

# Towards a Heuristic Neuropsychological Model of Adjudicative Competency

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This study sought to delineate the neuropsychological processes that undergird the psycho-legal concept of competency to stand trial (CST). Accordingly, we retrospectively examined the relationship between clinical judgments of competence or incompetence of defendants committed to a maximum-security psychiatric facility and neuropsychological measures of cognitive and social intelligence and declarative memory. Results indicated that both groups (competent and incompetent) showed similar levels of depressed cognitive intelligence with Wechsler full-scale IQ levels falling in the upper end of the borderline range. Compared with defendants clinically judged as incompetent, defendants recommended as competent scored significantly higher on measures of social intelligence and episodic memory, with the most pronounced advantage occurring on tests of verbal memory that place heavy demands on encoding, consolidation, and retrieval of aurally presented narrative material. Cognitive capacities in areas of social intelligence and episodic memory may play critical roles in developing a heuristic neuropsychological model of CST. The evaluation of these domains offers implications for the assessment, restoration, and understanding of CST.

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Competency to stand trial (CST) evaluations account for the largest number of criminal referrals for forensic psychiatrists and psychologists, with estimates ranging from 19,000 to 94,000 evaluations per year.<sup>1</sup> Studies<sup>2-4</sup> also show that nearly 30 percent of evaluated defendants are adjudicated as incompetent to stand trial (IST), and approximately 18,000 who are found unfit to proceed to trial are subsequently involuntarily committed to state psychiatric hospitals for restoration.<sup>5-8</sup> In all federal and most state courts, *Dusky v. United States*<sup>9</sup> provides the principal legal framework governing these CST evaluations.<sup>2</sup> In

*Dusky*, CST is evaluated in terms of “. . . whether [the defendant] has sufficient present ability to consult with his lawyer with a reasonable degree of rational understanding – and whether he has a rational as well as factual understanding of the proceedings against him” (Ref. 9, p 402). The *Dusky* standard sets a two-prong approach to competency, distinguishing abilities related to understanding criminal proceedings from those essential for assisting counsel. Both prongs are necessary for a defendant to be found competent.<sup>2</sup> The first prong, referred to as the “cognitive” prong, encapsulates aspects of personal orientation, awareness, and memory as well as fundamental knowledge of court principles. The second prong, known as the “cooperation” prong, emphasizes present abilities to communicate and actively participate in the litigation process.<sup>2</sup>

Studies of diagnostic groups have consistently revealed strong evidence linking the presence of a psychotic disorder with an IST finding.<sup>10-12</sup> For example, in 2011, Pirelli and colleagues,<sup>4</sup> using advanced meta-analytic techniques, found legal incompetency to be

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eight times more likely in the presence of a psychotic diagnosis. By comparison, studies suggest a much weaker association of an IST finding with nonpsychotic disorders of depression and posttraumatic stress disorder, and to even lesser extent, with nonpsychotic diagnoses of adjustment disorders and personality disorders.<sup>10,12</sup> Intellectual disability diagnoses have also been linked to IST judgements,<sup>5,13</sup> notwithstanding an earlier report that found no relationship between these two variables.<sup>14</sup> Gay and colleagues,<sup>5</sup> for example, investigated the relationships between forensic evaluators' opinions of CST and intellectual disability, psychosis, and impaired mental status in an archival record review of 257 assessment reports conducted between 2010 and 2013. Their results showed psychotic symptoms, intellectual disabilities, and impaired mental status all predicted clinical judgements of IST and these clinical factors far surpassed those related to legal and social demographic variables.<sup>5</sup>

Studies employing a neuropsychological approach have also yielded important findings linking CST to specific cognitive abilities and functions.<sup>15–21</sup> For example, Ryba and Zapf<sup>15</sup> in 2011 compared the relative contributions of specific psychiatric symptoms and particular cognitive abilities, measured via neuropsychological testing, to each of three domains of competency, identified as understanding, reasoning, and appreciation. They found that symptoms of psychoticism and neuropsychological deficits of attention each contributed significantly to IST judgements.<sup>15</sup> More recently, Arredondo and colleagues<sup>16</sup> in 2017 conducted a retrospective study of CST judgements in male and female defendants admitted to an inpatient psychiatric hospital in the Southeastern United States who were referred for neuropsychological evaluation between the years 2001 and 2016. All included cases had available measures of performance validity, intelligence, and scores on the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). The RBANS provides five indices of distinct cognitive functions: attention, language, visuospatial/constructional ability, immediate memory, and delayed memory.<sup>22</sup> Their results, which included only cases with valid performance, as assessed by the Test of Memory Malingering,<sup>23</sup> pointed to significantly reduced scores on RBANS immediate memory and delayed memory indices for IST defendants compared to CST defendants.<sup>16</sup> The most pronounced group differences occurred for delayed memory, as revealed by a large effect size (Cohen's  $d = .89$ ), with findings showing that standard index

scores of less than or equal to 50 nearly doubled the likelihood of IST determination.<sup>16</sup> By comparison, the groups did not differ significantly on the other RBANS indices or on measures of general intelligence. These results underscore the specific role of mnemonic processes related to encoding, retention, and retrieval of new information in the legal construct of adjudicative competency.

Thus, an important benefit of using a neuropsychological approach like that employed by Arredondo *et al.* and others (e.g., Nestor and colleagues<sup>19</sup>) is that it allows cognition to be deconstructed into distinct, measurable functions that in turn can be specifically related to CST abilities. For example, both memory and intelligence represent two global cognitive domains, each composed of isolable facets that may be differentially implicated in competency. For memory, empirical and theoretical works in cognitive neuroscience have long distinguished episodic and semantic subtypes, which Tulving<sup>24</sup> described as, respectively: “One is involved in the recording and subsequent retrieval of memories of personal happenings and doings, the other with the knowledge of the world that is independent of a person's identity and past” (Ref. 24, p 9). From this perspective, episodic memory is organized in terms of time and place, whereas the critical information units of semantic memory are ideas, facts, or concepts. Each may differentially affect CST abilities. In fact, Nestor and colleagues have shown that reduced performance on tests of episodic, but not semantic memory, distinguished incompetent from competent defendants.<sup>19</sup>

Our data pointed to a key and defining role for episodic knowledge, based on the idiographic recall of one's life events that would allow a defendant to answer the question “What did you do at time T in place P?”<sup>24</sup> General intelligence can also be decomposed into a distinct set of factors (see, for example, Kaufmann<sup>25</sup>). Among these factors, social intelligence or comprehension has emerged in the past two decades as playing a vital role in both healthy cognition<sup>26</sup> and clinical disorders such as schizophrenia.<sup>27–29</sup> Social intelligence is intricately linked to theory of mind, which is defined as a core human capacity to understand the thoughts and feelings of others and to attribute mental states to ourselves and others.<sup>30</sup> It involves perceiving social signals and integrating these inputs with emotion, motivation, and adaptive behavior directed toward interpersonal skill, communication, and comportment.<sup>31</sup>

Disturbances in social intelligence have long played major roles in neuropsychiatric conditions, most notably autism and schizophrenia spectrum disorders. Although the exact pathophysiology remains unknown, an influential evolutionary neuroscience hypothesis posits autism and schizophrenia spectrum disorders arise from faulty development of the social brain, a specialized neural network that supports social cognition.<sup>32</sup> From this perspective, diametrically opposite phenotypes emerge, best reflected in positive symptoms of paranoid delusions in schizophrenia spectrum disorders versus impairments in basic aspects of social communication (such as shared attention, reduced imagination, and symbolic play) in autism.<sup>32</sup> In a study of chronic schizophrenia, Nestor and colleagues<sup>33</sup> used symptom ratings, personality measures, and MRI gray matter volumes of two brain regions, the superior temporal gyrus (STG) and the fusiform gyrus (FG), each linked to social cognition functions. These results pointed to distinct personality-symptoms-brain relationships, with decreased STG volume linked with both increased positive symptoms of hallucinations and lower personality trait of agreeableness, and lower FG volume with increased negative symptoms of social anhedonia and lower personality trait of openness.<sup>33</sup> There is thus a growing body of research examining neuropsychological underpinnings of sociality in both healthy (e.g., Nestor *et al.*<sup>26</sup>) and clinical (e.g., Crespi and Badcock<sup>32</sup>) populations.

For the current study, these theoretical and empirical works help to provide a scientific rationale for examining social intelligence in adjudicative competence.<sup>33</sup> More specifically, the current study examines whether social intelligence is essential to competency, particularly to the cooperation prong embodied in the *Dusky* standard. That is, the capacity to assist or consult with counsel that is key to the *Dusky* prong likely depends on sufficient current social comprehension abilities.<sup>19</sup> These abilities, as measured with standardized neuropsychological tests, are often compromised by psychosis spectrum disorders such as schizophrenia and schizoaffective disorder,<sup>19,34</sup> which in turn have long been shown to be highly predictive of IST. There is, however, a dearth of studies that have directly examined the relationship of social comprehension and CST. For example, to the best of our knowledge, Nestor and colleagues<sup>19</sup> conducted the first and only study showing that poorer scores on neuropsychological tests of social intelligence distinguished incompetent from competent male defendants committed to a maximum-security forensic state hospital.<sup>19</sup>

Against this backdrop, the current study employed neuropsychological tests to probe social and informational processes underlying CST judgements. Based on the prior findings of Nestor and colleagues,<sup>19</sup> we predicted that competent defendants would be distinguished from their incompetent counterparts on selective tests of verbal episodic memory and social intelligence. To do so, the current study used archival data taken from a sample of male defendants committed from 2000 to 2009 to a maximum-security psychiatric facility for court-ordered CST evaluations referred for neuropsychological testing. What follows are data examining CST in relation to two widely used, standardized neuropsychological measures of intelligence and memory.

## Methods

### Participants

The sample consisted of male patients ( $n = 371$ ) ranging in age from 17 to 71 ( $M = 33.58$ ,  $SD = 11.15$ ) committed between the years 2000 and 2009 for CST evaluations to Bridgewater State Hospital (BSH). BSH is the only maximum-security psychiatric facility within the Commonwealth of Massachusetts to admit patients for evaluations of competence, criminal responsibility, aid-to-sentencing, or need for inpatient treatment of a correctional detainee. In Massachusetts, when the question of competence arises for criminal defendants facing serious felony charges, pretrial screening evaluations of CST are performed by court clinicians, often within 24 hours of the arrest. Based on these screening evaluations, courts will commit defendants for a period of 20 to 40 days to BSH. Defendants are then assessed by BSH psychiatrists or licensed psychologists, who prepare extensive clinical evaluations of CST generated from multiple sources of data (e.g., clinical interview, criminal history, collateral) that are used to support specific recommendations of either competence or incompetence.<sup>35</sup> The Massachusetts legal standard dictates that defendants are found competent if they have both a factual and rational understanding of the legal proceedings against them and are able to assist their lawyer in their defense.<sup>36</sup> Participants were included in the sample if they had undergone a CST evaluation and had also been referred separately for neuropsychological testing. To this end, all participants included in the sample had been administered at least one neuropsychological

test that included the Wechsler Adult Intelligence Scale, Third Edition (WAIS-III)<sup>37</sup> or Wechsler Memory Scale, Third Edition (WMS-III).<sup>37</sup> From this database we identified 129 CST evaluation patients who completed the WAIS-III, and 50 patients who completed the WMS-III. The University of Massachusetts Boston Institutional Review Board approved the study (No. 2010.009).

## Measures

### WAIS-III

For measures of intelligence, test scores from the WAIS-III were analyzed. The WAIS-III provides a Full-Scale IQ (FSIQ) generated from 12 subtest scores, a Verbal IQ (VIQ) generated from seven of these 12 subtest scores, and a Performance IQ (PIQ) generated from five of these 12 subtest scores.<sup>37</sup> In addition, based on our previous research, we used two of the 12 WAIS-III subtests, Comprehension and Picture Arrangement, as a proxy measure of social intelligence.<sup>19,26,29</sup> The Picture Arrangement subtest offers a nonverbal test of social intelligence, and its cartoon format has been adapted in several studies investigating neuropsychological bases of theory of mind.<sup>38-42</sup> By comparison, the Comprehension subtest provides a verbal measure of the social aspects of intelligence and it assesses common sense judgment and understanding of social situations.<sup>43,44</sup> As evidence in support of the validity of these subtests as a measure of a separable WAIS-III factor of social comprehension, Nestor and colleagues have shown that Comprehension and Picture Arrangement scores distinguished two empirically derived subtypes of mentally disordered murderers: a psychotic subtype (diagnosed primarily with schizophrenia) and a nonpsychotic subtype (defined primarily by high levels of psychopathy)<sup>28</sup>; predicted mentally ill, incompetent to stand trial defendants<sup>19</sup>; uniquely accounted for a significant source of variance in neuropsychological performance deficits in chronic schizophrenia<sup>29</sup>; and correlated with MRI gray matter volume of the orbital frontal cortex in healthy controls.<sup>26</sup> The *WAIS-III and WMS-III Technical Manual*<sup>37</sup> reports internal reliability coefficients of .98, .97, and .94 for FSIQ, VIQ, and PIQ, respectively, and .84 and .74 for Comprehension and Picture Arrangement subtests.

### WMS-III

For measures of memory, test scores from the WMS-III were examined.<sup>40</sup> This scale includes three measures of immediate recall (auditory, visual, and immediate), three measures of delayed recall (auditory, visual, and delayed) and one measure of auditory delayed recognition. The WMS-III auditory recall measures are derived from verbal subtests (Logical Memory 1 and 2, Verbal Paired Associates 1 and 2) and visual recall measures are computed on the basis of visual subtests (Faces 1 and 2, Family Pictures 1 and 2). For these psychometric tests of intelligence and memory, the mean score for the standardization sample is 100 with a standard deviation of 15. Scores may be classified as very superior (130 and above), superior (120–129), high average (110–119), average (90–109), low average (80–89), borderline (70–79), or extremely low (69 and below). The *WAIS-III and WMS-III Technical Manual*<sup>37</sup> reports internal reliability coefficients of .93, .82, .87 and .83 for verbal immediate, visual immediate, verbal delayed and visual delayed indexes, respectively.

## Data Analysis

We computed point-biserial correlations ( $r_{pb}$ ) to assess the strength and direction of the relationships between clinical judgment of competence, coded dichotomously, 1 = competent, 2 = incompetent, and neuropsychological test scores, measured on a continuous scale.<sup>41</sup> A negative  $r_{pb}$  indicated that, as the likelihood of an IST judgment increased, neuropsychological test scores decreased. Mixed model analyses of variance (ANOVAs) tested for competent/incompetent group differences in neuropsychological test scores with one between-subjects factor of group (competent, incompetent) and one within-subjects factor of neuropsychological measure (e.g., Verbal IQ, Performance IQ). Last, analysis of covariance (ANCOVA), controlling for full-scale IQ, tested the hypothesis of group differences in social intelligence. The mixed-model ANCOVA, consisted of one between-subjects factor of group (competent, incompetent) and one within-subjects factor of social intelligence comprised of WAIS-III subtests (Comprehension, Picture Arrangement).

## Results

Of the 371 records reviewed, evaluators recommended 245 defendants (66%) as competent and

**Table 1** WAIS-III Means and Standard Deviations for Competent and Incompetent Patients

	Cst		Ist		F	p
	M	SD	M	SD		
<b>Intelligence</b>						
Full Scale IQ	79.61	15.50	76.52	12.38	1.48	0.23
Verbal IQ	82.01	15.90	78.93	12.71	1.40	0.24
Performance IQ	80.16	13.81	77.28	13.15	1.50	0.22
<b>Memory</b>						
Auditory Immediate	84.52	19.30	73.48	15.48	4.86	0.032 <sup>a</sup>
Visual Immediate	79.41	17.48	76.09	15.43	0.50	0.48
Auditory Delayed	84.74	23.39	69.96	14.28	6.97	0.011 <sup>a</sup>
Visual Delayed	78.89	17.81	75.61	14.04	0.51	0.48

<sup>a</sup>*p* < .05.

126 (34%) as incompetent to stand trial. Both groups had similar mean years of age, 33.33 (*SD* = 11.02) and 33.93 (*SD* = 33.95) for competent and incompetent defendants, respectively. The competent group was 65.3 percent White, 23.3 percent Black, 10.2 percent Latino, and 1.2 percent Asian. The incompetent group was 55.6 percent White, 32.5 percent Black, 10.3 percent Latino, and 1.6 percent Asian. Of the 129 participants who had complete WAIS-III batteries, 75 formed the competent group and 54 the incompetent group. Of the 50 participants who completed the WMS-III, 27 formed the competent group and 23 the incompetent group.

**CST and Intelligence**

Table 1 presents the WAIS-III scores for the 129 participants who underwent CST evaluations. As seen in Table 1, mean WAIS-III summary scores fell in the Borderline range for full scale IQ (*M* = 78.32, *SD* = 14.30) and performance IQ (*M* = 78.95, *SD* = 13.15) and in the lower end of the Low Average range for verbal IQ (*M* = 80.72, *SD* = 14.67). A mixed-model ANOVA with one between-subjects factor of group (competent/incompetent) and one within-subjects factor of IQ (full-scale, verbal, performance) revealed no significant effects for group, *F*(1,127) = 1.60, *P* = .208, Partial Eta Squared = .012, or for the interaction of group by IQ, *F*(2, 254) = *F* < 1, *P* = .905, Partial Eta Squared = .000, as both groups showed similar scores across full-scale, verbal, and performance IQ measures. Table 1 shows that the competent group had higher scores, albeit not statistically significant, for full scale IQ (*M* = 79.61, *SD* = 15.49), verbal IQ (*M* = 82.01, *SD* = 15.89) and performance IQ (*M* = 80.16, *SD* = 13.81) in comparison to the incompetent group for full scale IQ (*M* = 75.52, *SD* = 12.38),

verbal IQ (*M* = 78.93, *SD* = 12.71), and performance IQ (*M* = 77.28, *SD* = 12.12).

In contrast, ANOVA revealed a significant group effect for WAIS-III measures of social intelligence *F*(1,127) = 4.15, *P* = .044, Partial Eta Squared = .032. As predicted, the competent group had significantly higher scores on WAIS-III subtests of Comprehension (*M* = 6.93, *SD* = 3.12) and Picture Arrangement (*M* = 7.07, *SD* = 2.79) in comparison to the incompetent group mean for Comprehension (*M* = 5.74, *SD* = 2.91) and Picture Arrangement (*M* = 6.50, *SD* = 2.11), *F*(1, 127) = 4.15, *P* = .044 Partial Eta Squared = .032. These group differences in social intelligence remained significant after controlling for FSIQ, *F*(1,126) = 4.68, *P* = .032, Partial Eta Squared = .036. Last, point-biserial correlations of clinical judgements of competency (coded 1 = competent, 2 = incompetent) and WAIS-III measures revealed no significant associations, with one exception linking higher scores on comprehension with greater likelihood of competency (*r*<sub>pb</sub> = -.192, *P* = .029).

**CST and Memory**

Of the 50 participants who completed the WMS-III, 27 formed the competent group and 23 the incompetent group. A mixed-model ANOVA with one between-subjects factor of group (competent, incompetent) and one within-subjects factor of auditory-verbal memory (Auditory Immediate, Auditory Delayed) revealed a significant effect for group, *F*(1,48) = 6.23, *P* = .016, Partial Eta Squared = .115. As shown in Table 1, the competent group scored significantly higher on Auditory Immediate (*M* = 84.52, *SD* = 19.30) and Auditory Delayed (*M* = 84.74, *SD* = 23.38) in comparison to Auditory Immediate (*M* = 73.48, *SD* = 15.45) and Auditory Delayed (*M* = 69.96, *SD* = 14.28) for the incompetent group. In relation to the incompetent group, the competent group also scored significantly higher on WMS-III subtests of immediate, *t*(48) = 2.38, *P* = .023, and delayed *t*(48) = 2.30, *P* = .026, recall of stories (Logical Memory 1 and 2) as well as delayed learning of verbal paired associates *t*(48) = 2.89, *P* = .006. The competent group also scored significantly higher on Auditory Delayed Recognition (*M* = 85.19, *SD* = 22.34) than did the incompetent (*M* = 73.91, *SD* = 15.74) group, *t*(48) = 2.03, *P* = .048. By contrast, no significant group differences emerged for measures of visual memory. As shown in Table 2, point-biserial correlations revealed significant

**Table 2** Point Biserial Correlations of WMS-III Scores and Competency Judgment

WMS-III Scores	Competency Judgment	<i>p</i> -Value
Auditory Verbal Immediate Memory	−0.303 <sup>a</sup>	0.032
Logical Memory I	−0.322 <sup>a</sup>	0.023
Verbal Paired Associates I	−0.225	0.117
Visual Immediate Memory	−0.101	0.484
Auditory Verbal Delayed Memory	−0.356 <sup>a</sup>	0.011
Logical Memory II	−0.315 <sup>a</sup>	0.026
Verbal Paired Associates II	−0.385 <sup>b</sup>	0.006
Auditory Delayed Recognition	−0.281 <sup>a</sup>	0.048
Visual Delayed Memory	−0.103	0.479
General Memory Index Score	−0.286 <sup>a</sup>	0.044

CST: *n* = 10.

Competency Judgment (coded competent = 1; incompetent = 2).

<sup>a</sup>*p* < .05. <sup>b</sup>*p* < .01.

associations of a competent judgment and higher scores on WMS-III auditory-verbal indices of immediate ( $r_{pb} = -.303, P = .032$ ) and delayed ( $r_{pb} = -.356, P = .011$ ) recall, delayed auditory recognition ( $r_{pb} = -.281, P = .048$ ) and general (delayed) memory ( $r_{pb} = -.286, P = .044$ ). In addition, for the WMS-III subtests, competency judgment correlated significantly with higher scores on measures of recall of aurally presented stories (logical memory) for both immediate ( $r_{pb} = -.322, P = .023$ ) and delayed ( $r_{pb} = -.315, P = .026$ ) as well as delayed verbal paired associates ( $r_{pb} = -.385, P = .006$ ).

## Discussion

The current study investigated clinical judgements of CST in an archival sample of male defendants committed to a maximum security forensic mental health hospital and referred for neuropsychological consultation. Record review of the 371 referrals revealed a rate of incompetence of 34 percent, consistent with the 33.3 percent base rate reported by the Arredondo and colleagues<sup>16</sup> 2017 study of male and female inpatients referred for neuropsychological evaluation. This base rate of 33 percent is consistent with other research findings which identified mean rates of 27.5 percent<sup>5</sup> and 38.8 percent<sup>45</sup> in samples that were not limited to only neuropsychological referrals. Against this backdrop, selected subsets of referrals had available neuropsychological measures of intelligence (*n* = 129) or declarative memory (*n* = 50) along with recorded CST judgements. Together, these data allowed for the direct empirical examination of the contributions of specific cognitive processes, namely social intelligence and verbal episodic memory, to CST judgements.

First, the results of the current study did not reveal statistically significant differences on scores of overall standardized measures of intelligence between groups of male defendants recommended incompetent and competent, although both groups showed IQ scores falling in the Borderline range. These results comported with recent findings of Arredondo and colleagues<sup>16</sup> who examined neuropsychological function and adjudicative competency in male and female defendants admitted to an inpatient psychiatric facility. As predicted, the current results pointed to lower scores for the incompetent defendants on WAIS-III subtests of Comprehension and Picture Arrangement, used here as a proxy measure of social intelligence.<sup>25,26,46,47</sup> As discussed later, more refined measures of social cognition have been developed since the collection of this data and may offer more nuanced insights into these deficits. These group differences remained statistically significant, after controlling for cognitive intelligence, as measured by the other WAIS-III subtests. Thus, consistent with Nestor and colleagues' prior study,<sup>19</sup> these data indicated that social, but not cognitive, intelligence differentiated incompetent and competent groups. This measure of social intelligence includes a complex set of abilities related to interpersonal communication and discourse. These include understanding and appreciating norms and the perspectives of others, as well as grasping context and intuiting nuance. These abilities are often substantially compromised by psychosis in general, and schizophrenia, in particular.<sup>29</sup> Considering meta-analytic evidence linking psychosis to incompetency,<sup>4</sup> the current findings suggest that this association may be mediated, in part, by illness-related disturbances in social intelligence. Taken together, these data lend support for the hypothesis that individual differences in these social abilities may be a key contributor to competency in general, and in the cooperative prong, in particular.

Second, the current results pointed to a rather pronounced and selective effect of declarative memory on CST abilities. Correlational analyses revealed strong association of IST judgements with poorer scores across neuropsychological measures of auditory-verbal memory that involve episodic recall of stories and novel word pairs. Similarly, between-group analyses revealed significantly lower scores for incompetent defendants on these tests of verbal episodic memory for immediate and delayed recall. For these tasks, the input modality is auditory, and the

content is verbal, as examinees listen and then recall what has been spoken to them, immediately and following a 30-minute delay. From a neuropsychological perspective, such tasks call on a suite of cognitive processes related to the encoding, retaining, and retrieving of new verbal information that is thought to be highly dependent on intact brain circuitry linking prefrontal-medial temporal lobes of the left hemisphere.<sup>34,48,49</sup> By contrast, competent and incompetent groups did not differ on tests of episodic visual memory. On these tasks, the material to be remembered is visual, which is tested immediately, and then again following a 30-minute delay. Such tasks recruit similar mnemonic operations and related neural circuitry to those underlying the episodic recall of verbal material, with the notable exception that the stimuli to be remembered are designs. In addition, the results also showed that the groups did not differ on tests of semantic knowledge and memory, for example as assessed by the WAIS-III Information subtest. Taken together, the results provided strong evidence linking IST judgments to impairment in a specific subtype of declarative memory, namely the episodic recall of aurally presented verbal information. And consistent with the previous results of Nestor and colleagues, they offer clear support for the critical role of auditory verbal learning and memory in competency.<sup>19</sup>

The current study aimed to interrogate the legal construct of competency from a more heuristic and process-oriented neuropsychological model of cognition than that of the largely diagnostic approach of identifying general clinical correlates (see Nestor and colleagues<sup>19</sup>). It extended prior neuropsychological findings of IST defendants<sup>16,21</sup> by demonstrating the joint contributions of specific cognitive functions related to social intelligence and episodic verbal memory in adjudicative competency. The current results thus add to an inchoate and novel neuropsychological model of competency that Nestor and colleagues first proposed<sup>19</sup> that seeks to elucidate the social-informational processes and dynamics of legal competency.

From a more practical perspective, a key question centers on how these laboratory-based neuropsychological findings translate to the actual CST abilities in the courtroom. In everyday legal proceedings and courtroom interactions, parties convey information almost exclusively through spoken word, with verbal communication and auditory comprehension vitally important for competency. From this perspective, the

courtroom may be aptly described as an auditory-verbal information ecosystem favoring those who are able to listen, comprehend, learn, remember, and attend to spoken language. These abilities and skills that may be viewed as fundamental and natural for mentally intact persons, are often severely disrupted by a host of clinical conditions, including neurodevelopmental disorders, psychosis, and traumatic brain injury. The results of this study indicate that abilities can be quantified and measured by neuropsychological tests of episodic memory, which in turn correlate strongly with CST judgements. These findings may be viewed as evidence of the ecological validity of these measures in CST evaluations, particularly in addressing the cognitive prong of the *Dusky* standard.<sup>9</sup>

CST also places heavy demands on social-informational processes, especially in assisting in one's defense. Indeed, the capacity to understand the requirements of a given social context and behave accordingly is directly related to skills outlined as necessary for competency by the American Academy of Psychiatry and the Law,<sup>50</sup> in particular, that an individual be capable of rational and manageable behavior within the courtroom and trial context. Further, an ability to interpret social events allows individuals to maintain collaborative relationships with their attorneys and effectively interpret the social roles of different court figures. Competency is a transactional process in which an individual must encode and retrieve new information from a novel social context and use this information to inform appropriate social comportment and guide behavioral decision-making. Thus, that the findings pointed to reduced social intelligence in IST defendants may help to deconstruct these transactional processes of competency in general, and the abilities to consult with and assist defense counsel.

In interpreting our results, several limitations should be considered, beginning with selection bias of the study sample comprising males committed to a maximum-security forensic state hospital referred for neuropsychological consultation. As individuals are typically only referred for neuropsychological testing when there is concern for cognitive functioning deficits, this sample may not be wholly representative of the general population of defendants referred for competency evaluations. Notably, however, the sample did not demonstrate significant patterns of neurocognitive impairment (e.g., global memory deficits, attentional or processing irregularities) that

would qualitatively separate it from a general forensic population.

While the sample provides unique insight into the neuropsychological functioning of high-risk defendants charged with serious felonies, it is an archival, exclusively male sample. This is particularly relevant to the findings related to social intelligence as women tend to perform more strongly on tests of social cognition,<sup>49,50</sup> which in this study differentiated incompetent and competent male defendants. Replication of this study with the recruitment of a sample of males and females may offer insight as to whether social cognition strengths observed in women provide a clinical buffer in competency evaluation. The lack of diagnostic information available for the participants in this study prohibited the investigation of the potential role that the presence of autism spectrum symptoms or disorders may have contributed to these deficits. Further, more refined measures of social cognition have been developed since the collection of these data. The Advanced Clinical Solutions (ACS) for the Weschler Adult Intelligence-Scale Fourth Edition (WAIS-IV<sup>51</sup>) offers a stand-alone standardized neuropsychological measure of social cognition. The use of this measure in future research may offer a more nuanced understanding of the specific social cognition skills most associated with competency requirements. In addition, no actuarial or semi-structured competency tools were used in the clinical determinations of competency for this sample. The advantages of structured tools for evaluation of competency are noted in the AAPL practice guidelines for forensic evaluations of competency,<sup>50</sup> and this approach may offer more systematic comparisons between psycho-legal and cognitive capacities. Last, many of these findings are correlational in nature and do not address the possibility that a third variable, unmeasured in the current study, may better account for the relationship between performance on neuropsychological measures with clinical recommendations of competency. Finally, these measures used in this archival, retrospective study did not include any performance validity tests that are now recommended as best practice.<sup>52,53</sup>

Despite these limitations, this study offers novel directions for the advancement of competency evaluation and restoration. This is one of the first studies to identify the specific cognitive processes that undergird competency capacities and most contribute to findings of incompetence. In the current clinical landscape

in which forensic services are overburdened with referrals for evaluations of competency,<sup>1</sup> it is crucial that clinicians have tools to refine and streamline evaluation efforts. The legal question of competency is pertinent to the question of capacity, not current knowledge. To this end, the isolation of specific cognitive functions that may assist an individual in participating in the legal process offers evaluators a rationale for selecting particular tests targeting the evaluation of verbal memory or social deficits during competency assessment. The results of these assessments may provide clinicians a direction for targeted improvement, restoration, or accommodation of verbal memory or social cognition deficits to support competency restoration.

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