

NDEs and REM Intrusion

“Does the Arousal System Contribute to
Near Death Experience?”:
A Summary and Response

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Lezlie Burwell-Pender, MA,
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Have you ever...

- Thought you had fallen asleep, awakened, and felt like you could not move or breathe?
- Or awakened and seen or heard things that seemed real but you later determined they were not real?
 - Like hearing intruders in the home?
 - Feeling like you were flying?
 - Seeing objects coming out of the wall?
 - Seeing objects in a picture on the wall move?



Today's presentation points

- Discuss Nelson et al. article
- Discuss response to Nelson et al. article and points of concern with research method and conclusions
- Highlight the difference between the content of REM Intrusion and NDEs
- Highlight other important points of difference between REM intrusion and NDEs
- Provide suggestions for further research

Today's presentation points

- Nelson, K., Mattingly, M., Lee, S. A., & Schmitt, F. A. (2006). Does the arousal system contribute to near death experience? *Neurology*, 66, 1003-1009.
- Can download Nelson et al. article at <http://www.neurology.org/>.
- We plan to post the paper on which this presentation is based at the web sites of the Near-Death Experience Research Foundation (NDERF; www.nderf.org) and the International Association for Near-Death Studies (IANDS; www.iands.org).

Discussion of article

- “Does the arousal system contribute to near death experience?”
 - written by Kevin Nelson, M.D.; Michelle Mattingly, Ph.D.; Sherman A. Lee, Ph.D.; and Frederick A. Schmitt, Ph.D.
- *REM Intrusion*: The major point of the Nelson et al. article is to suggest a connection between NDEs and REM intrusion.
- Concerns with research method and conclusions

First, Definition of important terms

- REM
 - Rapid Eye Movement, a normal phase of sleep that is usually associated with vivid, emotionally intense, bizarre, story-like dreams.
 - Eyes move around rapidly under closed eyelids, breathing may become irregular, blood pressure may rise, and muscle tone typically is lost to the point of paralysis.
 - Electroencephalogram (EEG) recordings of brain electrical activity during REM are similar to EEG recordings during alert wakefulness.



Definition of important terms

- Normally, REM occurs several times throughout the course of a night's sleep.
- First time begins about 90 minutes after a person has fallen asleep, and the last time is the hour or so just before waking up.
- Sometimes, REM occurs while an individual is awake, usually just as the person is falling asleep or waking up. This phenomenon is called “REM intrusion”.



Definition of important terms

- REM Intrusion: two forms (American Psychiatric Association, 2000, p. 610).
 - sleep paralysis
 - person feels awake but cannot move or talk and may feel unable to breathe—although breathing does actually continue.
 - sleep-related hallucinations
 - those that occur while the person is falling asleep (hypnagogic) or waking up (hypnopompic).
 - the person feels awake but sees or hears things that seem real but that, generally, the person later determines actually weren't real.



Definition of important terms

- Sleep-related hallucinations are visual and incorporate elements of the actual environment.
- Individuals may describe objects appearing through cracks in the wall or describe objects moving in a picture on the wall.
- May also be auditory, for example, hearing intruders in the home, or kinetic, for example, sensation of flying. (APA, 2000, p. 610).
- Last anywhere from a few seconds to a few minutes
- End by themselves
- Often are terrifying, especially if several elements of the experience occur together, such as feeling awake, hearing intruders in the house, and feeling unable to move or speak (p. 610).

Near-Death experience

- NDE (generally a pleasant experience)
 - Vivid senses
 - Usually feelings of peace, joy, and/or cosmic unity
 - A sense of being out of one's physical body
 - What goes on around the "vacated" body is often seen and heard accurately
 - A sense of an "otherworldly" environment
 - Passing through a tunnel or void, sometimes with sound
 - Seeing and/or feeling surrounded by a brilliant light
 - Presence of deceased loved ones and/or spiritual entities
 - Panoramic life review
 - Altered sense of time
 - A reluctance to return to physical existence
 - Disappointment at being revived



Adapted from www.isnds.org

Comparison of NDE elements and REM intrusion

- NDE (generally a pleasant experience)
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 - Altered sense of time
 - A reluctance to return to physical existence
 - Disappointment at being revived
 - REM intrusion (generally a terrifying experience)
 - Paralysis. One feels awake but cannot move or talk.
 - May feel unable to breathe (although breathing does continue)
 - Auditory or
 - Visual hallucinations, unusual light
 - Objects appearing through cracks in the wall, objects moving in a picture on the wall
 - Hearing intruders
 - Sensation of flying
- They are actually substantially different.

Adapted from www.isnds.org

Summary of Nelson et al. article

- Nelson et al. definition of NDEs
 - Stated the "[assumption that] even the most complex psychological process is dependent on brain function" (p. 1003).
 - A response to danger
 - Unique to individual NDEs with no universal elements
 - Assert that individual, age, and cultural differences "[suggest] the content of NDE is modified by experience" (p. 1003)



Summary of Nelson et al. article cont'd.

- They made comparison of similar features of NDEs and the REM state
 - Common element of extraordinary light
 - Feeling immobilized
 - Alert to surroundings
 - Aware of being dead
- APA (2000) distinguished cataplexy from REM Intrusion; however, Nelson et al. included cataplexy as a form of REM Intrusion
- Described nerve pathways in the brain
- “Five lines of evidence” that REM intrusion contributes to NDE

“Five lines of evidence”

- “Five lines of evidence” that REM intrusion contributes to NDE:
 - 1. REM intrusion occurs frequently among normal, healthy people
 - 2. REM intrusion underlies other clinical conditions such as narcolepsy, Parkinson's disease, and delirium tremens
 - because REM intrusion is common and occurs in a variety of clinical conditions, it might be involved in NDEs as well.

“Five lines of evidence” cont'd.

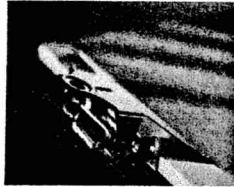
- 3. NDE elements can be explained by REM intrusion
 - Nelson et al. compared NDE and REM intrusion elements
 - REM intrusion occurring at the time of a life-threatening event could account for many elements of NDEs
- 4. Claimed that danger “undoubtedly” (p. 1005) provokes the arousal of certain nerve pathways that, when aroused, are known to generate REM-associated physiological responses.
- 5. “Under apparently similar [physical] conditions, a fraction of cardiac arrest survivors have an NDE” (p. 1006), suggesting that susceptibility to REM intrusion may explain why some do and some do not have an NDE.

The study they used to investigate the fifth line of evidence

- NDE group:
 - 464 invited
 - 64 responded
 - 55 interviewed (those whose NDE occurred during a dangerous situation and qualified on Greyson NDE Scale)
- Comparison group:
 - 55 people “recruited from medical center personnel or their contacts” (p. 1006)
 - were matched by age and sex, only.

The four questions

- Four questions to assess
 - 1) visual REM intrusion,
 - 2) auditory REM intrusion,
 - 3) atonic REM intrusion—sleep paralysis, and
 - 4) atonic REM intrusion—cataplexy.
- 1. Just before falling asleep or just after awakening, have you ever seen things, objects or people that others cannot see? (42% NDErs vs. comparison group 7%)
- 2. Just before falling asleep or just after awakening, have you ever heard sounds, music or voices that other people cannot hear? (36% vs. 7%)
- 3. Have you ever awakened and found that you were unable to move or felt paralyzed? (46% vs. 13%)
- 4. Have you ever had sudden muscle weakness in your legs or knee buckling? (p. 1007)



Nelson et al. concluded...

- The number of NDErs who said yes to a total of one or more questions also was greater: 60% vs. 24% (p. 1007).
- These differences were statistically significant, meaning that in the case of questions 2, 3, and the total REM intrusion score, the possibility that the differences between the two groups occurred by chance was less than 1 in 1,000.
- In the case of question 1, it was less than 1 in 10,000.
- The authors concluded that “episodes of REM intrusion appear to be substantially more common in the lifetime of subjects with an NDE. These findings imply that persons with an NDE have an arousal system predisposing to REM intrusion” (p. 1007).
- Nelson et al. ended the article by acknowledging some limitations of the study and identifying some challenges of further research on this topic.
- Nelson et al. appear to be hypothesizing a “diathesis-stress model”

Nelson et al. also concluded...

- According to the diathesis stress model, some people have a “vulnerable” arousal system (diathesis), as evidenced by their having experienced REM intrusion—a “glitch” in the sleep/arousal process—at some time in their lives.
- Nelson et al. suggested that when such people encounter fear in response to a life-threatening event (stress), they are more likely to experience an NDE.
- The point here is that the diathesis-stress model of NDEs appears to summarize the basis for Nelson et al.’s “lines of evidence,” study, and interpretation of the study findings.

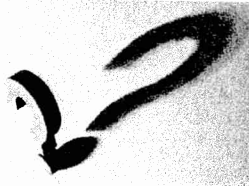
Important Responses to Nelson et al.’s article

- 40% of the NDErs said no to every question designed to assess REM intrusion
 - Assume that the questions actually assessed REM intrusion and that the NDErs in this study were representative of all NDErs.
 - If somewhere between one-third and one-half of NDErs deny ever having experienced a single episode of REM intrusion in their entire lives, the idea that REM intrusion “underlies” and “predisposes” a person to have an NDE when encountering a life-threatening event seems questionable, at best.



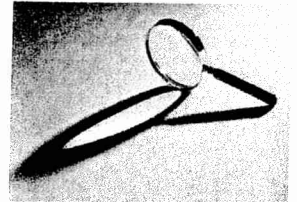
Validity of the questions

- A “yes” to the survey questions about visual and auditory experiences while falling asleep and waking up may have been experiences that do not actually fit the clinical definition of REM intrusion.
- This error would have artificially inflated the NDErs’ reported incidence of “REM intrusion.”



Validity of the questions

- “Yes” to the survey questions may not have been revealing conditions that *preexisted* the NDEs.
- They may have been revealing experiences that were *aftereffects* of NDEs.
- Rather than concluding only that NDErs may have had *arousal systems that predisposed* them to their NDEs, it is equally plausible to conclude that they experienced an increase in unusual falling-asleep and waking-up experiences *as a result* of their NDEs that involved no predisposition.



Validity of the questions

- Perhaps “yes” more often to “REM intrusion” questions may have been revealing not that they *have* such experiences more often than others but that, since their NDEs, they have become sensitized to *notice and remember* unusual experiences, including REM intrusion experiences.

Validity of the questions

- In science, validity refers to whether a researcher is getting information on what one *thinks* one is getting information on.
- Nelson et al. defined a lifelong prevalence of visual REM intrusion as an answer of “yes” to question 1.
- Is a yes answer necessarily an indication of REM intrusion? When a respondent said yes, did they have in mind the kind of experience that truly fell into the category of REM intrusion hallucinations?



The Gardenia and Mrs. Henry



Ring, K. (1984). *Heading toward omega: In search of the meaning of the near-death experience*. New York: William Morrow.

The difference between elements of REM Intrusion and NDE experience

REM Intrusion

- Elements from environment
- Realize hallucination does not reflect reality
- Bizarre, unrealistic
- Frightening

NDEr's experience

- Unknown elements that may reflect a meaningful message later: reality based
- Coherent and meaningful
- Pleasant

They thought...

The researchers *thought* they were getting responses about REM intrusion when they actually may have been getting responses based on unusual falling-asleep and waking-up experiences that do not fit the profile of REM intrusion.



The broken bone analogy

- Nelson et al. suggested a diathesis stress model: a vulnerable arousal system...
- We argue that changes after NDEs do not necessarily reflect a predisposition.
- It is quite possible that, in the aftermath of their NDEs and triggered by their NDEs, people have an increase in unusual falling-asleep and waking-up experiences that, as previously stated, may or may not represent REM intrusion.
- The wording of the study's questions—along with the entire design of the study, did not provide specific support for the diathesis-stress model.



Furthermore...

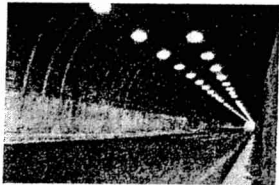
- Nelson et al. found that the higher an NDER's score on the Greyson Scale—indicating a deeper NDE—the more likely they were to say yes to the questions about visual and auditory hallucinations.
- Nelson et al. interpreted this finding as support for the relationship between REM intrusion and NDEs.
- An equally plausible interpretation is that deep NDEs—those whose NDEs were deeper for unknown reasons rather than because of a predisposition of some sort—are more likely to show the aftereffect of having, noticing, and reporting non-ordinary visual and auditory experiences around falling asleep and waking up that do not reflect REM intrusion as it is clinically defined.
- Nelson et al.'s research method did not rule out this very real possibility.
- Nelson et al. interpretations appear to be overstatements.

Concern with composition of study groups

- Comparison group: medical personnel/their contacts may have answered yes at an unrepresentatively low rate.
 - Comparison group response to REM intrusion experience low (7%) compared to APA research (10-15%).
 - Comparison group response to sleep paralysis low (13%) compared to APA (40 to 50%). Nelson et al.'s NDEs reported 46%.
- Without knowing how acutely endangered *non*-NDEs would respond to the study questions, any speculation about a specific connection between NDEs and the arousal system/"REM intrusion" must be tentative at best.

Concern with composition of study groups

- NDEs in research group and their higher rate of response... reflect most NDEs?



Therefore...

- Nelson et al. used groups that did not rule out plausible alternative explanations for their findings
- Considering both the issues of the validity of study questions and the composition of study groups...the diathesis-stress model of NDEs is possible but remains entirely hypothetical.

Their assumption...

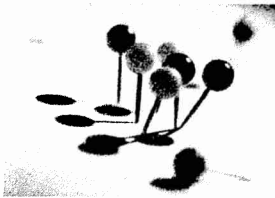
- ...that REM intrusion underlies NDEs
- Then all NDEs would need to occur in circumstances in which REM intrusion was possible.
- This assumption does not account for
 - When NDEr had no opportunity for fight-or-flight response
 - When congenitally blind people, who had never experienced vision or rapid eye movement, had NDEs that included vision
 - When the NDE occurred while the experiencer was under the influence of a drug that is known to suppress REM
 - When the NDE occurred while the experiencer was documented to be in deep coma, without pulse or breathing, during which REM was highly unlikely to have occurred.
 - And, how do Nelson et al. account for veridical perception?

Our position is...

- Rather than concluding that REM intrusion *underlies* NDE, we think it equally, if not more, plausible to conclude that NDEs occur in a variety of circumstances, possibly occasionally *in association with* REM intrusion, and that the two experiences are fundamentally different.

Other important points

- Use of the term *autoscopy*
 - Does not accurately describe NDE experience
- **Extraordinary light**
 - Quality and frequency
- **Sense of being dead**
- **Visual and auditory hallucinations**
 - REM intrusion and hallucinations versus NDEs experienced as realistic ... they do not fit the profile for hallucinations



Other important points

- NDERF web site survey: "Following the experience, have you had any other events in your life, medications or substances which reproduced any part of the experience?"
- Respondents can give a "Yes", "Uncertain" or "No" response, followed by a "Please explain" text box for a narrative.
- Question was deliberately worded to encourage as many positive responses as possible. Of 397 respondents who shared their NDEs an average of 16 years after the experience—plenty of time to have subsequent experiences—only 22% said yes.

Other important points

- We assert that, despite a few superficial similarities, NDEs are *not* easily explained by REM intrusion.
- For NDEs to be attributed to REM intrusion, we would expect the two subjective experiences to be *substantially* similar. We find that they are not.
- We also find another striking dissimilarity: the profound aftereffects of NDEs contrasted with the virtual absence of reports of life-changing aftereffects from REM intrusion experiences. If REM intrusion underlay NDEs, we would expect at least somewhat similar aftermaths of the two experiences.



NDE Content Comparison by Age and Culture

- Like REM dreams, NDEs show surface differences based on experiencers' differing ages, cultures, and life experiences.
 - The concept of deep and surface structures
- Unlike REM dreams, NDEs show basic consistency despite experiencers' differing ages and life experiences and may show basic consistency despite differing cultures.

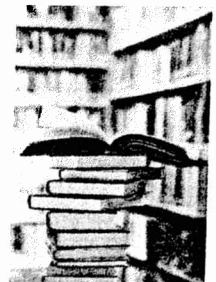


NDE Content Comparison by Age and Culture

- REM dreams apparently do not have a consistent deep structure, whereas NDEs apparently do—a fundamental difference that argues against a REM intrusion basis to NDEs.
- Despite superficial similarities between some elements of REM and REM intrusion, on the one hand, and NDEs, on the other, the differences between these experiences appear to outweigh substantially the similarities.

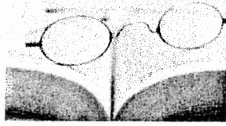
Further research

- Prospective studies should be undertaken to investigate the possible relationship between REM intrusion and NDEs.
 - Valid and reliable instrument and/or interview protocol that assesses how often respondents have experienced REM intrusion
 - Record the narratives of the respondents' experiences associated with answering yes to REM intrusion questions, and



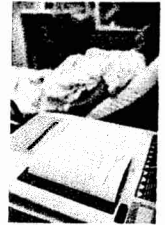
Further research

- Use a research design that would yield appropriate comparison groups.
 - Participants prone to near-death circumstances before an NDE, immediately after it, and at some established follow-up point in the future.



For example...

- A study could take place in a few hospitals for a period of time...
 - in which all patients who had never experienced cardiac arrest would complete a valid and reliable REM-intrusion paper-and-pencil instrument upon entering the hospital, again upon discharge, and again after one year.
 - Cardiac arrest patients are interviewed for NDEs.
 - If present, they are given the Greyson NDE scale.
 - This procedure creates three groups to study.



In summary...

- 40% of the NDErs said no to all of the alleged REM intrusion questions—a substantial minority
- When NDErs said yes to visual and auditory experience questions, they may have been indicating experiences that don't actually represent REM intrusion—creating the impression of greater alleged REM intrusion where it may not actually have existed.
- The questions that Nelson et al. used did not differentiate when the alleged REM intrusion experiences occurred relative to when the NDEs occurred.
- The comparison group members they used in their study were much less likely to have survived situations of acute danger comparable to what NDErs had experienced.
- NDErs' greater proportion of yes responses to survey questions may have been related to their having survived a life-threatening event, not their having had an NDE, which would have indicated no specific relationship between alleged REM intrusion and NDEs.
- The large difference in responses between the NDE and comparison groups may have been artificially increased by NDErs who were more prone to say yes to the survey questions, comparison group members who were less prone to say yes, and the exclusion of some willing participants from the study whose answers might have reduced the difference.

In summary...

- NDEs that occur in the absence of the fight-or-flight response that may activate REM, in persons with congenital blindness, and in person under the influence of drugs known to suppress REM, all discredit the argument that REM underlies NDEs.
- Although the surface content of both REM dreams and NDEs varies with the experiencer's age, culture, and prior life experience, REM dreams apparently do not have a consistent deep structure, whereas NDEs apparently do—a fundamental difference that argues against a REM intrusion basis to NDEs.
- Despite superficial similarities between some elements of REM and REM intrusion, on the one hand, and NDEs, on the other, the differences between these experiences appear to outweigh substantially the similarities.

In conclusion...

- We respect and appreciate the contribution Dr. Nelson et al. have made to the field of near-death studies.
- They raised a plausible hypothesis.
- Although we found much to criticize in their methods and conclusions, we don't want that criticism to be interpreted as lack of regard for them or their efforts.
- We encourage future high-quality research on NDEs, and we stand ready to support any scholarly NDE researchers, including Dr. Nelson et al., in any way we can.

Information on today's presentation points

- Can download Nelson et al. article at <http://www.neurology.org/>.
- We plan to post the paper on which this presentation is based at the web sites of the Near-Death Experience Research Foundation (NDERF; www.nderf.org) and the International Association for Near-Death Studies (IANDS; www.iands.org).

References

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.
- Long, J., & Holden, J. (under review). "Does the arousal system contribute to near-death experience?": A summary and response. *Journal of Near-Death Studies*.
- Nelson, K., Mattingly, M., Lee, S. A., & Schmitt, F. A. (2006). Does the arousal system contribute to near death experience? *Neurology*, *66*, 1003-1009.
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Questions?

Comments?