these 124 participants, the only apparent difference between their answers to the NDE Scale and NDE-C was the *difference in the wording of the items*. If there are significant shifts in the hierarchical placement of NDE-C items relative to the NDE Scale reference hierarchy, any differences in the meaning of the wording of these items should be assessed whether the wording differences account for the hierarchical shifts.

Table 4 lists the different wordings of the four scale item pairs that showed hierarchical shifts greater than ≈ 0.3 logits which are significant at $p < 0.05$. We evaluated each pair in turn.

N10 versus C9: Being aware of things elsewhere

In the NDE Scale, N10 (Aware of things elsewhere) is quite rare—number 3 in the NDE Scale hierarchy—whereas C9 (Aware beyond usual perceptions) is quite prevalent—number 10 in the NDE-C hierarchy when the new items are omitted. The difference in prevalence appears to be due to the *context* that is set for N10 in the possible answers to the item: 1 = Yes, but the facts have not been checked out; and 2 = Yes, and the facts have been checked out.

Item N10 is asking about perceptions (a) *in the physical realm*, (b) *going on elsewhere* (as if by ESP), and (c) *that could be checked out*. These kinds of perceptions are usually reported by NDErs in the context of being out-of-body within the physical realm and perceiving things going on away from their physical body or when the NDEr is physically unable to see (e.g., under anesthesia with the eyes taped shut). Given that the perceptions were of things in the physical realm, they could later be checked.

Table 4. Comparison of NDE Scale and NDE-C corresponding item wordings		
NDE Scale Item description	Hierarchical difference	NDE-C Item description
<p>N10. Did you seem to be aware of things going on elsewhere, as if by extrasensory perception (ESP)? 1 = Yes, but the facts <u>have not been checked out</u>. 2 = Yes, and the facts <u>have been checked out</u>.</p>	<p>C9 is much <u>more</u> prevalent. -0.46 *</p>	<p>C9. You were aware of things <u>beyond what your senses can usually perceive</u>. Suggested wording: <i>You were aware of things elsewhere in the physical realm, that could be checked.</i></p>
<p>N14. Did you seem to encounter a <u>mystical being or presence</u>, or hear an unidentifiable voice? 1 = I heard a <u>voice</u> I could not identify. 2 = I encountered a <u>definite being</u>, or a <u>voice</u> clearly of <u>mystical or unearthly origin</u>.</p>	<p>C3 is much <u>less</u> prevalent. +0.37 *</p>	<p>C3. You heard one or several <u>voices</u> which did not have any <u>material incarnation</u>. Suggested wording: <i>You encountered a mystical being or presence, or heard an unidentifiable voice.</i></p>
<p>N9. Were your senses <u>more vivid</u> than usual? 1 = <u>More vivid</u> than usual. 2 = <u>Incredibly more vivid</u>.</p>	<p>C8 is much <u>less</u> prevalent. +0.43 *</p>	<p>C8. You experienced <u>unusual sensations</u> (sight, hearing, smell, touch and/or taste). Suggested wording: <i>You experienced your senses as more vivid than usual.</i></p>
<p>N16. Did you come to a border or point of no return? 1 = I came to a definite conscious <u>decision to “return” to life</u>. 2 = I came to a barrier that I was not permitted to cross; or was <u>“sent back”</u> against my will.</p>	<p>C16 is less prevalent. Split with C17. +0.23</p>	<p>C16. You <u>came close</u> to a border and/or point of no return No suggested word change: This item was split into C16 and C17.</p>

*Hierarchical differences are in logits. *p < 0.05*

This context is missing from the wording of C9, which is much more general. Being “aware of things beyond what your senses usually perceive” can apply to all sorts of perceptions in the *transmaterial realm* as well as the physical realm, beyond what one’s senses usually perceive, so the large increase in prevalence is quite understandable.

To be more consistent with N10, we suggest the wording of C9 be changed to “*You were aware of things elsewhere in the physical realm, that could be checked.*” These changes focus the context of the item to perceptions elsewhere *in the physical realm* that *could be checked*, that is, that are not ordinarily perceptible but can be verified by checking.

N14 versus C3: Encountering a mystical being or presence versus hearing voices

In the NDE Scale, N14 (Encounter mystical presence) is quite prevalent—number 9 in the NDE Scale hierarchy—whereas C3 (Heard voices without a material incarnation) is quite rare—number 3 in the NDE-C hierarchy when the new items are omitted. Again, the difference in prevalence appears to be due to the *context* that is set for N14 in “encountering a mystical being or presence or hearing an unidentifiable voice.” Even when there is a voice, it is “clearly of mystical or unearthly origin.”

The context of a mystical being or presence—a definite being—is missing from C3 in hearing “one or several voices which did not have any material incarnation.” In our reading of NDE accounts, voices are nearly always associated with a being or presence, a being who is either directly visible, whose presence is sensed, or who is “heard” as a voice within one’s mind. In other words, voices are associated with a presence. Therefore, item N14 is prevalent among NDErs.

The fact that NDErs recognized “hearing voices which did not have any material incarnation” as *rarely applying* to their NDE, demonstrates that this wording does not convey the same contextual meaning as N14. To be more consistent with N14, we suggest the wording of C3 be changed to “*You encountered a mystical being or presence, or heard an unidentifiable voice.*” These changes focus the context of the item back to the experience of a mystical being or presence.

N9 versus C8: Your senses were more vivid versus experiencing unusual sensations

In the NDE Scale, N9 (Senses were more vivid) is prevalent—number 7 in the NDE Scale hierarchy—whereas C8 (Experienced unusual sensations—sight, hearing, smell, touch and/or taste) is less prevalent—number 5 in the NDE-C hierarchy when the new items are omitted. The difference in prevalence with C8 appears to be a *completely different meaning* from the meaning of N9. NDErs report their senses were more vivid in terms of how *real* they appeared, frequently using terms like “realer than real,” “hyperreal,” “much more real than everyday life,” and “this physical experience is the dream; the experience of the other side is the reality.” NDErs report that their sight is more acute and easily focused even to far-away objects, colors are much more vivid and vibrant, sounds are heavenly and unlike anything on earth, and so on.

The sense of vivid, hyperreal sensations is completely missing from C8, which lists the possible *unusual* sensations, rather than the vividness. This difference alone would account for the hierarchical shift, particularly with the overlap of 77% of the NDErs having been administered both scales.

To be more consistent with N9, we suggest the wording of C8 be changed to “*You experienced your senses as more vivid than usual.*” These changes focus the context of the item back to the vividness of the NDEr’s senses.

N16 versus C16: Coming to a border or point of no return

In the NDE Scale, N16 (Come to point of no return) is prevalent (number 8 in the NDE Scale hierarchy) whereas C16 (Came close to a border or point of no return) is less prevalent (number 7 in the NDE-C hierarchy when the new items are omitted). The difference in prevalence with C16 appears to be due to the context conveyed by the *answer choices* to N16—coming to a conscious decision to “return” to life; or coming to a barrier one is not permitted to cross, or being “sent back” against my will.

The structure of the original item N16 appears to us actually to be two different questions, (a) coming to a point of no return and (b) deciding to or being forced to return. Apparently Martial and colleagues agreed with this perspective and split N16 into C16 (Came close to a border or point of no return) and new scale item C17 (You made the decision, or were forced, to come back from the experience).

We agree with the choice to split N16. It is likely that the wording and answer choice for N16 has caused many NDErs confusion as to how to answer the item, having to choose between answering about coming to a point of no return and about the decision to return. The comparative prevalence of these three results (least prevalent to most prevalent) is:

- C16 (Came close to a border or point of no return): 0.05 logits.
- C17 (Made the decision, or were forced, to come back): -0.05 logits.
- N16 (Come to point of no return + decision to come back): -0.18 logits (the expected hierarchical value).

In our reading of NDE accounts, it seems much more common for the NDEr to be told to return or to decide to return (e.g., “It’s not your time, you must return”) than to come to a border or point of no return. More simply put, N16 offers NDErs more choices to respond to the item. In our view, splitting N16 into C16 and C17 is the correct decision.

Conclusions

In our opinion, the new NDE-C Scale made several improvements over the current NDE Scale (Greyson, 1983).

- Five new items, C15, C17, C18, C19, and C20, were included in NDE-C, which added several dimensions to the measurement that were absent in the NDE Scale, including: A feeling of non-existence or fear (C15); A gateway or tunnel (C19); and A feeling of dying and/or being dead (C18).
- NDE-C omitted N6 (A feeling of joy) as redundant with N5/C5 (A feeling of peace or pleasantness).
- NDE-C split the item N16 (Came to point of no return) into two items, C16 (Came close to a border or point of no return) and C17 (Made the decision, or were forced, to come back).

- The NDE-C items were reworded as affirmative statements (“You felt ...”; “You had the impression ...”), rather than as questions. The aim also was to make the items clearer, more specific, more representative, and more relevant.
- NDE-C used a different Likert-type response scale (0 to 4, rather than 0 to 2), giving more precise and finer-grained scores.

We found that the hierarchical order of different sets of NDE responses were variable, particularly in the middle range of the hierarchy. Our conclusions about the item hierarchy are: (a) the published Lange et al. hierarchical order is not fixed, especially in the middle range of the scale, but is dependent on the particular set of NDE responses; (b) when Rasch measurements are compared between two sets of NDE results, the hierarchy of one set becomes the reference hierarchy and the values of the other scale can be compared to that reference set; and (c) comparing two different scales—such as NDE-C versus the original NDE Scale—can be meaningful only if the same group of participants (NDErs) are measured on both scales.

If the individual NDEr responses for a study are not available, we found that the NDEr responses can be *simulated* from the overall statistics of the study results, that is, for each scale item, the number of answers of each value (0, 1, 2, 3, or 4). This sort of simulation produces a Rasch measurement hierarchy that is close to the actual hierarchical values.

We simulated the NDEr responses and derived the Rasch scale hierarchy for both the Study 1 NDE Scale (N=403) and Study 2 NDE-C (N=161) results. Since 77% of the NDE-C participants were evaluated on both scales, we would expect that the Study 2 NDE-C hierarchy would closely match the order of the Study 1 NDE Scale hierarchy.

Using interpolated data points, we modeled the “expected item hierarchy” for NDE-C that mirrored the Study 1 NDE Scale hierarchy. Large differences between the expected NDE-C item value and the actual value indicated unexpected hierarchical shifts for several items. In particular, there were apparently statistically significant shifts in three scale items (C9, C3, and C8).

Our analysis of the differences in item wording indicated that the NDE-C wording had altered the original context and meaning of these items. This conclusion strongly suggests returning to the original context and meaning for these items. We have offered our suggestions for wording changes in C9, C3, and C8. In our view, it is important to preserve the item hierarchy from the original NDE Scale, so that subsequent NDE-C results can be compared with earlier NDE Scale results on the basis of the 15 common scale items.

Recommendations

1. Revise the wording of NDE-C items C9, C3, and C8.
2. Administer both the original NDE Scale and the revised NDE-C Scale—in randomized order—to a large cohort of NDErs.
3. Calculate Rasch measurement hierarchies for both scale results. Compare the two results with the NDE Scale as the reference “expected NDE-C hierarchy” as shown in Figure 4. We expect that the revised NDE-C hierarchy will closely match the NDE Scale hierarchical sequence for those scale items they have in common, within the 95% Confidence Interval. Because of the split with C17, item C16 will be less prevalent than the “expected” value of item N16 in the “expected NDE-C hierarchy.”

Martial and colleagues “encourage further research involving a Rasch analysis of the NDE-C scale” (p. 19). We think our proposed comparison of the original scale with NDE-C is *essential* to validate the rewording of the original scale items to the new format.

An important limitation of our conclusions and recommendations is that they are based on simulated data sets. What our results most clearly indicate is the urgency for a Rasch analysis to be conducted on the original data set which, according to standard ethical research practices, Martial and colleagues should still have. If they find similar results as we found, they may find our recommendations helpful.

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APPENDIX A: Analysis comparing Rasch hierarchies

We compiled NDE Scale data from 215 NDE cases from the Experience Registry database maintained by the International Association for Near-Death Studies (IANDS, n.d.). The cases were submitted voluntarily to IANDS from March 2016 through January 2021. We selected three subsets of the cases: odd numbered cases, even numbered cases, and the combined set of cases. We ran Rasch analyses on each set of cases to generate the item measurement hierarchy. The detailed results are summarized in the following table and chart.

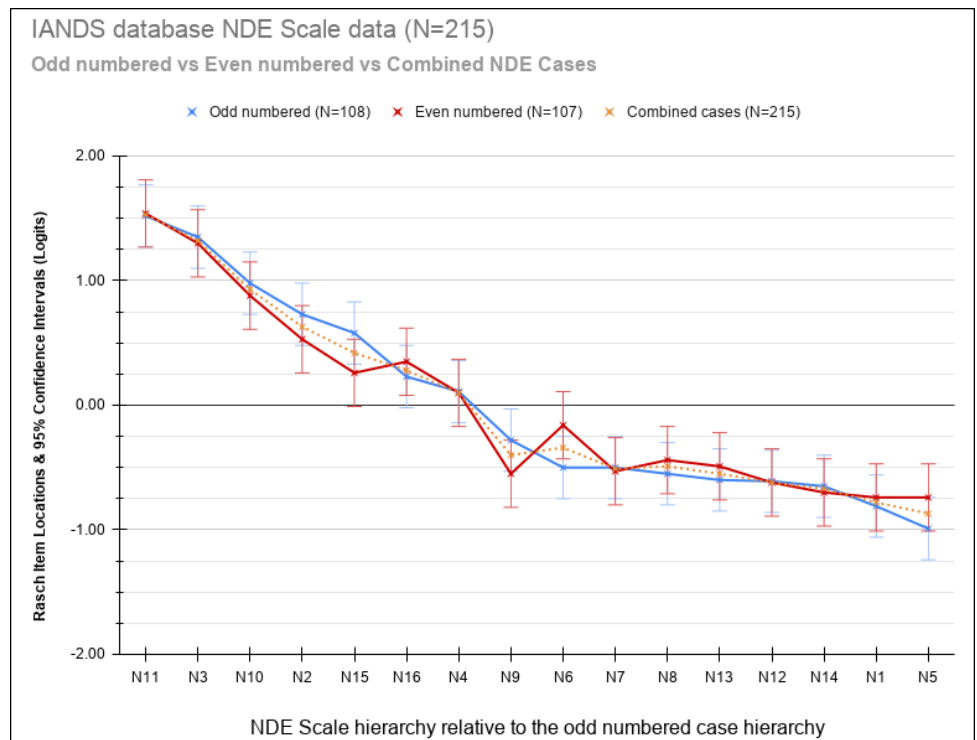
Table 5: Comparing the even numbered set and the full set relative to the odd numbered reference hierarchy. The even numbered and combined cases have several items out of hierarchical sequence relative to the odd-numbered reference hierarchy.

Conclusion: Different sets of NDE cases generally produce different item hierarchies. The items that are *least* prevalent and *most* prevalent typically do not shift in the top and bottom hierarchical sequence respectively, regardless of the set of NDE cases. In contrast, the hierarchical sequence of the items in the *middle* of the hierarchy will shift with different sets of NDE cases.

NDE hierarchy	Description	Odd numbered cases (N=108)	Even numbered cases (N=107)	Combined cases (N=215)
		Reference hierarchy	Items out of hierarchical sequence	
N11	See scenes from future	1.52	0.09	1.53
N3	See scenes from past	1.35	1.30	1.32
N10	Aware of things elsewhere	0.98	0.88	0.93
N2	Thoughts speeded up	0.73	0.53	0.63
N15	See deceased, religious spirits	0.58	0.26	0.42
N16	Come to point of no return	0.23	0.35	0.28
N4	Understand everything	0.11	0.10	0.10
N9	Senses more vivid	-0.28	-0.55	-0.40
N6	Feeling of joy	-0.50	-0.16	-0.34
N7	Feel harmony, unity with universe	-0.50	-0.53	-0.51
N8	See brilliant light	-0.55	-0.44	-0.49
N13	Enter unearthly world	-0.60	-0.49	-0.55
N12	Feel separated from body	-0.61	-0.62	-0.62
N14	Encounter mystical presence	-0.65	-0.70	-0.67
N1	Time speeding up or slowing down	-0.81	-0.74	-0.78
N5	Feeling peace, pleasantness	-0.99	-0.74	-0.87
	Standard Error	0.13	0.14	0.09
	95% Confidence Interval	0.25	0.27	0.18

Figure 5: Graphical presentation of the three sets of cases. The blue line in this graph is the reference hierarchy. The shifts in the other two sequences are relative to this reference hierarchy. The hierarchical shifts are apparent by a change to a *positive slope* in the line from one point to the next. The hierarchy line of the combined set of cases falls between the two subsets of odd and even NDE cases.

Note: the full Rasch Measure Order analysis of the combined IANDS cases is given in Appendix B, left table.



APPENDIX B: Simulating the NDEr responses to a rating scale

We devised and validated a simulation technique with the NDE Scale results from the IANDS NDE data (N=215). In a simulation, for example of the NDE Scale, hypothetical NDEr responses are distributed across the 16 scale items based on two constraints: (a) that each scale item has so many responses of 0, 1, or 2, and (b) that the distribution of NDE Scale scores (7–32) follow the distribution of scores from actual or typical NDE results.

The results of the Rasch analysis of the “real” and simulated NDE responses were nearly identical:

TABLE 13.1 NDE Scale [IANDS_data_N=215] ZOU904HS.TXT Feb 10 2021 20:54													
INPUT: 215 NDEr 16 Item REPORTED: 215 NDEr 16 Item 3 CATS WINSTEPS 4.8.0.0													
NDEr: REAL SEP.: 1.66 REL.: .73 ... Item: REAL SEP.: 7.42 REL.: .98													
Item STATISTICS: MEASURE ORDER													
ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEASUR-CORR.	AL-EXP.	EXACT MATCH	EXP%	Item
11	68	215	1.53	.12	.69	-2.65	.68	-1.72	.54	.44	77.2	74.8	N11-Scenes from future
3	83	215	1.32	.11	.99	-.03	.86	-.78	.49	.46	72.1	68.3	N3-Scenes from past
10	118	215	.93	.10	1.08	.90	1.29	2.05	.41	.49	59.1	57.6	N10-Aware things elsewhere
2	150	215	.63	.09	.94	-.71	.94	-.54	.54	.50	50.7	48.0	N2-Thoughts speed up
15	175	215	.42	.09	1.27	3.38	1.35	3.18	.33	.50	35.8	42.5	N15-Deceased/relig spirits
16	192	215	.28	.09	1.03	.45	1.07	.74	.38	.50	37.7	42.9	N16-Point of no return
4	215	215	.10	.09	.88	-1.84	.88	-1.26	.51	.49	43.7	38.9	N4-Understand everything
6	271	215	-.34	.09	.94	-.82	.91	-.78	.49	.45	44.7	43.5	N6-Feelings of joy
9	279	215	-.40	.09	.94	-.77	.92	-.68	.42	.45	45.6	42.0	N9-Senses more vivid
8	290	215	-.49	.09	1.10	1.27	1.00	.01	.50	.43	36.3	45.1	N8-Brilliant light
7	292	215	-.51	.09	.91	-1.15	.83	-1.39	.56	.43	40.0	45.3	N7-Harmony, unity
13	296	215	-.55	.09	1.05	.63	.97	-.22	.48	.43	44.7	45.5	N13-Unearthly world
12	304	215	-.62	.09	.96	-.46	.93	-.50	.40	.42	48.8	50.1	N12-Separated from body
14	310	215	-.67	.10	1.15	1.74	1.10	.70	.37	.41	49.8	50.6	N14-Mystical presence
1	321	215	-.78	.10	1.18	1.97	1.12	.81	.29	.40	48.8	53.7	N1-Time speeds up
5	330	215	-.87	.10	.84	-1.78	.77	-1.49	.50	.38	61.9	57.5	N5-Peace, pleasantness
MEAN	230.9	215.0	.00	.10	1.00	.0	.98	-.1			49.8	50.4	
P.SD	85.7	.0	.74	.01	.14	1.5	.17	1.3			11.8	9.6	

TABLE 13.1 NDE Scale [IANDS_data_N=215 Simulated] ZOU453WS.TXT Feb 13 2021 10:29													
INPUT: 215 NDEr 16 Item REPORTED: 215 NDEr 16 Item 3 CATS WINSTEPS 4.8.0.0													
NDEr: REAL SEP.: 1.63 REL.: .73 ... Item: REAL SEP.: 7.17 REL.: .98													
Item STATISTICS: MEASURE ORDER													
ENTRY NUMBER	TOTAL SCORE	TOTAL COUNT	MEASURE	MODEL S.E.	INFIT MNSQ	ZSTD	OUTFIT MNSQ	ZSTD	PTMEASUR-CORR.	AL-EXP.	EXACT MATCH	EXP%	Item
11	68	215	1.53	.12	.41	-5.78	.28	-5.10	-.79	.45	86.0	74.3	N11-Scenes from future
3	83	215	1.32	.11	.52	-4.91	.36	-4.88	-.80	.47	86.0	68.8	N3-Scenes from past
10	118	215	.93	.10	.63	-4.44	.51	-4.51	-.76	.49	79.1	58.1	N10-Aware things elsewhere
2	150	215	.63	.09	.65	-4.93	.56	-4.78	-.75	.50	62.8	47.5	N2-Thoughts speed up
15	175	215	.42	.09	1.39	4.72	1.38	3.44	.28	.50	41.4	42.6	N15-Deceased/relig spirits
16	192	215	.28	.09	1.38	4.77	1.42	3.96	.14	.50	35.3	42.8	N16-Point of no return
4	215	215	.10	.09	1.24	3.27	1.22	2.23	.27	.49	37.2	39.7	N4-Understand everything
6	271	215	-.34	.09	1.09	1.25	1.14	1.21	.38	.45	44.2	43.2	N6-Feelings of joy
9	279	215	-.40	.09	1.03	.46	1.12	.99	.35	.44	46.5	41.7	N9-Senses more vivid
8	290	215	-.49	.09	.73	-3.98	.65	-3.13	.71	.43	42.3	44.4	N8-Brilliant light
7	292	215	-.51	.09	.84	-2.17	.83	-1.39	.59	.43	47.0	44.5	N7-Harmony, unity
13	296	215	-.54	.09	1.49	5.52	1.34	2.43	.22	.42	44.2	44.8	N13-Unearthly world
12	304	215	-.62	.09	1.17	2.06	1.13	.97	.24	.41	43.3	49.6	N12-Separated from body
14	310	215	-.67	.10	1.18	2.13	1.05	.38	.36	.41	43.3	50.0	N14-Mystical presence
1	321	215	-.77	.10	1.17	1.87	1.31	1.89	.29	.39	47.4	53.3	N1-Time speeds up
5	330	215	-.86	.10	1.01	.16	.92	-.48	.38	.38	53.5	57.8	N5-Peace, pleasantness
MEAN	230.9	215.0	.00	.10	1.00	.0	.95	-.4			52.5	50.2	
P.SD	85.7	.0	.74	.01	.32	3.7	.36	3.0			16.2	9.7	

At most the two sets of hierarchical measures differ by 0.01 logits. The “infit” and “outfit” mean-square values are somewhat higher in the simulated analysis. These results demonstrate the validity of simulating the NDEr responses for Rasch item hierarchy analysis, when the actual NDEr responses are not available.

Given these results, we did the same simulation of the NDE Scale responses from the Martial et al. Study 1 (N=403), using the same constraints (a) that the scale items had so many responses of 0, 1, or 2, and (b) that the distribution of NDE Scale scores (7–32) followed a distribution similar to that shown in Lange et al. in Figure 6, below.

Finally, we did the similar simulation of the NDE-C responses from Study 2 (N=161). In the simulation, the individual answers were distributed based on the constraints (a) that each scale item had so many answers of 0, 1, 2, 3, or 4 as reported in the supplementary material, and (b) that the distribution of NDE-C scores (27–80) followed a distribution similar to that shown in Lange et al. (Figure 6), reproduced here.

Given the constraints, the simulated Rasch analysis should be very close to the Rasch analysis from the actual NDEr response data for both Study 1 and Study 2.

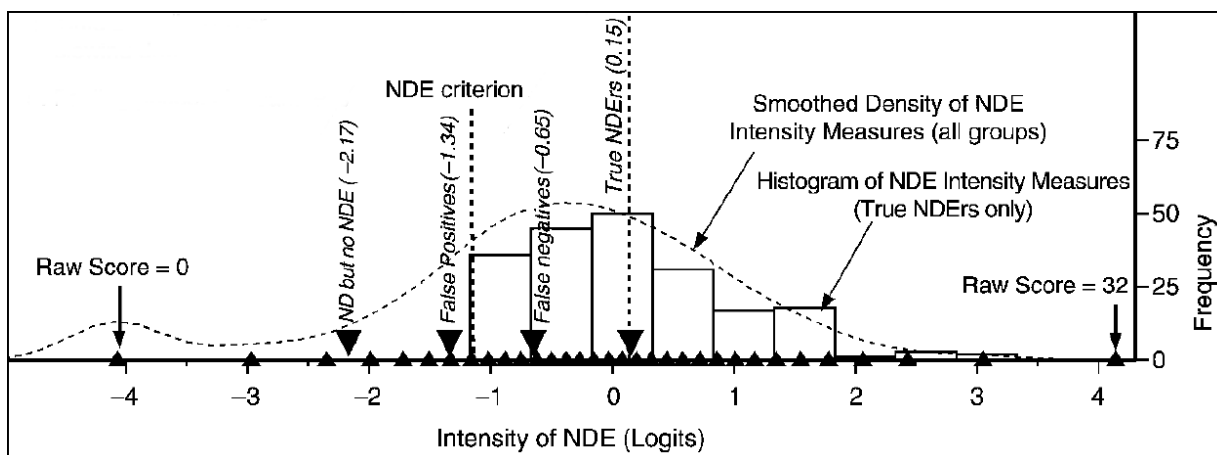


Figure 6. NDE Scale distribution with frequencies, from Lange et al. (2004, p. 167)