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The association between specific competence-related abilities and competence restoration treatment

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ABSTRACT

Inpatient competence restoration treatment comes with enormous costs in terms of civil liberties, but also significant financial costs to the state/institution responsible for providing the treatment. The present investigation was designed to evaluate the utility of a commonly used competence assessment instrument, the MacArthur Competence Assessment Tool – Criminal Adjudication (MacCAT-CA), in identifying individuals who may require more tailored, lengthier, and/or more intensive treatment. The sample included 93 men and women who were administered the MacCAT-CA during an inpatient hospitalization for competence restoration treatment in the United States. All of the patients were restored to competence within the study period, ranging from 3 to 32 months of inpatient hospitalization. Results suggest that performance on the MacCAT-CA was associated with hospitalization length, with total scores as the greatest predictor of response to treatment. Sensitivity and specificity estimates are discussed in terms of their utility in identifying patients most at-risk for extended hospitalization, with the authors arguing that instruments like the MacCAT-CA can be used in a practical manner of identifying patients who might require greater or more intensive treatment.

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Competence to stand trial (CST), or adjudicative competence, is the most frequently referred forensic assessment in the United States (Melton, Petrila, Poythress, & Slobogin, 2007). Approximately one-third of defendants who are referred for an assessment of CST are determined incompetent to stand trial

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(IST) and therefore in need of restoration treatment to proceed with the charges against them (see Melton et al., 2007, for a review). In the United States, competence restoration treatment is most often provided on an inpatient basis in state-funded psychiatric and forensic hospitals (Zapf, 2013). The body of literature on the topic suggests that competence restoration focuses on treating the symptoms of the underlying disease or defect rendering the defendant incompetent (most often through psychotropic medications) or addressing the specific psycholegal deficits via psychoeducation (see Zapf, 2013, for a review). Most individuals who are provided with competence restoration treatment are ultimately restored to competence, with some exceptions for certain populations (e.g. individuals with underlying intellectual and/or developmental disabilities have lower rates of restoration).

The hospitalization and subsequent treatment of individuals adjudicated IST ensures the integrity of court proceedings by guaranteeing the rights of a defendant in the preparation of her or his defense. However, this leads to the concomitant loss of liberty for the individual, particularly in states that provide competence restoration treatment in institutional settings. Although previous research suggests that competence restoration treatment can be provided on a brief basis, with the majority of individuals achieving competence within a period of about six months (e.g. Advokat, Guidry, Burnett, Manguno-Mire, & Thompson, 2012; Melton et al., 2007; Morris & DeYoung, 2012; Nicholson, Barnard, Robbins, & Hankins, 1994; Pinals, 2005; Zapf & Roesch, 2011), there is still a proportion of individuals who require lengthier and/or more intensive treatment, and an even smaller minority who are ultimately deemed unrestorable and in need of alternative dispositions. Therefore, it is imperative that the treatment of individuals adjudicated IST is not only effective and efficient, but also that individuals who may require lengthier or more intensive interventions are identified early enough in the process to benefit fully from treatment.

The United States Supreme Court (USSC) has addressed the need for incompetent individuals to make progress toward competence during their treatment, given that the period of competence restoration treatment often comes with an enormous loss of liberty and a natural halting of the trial process (therefore lengthening the period during which a defendant's civil rights and freedoms are lost prior to adjudication). Specifically, the USSC in *Jackson v. Indiana* (1972) ruled that defendants for whom competence would not be restored within a 'reasonable period of time' must be either civilly committed or released because of the unconstitutionality of indefinite commitment. Some states have met this criterion by establishing their own guidelines for what a 'reasonable period of time' means. California, for example, quantified that timeframe to mean three years, after which point alternative dispositions must be pursued (e.g. drop charges, conservatorship/civil commitment; Cal Pen Code § 1370).

In an effort to address the USSC's concern regarding excessive commitment lengths, as well as the economic and political pressures to provide efficient treatment and competency restoration for those adjudicated IST, it would be beneficial to identify and target those individuals who may require lengthier and/or more intensive treatment at an earlier stage of their hospitalization. Related to this aim (i.e. the identification of individuals for whom more intensive treatment may be required), previous researchers have investigated an extensive set of variables believed to be conceptually related to adjudicative competence. Results of these investigations have revealed several key variables that strongly relate to findings of IST, but also relate directly (or indirectly) to restoration to competence. For example, Colwell and Gianesini (2011) found that individuals opined to be 'unrestorable' had more prior hospitalizations, more incarcerations, and more prior findings of incompetence. In a comparison of the archival records of patients adjudicated competent and IST, Nestor and colleagues (1999) opined that measures of intelligence and verbal ability might be linked to competency-related abilities, suggesting neuropsychological ability is important in understanding deficits and potentially response to treatment. Of greatest salience, previous research has focused on the association between psychosis and findings of competence and/or psycholegal abilities (e.g. Cooper & Zapf, 2003; Jacobs, Ryba, & Zapf, 2008; Warren et al., 2006).

Although a diagnosable mental illness (e.g. a psychotic disorder) is a prerequisite for a finding of incompetence, the criteria for establishing CST in the United States is taken directly from the USSC holding in *Dusky v. U.S.* (1960) and generally comports with the following three prongs: (1) a factual understanding of the proceedings, (2) a rational understanding of the proceedings, and (3) sufficient present ability to consult with counsel. In determining whether an individual is competent and/or has been restored to competence, the evaluation is naturally structured around these so-called *Dusky* prongs. It makes conceptual sense, then, to determine whether deficits in these competence-related abilities are linked to the length of time an individual may require to be restored to competence. In other words, the level and length of treatment an individual may require to be restored may depend on the impairments he or she demonstrates in competence-specific skills, rather than the severity and/or degree of his or her psychiatric impairment (a prerequisite for incompetence, yet insufficient, as impairment must relate to psycholegal ability). Unfortunately, there is a dearth of research available in this area.

Relatedly, previous researchers have sought to identify deficits in psycholegal abilities that preclude and/or interfere with restoration treatment. In their review of prior competency evaluations, Warren and colleagues (2006) found that the majority (81%) of incompetent defendants demonstrated impairments on all three *Dusky* prongs. The authors demonstrated that

individuals with intellectual disabilities, learning disorders, and/or an organic disorder were significantly more likely to demonstrate impairments on both prongs relative to individuals without similar diagnoses. The association between diagnosis and competence-related abilities was also demonstrated by Stein (2014), who found that cognitive disorders demonstrated a greater association with basic, factual knowledge, and that psychotic disorders were more strongly associated with the rational prong. Combined, these findings suggest that the skills underlying competence are related to the disorder with which an individual presents. Although there is evidence to suggest a relationship between diagnosis and psycholegal ability, the relationship between these deficits (i.e. the foundation of competence evaluations) and response to treatment is less established. An investigation of the important nexus between psycholegal deficits and response to restoration treatment served as the basis for the present research.

In a similarly purposed study, Morris and DeYoung (2012) empirically demonstrated that psycholegal abilities (i.e. factual and rational understanding) predicted successful restoration at three months, though rational appreciation held greater predictive weight relative to factual understanding (i.e. odds ratios of 35.2 versus 169.2 for the factual and rational factors, respectively). Of interest, factual understanding scores measured after three months of competence restoration treatment predicted successful restoration at six months, suggesting factual understanding served as a building block upon which the rational assistance skills could be built, thereby resulting in a greater likelihood of successful restoration three months later.

Purpose of the current study

The purpose of the present study was to investigate whether the measurement of competence-related abilities, as measured by a commonly administered competence assessment instrument (CAI), the MacArthur Competence Assessment Tool – Criminal Adjudication (MacCAT-CA; Archer, Bluffton-Vollum, Stredny, & Handel, 2006; Poythress et al., 1999) could explain variability in the length of time patients required to be restored to competence in the United States. The MacCAT-CA is a standardized, norm-referenced instrument through which the competency evaluation is structured. The MacCAT-CA was developed with a theoretical basis in Bonnie's (1992) legal theory of competence, which is comprised of foundational and decisional competence, with some items modeled from the assessment of competence to consent to treatment. The foundational component is the operational component of *Dusky*, including the ability to assist counsel via understanding and appreciation. The decisional component is context dependent, with capacity ranging from expressing a choice to reasoning through response options. Although modeled from Bonnie's (1992) theory,

on its face the MacCAT-CA appears to more closely map onto the three-pronged structure of competency to consent to treatment and *Dusky*, allowing us to conceptualize impairment on the specific competency-related abilities.

The MacCAT-CA is contrasted to other CAIs in its level of standardization and the provision of a normative sample, as prior instruments were generally semi-structured interviews with subjective scoring methods. The MacCAT-CA was selected for the current investigation due to its adequate psychometric properties and its ecological validity in this particular population, as well as its correspondence with the *Dusky* prongs. In addition to examining the relationship between scores on the MacCAT-CA and hospitalization length, the current study sought to identify the sensitivity and specificity of scores on the MacCAT-CA for identifying potential cutoffs to identify patients in need of more tailored and/or intensive restoration treatment. The goal of the current investigation was to provide a demonstration of an early identification tool for individuals who are likely to have a lengthier course of restoration, as well as to identify targets for intervention in competence restoration.

Method

Participants

Data for the current study were taken from archival records for 133 IST patients who were administered the MacCAT-CA (Poythress et al., 1999) as part of their inpatient commitment for competency restoration at a large forensic hospital in Southern California. Notably, the decision to administer the MacCAT-CA is up to the evaluator and/or treatment team, and therefore is not a random process (i.e. not all patients committed to the hospital are administered the MacCAT-CA). Records from 30 MacCAT-CA administrations were removed pursuant to presumptive evidence of feigning, either via performance on measures of performance validity/feigning, and/or because the clinician opined the patient was feigning during the course of the evaluation. Patients were excluded from the present analyses if they had a total hospitalization of longer than three years (n = 10), as this is the time at which the state of California requires alternative dispositions be pursued for an incompetent defendant, thereby changing the criteria for discharge from the hospital for these patients. After all exclusionary criteria were applied, the final sample consisted of 93 patients who had been administered the MacCAT-CA during the course of their inpatient hospitalization for competency restoration treatment.

The final sample was comprised of 62 men (67.4%) and 30 women (32.3%); gender was missing for 1 participant. Primary diagnoses, taken from the electronic medical record system at the hospital from the date of testing, included

Schizophrenia (n = 34; 36.6%), Schizoaffective Disorder (n = 12; 12.9%), Other Psychotic Disorder (e.g. Psychotic Disorder, Not Otherwise Specified, Delusional Disorder; n = 27; 29.0%), Mood Disorder (n = 12; 12.9%), and 'Other' (e.g. substance use disorders; n = 8; 8.6%). Patients ranged in age from 18 to 82 years (M = 38.52, SD = 13.32). The sample was ethnically diverse, with the majority of patients classified as Caucasian (n = 38; 40.9%), African American (n = 23; 24.7%), or Hispanic/Latino (n = 26; 28.0%). Two patients were classified in each of the following categories: Asian American, Multiple Ethnicities, and Other. Taken together, the present sample was consistent with the overall population of patients committed to the hospital for competence restoration treatment.

In addition to demographic information, data were collected for each patient regarding the clinician's opinion of competence (taken from the psychological evaluation report), as well as the length of time (in days) from: (1) admission to the hospital until administration of the MacCAT-CA (i.e. admission-to-test time), and (2) administration of the MacCAT-CA to discharge (i.e. test-to-discharge time). Clinician opinions were formed during the course of the evaluations that were conducted, and relied partially on the results of the MacCAT-CA. It is important to note, however, that clinicians also used other sources of information in arriving at their opinions, consistent with standard clinical practice (e.g. collateral data, behavioral observations, clinical interviews, additional psychological testing, etc.). As such, the results of the MacCAT-CA were only one source of data upon which the clinicians arrived in forming their ultimate opinions of competency. The majority of clinicians (95.7%) provided an opinion regarding the patient's competency or lack thereof at the time of the evaluation (n = 88); of those reports where an opinion was provided, approximately half were opined to be competent (48.4%) and the remainder (46.2%) were opined to be incompetent.

The total hospitalization time ranged from 34 and 971 days (M = 218.08, SD = 205.89) for competence restoration treatment, with an average total length of stay just over six months (i.e. 7.27 months). It is important to note that all the participants in this study were discharged from the hospital as competent to proceed, meaning that the length of stay (in days) provides a measure of their response to treatment. In other words, although some of the evaluators opined that the patient was incompetent at the time of the evaluation, they were ultimately provided with additional treatment, and ultimately restored to competence and returned to court.

Approximately 40% of the patients (n = 37) required more than six months to be restored to competence. Given prior research suggesting that this is beyond the average length of time to be restored (Advokat et al., 2012; Melton et al., 2007; Morris & DeYoung, 2012; Nicholson et al., 1994; Pinals, 2005; Zapf & Roesch, 2011), this group was considered the 'at-risk' group requiring more intensive treatment. The majority of patients

(65.6%) were administered the MacCAT-CA within the first 90 days of their hospitalization (i.e. admission-to-test time; Range = 2–506; *M* = 98.82, SD = 119.25). Following administration of the MacCAT-CA, patients were hospitalized for an average of 119.26 additional days (i.e. test-to discharge time; SD = 145.95; Range = 11–844).

Measures

The MacCAT-CA (Poythress et al., 1999) is a 22-item, vignette-based measure designed to evaluate psycholegal abilities. Three subscales, Understanding (eight items), Reasoning (eight items), and Appreciation (six items), are scored based on the quality of examinee responses to questions about hypothetical legal scenarios (Understanding and Reasoning) and questions about the examinee's own legal situation (Appreciation). Previous research has supported the reliability and validity of this measure (e.g. Otto et al., 1998; Poythress et al., 1999). Notably, Cronbach's alpha coefficients for the present sample were adequate (i.e. Understanding Cronbach's α = .78; Reasoning α = .78; Appreciation α = .77).

With regard to the *Dusky* standard, the Understanding subscale corresponds to the factual understanding prong, the Reasoning subscale best fits the consult-with-counsel prong, and the Appreciation subscale relates most closely to the rational understanding prong. In sum, the three subscales roughly map onto the three *Dusky* prongs that comprise the competency statute in the United States. Scores on each subscale are categorized depending on severity of impairment (i.e. minimal, mild, or clinically significant impairment). Higher scores on the MacCAT-CA are reflective of less impairment (i.e. fewer psycholegal deficits). Once summed, subscale scores are compared to normative data published in the MacCAT-CA manual, which provide percentile ranks for the competent, incompetent, and confirmed incompetent groups. The reader is directed to the instrument's manual for more information on these normative groups.

In addition to being one of the more commonly used CAIs (Archer et al., 2006), previous research has revealed adequate psychometric properties of the MacCAT-CA, supporting its use in this population (e.g. Rogers, Grandjean, Tillbrook, Vitacco, & Sewell, 2001; Zapf, Skeem, & Golding, 2005). Indeed, Wood, Anderson, and Glassmire (2017) found that the MacCAT-CA had adequate internal consistency estimates, and demonstrated good model fit with the factor structure in a sample of 103 male and female patients who were adjudicated IST. In addition, the authors demonstrated adequate interrater reliability, and found a statistically significant relationship between scores on the Appreciation subscale and opinions of competence (Wood et al., 2017).

Procedure

The current authors abided by institutional and ethical guidelines when extracting and analyzing data taken from archival patient records, and the current study was approved by a California Committee for the Protection of Human Subjects. MacCAT-CA scores were extracted from inpatient records and exported into SPSS 19.0 in order to conduct the following analyses.

Statistical analysis plan

For the present study, MacCAT-CA subscale scores were first compared between the two groups of patients: (1) those requiring at or less than six months to be restored, and (2) those requiring greater than six months to be restored (i.e. the 'at-risk' group). This prerequisite analysis was conducted to determine whether the MacCAT-CA could successfully discriminate between the two groups. Next, the subscale scores were used to predict length of inpatient hospitalization, controlling for psychotic disorder diagnosis and days to administration of the instrument, via hierarchical linear regression. Finally, relative risk ratios (RRRs) and sensitivity/specificity estimates were calculated to investigate the utility of cutoff scores in identifying patients who may be in need of more intensive restoration treatment (i.e. identifying the 'at-risk' group of patients to divert to more intensive treatment).

Additionally, receiver operating characteristic (ROC) analyses were conducted to determine whether the scales separated the two groups significantly better than chance. The primary statistic in ROC analyses is the area under the curve (AUC), which is calculated based on a combination of sensitivity (i.e. true positive values) and non-specificity (i.e. false positive values) for every obtained score on the test in the sample. An AUC of .5 indicates that the scale does not separate the groups better than chance, and larger AUCs indicate better group separation.

Results

Descriptive statistics

Descriptive statistics for MacCAT-CA subscale and total scores are provided in Table 1 by group; the total sample for this analysis was $n = 91$, as two participants did not have Appreciation subscale scores. As a prerequisite analysis, we first aimed to determine whether lower MacCAT-CA scores (and therefore, greater deficits in competence-related abilities) were indicative of lengthier inpatient hospitalizations. A multivariate analysis of variance (MANOVA) was run in order to test whether MacCAT-CA subscale scores differed between the two groups (i.e. patients hospitalized for less or more than six months). The overall model was significant, $F(3,87) = 3.85$, $p = .01$,

Table 1. Descriptive statistics and univariate comparison results for MacCAT-CA subscale and total scores, M (SD).

Subscale	Less than six months (*ncolname=align=6#=* 55)	Greater than six months (*ncolname=align=6#=* 36)	Univariate test results
Understanding	11.79(3.10)	9.89(3.24)	$F(1,89) = 7.56$, $p = .007$, $\eta_p^2 = .08$
Reasoning	11.73(3.37)	9.38(4.10)	$F(1,89) = 9.27$, $p = .003$, $\eta_p^2 = .09$
Appreciation	8.89(3.10)	7.14(3.33)	$F(1,89) = 6.55$, $p = .012$, $\eta_p^2 = .07$
Total score	32.54(7.90)	26.53(8.55)	N/A

$\eta_p^2 = .12$, as were the univariate tests (see Table 1). This suggests that individuals requiring at or less than the typical length of time to be restored to competence (i.e. six months) scored higher on the MacCAT-CA than those requiring lengthier periods of restoration treatment.

Predicting length of stay

A hierarchical linear regression was run to investigate the utility of psycholegal abilities, as measured by the MacCAT-CA, in predicting length of inpatient hospitalization (i.e. test-to-discharge time). The length of inpatient hospitalization (from administration of the MacCAT-CA) was the method by which response to treatment was conceptualized (i.e. the number of days it took for a patient to be restored to competence from the date of testing with the MacCAT-CA; test-to-discharge time). Given the strong, established association between psychotic disorder diagnosis and findings of incompetence (Murrie, Boccaccini, Zapf, Warren, & Henderson, 2008), psychosis was controlled for in Step 1 via a dichotomous categorization of Axis I (*DSM-IV-TR;* American Psychiatric Association, 2000) disorder diagnoses. At the time the data were extracted, the *DSM-IV-TR* was the diagnostic classification system used by clinical staff at the hospital. In addition, the number of days from admission to MacCAT-CA administration (i.e. admission-to-test time) was included to control for the influence of restoration treatment and psychiatric stabilization prior to administration of the MacCAT-CA. In Step 2, MacCAT-CA subscale scores were entered.

The overall model was significant, $F(5,82) = 3.39$, $p = .008$, $R^2 = .17$ (Table 2). Although the variables entered in Step 1 were non-significant, they remained in the final model due to the previously established empirical associations between psychosis and competence, as well as the need to control for previous treatment. In Step 2, the Appreciation subscale approached significance in predicting length of hospitalization ($p = .059$, $\beta = -.23$). The Understanding and Reasoning subscales were non-significant (β's = −.23 and .01, respectively).

In addition to examining the unique contribution of the subscale scores in explaining response to treatment, the authors were interested in the

Table 2. Hierarchical regression predicting length of stay from MacCAT-CA scores.

Step and Predictor	*b*(SE)	*β*	Sig.(*p*)	R^2
Step 1				.04
Psychotic disorder	−11.70(35.15)	−.04	.74	
Days to MacCAT-CA administration	.22(.13)	.18	.09	
Step 2				.16
Understanding	−9.29(5.89)	−.21	.12	
Reasoning	.002(5.31)	.00	1.00	
Appreciation	−10.35(5.31)	−.23	.055	

relationship between overall performance on the MacCAT-CA and length of stay (test-to-discharge time). A second linear regression model was created, with psychotic disorder and days until administration of the MacCAT-CA controlled for on Step 1, and total MacCAT-CA scores entered on Step 2. The overall model was significant, $F(3,84) = 5.11$, $p = .003$, $R^2 = .15$ (Table 3). Consistent with the previous model, neither of the predictors in Step 1 were significant, though Total MacCAT-CA score was a significant predictor of length of inpatient hospitalization ($p < .001$).

Using MacCAT-CA performance to gauge risk of extended hospitalization

To evaluate the association between MacCAT-CA performance and risk of extended hospitalization, operationally defined as greater than six months, RRRs were calculated for each of the subscales. The RRR is calculated by dividing the risk of extended hospitalization (i.e. greater than six months) among patients scoring below a specific cutoff by the risk of extended hospitalization among patients who scored above the cutoff. A RRR of 1.0 indicates an equal risk of extended hospitalization for patients above and below the cutoff. We also calculated 95% confidence intervals (CIs) for the RRRs. CIs that overlap with the value 1.0 indicate nonsignificant findings. The relative risk of hospitalization was compared for patients who demonstrated: (1) no impairment on each of the subscales, to (2) those individuals who presented with any level of impairment. The cutoff scores for impairment were taken directly from the instrument's manual.

Results indicated that individuals scoring in the impaired range on the Understanding subscale were .79 times (95% CI = .51–1.17) less likely to require extended hospitalization relative to individuals demonstrating no to

Table 3. Hierarchical regression predicting length of stay from MacCAT-CA total score.

Step and Predictor	*b*(SE)	*β*	Sig.(*p*)	R^2
Step 1				.04
Psychotic disorder	6.55(37.63)	.02	.86	
Days to MacCAT-CA administration	.24(.13)	.19	.08	
Step 2				.15
Total Score	−6.13(1.79)	−.36	.001	

minimal impairment. Because the 95% CI overlapped with 1.0, this finding was not statistically significant. Individuals scoring in the impaired range on the Reasoning subscale were 1.75 times (95% CI = 1.04–2.96) more likely to require lengthier treatment (i.e. a 75% increase in the risk for extended hospitalization). This finding was statistically significant. Finally, individuals scoring in the impaired range on the Appreciation subscale were 2.48 times (95% CI = 1.08–5.68) more likely to require more than six months to be restored to competence (i.e. a 148% increase in risk for extended hospitalization). This finding was also statistically significant.

Classification accuracy of MacCAT-CA scores in identifying patients at greater risk of extended hospitalization

To identify patients for whom restoration took greater than six months (i.e. the 'at-risk' group), sensitivity and specificity estimates were calculated for the MacCAT-CA total and subscale scores (see Table 4). *Sensitivity* refers to the true positive rate, or the percentage of patients who were correctly identified by a particular cutoff score as being hospitalized more than six months. *Specificity* refers to the true negative rate, or the percentage of patients who were correctly identified by a particular cutoff score as being hospitalized less than six months.

When considering the sensitivity and specificity values for the present sample (Table 4), cutoff scores would need to be relatively high in order to maximize sensitivity. For example, to maintain a sensitivity of ≥85% on the Appreciation subscale, the clinician would need to select a cutoff score of 10 (out of 12 possible points), which results in a very high false positive rate (i.e. 62% of patients would be incorrectly diverted to more intensive treatment despite requiring less than six months to be restored). Conversely, maximizing higher levels of specificity (e.g. ≥90%) and a concomitantly lower false positive rate (~10%) results in much lower cutoff scores (i.e. scores of 7, 6, or 2 on the Understanding, Reasoning, and Appreciation subscales, respectively).

Finally, to evaluate the overall utility of the MacCAT-CA scales using the combination of true positive and false positive values for all possible scores on each scale, ROC analyses were conducted. The AUCs for the three subscales and the overall total score were as follows: Understanding (AUC = .67; p = .008), Reasoning (AUC = .67; p = .006), Appreciation (AUC = .66; p = .008) and Total Score (AUC = .70; p = .001). When interpreting AUC results, p-values lower than .05 indicate that the AUC differed significantly from chance in discriminating those who required less than six months to be restored to competence from those who required more than six months.

Table 4. Sensitivity and specificity of MacCAT-CA subscale scores in discriminating between patients hospitalized longer than six months.

Cutoff score	Sensitivity (%)	Specificity (%)
Appreciation		
≤12	100	0
≤11	94	2.0
≤10	86	38
≤9	67	53
≤8	58	69
≤7	50	75
≤6	36	82
≤5	28	87
≤4	28	89
≤3	19	89
≤2	11	91
≤1	6	96
0	3	100
Reasoning		
≤16	100	0
≤15	92	18
≤14	84	32
≤13	84	36
≤12	70	41
≤11	68	54
≤10	62	61
≤9	57	77
≤8	41	82
≤7	32	86
≤6	24	95
≤5	24	95
≤4	11	98
≤3	8	100
≤2	3	100
≤1	3	100
0	3	100
Understanding		
≤16	100	0
≤15	97	14
≤14	92	23
≤13	84	30
≤12	78	43
≤11	70	59
≤10	54	66
≤9	41	75
≤8	35	86
≤7	24	96
≤6	16	96
≤5	14	96
≤4	5	96
≤3	0	96
Total score		
≤44	100	0
≤43	97	2
≤42	97	7
≤41	92	13
≤40	92	16
≤39	92	26
≤38	92	27

(*Continued*)

Table 4. (Continued).

Cutoff score	Sensitivity (%)	Specificity (%)
≤37	89	29
≤36	89	36
≤35	89	42
≤34	89	49
≤33	83	51
≤32	78	56
≤31	72	58
≤30	64	62
≤29	58	62
≤28	56	73
≤27	53	76
≤26	50	76
≤25	42	80
≤24	39	84
≤23	36	87
≤22	31	91
≤21	31	91
≤20	28	93
≤19	25	95
≤18	22	95
≤17	17	96
≤16	14	96
≤15	8	96
≤14	6	98
≤9	3	98
≤7	3	100

Discussion

The present study evaluated the relationship between specific competence-related abilities and the length of time required for competence restoration treatment. Specifically, this study investigated the use of the MacCAT-CA as a tool to identify specific competence-related abilities and the impact these deficits have on the length of hospitalization in an inpatient psychiatric hospital. Although there is a substantial literature focused on the role of psychosis in competence (e.g. Cooper & Zapf, 2003; Jacobs et al., 2008; Warren et al., 2006), there is minimal information known about the extent to which specific competency-related abilities impact restoration, despite research showing that the large majority of incompetent individuals show deficits in these abilities (Warren et al., 2006), as well as the U.S. legal requirement of psycholegal deficits in determinations of incompetence (i.e. the *Dusky* prongs).

Individuals who showed greater deficits across competence-related skill areas required lengthier periods of hospitalization and restoration treatment than individuals without similar deficits. Given the role of psycholegal ability evaluation in standard competency assessment, this finding was expected. However, in addition to empirically establishing this relationship, this study aimed to evaluate the specific deficits most relevant to length of hospitalization, as well as the

possible use of competency test scores to identify individuals who may need more intensive or more specifically targeted treatments to prevent unnecessarily lengthy hospitalizations (i.e. individuals requiring greater than the standard length of hospitalization time to be restored, six months).

Total scores on the MacCAT-CA, as opposed to individual subscale scores, significantly predicted length of inpatient hospitalization to be restored. This finding suggests that overall performance on the MacCAT-CA, best understood as a broadband measure of competence-related deficits, is significant in predicting the length of time a patient will require to be restored to competence. This is consistent with our initial intention, to examine the relationship between competence-related abilities and response to treatment. The difficulty in interpreting this finding, however, is that the MacCAT-CA does not produce a total score, instead opting to measure the discrete competence-related abilities separately (i.e. factual understanding, rational understanding, and ability to consult with counsel). As such, total scores on the MacCAT-CA are clinically meaningless. That said, overall scores on the MacCAT-CA provide a summary of competence-related deficits, independent of domain. There are several reasons why the initial model, using the subscale scores, may have been non-significant, most salient being the nature of the data (i.e. an archival analysis as opposed to a systematically controlled investigation). It is also possible that the total scores – reflecting a general level of impairment across abilities – are simply more useful in describing a patient's deficits, as opposed to separating them by the *Dusky* prongs. In addition, the relatively small sample size may have played a role in the non-significant result. Additional research is needed to investigate the relationship between competence-related abilities and hospitalization length, ideally in a more systematically controlled sample (i.e. where administration of the MacCAT-CA is standardized, and not drawn from archival data that were not systematically collected).

In addition, this study aimed to determine whether scores on the MacCAT-CA could aid in identifying individuals who are more likely to require longer restoration time (i.e. more than the standard length of treatment, six months). The authors view this as especially relevant, as identifying patients who may require additional treatment earlier during their hospitalization could reduce the length of unnecessary hospitalization days. RRRs showed that although scores on the Understanding scale were not significantly associated with risk for requiring lengthier restoration treatment, scores in the impaired range on the Reasoning (1.75 times more likely) and Appreciation (2.48 times more likely) scales were associated with significantly higher risk of requiring more than six months to be restored (the time period at which most individuals are restored to competence; Melton et al., 2007). Here, the Appreciation subscale was the best tool on the MacCAT-CA to make these determinations. Importantly, the Appreciation subscale on the MacCAT-CA is the only one of the three that

directly relates to the defendant's own legal situation; items on the other two subscales relate to a hypothetical scenario referenced by the instrument. Several clinical applications stem from these findings.

First, these findings suggest that an assessment of specific psycholegal abilities, particularly an individualized appreciation of their legal circumstances, is especially useful in identifying individuals who may require additional treatment. If such patients are identified, it may be useful to enroll them in more intensive, individualized treatment (e.g. individual therapy or individualized psychoeducation). Although it is important that patients who are adjudicated IST be enrolled in treatment aimed at gaining basic legal knowledge, the current study suggests that the rational thinking prong, which is naturally more individualized, is the factor most likely to keep patients hospitalized for longer periods. Therefore, individuals with greater deficits in these areas may require treatment specifically aimed at these issues. We argue that these results underscore the importance in identifying these patients and implementing more intensive treatment as early as possible. Certainly, the presence of acute psychosis may impede immediate assessment upon admission to a psychiatric facility, but early assessment is likely to be a useful tool in identifying individuals who may require additional treatment in order to decrease their hospitalization time. We also postulate that the limited value of the Understanding subscale is an artifact of the fact that competence restoration programs focus almost exclusively on this prong, meaning that all of the patients in this sample would have been exposed to varying degrees of this education at the time of testing, rendering it relatively meaningless with respect to differentiating between the groups.

As an extension of these analyses, the authors calculated sensitivity and specificity estimates for varying cutoff scores on the MacCAT-CA. In determining the level at which to identify patients for diversion to a more targeted or intensive intervention, the clinician should consider the relative cost of the errors associated with a cut score (i.e. depending on the cost of the intervention and the resources available, a false positive error may be more costly than failing to identify patients in need of such an intervention). In this particular sample, cutoff scores of 7, 6, or 2, respectively, on the Understanding, Reasoning, and Appreciation subscales successfully limited false positive errors to 10% or less, meaning that only 1 in 10 patients would be inaccurately diverted to more intensive treatment. Keeping the false positive rate at this low level would be ideal in scenarios where the tailored intervention was costly and the number of patients who could be served was low (e.g. a time-intensive, individualized treatment model requiring multiple staff and extra hours). Conversely, if the tailored treatment to target psycholegal deficits in these patients was less resource intensive (e.g. once- or twice-weekly group formatted treatment with minimal need for

additional staff), the clinician may wish to instead emphasize sensitivity to successfully target the greatest number of patients in need of the treatment. In the present sample, cutoff scores of 13, 13, and 10 on the Understanding, Reasoning, and Appreciation subscales would maximize sensitivity estimates near ≥85%. The trade-off, though, is that a large proportion of patients would inappropriately receive the tailored intervention (i.e. false positive rates ranging from 62% to 70%). Ultimately, individual clinicians and institutions need to adeptly balance the competing demands in order to determine which type of error is more costly in identifying patients for more intensive treatment. Regardless, the present study was a practical demonstration of the utility of selecting cutoff scores on an instrument to divert patients in need of additional or tailored treatment.

This issue is important from both an administrative and a legal standpoint. Administratively, numerous hospital resources are put towards restoration treatment and many facilities have lengthy waiting lists for hospital admission. Therefore, it is beneficial that the length of overall restoration time is decreased when possible. More importantly, individuals in these circumstances have a right to a speedy legal process. In accordance with *Jackson v. Indiana* (1972), it is imperative that they are admitted to treatment as quickly as possible and that treatment is provided effectively, and in a 'reasonable amount of time.' Individuals who are found incompetent may have shorter restoration times with earlier identification of deficits and more targeted, intensive treatment, which benefits that particular individual, the numerous individuals who are awaiting treatment in jails, and the state hospital and legal systems at large. In other words, using a systematic method of identifying patients who may require lengthier periods of time to be restored (e.g. using cutoff scores on the MacCAT-CA) may allow earlier diversion of these individuals to more intensive treatment, meaning their overall length of restoration treatment may be reduced.

The current investigation was a practical demonstration of how performance on a widely used instrument, such as the MacCAT-CA, could be useful to divert patients from standard programmatic treatment to more intensive treatment in an effort to address those with greater needs. The authors do not suggest that scores alone on an instrument are the end-all be-all of decisions to be made, nor do we suggest that performance on an instrument like the MacCAT-CA be considered in isolation. We do, however, believe in the practical value of screening patients early in the course of treatment to identify those who may require lengthier stays, at which point providers can devote greater efforts to this group of patients. Future research would be ideal in testing these methods, and determining whether implementing such a strategy can be effective in reducing the length of time, overall, that defendants require treatment.

Limitations and future directions

The current study has several limitations that are important to acknowledge. One of the primary limitations stems from the use of archival data. Although these data are typical of this setting and widely generalizable to state hospital settings, the method by which individuals included in this study were evaluated was not completely standardized, and random sampling was not used. For instance, not all patients who were admitted as IST were administered the MacCAT-CA, and the time between admission and administration of the MacCAT-CA was not standardized. Indeed, the decision to evaluate CST using standardized competence measures is at the discretion of the treatment provider in each individual case. Therefore, future research would benefit from a more standardized assessment procedure in which all individuals are assessed at standard time points. Ideally, future research should include systematic identification of patients, administered the measure around the same timeframe, with greater attention to the length of time to be restored.

Another limitation of the current study is the use of only one specific competency assessment measure. Although the MacCAT-CA is a well-validated test of competence-related abilities (e.g. Poythress et al., 1999; Wood et al., 2017; Zapf et al., 2005), it is not the only means by which clinicians assess this construct. Therefore, future research in this area should include other measures of competency, such as the Evaluation of Competency to Stand Trial-Revised (ECST-R; Rogers, Tillbrook, & Sewell, 2004), the Georgia Court Competency Test (GCCT; Wildman et al., 1978), the Fitness Interview Test (FIT; Roesch, Webster, & Eaves, 1984), and the Competency Assessment Instrument (CAI; Lipsitt, Lelos, & McGarry, 1971), among others. As mentioned previously, the MacCAT-CA is one of the more widely used instruments of competence assessment (Archer et al., 2006), and it is relatively unique in that it was the first to include normative data by which to compare performance. Indeed, many of the remaining instruments used by professionals are structured interviews for which no normative data are provided.

Finally, the course of treatment for each patient included in the current study was not standardized. The level of participation and compliance with treatment was unknown and administration of treatment was unstandardized. In other words, some patients who were assessed and included in the current study may have been treatment noncompliant; however, the rate at which this occurred was unknown for the purposes of this study. In addition, although courtroom education groups are provided on each unit housing patients who are adjudicated IST, the method by which these treatment groups are facilitated may vary across treatment units and providers. Furthermore, a portion of patients may have also engaged in additional treatment, such as mock court proceedings and/or individual therapy; however, these data were also

unavailable. Future research may benefit from collecting additional data regarding the level of treatment adherence and the types of treatment provided to each individual during the course of hospitalization, as it is likely that these factors are related to restoration times.

In addition to future research that would address the limitations of the current study, research continues to be needed in the area of competency restoration treatment, particularly with the aim of establishing the most effective treatments for patients who are adjudicated IST. However, the identification of individuals who may require lengthier treatment is an initial step in improving the competency restoration process, and the identification of specific cutoff scores on a competency measure has potential clinical utility in doing so. The current study provides evidence that this identification is important in order to understand restoration limitations and suggests that competency assessment measures could be useful in aiding in the identification of these patients in forensic psychiatric settings. Although mostly applicable to a U.S. audience, the current study provided a practical demonstration of the use of cut scores on a standard instrument, for which similar methods can be used for patients in other domains (e.g. using performance on other measures to aptly divert patients in need of specific treatments). Altogether, the authors view this as a novel method through which addition investigation can seek to guide appropriate treatment for patients in forensic settings.

Disclosure statement

No potential conflict of interest was reported by the authors.

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