Consciousness & near-death experiences: what is known, what is new

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Who are we?

GIGA Research Center
Who are we?

Prof. Steven Laureys, MD, PhD

Doctors
Neuropsychologists
Physiotherapists
Speech therapists
Computer scientists
Nurses
Biologists

Coma Science Group – GIGA-Consciousness
Defining consciousness?

Where could near-death experiences be placed on this graph?

Laureys, 2005; Laureys et al., 2008
Measuring brain activity

- **Altered or modified states of consciousness**
  - Pathological: coma
  - Pharmacological: anesthesia
  - Physiological: hypnosis

Understanding consciousness remains one of the greatest mysteries for science to solve
“Clinical” vs “brain” death

! Remember that not a single patient who showed clinical criteria of brain death has ever recovered consciousness!
Near-death experiences (NDEs)

- No universally accepted definition but...
- can be defined as “profound psychological events with transcendental & mystical elements typically occurring to individuals close to death or in situations of intense physical or emotional danger”

- 3 main (non-mutually exclusive) explanatory models
  - Spiritual theories → “dualistic” approach toward the mind–brain relationship
  - Psychological theories → psychological reaction to impending death
  - Neurobiological theories → brain mechanisms might underlie NDEs

Greyson, 2000; Charland-Verville et al., 2018
Historical background

Platon’s Republic
315 B.C.

Jerome Bosch
1516

Pierre Jean du Monchaux
1740

Amiral Beaufort
1795

Albert Heim
1892
NDE testimonies & stories
Research on NDEs

Number of publications per year (for a total of 295 publications):
Medline search with the keyword ‘near-death experiences’
NDE testimonies collection

- Database: 1630 testimonies → permitting empirical studies
  - Descriptive & clinical data
  - Written narratives (mainly French, Dutch & English)
- Greyson NDE scale: total scores ≥ 7/32 = NDE experiencer

Histograms of the age of the experiencers at the time of the NDE & at the time their accounts were retrospectively recollected.
NDE phenomenology

- Semantic analysis of written reports using natural language processing

Written reports
N=625

Martial*, Cassol*, et al., under review
Frequency of NDE features

![Graph showing the frequency of NDE features](image)

**Life-threatening “Real NDEs” n=140**
- Total score 16 ± 6 (7-30/32)
- Anoxia 15 ± 6 (7-29)
- Trauma 16 ± 6 (7-26)
- Other 16 ± 6 (7-30)

**Non-life-threatening “NDE-like” n=50**
- Total score 17 ± 7 (7-30/32)

Charland-Verville et al., 2014
Phenomenological memory characteristics

Thonnard*, Charland-Verville*, et al., 2013; Martial et al., 2017
Semantic similarity with drug-induced experiences

Martial*, Cassol*, et al., under review

NDE written reports
N=625
VS
Drug-induced written reports
N=15,000
Semantic similarity with Ketamine experiences
Are NDEs self-defining?

- 71 NDE experiencers responded to a self-defining memory task
  - Describe their 2 main self-defining memories
  - Complete the Centrality of Event Scale (CES) for each memory
Are NDEs self-defining?

Flowchart representing the distribution of participants within the different subgroups.

For a majority of NDE experiencers, NDE = self-defining

Cassol et al., under review
Are NDEs self-defining?

How central is the NDE to their identity?

This highlights importance for clinicians to facilitate their integration within the self.

Association between CES total scores & Greyson NDE scale total scores ($r_s = 0.48$, $p<0.01$).
Inducing NDE-like features in controlled laboratory

**EEG results: Cortical maps of the bands of interest**

Charland-Verville*, Piarulli*, et al., in preparation
Conclusion

- Research on NDEs is currently progressing...
- Recurrent features in NDE reports
- NDE memories contain a particular high amount of memory characteristics
- NDE phenomenology reports resemble Ketamine-induced phenomenology reports
- For a majority of NDE experiencers, NDE seems to be self-defining
- Correlations between NDE phenomenology & neural correlates
THANK YOU