Reliability of the Millon Behavioral Medicine Diagnostic in Pre-surgical Bariatric Weight-loss Evaluations

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BACKGROUND

- Samaritan Weight Management Institute (SWMI) conducts psychological evaluations for their patients before they undergo bariatric surgery for weight loss.
- Those evaluations use The Millon Behavioral Medicine Diagnostic (MBMD), which evaluates a person's experience of their health, response to medical treatment recommendations, history of adherence to treatment plans, and coping skills[1].
- Researchers have questioned the reliability and validity of the 32 component scales of the MBMD when used within the bariatric population[2,3].

OBJECTIVES

- To assess the internal consistency of the 32 component scales of the MBMD when applied within the bariatric population at SWMI.

METHODS

- SWMI adult bariatric surgery candidates MBMD data were extracted from an existing database. If a patient completed the MBMD multiple times, only their first recorded MBMD administration was included. Patients who were missing information needed to identify repeated MBMD responses were also excluded.
- We evaluated internal consistency by calculating Cronbach's Alpha for each of the 32 scales of the MBMD.
- Prior to calculating Cronbach's Alpha, items with negative weighting were reverse coded so that a value of "True" always corresponded to an elevation of the scale.
- The original MBMD bariatric norms were created using data from 711 patients from multiple sites within the United States. Our study exceeded that sample size using a single clinic sample.
- Based on sample size estimates provided by Bujang et al[4], our study was adequately powered (80%) at an alpha of 0.05 for scales with 5 to 25 items to test a null hypothesis setting the Cronbach's alpha to 0.70 and an alternative hypothesis setting the Cronbach's alpha to 0.75.

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RESULTS

- 759 patients were included (Average Age: 46.1 [SD=12.0]; 84% Female; 87% white, Non-Hispanic; 48% high school education and 37% Associate's or higher).
- Of the 32 scales, 19 (59%) had an acceptable or better Cronbach's Alpha value of ≥0.70.

Table 1. Internal Consistency for the 32 MBMD Scales

Scale	# Items in Scale	Patients with Complete Data	Cronbach's Alpha	95% CI	Interpretation
X - Disclosure	6	755	0.50	0.44-0.55	Poor
Y - Desirability	11	752	0.56	0.52-0.60	Poor
Z - Debasement	10	756	0.71*	0.65-0.76	Acceptable
AA - Anxiety-Tension	15	750	0.80**	0.77-0.83	Good
BB - Depression	23	750	0.87**	0.84-0.89	Good
CC - Cognitive Dysfunction	14	751	0.76**	0.73-0.79	Acceptable
DD - Emotional Lability	18	754	0.81**	0.78-0.83	Good
EE - Guardedness	20	743	0.75**	0.71-0.77	Acceptable
1 - Introversion	15	748	0.71*	0.67-0.75	Acceptable
2A - Inhibited	17	752	0.85**	0.83-0.87	Good
2B - Dejected	13	753	0.82**	0.78-0.84	Good
3 - Cooperative	15	752	0.65	0.61-0.69	Questionable
4 - Sociable	9	753	0.51	0.46-0.56	Poor
5 - Confident	12	753	0.50	0.45-0.55	Poor
6A - Nonconforming	14	747	0.62	0.57-0.67	Questionable
6B - Forceful	12	750	0.64	0.60-0.68	Questionable
7 - Respectful	17	744	0.56	0.52-0.60	Poor
8A - Oppositional	22	750	0.83**	0.80-0.85	Good
8B - Denigrated	17	755	0.78**	0.75-0.80	Acceptable
A - Illness Apprehension	21	750	0.82**	0.80-0.84	Good
B - Functional Deficits	16	753	0.84**	0.83-0.86	Good
C - Pain Sensitivity	22	749	0.85**	0.82-0.86	Good
D - Social Isolation	20	754	0.86**	0.83-0.88	Good
E - Future Pessimism	16	751	0.82**	0.80-0.84	Good
F - Spiritual Absence	7	751	0.91**	0.90-0.92	Excellent
G - Interventional Fragility	17	755	0.77**	0.74-0.80	Acceptable
H - Medication Abuse	10	755	0.45	0.39-0.51	Unacceptable
I - Information Discomfort	6	758	0.26	0.15-0.37	Unacceptable
J - Utilization Excess	17	746	0.75**	0.72-0.78	Acceptable
K - Problematic Compliance	16	746	0.65	0.60-0.68	Questionable
L - Adjustment Difficulties	15	747	0.62	0.57-0.66	Questionable
M - Psych Referral	14	755	0.62	0.56-0.67	Questionable

** Indicates Cronbach's alpha >.70 and <.75;* ** Indicates Cronbach's alpha >.75

CONCLUSIONS

- 13 of 32 MBMD scales (41%) are not consistently measuring unified concepts. The remaining 19 scales (59%) had acceptable consistency or better.
- MBMD scales are organized in clusters. The Psychiatric Indications and Stress Moderators clusters had acceptable internal consistency, whereas few Coping Style and Treatment Prognostics clusters had acceptable internal consistency. Scales within the Management Guides cluster had poor internal consistency.
- Critically, two-thirds of scales assessing a participant's tendency toward Desirability had poor internal consistency. This casts significant doubt on the interpretive utility of the MBMD, as patients may anticipate that a generally more positive response to the scale could accelerate their eligibility for treatment.
- In an adult bariatric surgery population, we found the MBMD lacks internal consistency on multiple scales, except on psychiatric indications (e.g., depression or anxiety) and stress moderation (e.g., social isolation and future pessimism). Caution may be warranted given the challenges with the Disclosure and Desirability scales.

FUTURE IMPLICATIONS

- Further examination of internal consistency on the scale and item level is warranted.
- A correlation matrix of items within each scale could help delineate which items are impacting internal consistency.
- Additionally, examining internal consistency at the item level could help in the development of a reliability index for individual respondents' response styles.
- We recommend factor analyses of poorly consistent scales to better assess the construct validity and reliability of the MBMD.

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