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Psychological Attachment Orientations of Surrogate Decision-Makers and Goals-of-Care Decisions for Brain Injury Patients in ICUs

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Objectives: To determine whether ICU surrogates with “insecure” psychologic attachment orientations are more prone to requesting tracheostomy and gastrostomy (i.e., life-sustaining therapy) for severe acute brain injury patients with poor prognosis compared to surrogates with “secure” orientations.

Design: Cross-sectional survey from November 2017 to August 2018.

Setting: Single neuroscience ICU at an academic medical center.

Subjects: Consecutive sample of surrogates of patients admitted to the ICU with a minimum length of stay of 24 hours.

Interventions: None.

Measurements and Main Results: We identified surrogates’ psychologic attachment orientation via a standard tool, the Relationship Questionnaire, and collected other surrogate and patient demographics. We also presented surrogates with a hypothetical scenario of an intubated severe acute brain injury patient with poor prognosis and asked each surrogate whether he or she would request

life-sustaining therapy or comfort measures only. Fisher exact test was used to compare frequency of life-sustaining therapy selection between secure and insecure surrogates. Additionally, we conducted univariate and multivariate analyses to determine other independent predictors of life-sustaining therapy selection. Two-hundred seventy-five of 713 (38.6%) eligible respondents participated; 153 (55.6%) surrogates were secure, and 122 (44.4%) insecure. There was no significant difference in the proportion of secure respondents selecting life-sustaining therapy compared to insecure (18.3% vs 20.5%; $p = 0.38$). Although still nonsignificant, the observed difference was slightly greater for those with a specific “anxious” insecure subtype versus “nonanxious” (18.2% vs 23.0%; $p = 0.41$). Overall, a higher proportion of respondents selecting life-sustaining therapy (vs comfort measures only) reported feeling uncertain or very uncertain about the hypothetical decision (45.3% vs 9.5%; $p < 0.001$). In a multivariate model, nonwhite race and high religiosity were significant predictors of life-sustaining therapy selection.

Conclusions: Although surrogate attachment orientation is not predictive of life-sustaining therapy selection, nonwhite race and high religiosity are. Future interventions designed to support severe acute brain injury surrogates could focus on surrogates prone to selecting life-sustaining therapy with high degrees of uncertainty.

Key Words: critically ill; end-of-life care; goals of care; intensive care; palliative care medicine; terminal care

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Surrogate decision-makers play an enormous role for patients hospitalized with severe acute brain injury (SABI). Millions of these patients with SABI (e.g., acute ischemic stroke, intracerebral hemorrhage, traumatic brain injury) are hospitalized in ICUs each year, and those who survive may have devastating long-term disability (1). The most severely afflicted require prolonged intubation in the setting of a projected poor functional outcome (2). In such grave situations, many patients are too incapacitated to communicate their preferences to the medical team (3, 4).

Therefore, surrogate decision-making is often necessary to decide whether the patient would have wanted to maintain life-sustaining therapy (LST) (e.g., long-term tracheostomy and gastrostomy) or to institute comfort measures only (CMO) in the setting of a challenging prognosis (2). Surrogates often find exercising substituted judgment on behalf of the patient to be a difficult task, as they must base their decisions on what the incapacitated patient would have wanted, rather than what the surrogate thinks is in the patient's best interests (5–7).

Developed by psychologists to help understand the emotions of a person being separated from another person in a close relationship, the theory of adult attachment outlines cognitive-affective schemata which shape an individual's view of the self, others, and close relationships (8, 9); these schemata have been posited to play a factor in end-of-life (EOL) care decision-making but have not yet been explored in critical care situations (10, 11). Multiple models of adult attachment exist (12); the four-category model of adult attachment distinguishes four orientations, which are defined by underlying degrees to which an individual feels 1) dependent on others for approval and/or 2) avoids others as a potential source of undependability or rejection (13). Individuals with "secure" attachment compose approximately 60% of the population and have a positive view about the world and themselves. Conversely, approximately 40% of the population have "insecure" attachment, which can be characterized as one of three subtypes (14, 15). "Dismissing-avoidant" individuals tend to rely on themselves over others. "Fearful-avoidant" individuals often desire close relationships but find it difficult to get close to others. "Preoccupied" individuals are overdependent on others. Research on coping strategies employed by individuals who are being separated from those with whom they have close relationships (e.g., divorce) suggests that attachment orientations may influence whether individuals rely on problem-oriented and support focused strategies (secure), tend to ruminate and experience high levels of distress (high dependence), or deny the source of distress altogether and dismiss support from others (high avoidance) (16). In outpatient settings, surrogates with insecure attachment orientations have already been shown to be less accurate at predicting relatives' EOL care wishes compared to surrogates with secure attachment orientations (10).

Understanding whether high levels of attachment insecurity may influence surrogates in ICUs when making goals-of-care decisions may be critical in the design of effective ICU family support interventions. In particular, previous data suggest that surrogates selecting LST are by in large more uncertain with their decision-making (17). We thus hypothesized that ICU surrogates with any of the three insecure attachment orientations are more likely to choose LST (vs CMO) than surrogates with secure attachment when making decisions on behalf of a critically ill SABI patient. As a secondary analysis, we also explored other independent surrogate and patient predictors of LST decision-making, such as race and religion.

MATERIALS AND METHODS

Study Design and Setting

A cross-sectional descriptive survey including both 1) a standardized assessment of a respondent's attachment style and 2) a

hypothetical ICU goals-of-care decision-making scenario involving a relative hospitalized with an SABI was conducted among surrogates of patients admitted to the Yale New Haven Hospital (YNHH) Neuroscience ICU (Neuro ICU) between November 2017 and August 2018. The study was approved by the Yale Human Investigation Committee.

Participants

During the study period, we recruited a consecutive sample of one surrogate for each patient who had been admitted to the YNHH Neuro ICU for a minimum length of stay of 24 hours. Surrogates were defined as any family member who visited the patient during their hospitalization. Surrogates had to be at least 18 years old, English speaking, and literate.

Surrogates of survivors were recruited in person at YNHH within 7 days after patient transfer out of the Neuro ICU to another hospital unit. To respect the time to cope with a loved one's death, surrogates of nonsurvivors were recruited by mail and phone approximately 4 weeks after the patient's death or discharge to a hospice facility.

Variables and Data Collection

To define participants' attachment orientations, we administered the brief and validated Relationship Questionnaire (RQ), which has been used in numerous psychologic and healthcare studies (13, 18–24). The RQ is a single-item measure which consists of four short paragraphs, each describing a prototypical attachment orientation: secure, dismissing-avoidant, fearful-avoidant, and preoccupied (19, 20). The measure asks the respondent to 1) rate his or her personal feeling of concordance with each description on a 7-point Likert scale and 2) select the one paragraph that best describes how he or she generally is in close relationships. The orientation rated with the highest Likert score serves as categorical measure of attachment orientation. If two or more patterns are rated identically by a participant, the orientation chosen by the participant as best describing how he/she generally is in close relationships is used (21–24).

We also collected other surrogate covariates via additional direct survey questions: age, sex, race, ethnicity, English as a first language, state of residency, level of education, religion, frequency of attending religious meetings, past experience as a caregiver of patients with cognitive/physical disabilities, healthcare proxy status, relationship with patient, average number of visitors, number of formal family meetings participated in during their ICU experience, average hours per day at bedside, and experience with similar decisions in the past.

Surveys for surrogates of Neuro ICU survivors were given a choice of taking the survey on a laptop computer or on paper. Surrogates for Neuro ICU nonsurvivors completed their surveys on paper and mailed back their responses.

We also collected data on the patients for whom survey participants were family members, via medical record review: age, sex, race, ethnicity, code status, insurance, route of admission, primary team (i.e., neurology vs neurosurgery), diagnosis, Acute Physiology and Chronic Health Evaluation (APACHE) II score, length of stay, discharge disposition, and modified Rankin Scales

at time of discharge from the ICU. For calculation of APACHE II scores, nonintubated patients with no significant lung pathology who did not have arterial blood gases available were assumed to have normal levels.

Outcome

To assess respondents' inclination toward selecting LST versus CMO when acting as a surrogate for an SABI patient with poor prognosis, our survey contained a hypothetical decision-making scenario that had previously undergone extensive cognitive testing in the New Haven community for a separately published project (17).

The hypothetical decision-making scenario 1) asked respondents to imagine an elderly unresponsive intubated relative with a severe intracerebral hemorrhage and poor neurologic prognosis, 2) provided descriptions of LST versus CMO options, and 3) asked family members to arrive at a decision on behalf of their relative: "Which option are you leaning toward?" ("Place a breathing tube and feeding tube in my loved one" vs "Make my loved one comfort measures only").

The **Supplemental Methods** (Supplemental Digital Content 1, <http://links.lww.com/CCX/A214>) contains the survey in its entirety, including both the RQ and the hypothetical scenario. The order of the RQ and hypothetical scenario in the survey were automatically randomized on tablets by Qualtrics (Provo, UT). Paper surveys were manually randomized.

Statistical Analysis

We analyzed surrogate and patient covariates using IBM SPSS Statistics 24 and IBM SPSS Statistics 26 (IBM Corp., Armonk, NY) (25, 26). For a univariate comparison of surrogates and patient covariates between our secure and insecure participants, we performed Pearson two-tailed chi-square test for categorical variables and the Mann-Whitney *U* test or *t* test for continuous variables. The primary analysis of this study, comparing the proportion of secure versus insecure (dismissing-avoidant, fearful-avoidant, and preoccupied) respondents selecting LST versus CMO in the survey, was conducted via a Fisher exact test. For our secondary analysis, we first compared surrogate and patient covariates for participants selecting LST versus CMO via Pearson two-tailed chi-square test for categorical variables and the Mann-Whitney *U* test or *t* test for continuous variables. We then performed exploratory multivariate logistic regression analyses to assess whether selected surrogate and patient covariates (i.e., covariates with univariate $p < 0.1$, as well as attachment orientation) were independently predictive of participant LST selection. Additionally, a subgroup analysis of those with attachment anxiety (preoccupied and fearful-avoidant participants) was also performed. Missing data were excluded from the analyses.

Sample Size

In calculating the sample size necessary for the primary analysis, we 1) assumed that our sample would have approximately 66% secure and 34% insecure participants (14) and 2) posited that a 10% difference in the selection of LST among the two attachment orientation groups would be a minimal clinical significant difference, in part based on prior literature (10). Using this assumption,

our a priori sample size calculation determined a minimum sample size of 250 participants to discover a 10% difference between groups with $\alpha = 0.05$ and power = 0.80 (27, 28).

RESULTS

Participant Recruitment

Figure 1 outlines details of surrogate recruitment, as well as collection of data from surviving and nonsurviving patients for whom each survey participant was a family member. We collected usable survey data from 275 of 713 (38.6%) eligible surrogates; 41.5% of all eligible surrogates of survivors and 20.0% of all eligible surrogates of nonsurvivors provided usable data. Available basic demographic data for patients whose surrogates were eligible but not enrolled were also collected to assess for possible sources of bias (**Supplemental Table 1**, Supplemental Digital Content 2, <http://links.lww.com/CCX/A215>). The cohort of patients whose surrogates were not enrolled had a higher percentage of nonwhite patients (28.8% vs 19.4%; $p = 0.01$) and nonsurviving patients (18.7% vs 7.7%; $p < 0.001$).

Family Characteristics

Of the 275 participants, 153 (55.6%) family members identified as secure and 122 (44.4%) as insecure (**Supplemental Table 2**, Supplemental Digital Content 3, <http://links.lww.com/CCX/A216>). Subtypes of the insecure attachment orientation amongst the entire cohort were distributed as follows: 61 (22.2%) dismissing-avoidant, 40 (14.5%) fearful-avoidant, and 21 (7.6%) preoccupied participants. Apart from race, no other covariate was different between the secure and insecure surrogates; of all secure surrogates, 13.7% were nonwhite, compared to 25.2% of all insecure surrogates ($p = 0.02$).

Patient Characteristics

The racial and ethnic distributions of the patients matched those among the surrogates (**Supplemental Table 3**, Supplemental Digital Content 4, <http://links.lww.com/CCX/A217>). In the cohort, 19.4% of the patients were elective admissions to the Neuro ICU. About half of the patients were functionally dependent at time of discharge, with 11.4% having their code status changed during admission, and 7.7% being made CMO.

Attachment Orientation and Selection of LST Versus CMO in the Hypothetical Scenario

Out of all 275 surveyed surrogates, 53 (19.3%) chose LST and 222 (80.7%) chose CMO when presented with the hypothetical scenario. Of the 53 participants who selected LST, 45.3% were uncertain or very uncertain in their choice, compared to only 9.5% of the 222 surrogates who selected CMO ($p < 0.001$).

For the primary analysis, we did not find a difference in the proportion of secure respondents selecting LST compared to the proportion of insecure respondents (18.3% vs 20.5%; $p = 0.38$; **Table 1**). In an exploratory analysis, we also did not find differences in the proportions of respondents with varying attachment orientations selecting LST when respondents were categorized as secure or one of the three insecure orientation subtypes ($p = 0.87$; **Table 1**). Additionally, we found no significant relationship between degree of uncertainty and attachment orientation.

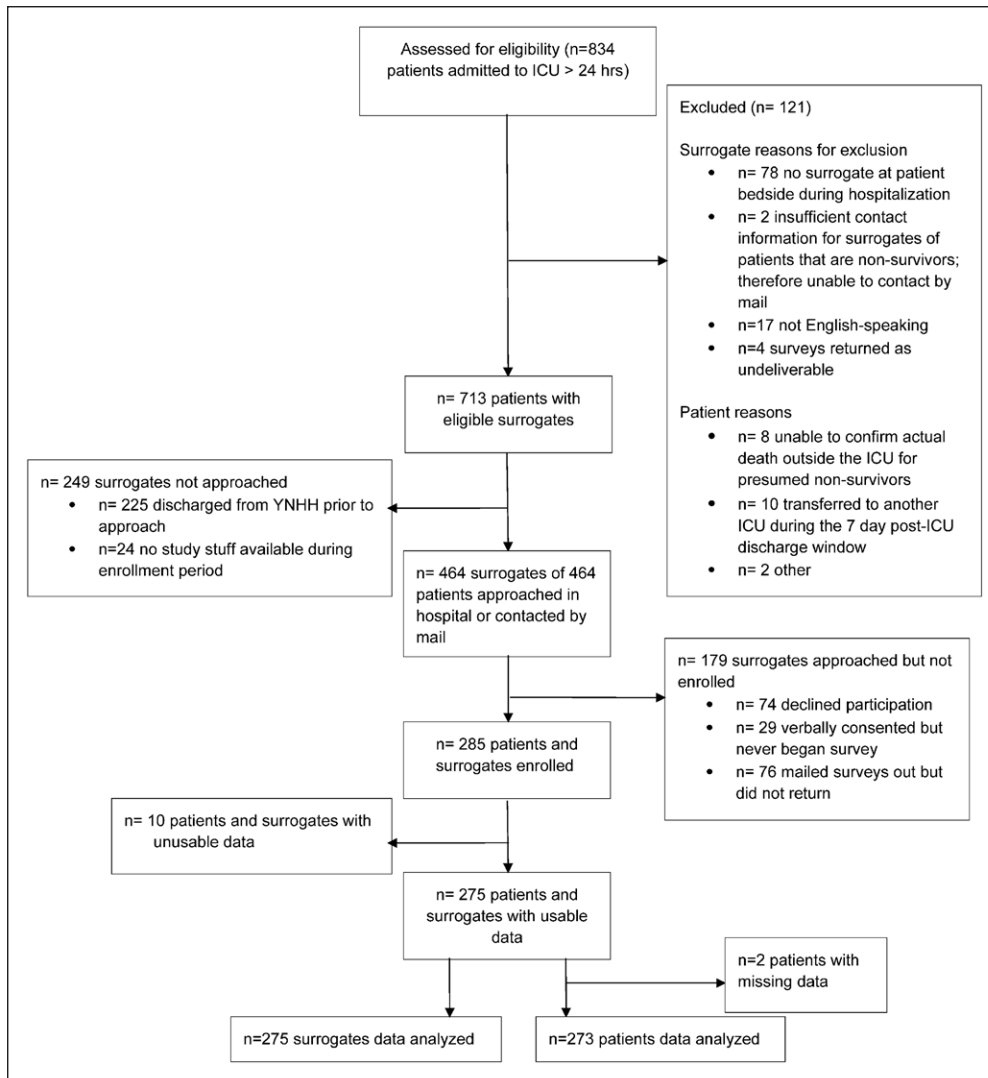


Figure 1. Surrogate and patient recruitment. YNH = Yale New Haven Hospital.

Of note, individuals with fearful-avoidant and preoccupied attachment orientations share attachment “anxiety,” in that they are both prone to seek out the approval of others. We found that 23.0% of surrogates (14/61) with attachment anxiety selected LST for the scenario versus 18.2% (39/214) of nonanxious surrogates (i.e., those who were secure or dismissing-avoidant); however, this near 5% difference between groups did not reach statistical significance ($p = 0.41$). Our subgroup analysis of the 61 anxious surrogates revealed that, of the 26 surrogates who also had experience with a similar decision in the past, only one (3.8%) selected LST in the survey, while 37.1% of the anxious respondents (13/35) without prior experience selected LST ($p = 0.002$). Amongst 214 nonanxious surrogates, no difference in rate of LST selection was seen between those with and without prior experience.

Univariate Comparison of Family and Patient Covariates Among Those Selecting LST Versus CMO

Distributions of respondents with secure versus insecure attachment orientations (and insecure subtypes) were similar amongst respondents selecting LST versus CMO (Supplemental Table 4, Supplemental

Digital Content 5, <http://links.lww.com/CCX/A218>). However, the cohort of family respondents selecting LST was younger (mean 47.1 vs 54.5 yr; $p = 0.003$) and less experienced with surrogate decision-making (prior experience: 28.3% vs 45.9%; $p = 0.02$), with a higher proportion of nonwhite respondents (44.2% vs 12.7%; $p < 0.001$) and respondents who reported attending religious meetings frequently (e.g., “more than a few times a month/week,” 44.2% vs 22.7%; $p = 0.001$).

Respondents selecting LST also reported requiring more formal family meetings with ICU staff during their relative’s actual admissions, compared to those selecting CMO (e.g., “three or more meetings,” 28.3% vs 13.6%; $p = 0.01$).

Family Covariates Predictive of Family LST Selection: Multivariate Analyses

We conducted an exploratory multivariate logistic regression analysis to assess the significance of attachment orientation when controlling for covariates and to identify covariates independently predictive of LST selection (Table 2). Attachment orientation remained nonsignificant, but surrogate covariates clearly independently associated with LST selection included nonwhite race (odds ratio [OR], 4.27; 95% CI, 1.94–9.40), and

high frequency of attending religious meetings (e.g., “more than a few times a month/week,” OR, 5.84; 95% CI, 2.36–14.49; compared to “once a year or less”). We also conducted a second exploratory multivariate logistic regression analysis in the same fashion as the first, except with all four attachment orientations listed separately in the model (Supplemental Table 5, Supplemental Digital Content 6, <http://links.lww.com/CCX/A219>). This analysis yielded very similar results as the first, with the same independent predictors discovered.

DISCUSSION

We hypothesized that having an insecure attachment orientation would predispose an ICU surrogate toward LST selection for a critically ill SABI patient with poor prognosis facing a goals-of-care decision. Although our study supported the null hypothesis, we did observe a slightly higher percentage of surrogates with anxious attachment orientations selecting LST versus those with non-anxious orientations, although this 5% difference did not reach statistical significance. This study did confirm that surrogates selecting LST tend to be more uncertain in their decision-making

TABLE 1. Proportion of Secure and Insecure Respondents Selecting Life-Sustaining Therapy Versus Comfort Measures Only for the Hypothetical Scenario

Attachment Orientation	Selecting Life-Sustaining Therapy	Selecting Comfort Measures Only	<i>p</i>
Total cohort (<i>n</i> = 275)	53 (19.3)	222 (80.7)	
Secure (<i>n</i> = 153)	28/153 (18.3)	125/153 (81.7)	0.38
Insecure (<i>n</i> = 122)	25/122 (20.5)	97/122 (79.5)	
Secure (<i>n</i> = 153)	28/153 (18.3)	125/153 (81.7)	0.87
Dismissing-avoidant (<i>n</i> = 61)	11/61 (18.0)	50/61 (82.0)	
Fearful-avoidant (<i>n</i> = 40)	9/40 (22.5)	31/40 (77.5)	
Preoccupied (<i>n</i> = 21)	5/21 (23.8)	16/21 (76.2)	
Nonanxious (secure or dismissing-avoidant) (<i>n</i> = 214)	39/214 (18.2)	175/214 (81.8)	0.41
Anxious (fearful-avoidant or preoccupied) (<i>n</i> = 61)	14/61 (23.0)	47/61 (77.0)	

All categorical variables reported as *n* (%).

and that major independent predictors of LST selection among surrogates of SABI patients are nonwhite race and high frequency of attending religious meetings.

Because surrogate decision-making for brain-injured ICU patients is a challenging and imperfect task (29, 30), it is of critical importance for research to explore unique factors intrinsic to surrogates that may be relevant to their selection of LST versus CMO for loved ones. As attachment orientation guides individuals' thoughts and behaviors in close relationships, interest in attachment theory has been emerging in many health contexts (31–35), including some work in the field of EOL care and palliative

TABLE 2. Multivariate Logistic Regression Analysis of Family Characteristics Predicting the Selection of Life-Sustaining Therapy for the Scenario

Family Variables	OR (95% CI)	<i>p</i>
Age	0.97 (0.95–1.00)	0.05
Male sex	1.89 (0.91–3.95)	0.09
Nonwhite race	4.27 (1.94–9.40)	< 0.001
Frequency of attending religious meetings		
Once a year or less		
A few times a year/month	2.59 (1.04–6.42)	0.04
More than a few times a month/week	5.84 (2.36–14.49)	< 0.001
Experience with similar decision in the past	0.51 (0.24–1.07)	0.08
Insecure attachment orientation	0.92 (0.44–1.89)	0.81

OR = odds ratio.

In addition to attachment orientation, family variables with *p* ≤ 0.1 in the univariate comparison of those selecting life-sustaining therapy vs comfort measures only were considered for inclusion in the multivariate model, with a couple of exceptions. Native English speaker was excluded because of its likely correlation with race, while number of formal family meetings participated was not included because it is not information that is known ahead of time when a patient is initially admitted to the ICU.

oncology (36–41). Attachment theory has been considered in developing interventions for facilitating improved communication between clinicians and patients on EOL choices (11, 42) and used in understanding the psychologic processes of bereavement (43, 44). However, previous studies have not yet taken the first step of assessing how large an influence (if any) a surrogate's attachment orientation may play in a decision to ultimately pursue comfort care for an incapacitated ICU patient with poor prognosis.

Our data suggest that other previously described characteristics of surrogates, such as race and religiosity, may ultimately be more closely associated with decisional outcomes. Existing literature on racial differences have generally found that African-Americans are more likely to prefer aggressive LST than Caucasians, in-line with our findings (45–52). Furthermore, our religiosity findings are supported by previous evidence with patient populations that suggest religiosity is associated with preferences for cardiopulmonary resuscitation, mechanical ventilation, and hospitalization near death (53–56). Future studies should further explore the role of race and religiosity when surrogates are making decisions, as opposed to when patients are making decisions themselves.

Our single-center study has limitations. Although our sample could have been larger, we did power the study to detect a meaningful, clinically relevant difference between groups. With regards to survey nonresponse bias, we acknowledge that minority patients were less likely to have families participate in the study. However, this difference between responders versus nonresponders would likely be more concerning had we not confirmed that race is indeed a predictor in LST decision-making.

It is possible that replicating this study with other measures of adult attachment could yield different results. We selected an established categorical model of attachment because its brief assessment tool reduced survey burden for participants (57). We wanted to respect the time of these families as they cope with difficult and challenging situations in the ICU.

Last, our survey used a hypothetical scenario. Given the ethical challenges of surveying surrogates in the midst of highly stressful real-life EOL situations, hypothetical scenarios have become a common substitute used in order to assess general surrogate

preferences in ICU goals-of-care decision-making research (58, 59). To maximize experiential realism, we used a hypothetical scenario that had been developed for a previously published project utilizing direct input from ICU surrogates and national decision-making experts, with cognitive testing amongst the local community (24). To further increase realism, we also intentionally recruited the surrogates of critically ill patients recently discharged from the ICU, rather than recruiting online or from the local community.

CONCLUSIONS

Surrogate decision-makers with “insecure” attachment orientations do not appear to be more likely to select LST than surrogates with “secure” attachment orientations. Although the possible influence of a surrogate’s attachment orientation on their decision regarding LST for a relative with SABI might be small, future studies could potentially explore whether attachment orientation is associated with adverse psychologic outcomes among surrogates themselves.

Our data do confirm that overall surrogates selecting LST for these patients tend to be more uncertain in their decision-making, implying that they may benefit from additional decision-making support. The predictors we have identified for LST selection could indicate which subgroups of the larger population may benefit the most from a new tool like a decision-aid to improve the decision-making process (60–63).

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