Journal of the Society for Psychical Research, 2017
Vol. 81, No. 4, 228–240,
www.spr.ac.uk

Established 1882

RESEARCH NOTE: EXPLORING LINGUISTIC PATTERNS IN NDE ACCOUNTS

By James Houran, Rense Lange & Bruce Greyson

Introduction

After undergoing surgery for pancreatic cancer, Steve Jobs, the celebrated co-founder of Apple, delivered a moving 2005 address at Stanford University transcribed in full by *The Guardian* (2011) in which he characterized death as "very likely the single best invention of life". That statement was arguably prophetic, as according to his sister who was present at his deathbed (Jones, 2011), Jobs' last moments consisted of him looking lovingly at family members and then seemingly over their shoulders beyond them while voicing the simple, if mysterious, observation — "*Oh wow. Oh wow. Oh wow*". It is unclear what Jobs was perceiving or describing, but the event hints at something reminiscent of a deathbed vision or even a full-scale Near-Death Experience (NDE).[1] NDEs represent a distinctive state in which individuals suddenly confronted with actual or expected death perceive their consciousness as unbounded by the physical body or earthly environs (for overviews see Blackmore, 2012; Greyson, 2014). These experiences are within a special class of crossover anomalies that have captured and sustained the interest of researchers studying both heterodox and orthodox phenomena. Therefore, advancements in understanding NDEs have the potential to inform and perhaps bridge various, and even competing, models of consciousness within the social and medical sciences.

A popular tool in the NDE literature is Greyson's (1983, 1985, 1990) NDE Scale, which quantifies the *intensity* of NDEs according to their cognitive, affective, transcendental and paranormal components. It was specifically developed through an iterative process from an initial list of 80 phenomenological features reported to be characteristic of NDEs. Analysis of item-total score correlations yielded a 16-item scale, which had face validity and was highly correlated with other measures of NDEs. Moreover, this scale differentiated unequivocal NDEs from ambiguous or questionable experiences. Each of the sixteen experiences is rated in terms of three ordered categories that generically represent 'not present', 'mildly or ambiguously present', or 'definitively present', but whose exact wording varies depending

[1] Curiously, there are many celebrities who have gone public with their NDE experiences, see: http://www.near-death.com/experiences/rich-and-famous.html.

on the nature of the question. When such categories are scored 0, 1 and 2 a sum-score of 32 can be achieved.

In earlier research (Greyson, 1983, 1990) a sum of seven was chosen as the criterion for identifying someone with a 'True-NDE', because that value was one standard deviation below the mean among a criterion group of NDErs. This approach was later validated in a comparison between NDErs and people who had come close to death without an NDE (Greyson, 1990). The instrument has proved useful in several applications (see, e.g., Holden, Greyson & James, 2009), especially for identifying such 'True NDEs' from other respondent types. That said, we acknowledge that the term may invoke unavoidable connotations in some readers, i.e. truth and reality, a state of affairs that is as it appears or is claimed to be. This may imply to some that other experiences are untrue or less true or meaningful. Therefore, 'True-NDE' should be understood as being equated with a 'classic NDE' in an authentic or consensual sense. Given this understanding, we retain use of the 'True NDE' term here for consistency with previous studies using the NDE Scale. Furthermore, we note that advanced psychometric analysis of the NDE Scale using Rasch (1960/1980) scaling has validated the notion that NDEs can be treated as a unidimensional and 'progressive' phenomenon that implies a generally consistent unfolding of the experience regardless of a percipient's current age, age at time of NDE, as well as intensity of the NDE and years elapsed since the event (Lange, Greyson & Houran, 2004).

Building on the above, we recently studied a database of NDE accounts in an attempt to gain insights from understanding their structure and semantics (Lange, Greyson & Houran, 2015). The details of this database are given later in this paper. That work differed from previous research in two notable ways: (i) using qualitative comparisons rather than quantitative, and (ii) pairing NDE narratives with data from the NDE Scale. We refer readers to our original paper for technical details on the statistical methods we used, known as Latent Semantic Analysis (LSA). This method differs from Interpretive Phenomenological Analysis, a qualitative, phenomenological approach that combines hermeneutics and idiography to understand how percipients construct meaning from their experiences and likewise how experiences affect individuals, which has been used in some parapsychological studies (e.g., Drinkwater, Dagnall & Bate, 2013; Simmonds-Moore, 2016). Nor is LSA the same as Statement Validity Analysis, Criteria-Based Content Analysis or related approaches that evaluate the veracity of witness reports (see, e.g., Houran & Porter, 1998; Kang & Lee, 2014). Rather, LSA is essentially a 'factor analysis' of linguistic data — a simple concept that has become technically feasible only after the development of efficient computer algorithms capable of dealing with large data sets.

Just as exploratory factor analysis of questionnaire data traditionally serves as part of the model building process for psychometric constructs, so LSA can offer additional insights from patterns in linguistic data that speak to the phenomenology of a construct or concept. LSA accomplishes this by determining the similarity of meaning of words and passages of written text (Deerwester et al., 1990; Landauer, Foltz & Latham, 1998). Based on word and context co-occurrences, words, sentences and paragraphs contained in

narratives or reports can be represented as 'points' located within a very high-dimensional 'semantic space' (Landauer et al., 1998). Groupings of text within the same location in this broad model of semantic space suggest common themes underlying different descriptors or references. Using this approach, Lange et al. (2015) discovered that specific linguistic patterns in NDE accounts could discriminate between individuals scoring low vs. high on Greyson's NDE Scale with 64% accuracy. Moreover, this predictive power was due primarily to seven linguistic factors within the narratives ($p < .001$).

However, Lange et al.'s (2015) original paper did not explore or speculate on the meaning or theoretical import of these seven linguistic factors, except to assert that "the elements defy a coherent conceptualization, and little theoretical meaning can be inferred from the empirical patterns at this time" (pp. 84–85). Table 1 lists the words with the highest absolute loadings on each linguistic factor. For simplicity, the exact loadings are not shown. As the sign of loadings (positive or negative) is arbitrary, the factors' interpretations depends solely on the juxtaposition of the top vs. bottom parts of each column. Since the publication of Lange et al. (2015), we have given these interpretive issues more thought and suggest a meaningful exercise would be to share our speculations on possible meanings of the factors so as to spark additional contemplation or debate within the broader parapsychological community.

Table 1 shows that some of words or themes within the factors broadly agree with those reported in earlier qualitative research (e.g., Ring, 1980). For example, the psychometric 'core NDE' described by Lange et al. (2004), by its inherent definition, focuses on transcendental or unconventional components in many NDE accounts. Four of the seven major linguistic factors (labeled 1, 2, 3, and 4 in Table 1) included such themes, whereas the remaining three major linguistic factors (5, 6, and 7 in Table 1) tended to include both vague and specific references to physiological or environmental elements.

We acknowledge that a detailed interpretation or deemed relevance of these linguistic factors is hindered in several ways. First, the linguistic structures outlined in Table 1 do not always immediately or obviously relate to the experiential factors previously mentioned in NDE literature. Second, LSA strips temporal relational information from the data and consequently any interpretation of the descriptors or components in terms of their potential *chronological* relationships is infeasible. However, even a *post-hoc* analysis of a limited kind on the seven linguistic themes might yield new insights and propose fresh speculations that contribute productively to the NDE debate. To that end, this Research Note reports the results of a simple, exploratory exercise that did not test specific hypotheses but rather was primarily descriptive in nature.

Database of NDE Accounts

It is important to understand the origins and contexts of the NDE data under consideration here. Indeed, NDE-type experiences can occur in a variety of situations, ranging from cardiac arrest, through brain dysfunction, to extreme fear with no physical alteration in brain function, to spontaneous NDEs during full consciousness and without brain pathology that are more

Table 1.

Perceptual themes across Lange et al.'s (2015) seven major NDE linguistic clusters

	Factor[a]						
	1	2	3	4	5	6	7
Extreme	water	tunnel	warm	door	accident	Didn't	light
	operate	surgery	brother	sensation	angel	path	above
	surgery	light	demon	pain	watch	NDE	yes
	recall	beautiful	breath	open	Doctor/	play	nose
	car	heaven	God	music	nurse	quite	following
	body	God	breathe	recall	must	hot	each
	occurred	bright	oxygen	lights	room	work	cry
	event	angel	Christ	coma	ill	complete	began
	blood	warm	pulse	remember	window	else	phone
	which	white	accident	love	heart	area	process
					minute		
Sign change	*vs.*	*vs.*	*vs.*	*vs.*	*vs.*	*vs.*	*vs.*
Extreme	here	these	Husband/	major	soft	dad	front
	angel	minute	wife	voice	Husband/	forget	form
	Couldn't	drive	head	nurses	wife	shoulder	nearly
	baby	phone	tunnel	everything	black	appear	familiar
	church	some	stay	hands	four	tremendous	between
	want	labor	recall	bed	float	wonder	breathe
	beautiful	event	energy	quite	god	pleasant	also
	earth	dream	aware	ceiling	home	ask	darkness
	God	operate	sister	ago	recall	comfortable	feelings
	love	baby	coma	Lord	darkness	night	wake
			voice		music		

[a] Factors are listed in order of decreasing eigenvalue
[b] Tokens are listed in order of decreasing loadings (absolute values)

akin to transpersonal or mystical experiences. In other words, severe brain damage or complete loss of vital signs are not prerequisites for NDEs.

The third author (BG) maintains an ongoing database of NDE accounts provided personally by those reporting NDEs. Available for analysis were a total of 863 such accounts, some of which constitute only a couple of paragraphs, whereas others span 10-20 typewritten pages. Scores on the NDE Scale were also available for 588 of these NDE accounts, which Lange et al. (2015) scored according the Rasch (1960/1980) the table described in an earlier paper (Lange et al., 2004). This database of NDE accounts was the foundation for Lange et al.'s (2015) LSA analyses. Table 2 reveals there is some diversity in the situations attending the NDEs in our sample, although most of the cases we analyzed arguably represented instances of experiencers with perceptual or cognitive faculties that were seemingly substantially compromised at the time of the NDE, i.e., Christian women who reported

Table 2

Descriptive Statistics for Lange et al.'s (2015) NDE Dataset

Variable	Percent or Mean	Variable	Percent or Mean
Gender:		Drugs taken within 24 hrs of NDE?:	
Male	33%	Yes	61%
Female	67%	No	39%
Age at NDE	31.1 yrs (± 15.8)	Ethnicity:	
Time elapsed since NDE	20.6 yrs (± 15.9)	Caucasian	76%
Cause of near-death event:		Other	24%
Illness	28%	Religion:	
Surgery/childbirth	35%	Protestant	46%
Accident	14%	Catholic	22%
Other	23%	Other religion	23%
Closeness to death:		theist/agnostic	9%
Loss of vital signs	37%	NDE Scale	15.4 (± 7.2)
Serious illness/injury	37%	Emotional tone of NDE:	
Not serious	26%	Pleasant	80%
Cause of unconsciousness:		Neutral	9%
Drugs/medications	30%	Unpleasant	11%
Head injury	14%		
Cardiac arrest	10%		
Other	46%		

'positive-toned' NDEs in the context of illness or surgery/childbirth, involving serious illness/injury or loss of vital signs.

Classification Procedure

We categorized the themes contained in the linguistic factors listed in Table 1 into three groups:

> *Unconventional:* words directly referencing esoteric/transpersonal type content, especially when consistent with NDE literature (i.e., angel, church, God, tunnel, heaven, demon, Christ and Lord).
> *Conventional:* words directly referencing environmental or mundane content (i.e., wake, breathe, doctor-nurse, familiar, accident, pain and night).
> *Ambiguous:* words that were emotive or tied to perceptions that are open to various interpretations due to context (i.e., lights, beautiful,

bright, warm, love, voice, music, darkness, comfortable, pleasant, feelings, float, soft, appear, tremendous, form, wonder, dream, sensation and energy).

Being a subjective exercise, admittedly some of our classifications are open to competing interpretations — similar to the situation of making sense of Steve Jobs' deathbed perceptions and descriptions. This is a major part of the challenge forming a comprehensible conceptualization of the patterns in Table 1. For instance, *float* and *light* could arguably be included in the Unconventional category as they align to classic NDE perceptions, although they could also be mundane perceptions related to the specific circumstances or environment in which the NDE occurred.

Moreover, words deemed Conventional like *ceiling*, *brother* or *bed* might indeed be mundane references or they could represent spatial perceptions that would have been impossible for an experiencer at the time of occurrence, i.e., experiencers' views of a scene during an out-of-body episode. Finally, some words (e.g., watch, voice, light) could variously act either as nouns, verbs or adjectives depending on a user's context, so attempts to classify words reliably in terms of their functions and subsequently juxtapose with the linguistic dimensions was effectively stymied. Nevertheless, our categorizations represent our best faith effort taking each of the words (linguistic components) at face value.

Themes across Seven Major Linguistic Factors of NDEs (Lange et al., 2015)

Using the approach above, we found that NDE accounts as defined by the seven major linguistic factors from Lange et al. (2015) largely consisted of Conventional as opposed to Unconventional content (see Table 3). This finding might seem trivial except for the fact that the type of brain activity necessary for complex conscious experience typically reported in NDEs is absent in both cardiac arrest and general anaesthesia, conditions under which NDEs commonly occur (Greyson et al., 2009). Likewise, the accounts in our sample typically involved physiological conditions that would seem to undermine complex conscious experience.

More curiously, concomitant with the preponderance of Conventional themes is an approximate balance between Unconventional and Ambiguous perceptions. If anything, there is a slightly higher incidence of Unconventional compared to Ambiguous themes, at least among the three linguistic factors with the highest eigenvalue loadings. The trend flips in the four linguistic factors with the lowest eigenvalue loadings, with Ambiguous themes dominating over Unconventional content.

Themes across the 3 Highest-Loading Linguistic Factors

Given the trends in Table 3, we further studied the patterns within the first three linguistic factors, and specifically those components (words) with the positive factor loadings shown in Table 1.

As before, Table 4 shows that Conventional themes tended to dominate the NDE linguistic factors, but Unconventional content was a steady theme that was more prevalent than Ambiguous themes.

Table 3

Descriptive statistics for general incidence of word themes across the seven major NDE linguistic clusters from Lange et al. (2015)

	Linguistic Themes		
Linguistic Factor[a]	% Unconventional	% Ambiguous	% Conventional
1	**15**	10	75
2	**20**	25	55
3	**20**	15	65
4	5	**25**	70
5	10	**20**	70
6	0	**25**	75
7	0	**20**	80

[a] Factors are listed in order of decreasing eigenvalue

Table 4

Descriptive statistics for incidence of word themes in the positive loading clusters across the three-highest eigenvalue NDE linguistic clusters from Lange et al. (2015).

	Linguistic Themes		
Linguistic Factor[a]	% Unconventional	% Ambiguous	% Conventional
1	0	0	100
2	40	40	20
3	30	10	60

Discussion

Whereas Greyson's NDE Scale quantifies the intensity of the perceptions defining NDEs, the results from Lange et al.'s (2015) LSA study is different in that it captured and described the phenomenology of NDE *accounts*. As discussed here, these narratives were characterized by specific sets of descriptors that were not distinguished in terms of exclusively Conventional versus Unconventional content. Rather, the NDE reports included a mixture of themes that was consistent with the idea that experiencers maintained a meaningful degree of awareness of physical realities while they simultaneously perceived Ambiguous and Unconventional stimuli.

Such a *continuity of acute awareness* on the part of experiencers arguably fails to make obvious sense in terms of a reductionist model of NDEs, whereby sensory or cognitive faculties are substantially compromised, altered or absent due to a vivid internal attention state, dissociative episode or medical

crisis. In other words, the NDE phenomenology studied here might suggest that 'True-NDEs', defined psychometrically by the NDE Scale, involve an expanded degree of awareness or consciousness than might be expected by current medical models of brain functioning. That is, it might be expected that experiencers would have reported more rigid separations in levels or aspects of their consciousness if they were experiencing discrete episodes related to profound changes in their medical states. Of course, our simple, descriptive exercise was considerably constrained in scale and scope, so obviously more in-depth work is needed to explore the issue of 'expanded versus reduced awareness' raised here.

The observed mixture or potential blending of disparate perceptions does not necessarily constitute an argument for parapsychological aspects to NDEs. For example, we speculate whether the NDE accounts considered here are marked examples of *syncretic cognition* that manifested under extreme physiological stress. Syncretic cognition, long discussed within the domain of sensation and perception (e.g., Werner, 1934/1978), entails a de-differentiation (or fusion) of perceptual qualities in subjective experience. Werner offered examples such as *physiognomic perception* (fusion of perception and feeling), *synaesthesia* (fusion of sensory modalities), and *eidetic imagery* (fusion of imagery and perception, i.e., structural eidetic imagery). Therefore, NDEs might derive from increased permeability in mental boundaries, or what amounts to a special transliminal state. Thalbourne and Houran (2000) defined transliminality as the "hypothesized tendency for psychological material to cross (*trans*) thresholds (*limines*) into or out of consciousness" (p. 853). This construct has been conceptualized in terms of state or trait *neuroplasticity*, i.e., an enhanced interconnectedness between brain hemispheres, as well as among frontal cortical loops, temporal-limbic structures and primary or secondary sensory areas or sensory association cortices (cf. Houran, Hughes, Thalbourne & Delin, 2006; Thalbourne, Crawley & Houran, 2003; Thalbourne, Houran, Alias & Brugger, 2001).

The clinical literature references curious examples of presumed neuroplasticity in various waking states. For instance, Glicksohn and colleagues (Glicksohn, Salinger & Roychman, 1992; Glicksohn, Steinbach & Elimalach-Malmilyan, 1999) have repeatedly found that synesthesia is related to eidetic imagery, which in turn has been implicated in some apparitional experiences (e.g., Martin, 1915; Osis, 1986). Similarly, Jacome (1999) reported in a recent case study that a woman diagnosed with multiple sclerosis and temporal lobe epilepsy experienced general hallucinations and Lilliputian imagery with synesthetic components. Most recently and exceptionally, Simmonds-Moore (2016) published a case study of a 27-year-old male who reported several forms of strong synesthesia in addition to exceptional experiences and cognitive and perceptual abilities, which spanned paranormal experiences, musical and mathematical abilities and enhanced memory skills. However, discussions of syncretic cognitions in the context of subjective paranormal experience have only recently appeared in the literature (e.g., Alvarado, 1994; Hunt, 1995; Irwin, 1985, 2000; Ring & Cooper, 1999; Sako & Homma, 1997; Zingrone & Alvarado, 1997; Zingrone,

Alvarado & Agee, 2009; Simmonds-Moore, 2016) – including the idea that such perceptions are mediated or produced by particular conditions of psychophysical distress (see e.g., Houran, Kumar, Thalbourne, Lavertue, 2002; Thalbourne, Crawley & Houran, 2003; Thalbourne, Houran & Crawley, 2003). Moreover, percipients consistently describe the content of anomalous (syncretic-like) experiences as mystical, religious or paranormal when neuroplasticity involves temporal-limbic activation (e.g., Brugger 2001; Persinger, 1983; Thalbourne, Crawley & Houran, 2003; Thalbourne & Maltby, 2008).

Though not as disruptive as the hypothesis that NDEs represent survival of personal consciousness after physical death, the alternative idea that a 'dying or clinically dead brain' can somehow produce marked experiences of syncretic cognition is nonetheless a remarkable claim in terms of modern theories of brain physiology. To be sure, the type of brain activity necessary for complex conscious experience is assumed to be abolished during the psychophysiological conditions in which NDEs are commonly reported (Greyson, Kelly & Kelly, 2009), and this applies to a good percentage of experiencers in the present sample. That said, it remains to be determined to what extent the perceptual features of NDEs are wholly inherent to their underlying state or are themselves confounded or biased during their subsequent recollection, particularly if the recall happens long after the apparent NDE occurred.

Further research could explore some new approaches. For example, cross-cultural research should attempt to replicate the basic linguistic patterns reviewed here. Certainly different societies and cultures will use at least some different descriptors, but the general pattern of having a mixture of Conventional/environmental and Unconventional themes suggesting a continuity of conscious awareness or syncretic cognition should be evidenced if these ideas are valid. Another idea is to compare the linguistic patterns of 'True NDE' narratives with those of comparison narratives produced by research participants who 'imagined' or fabricated an NDE, either spontaneously or under guided-imagery.

It might be expected that significant differences would emerge in the linguistic patterns between accounts of an ontologically-real phenomenon attending the dying (or perceived to be dying) process versus accounts of a wholly-imagined scenario that draws upon one's memory of religious or cultural learnings. Furthermore, there might be dissimilar linguistic patterns for traditional NDEs as compared to deathbed visions (cf. Houran & Lange, 1997), as was perhaps exemplified in the case of Steve Jobs. Identifying differences in such patterns can advance theory-building directly, as well as help researchers to screen out spontaneous cases unlikely to hold evidential value and instead pinpoint cases that deserve more detailed study (cf. Lange et al., 2004, 2015; Houran, Lynn & Lange, 2017). An important goal for fresh studies would be to look for consistencies among disparate data sets that would either support or refute the hypotheses that (1) 'True NDEs' represent a structured, ontological phenomenon and (2) current physiological models of brain functioning are insufficient explanations for the perceptions that define NDE phenomenology.

These two hypotheses are not necessarily mutually exclusive. To be sure, there is a burgeoning neuroscientific literature that suggests the brain's sophistication, adaptability and perhaps resilience are more substantial than previously thought. For example, the concept of *predictive coding* (e.g., Clark, 2013; Donnarumma, Costantini, Ambrosini, Friston & Pezzulo, 2017; Park & Friston, 2013) implies that the brain is an organic neural net that continually but unconsciously generates hypotheses and simulates models of the world to anticipate action and events and to minimize prediction errors to promote cognitive, neural, and generally adaptive functioning in everyday life.

This predictive modelling is presumably generated in higher cortical areas and flows downward via feedback to lower sensory areas in a process that ideally engenders an increasingly accurate or refined representation of the natural world by comparing expectations to actual events and minimizing prediction errors in the process. Transliminality (or permeable mental boundaries) might facilitate these capabilities, just as it apparently does for the mechanisms underlying syncretic cognition. Regardless, these leading-edge neurological studies clearly indicate that our understanding of the brain's orthodox capabilities and limitations across various physiological conditions remains a tremendous unknown. Continued and more refined explorations of NDEs are expected to help elucidate these important questions, whether or not these anomalous experiences are parapsychological or not.

Acknowledgments

This paper was supported by the second author's bursary (#54/12) from the BIAL Foundation (Portugal) for which we express appreciation. We also thank the editor and reviewers for helpful suggestions on an earlier draft. Please address correspondence to the first author at jim_houran@yahoo.com

Integrated Knowledge Systems, Inc. James Houran & Rense Lange
Laboratory for Statistics and Computation,
ISLA – Instituto Politécnico de Gestão e Tecnologia

Dept. of Psychiatry & Neurobehavioral Sciences, Bruce Greyson
University of Virginia Health System

REFERENCES

Alvarado, C. S. (1994, August). *Synesthesia and claims of psychic experiences: An exploratory study.* Paper presented at the 37th Annual Convention of the Parapsychological Association, Amsterdam, The Netherlands.

Alvarado, C., & Zingrone, N.L. (1997). Factors related to the depth of near-death experiences: Testing the 'embellishment over time' hypothesis. *Imagination, Cognition & Personality*, *17*, 339–344.

Blackmore, S.J. (2012). Near-death experiences: in or out of the body? In I. Fredriksson (Ed.), *Aspects of consciousness: Essays on physics, death and the mind* (pp. 104–118). Jefferson, NC: McFarland.

Blei, D, M., Ng, A. Y., & M. I. Jordan. (2003). Latent dirichlet allocation. *Journal of Machine Learning Research*, *3*, 993–1022.

Bond, T.G., & Fox, C. (2007). *Applying the Rasch model: Fundamental measurement in the human sciences*. Mahwah, NJ: Lawrence Erlbaum Associates.

Brugger, P. (2001). From haunted brain to haunted science: A cognitive neuroscience view of paranormal and pseudoscientific thought. In J. Houran & R. Lange (Eds.), *Hauntings and poltergeists: Multidisciplinary perspectives* (pp. 195–213). Jefferson, NC: McFarland.

Deerwester, S., Dumais, S.T., Furnas, G.W., & Landauer, T.K. (1990). Indexing by latent semantic analysis. *Journal of the American Society for Information Science*, *41*, 391–407.

Drinkwater, K., Dagnall, N., & Bate, L. (2013). Into the unknown: Using interpretative phenomenological analysis to explore personal accounts of personal paranormal experiences. *Journal of Parapsychology*, *77*, 281–294.

Glicksohn, J., Salinger, O., & Roychman, A. (1992). An exploratory study of syncretic experience: Eidetics, synaesthesia, and absorption. *Perception*, *21*, 637–642.

Glicksohn, J., Steinbach, I., & Elimalach-Malmilyan, S. (1999). Cognitive dedifferentiation in eidetics and synaesthesia: Hunting for the ghost once more. *Perception*, *28*, 109–120.

Greyson, B. (1983). The near-death experience scale: Construction, reliability, and validity. *Journal of Nervous and Mental Disease*, *171*, 369–375.

Greyson, B. (1985). A typology of near-death experiences. *American Journal of Psychiatry*, *142*, 967–969.

Greyson, B. (1990). Near-death encounters with and without near-death experiences: Comparative NDE Scale profiles. *Journal of Near-Death Studies*, *8*, 151–161.

Greyson, B. (2014). Near-death experiences. In E. Cardeña, S. Lynn & S. Krippner (Eds.), *The varieties of anomalous experience: Examining the scientific evidence* (2nd ed., pp. 333–367). Washington, DC: American Psychological Association.

Greyson, B. (2007). Consistency of near–death experience accounts over two decades: Are reports embellished over time? *Resuscitation*, *73*, 407–411.

Greyson, B., Kelly, E.W., & Kelly, E.F. (2009). Explanatory models for near-death experiences. In J.M. Holden, B. Greyson, & D. James (Eds.), *Handbook of near-death experiences: Thirty years of investigation* (pp. 213–234). Santa Barbara, CA: Praeger/ABC-CLIO.

Holden, J.M., Greyson, B., & James, D. (Eds.). (2009). *Handbook of near-death experiences: Thirty years of investigation*. Santa Barbara, CA: Praeger.

Houran, J. (2000). Toward a psychology of 'entity encounter experiences'. *Journal of the Society for Psychical Research*, *64*, 141–158.

Houran, J., Kumar, V. K., Thalbourne, M. A., & Lavertue, N. E. (2002). Haunted by somatic tendencies: Spirit infestation as psychogenic illness. *Mental Health, Religion & Culture*, *5*, 119–133.

Houran, J., & Lange, R. (1997). Hallucinations that comfort: Contextual mediation of deathbed visions. *Perceptual and Motor Skills*, *84*, 1491–1504.

Houran, J., Lynn, S. J., & Lange, R. (2017). Commentary on Stokes' (2017) quest for "white crows" in spontaneous cases of psi. *Australian Journal of Parapsychology*, *17*, 61–88.

Houran, J., & Porter, S. (1998). Statement validity analysis of the "Jim Ragsdale Story": Implications for the Roswell incident. *Journal of Scientific Exploration*, *12*, 57–71.

Hunt, H. (1995). *On the nature of consciousness: Cognitive, phenomenological and transpersonal perspectives*. New Haven, CT: Yale University Press.

Irwin, H.J. (1985). *Flight of mind: A psychological study of the out-of-body experience*. Metuchen, NJ: Scarecrow Press.

Irwin, H.J. (2000). The disembodied self: An empirical study of dissociation and the out-of-body experience. *Journal of Parapsychology*, *64*, 261–277.

Jacome, D.E. (1999). Volitional monocular Lilliputian visual hallucinations and synesthesia. *European Neurology*, *41*, 54–56.

Jones, S. (2011, Oct 31). Steve Jobs's last words: 'Oh wow. Oh wow. Oh wow.' The Guardian. com, http://www.theguardian.com/technology/2011/oct/31/steve-jobs-last-words Accessed 12/16/2015.

Kang, S-M., & Lee, H. (2014). Detecting deception by analyzing written statements in Korean. *Linguistic Evidence in Security, Law and Intelligence*, *2*, 1–10. DOI 10.5195/lesli.2014.13.

Karatzoglou, A., Meyer, D. & Hornik, K. (2006). Support vector machines in R. *Journal of Statistical Software*, *15*, 1–28.

Landauer, T.K., Foltz, P.W., & Laham, D. (1998). Introduction to latent semantic analysis. *Discourse Processes*, *25*, 259–284.

Lange, R., Greyson, B., & Houran, J. (2004). A Rasch scaling validation of a 'core' near-death experience. *British Journal of Psychology*, *95*, 161–177.

Lange, R., Greyson, B., & Houran, J. (2015). Using computational linguistics to understand near-death experiences: concurrent validity for the NDE scale. *Psychology of Consciousness: Theory, Research, and Practice*, *2*, 79–89.

Lange, R., & Houran, J. (2001). Ambiguous stimuli brought to life: the psychological dynamics of hauntings and poltergeists. In J. Houran & R. Lange (Eds.), *Hauntings and poltergeists: Multidisciplinary perspectives* (pp. 280–306). Jefferson, NC: McFarland & Co.

Lange, R., Irwin, H.J., & Houran, J. (2000). Top-down purification of Tobacyk's Revised Paranormal Belief Scale. *Personality and Individual Differences*, *29*, 131–156.

Lester, D. (2003). Depth of near-death experiences and confounding factors. *Perceptual and Motor Skills*, *96*, 18.

Lundahl, C.R. (1993). The near-death experience: a theoretical summarization. *Journal of Near-Death Studies*, *12*, 105–118.

Martin, L.J. (1915). Ghosts and the projection of visual images. *American Journal of Psychology*, *26*, 251–257.

Moody, R.A. (1975). *Life after life*. Covington, GA: Mockingbird.

Osis, K. (1986). Characteristics of purposeful action in an apparition case. *Journal of the American Society for Psychical Research*, *80*, 175–193.

Persinger, M.A. (1983). Religious and mystical experiences as artifacts of temporal lobe function: A general hypothesis. *Perceptual and Motor Skills*, *57*, 1255–1262.

Rasch, G. (1960/1980). *Probabilistic models for some intelligence and attainment tests*. Chicago, IL: MESA Press.

Ring, K. (1980). *Life at death: a scientific investigation of the near-death experience*. New York: Coward, McCann & Geoghegan.

Ring, K., & Cooper, S. (1999). *Mindsight: near-death and out-of-body experiences in the blind*. Palo Alto, CA: William James Center for Consciousness Studies.

Sako, Y., & Homma, S. (1997). Non-visual color recognition. *Journal of International Society of Life Information Science*, *15*, 169–172.

Simmonds-Moore, C.A. (2016). An interpretative phenomenological analysis exploring synesthesia as an exceptional experience: Insights for consciousness and cognition *Qualitative Research in Psychology*, *13*, 303–327.

Thalbourne, M.A., Crawley, S.E., & Houran, J. (2003). Temporal lobe lability in the highly transliminal mind. *Personality and Individual Differences*, *35*, 1965–1974.

Thalbourne, M.A., Houran, J, Alias, A.G., & Brugger, P. (2001). Transliminality, brain function, and synesthesia. *Journal of Nervous and Mental Disease*, *189*, 190–192.

Thalbourne, M.A., Houran, J., & Crawley, S.E. (2003). Childhood trauma as a possible antecedent of transliminality. *Psychological Reports*, *93*, 687–694.

Thalbourne, M.A., & Maltby, J. (2008). Transliminality, thin boundaries, unusual experiences, and temporal lobe lability. *Personality and Individual Differences*, *44*, 1617–1623.

The Guardian (2011, Oct 6). "Steve Jobs: Death is very likely the single best invention of life." Transcription of his 2005 Stanford University Address. http://www.theguardian.com /technology/2011/oct/06/steve-jobs-pancreas-cancer Accessed 12/16/2015.

Werner, H. (1934/1978). Unity of the senses. In S.S. Barten & M.B. Franklin (Eds.), *Developmental processes: Heinz Werner's selected writings, vol. 1* (pp. 153–167). New International Universities Press.

Zingrone, N.L., & Alvarado, C.S. (1997, August). *Correlates of aura vision: The role of psi experiences, dissociation, absorption, and synesthetic-like experiences*. Paper presented at the 40th Annual Convention of the Parapsychological Association, Brighton, England.

Zingrone, N.L., Alvarado, C.S., & Agee, N. (2009). Psychological correlates of aura vision: Psychic experiences, dissociation, absorption, and synaesthesia-like experiences. *Australian Journal of Clinical and Experimental Hypnosis*, *37*, 131–168.