

Impact of MMPI-2 versus MMPI-2-RF Booklet Administration on Internal Structure Comparability and Predictive Utility of MMPI-2-RF Scales in a Forensic Inpatient Setting

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Disclosures

The statements and opinions expressed are those of the authors and do not constitute the official views or the official policy of DSH-Patton, the California Department of State Hospitals, or the State of California.

Funding:

Undergraduate Research Opportunities Center (UROC)

University of Minnesota Press: Test Division

Where is the MMPI used?



**Clinical
Settings**



**Air Traffic
Control**



**Police
Cadets**



**Medical
Settings**



**Forensic
Settings**

MMPI Overview

Minnesota Multiphasic Personality Inventory-2 (MMPI-2)

- Published in 1989
- 567 True/False Items

Minnesota Multiphasic Personality Inventory-2- Restructured Form (MMPI- 2-RF)

- Published in 2008
- 338 True/False Items
- 51 Scales

Original Test

	T	F		T	F
1)	☒	☐	16)	☒	☐
2)	☐	☒	17)	☐	☒
3)	☒	☐	18)	☐	☒
4)	☒	☐	19)	☒	☐
5)	☐	☒	20)	☐	☒
6)	☐	☒	21)	☒	☐
7)	☒	☐	22)	☒	☐
8)	☐	☒	23)	☐	☒
9)	☒	☐	24)	☒	☐
10)	☒	☐	25)	☐	☒
11)	☐	☒	26)	☐	☒
12)	☒	☐	27)	☒	☐
13)	☐	☒	28)	☐	☒
14)	☐	☒	29)	☒	☐
15)	☐	☒	30)	☒	☐

Shorten and
Shuffle

Restructured Test

	T	F
1)	☐	☒
2)	☒	☐
3)	☐	☒
4)	☐	☒
5)	☐	☒
6)	☒	☐
7)	☒	☐
8)	☐	☒
9)	☒	☐
10)	☐	☒
11)	☒	☐
12)	☐	☒
13)	☒	☐
14)	☒	☐
15)	☐	☒

MMPI-2-RF

51

Total
Scales

9

Validity Scales

3

Higher-Order Scales

9

Restructured Clinical Scales

23

Specific Problems Scales

2

Interest Scales

5

Personality-Psychopathology Five Scales

Where is the MMPI used?

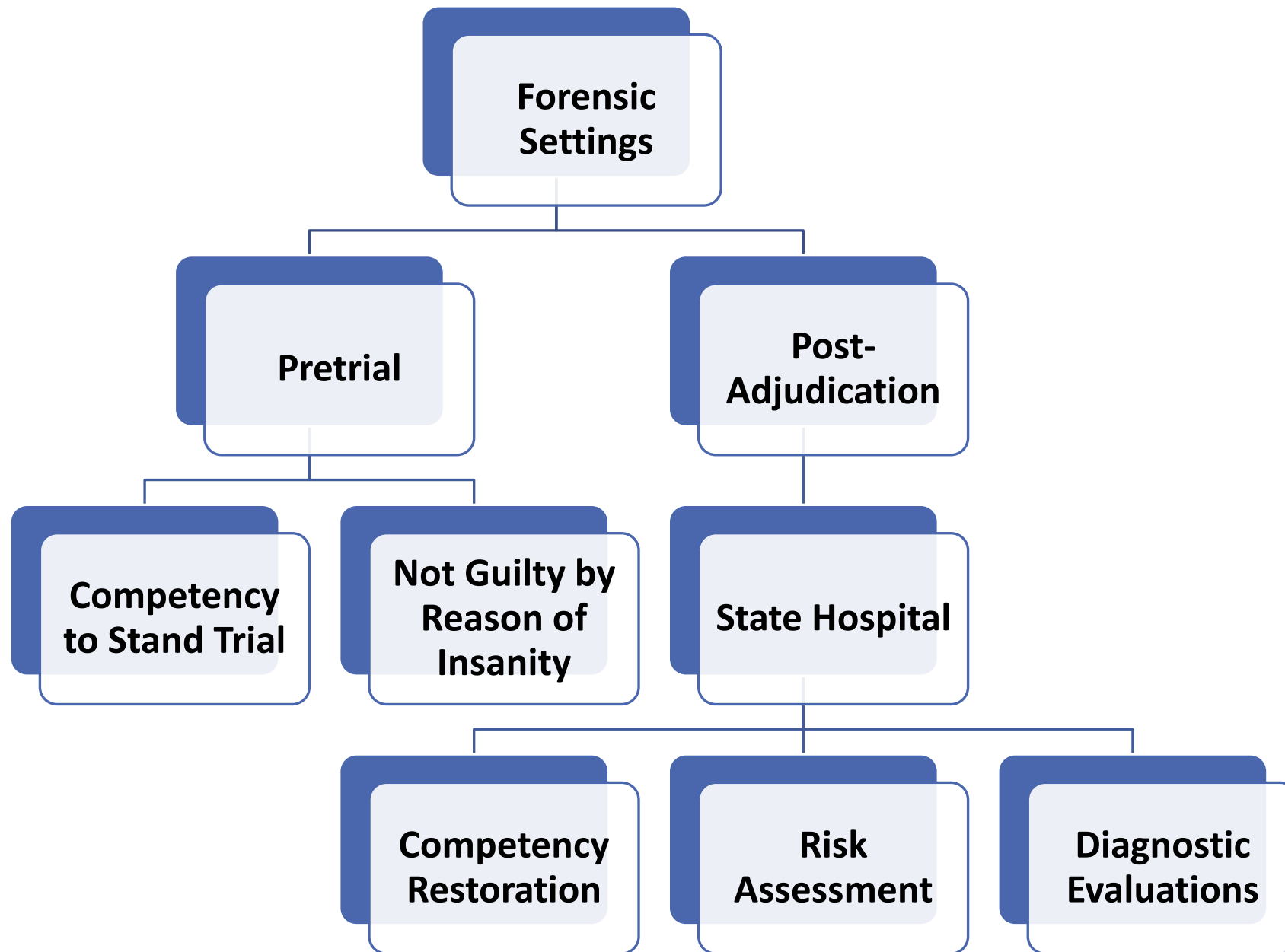
**Clinical
Settings**

**Air Traffic
Control**

**Police
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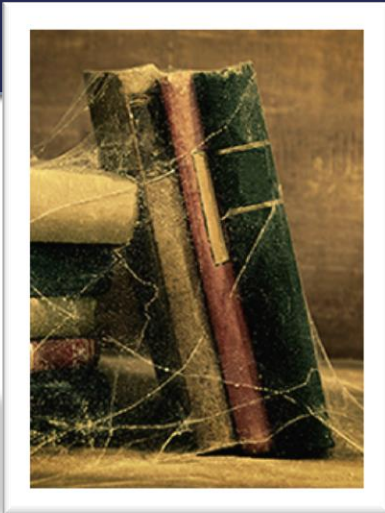
**Medical
Settings**

**Forensic
Settings**



Research Trends

MMPI-2 Datasets



Rescored

MMPI-2-RF Scales

Day	Month	Year	Plantspecies	Seconds	Group	PlantPart	AgeSex	Moisture	MNut	P_MN	C_MN	L_MN	Lipids	EthanolS
1	5	2002	Kaway	8	4	1	6	10.2000	22.0000	73.4545	24.0909	2.4545	5400	9
2	1	5	2002	Kaway	99	4	1	6	10.2000	22.0000	73.4545	24.0909	2.4545	5400
3	1	5	2002	Kaway	204	3	1	6	10.2000	22.0000	73.4545	24.0909	2.4545	5400
4	1	5	2002	Kaway	215	3	1	6	10.2000	22.0000	73.4545	24.0909	2.4545	5400
5	1	5	2002	Kaway	208	2	1	7	10.2000	22.0000	73.4545	24.0909	2.4545	5400
6	1	5	2002	Kaway	182	2	1	2	10.2000	22.0000	73.4545	24.0909	2.4545	5400
7	1	5	2002	Kaway	132	2	1	2	10.2000	22.0000	73.4545	24.0909	2.4545	5400
8	1	5	2002	Kaway	47	2	1	2	10.2000	22.0000	73.4545	24.0909	2.4545	5400
9	1	5	2002	Kaway	196	2	1	2	10.2000	22.0000	73.4545	24.0909	2.4545	5400
10	1	5	2002	Kaway	88	2	1	1	10.2000	22.0000	73.4545	24.0909	2.4545	5400
11	1	5	2002	Kaway	158	2	1	6	10.2000	22.0000	73.4545	24.0909	2.4545	5400
12	1	5	2002	Kaway	63	2	1	1	10.2000	22.0000	73.4545	24.0909	2.4545	5400
13	1	5	2002	Kaway	141	2	1	1	10.2000	22.0000	73.4545	24.0909	2.4545	5400
14	1	5	2002	Kaway	42	2	1	1	10.2000	22.0000	73.4545	24.0909	2.4545	5400
15	6	5	2002	Kaway	189	2	1	1	10.2000	22.0000	73.4545	24.0909	2.4545	5400
16	6	5	2002	cabbage bark	130	2	1	1	10.2000	22.0000	73.4545	24.0909	2.4545	5400
17	6	5	2002	cabbage bark	175	2	1	6	10.2000	22.0000	73.4545	24.0909	2.4545	5400
18	6	5	2002	Kaway	81	2	1	7	10.2000	22.0000	73.4545	24.0909	2.4545	5400
19	29	5	2002	Fiddlewood	99	2	1	7	10.2000	22.0000	73.4545	24.0909	2.4545	5400
20	29	5	2002	Kaway	27	2	1	7	10.2000	22.0000	73.4545	24.0909	2.4545	5400
21	29	5	2002	Kaway	102	2	1	6	10.2000	22.0000	73.4545	24.0909	2.4545	5400

(Haber & Baum, 2014; Tarescavage, Wygant, Boutacuff, & Ben-Porath, 2013)

What's Been Done?

- Internal structure has been measured in college student samples and forensic pretrial samples
- Minimal differences for scales between booklet types
- Deemed rescoring MMPI-2 booklets into MMPI-2-RF scales acceptable

Why Does this Matter?

- Clinicians have adopted the MMPI-2-RF
 - Need to know that the test is working properly
- Previous research rescoring MMPI-2 scores into MMPI-2-RF scales needs to be supported

Current Study

Aims

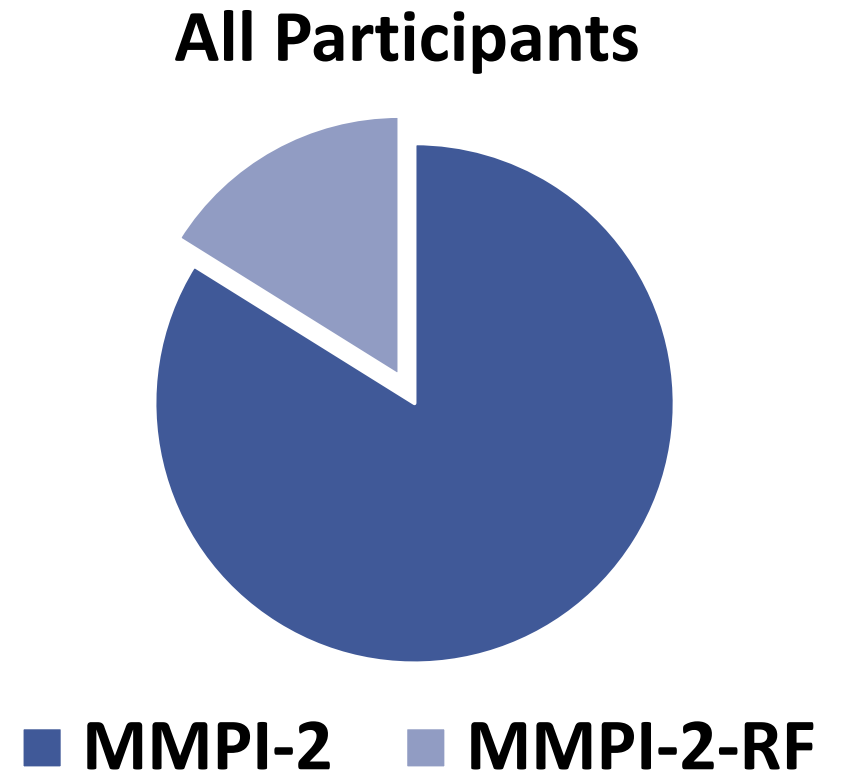
- Replicate Tarescavage et al. (2015) in a larger sample to measure mean score comparisons
- Extend from previous research to include diagnostic predictive utility

Hypotheses

- Research Question #1: Scale Mean Score Comparison
 - I Hypothesized:
 - Minimal differences would be found for the majority of scales
 - VRIN-r and TRIN-r would be elevated higher on the MMPI-2
- Research Question #2: Diagnostic Predictive Utility
 - I Hypothesized:
 - Minimal differences would be found for the majority of scales

Participants

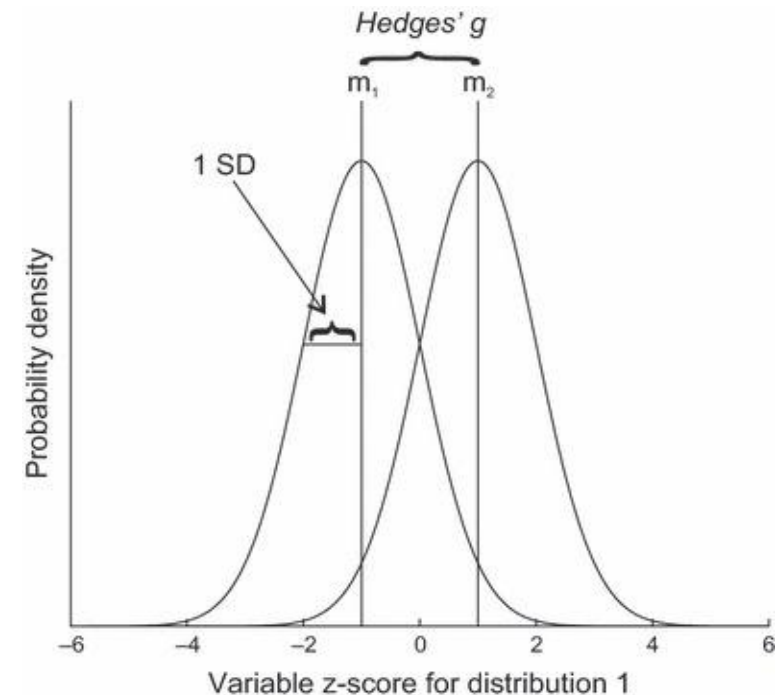
- Deidentified archival dataset of 1,104 psychiatric inpatients at a forensic state hospital
 - 926 (84%) administered the MMPI-2 booklet
 - 178 (16%) administered the MMPI-2-RF booklet



Methods: Research Question 1

- Means, Standard Deviations, independent samples t -tests, and Hedges' g values

Hedges' g	
Small Effect	0.20 – 0.49
Medium Effect	0.50 – 0.79
Large Effect	0.80 +



Research Question 1: Mean Score Comparisons

Research Question 1: Scale Mean Score Comparison

	MMPI-2		MMPI-2-RF		Mean Statistical Comparisons		
Scale Name	M	SD	M	SD	t	p	g
Validity Scales							
Cannot Say (CNS)	3.0799	15.483	0.7978	2.776	4.151	0.001	0.16*
Variable Response Inconsistency (VRIN-r)	58.09	14.86	58.69	15.11	-0.484	0.629	-0.04
True Response Inconsistency (TRIN-r)	61.6	12.65	64.44	15.08	-2.339	0.02	-0.22*
Infrequent Responses (F-r)	68.812	25.606	65.129	21.282	1.812	0.071	0.15
Infrequent Psychopathology Responses (Fp-r)	64.182	22.808	63.978	20.165	0.098	0.922	0.01
Infrequent Somatic Responses (Fs)	60.933	20.142	58.928	16.771	1.253	0.212	0.1
Symptom Validity (FBS-r)	56.86	14.18	56.712	9.79	0.151	0.88	0.01
Response Bias Scale (RBS)	62.271	19.125	60.683	15.247	1.081	0.281	0.09
Uncommon Virtues (L-r)	61.311	13.286	63.82	14.057	-2.027	0.043	-0.19*
Adjustment Validity (K-r)	51.359	12.099	53.086	11.129	-1.565	0.118	-0.14
Higher Order Scales							
Emotional/Internalizing Dysfunction (EID)	49.854	12.173	49.766	10.757	0.076	0.94	0.01
Thought Dysfunction (THD)	56.159	14.841	58.169	14.138	-1.39	0.165	-0.14
Behavioral/Externalizing Dysfunction (BXD)	55.878	11.103	54.54	10.849	1.232	0.218	0.12
Restructured Clinical Scales							
Demoralization (RCd)	51.936	11.715	52.79	10.482	-0.813	0.417	-0.07
Somatic Complaints (RC1)	52.768	11.117	55.741	9.829	-2.774	0.006	-0.27*
Low Positive Emotions (RC2)	51.183	12.725	50.862	12.132	0.258	0.796	0.03
Cynicism (RC3)	50.061	11.044	49.112	10.6	0.88	0.379	0.09
Antisocial Behavior (RC4)	59.149	12.13	57.774	10.81	1.175	0.24	0.12
Ideas of Persecution (RC6)	59.932	15.658	62.766	15.387	-1.848	0.065	-0.18
Dysfunctional Negative Emotions (RC7)	48.055	11.003	47.87	11.197	0.17	0.865	0.02
Aberrant Experiences (RC8)	53.514	12.413	55.201	11.224	-1.405	0.16	-0.14
Hypomanic Behavior (RC9)	46.506	10.682	46.548	11.436	-0.04	0.968	0
Specific Problem Scales							
Malaise (MLS)	53.225	11.514	52.54	11.782	0.604	0.546	0.58
Gastrointestinal Complaints (GIC)	51	10.671	50.741	9.692	0.25	0.803	0.02
Head Pain Complaints (HPC)	50.476	10.069	51.927	9.451	-1.547	0.124	-0.15
Neurological Complaints (NUC)	56.242	12.805	59.33	12.037	-2.479	0.013	-0.24*
Cognitive Complaints (COG)	51.895	12.201	52.217	11.663	-0.271	0.787	-0.03
Suicidal/Death Ideation (SUI)	51.402	13.041	50.427	11.799	0.773	0.44	0.08
Helplessness/Hopelessness (HLP)	49.769	12.369	50.991	10.594	-1.141	0.255	-0.1
Self-Doubt (SFD)	49.911	10.594	50.564	10.249	-0.635	0.526	-0.06
Inefficacy (NFC)	50.493	10.509	51.491	11.444	-0.953	0.341	-0.09
Stress/Worry (STW)	48.099	10.509	49.435	9.112	-1.32	0.187	-0.13
Anxiety (AXY)	52.725	13.152	53.427	13.955	-0.538	0.591	-0.05
Anger Proneness (ANP)	47.823	9.479	47.975	9.154	-0.165	0.869	-0.02
Behavior-Restricting Fears (BRF)	53.949	12.514	52.604	11.581	1.107	0.269	0.11
Multiple Specific Fears (MSF)	50.119	9.381	49.838	9.343	0.306	0.76	0.03
Juvenile Conduct Problems (JCP)	58.377	13.535	57.572	12.692	0.612	0.541	0.06
Substance Abuse (SUB)	54.201	10.669	53.83	10.578	0.355	0.723	0.03
Aggression (AGG)	48.187	10.659	48.104	10.769	0.079	0.937	0.01
Activation (ACT)	46.112	11.88	45.596	11.258	0.445	0.656	0.04
Family Problems (FML)	50.149	12.142	48.951	11.195	1.017	0.309	0.1
Interpersonal Passivity (IPP)	48.783	9.972	48.427	9.215	0.368	0.713	0.04
Social Avoidance (SAV)	49.567	10.794	49.346	9.619	0.212	0.832	0.02
Shyness (SHY)	47.872	9.025	47.419	7.612	0.587	0.558	0.05
Disaffiliativeness (DSF)	53.454	12.338	53.096	10.988	0.3	0.764	0.03
Personality-Psychopathology-5 Scale							
Aggressiveness (AGGR-r)	50.845	9.682	51.532	10.56	-0.712	0.477	-0.07
Psychoticism (PSYC-r)	54.566	14.651	55.596	13.531	-0.765	0.445	-0.07
Disconstraint (DISC-r)	54.782	10.216	53.846	10.484	0.929	0.353	0.09
Negative Emotionality/Neuroticism (NEGE-r)	48.872	10.806	49.362	10.242	-0.466	0.641	-0.05
Introversion/Low Positive Emotionality (INTR-r)	51.504	11.264	50.975	11.219	0.479	0.632	0.05

Mean Score Comparisons: Hypothesized and Statistically Significant Findings

	MMPI-2		MMPI-2-RF		Mean Statistical Comparisons		
Scale Name	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>g</i>
<i>Validity Scales</i>							
Cannot Say (CNS)	3.08	15.48	0.80	2.78	4.15	0.001	0.16*
Variable Response Inconsistency (VRIN-r)	58.09	14.86	58.69	15.11	-0.48	0.63	-0.04
True Response Inconsistency (TRIN-r)	61.60	12.65	64.44	15.08	-2.34	0.02	-0.22*
Uncommon Virtues (L-r)	61.31	13.29	63.82	14.06	-2.03	0.04	-0.19*
<i>Restructured Clinical Scales</i>							
Somatic Complaints (RC1)	52.77	11.12	55.74	9.83	-2.77	0.01	-0.27*
<i>Specific Problems Scales</i>							
Neurological Complaints (NUC)	56.24	12.81	59.33	12.04	-2.48	0.01	-0.24*

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Research Question 2: Diagnostic Predictive Utility

Diagnostic Groupings

Internalizing Disorders

- Depression
- Anxiety

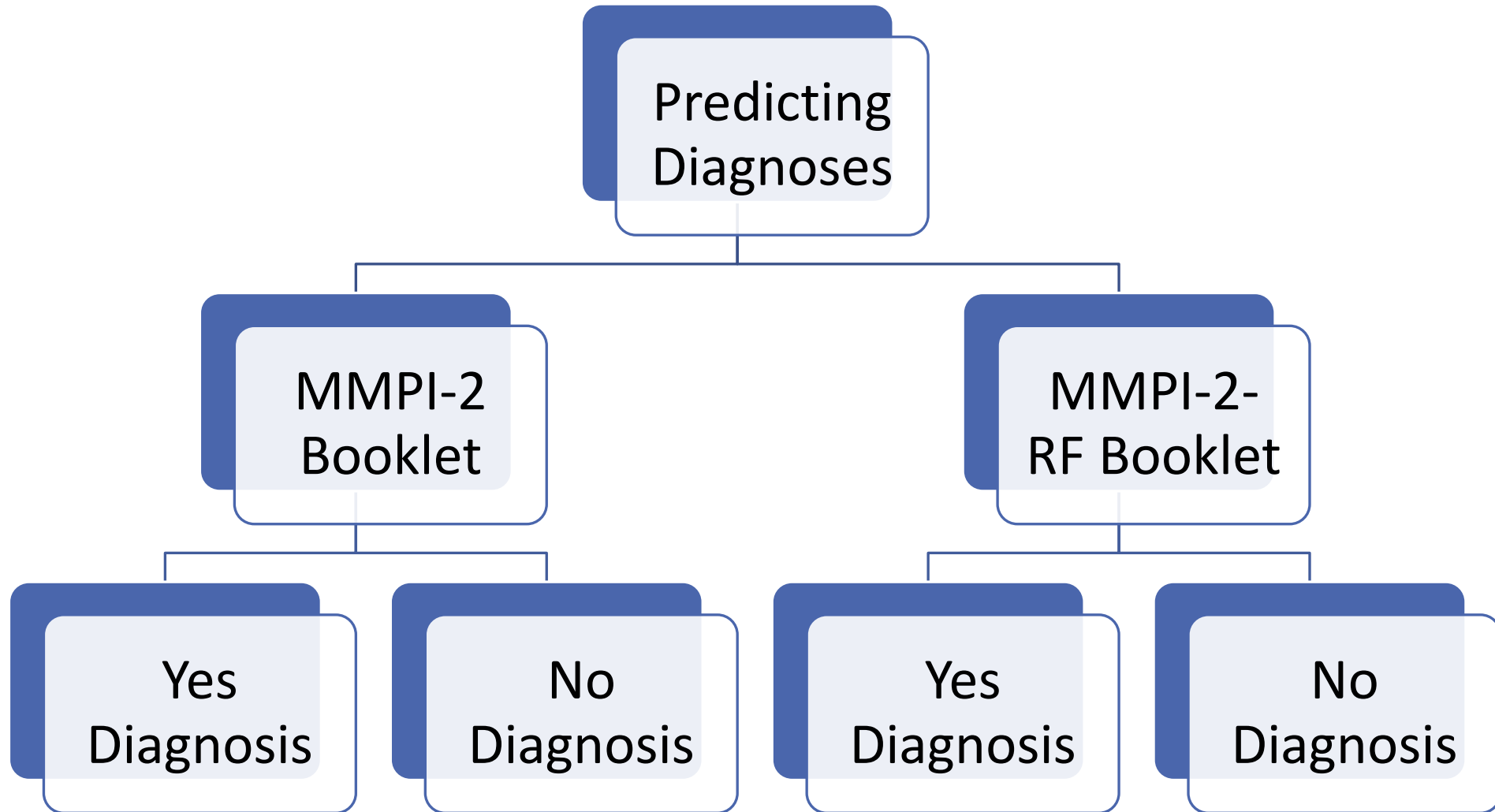
Thought Dysfunction Disorders

- Schizophrenia-Related Disorders

Externalizing Disorders

- Substance Use Disorder
- Antisocial Personality Disorder

Note: Diagnosis is independent and uncontaminated of MMPI results



Results: Research Question 2

Predictive Utility
for Patients With
vs. Without
Internalizing
Diagnoses

	MMPI-2 Booklet (<i>n</i> = 634)	MMPI-2-RF Booklet (<i>n</i> = 124)	
	<i>g</i> ₁ (<i>CI</i>)	<i>g</i> ₂ (<i>CI</i>)	<i>g</i> ₁ - <i>g</i> ₂
Emotional/Internalizing Dysfunction (EID)	0.39 (0.23, 0.55)	0.24 (-0.11, 0.60)	0.15
Demoralization (RCd)	0.40 (0.24, 0.56)	0.02 (-0.33, 0.37)	0.38
Low Positive Emotions (RC2)	0.22 (0.07, 0.38)	0.12 (-0.23, 0.48)	0.10
Dysfunctional Negative Emotions (RC7)	0.35 (0.20, 0.51)	0.36 (0.01, 0.72)	-0.01
Suicidal/Death Ideation (SUI)	0.30 (0.14, 0.46)	0.25 (-0.11, 0.60)	0.05
Helplessness/Hopelessness (HLP)	0.29 (0.13, 0.45)	-0.12 (-0.47, 0.24)	0.41
Self-Doubt (SFD)	0.36 (0.20, 0.52)	0.19 (-0.16, 0.55)	0.17
Inefficacy (NFC)	0.29 (0.13, 0.44)	0.15 (-0.20, 0.51)	0.12
Stress/Worry (STW)	0.35 (0.19, 0.50)	0.26 (-0.10, 0.61)	0.09
Anxiety (AXY)	0.27 (0.12, 0.43)	0.11 (-0.25, 0.46)	0.16

**Predictive
Utility for
Patients With
vs. Without
Thought
Dysfunction
Diagnoses**

	MMPI-2 Booklet (<i>n</i> = 634)	MMPI-2-RF Booklet (<i>n</i> = 124)	
	<i>g</i> ₁ (<i>CI</i>)	<i>g</i> ₂ (<i>CI</i>)	<i>g</i> ₁ - <i>g</i> ₂
Thought Dysfunction (THD)	0.19 (-0.05, 0.43)	0.79 (0.07, 1.52)	-0.60
Ideas of Persecution (RC6)	0.07 (-0.17, 0.31)	0.54 (-0.18, 1.26)	0.47
Aberrant Experiences (RC8)	0.14 (-0.10, 0.38)	0.93 (0.20, 1.65)	0.79
Psychoticism (PSYC-r)	0.18 (-0.06, 0.42)	0.67 (-0.05, 1.39)	-0.49

Predictive Utility for Patients With vs. Without Externalizing Diagnoses

	MMPI-2 Booklet (<i>n</i> = 634)	MMPI-2-RF Booklet (<i>n</i> = 124)	
	<i>g1 (CI)</i>	<i>g2 (CI)</i>	<i>g₁-g₂</i>
Behavior/Externalizing Dysfunction (BXD)	0.44 (0.27, 0.62)	0.66 (0.22, 1.09)	-0.22
Antisocial Behavior (RC4)	0.44 (0.27, 0.62)	0.72 (0.29, 1.16)	-0.28
Hypomanic Activation (RC9)	0.09 (-0.08, 0.26)	0.33 (-0.10, 0.76)	-0.24
Juvenile Conduct Problems (JCP)	0.43 (0.25, 0.60)	0.53 (0.10, 0.97)	-0.10
Substance Abuse (SUB)	0.61 (0.44, 0.79)	0.92 (0.48, 1.36)	-0.32
Aggression (AGG)	0.13 (-0.04, 0.30)	0.38 (-0.05, 0.81)	-0.25
Activation (ACT)	0.12 (-0.06, 0.29)	0.15 (-0.28, 0.57)	-0.03
Disconstraint (DISC-r)	0.42 (0.25, 0.60)	0.25 (-0.18, 0.68)	-0.17
Aggressiveness (AGGR-r)	0.01 (-0.16, 0.18)	0.64 (0.21, 1.08)	-0.63*

Discussion

- Mean Score Comparisons:
 - Hypothesis for VRIN-r was not supported
 - TRIN-r was statistically significant
 - Elevated in the opposite direction of our prediction

Discussion

- $\alpha = 0.05$; expect approximately 1 in 20 to be significant due to chance

Tarescavage et al. (2015)	van der Heijden et al. (2010)	Conen et al. (2018)
Variable Response Inconsistency Scale (VRIN-r)	Hypomanic Activation (RC9)	Cannot Say (CNS)
True Response Inconsistency Scale (TRIN-r)	Gastro-Intestinal Complaints (GIC)	True Response Inconsistency Scale (TRIN-r)*
	Activation (ACT)	Uncommon Virtues (L-r)
	Family Problems (FML)	Somatic Complaints (RC1)
	Aesthetic-Literary Interests (AES)	Neurological Complaints (NUC)

* Indicates elevation in the opposite direction

Conclusions

- Statistically significant results had small or negligible practical significance
- Results coincide with previous research, confirming the acceptability of rescoreing the MMPI-2 items into MMPI-2-RF scales
- Supports the validity and reliability of all MMPI-2-RF research done using this method

Limitations

- Unequal MMPI-2 and MMPI-2-RF sample sizes
- Small sample size of patients not diagnosed with thought disorders who completed the MMPI-2-RF booklet ($n = 8$)

Future Directions

- Utilize equal sample sizes
- Compare individual scale intercorrelations
- Replication in various settings

Acknowledgements & Disclosures

- Research Collaborator: David M. Glassmire, Ph.D., ABPP
- Mentor: Danielle Burchett, Ph.D.
- Supported by a University of Minnesota Press, Test Division Grant & the CSU Monterey Bay Undergraduate Research Opportunities Center [ask about wording for UROC grants]
- Approved by the CA Dept. of Mental Health Committee for the Protection of Human Subjects



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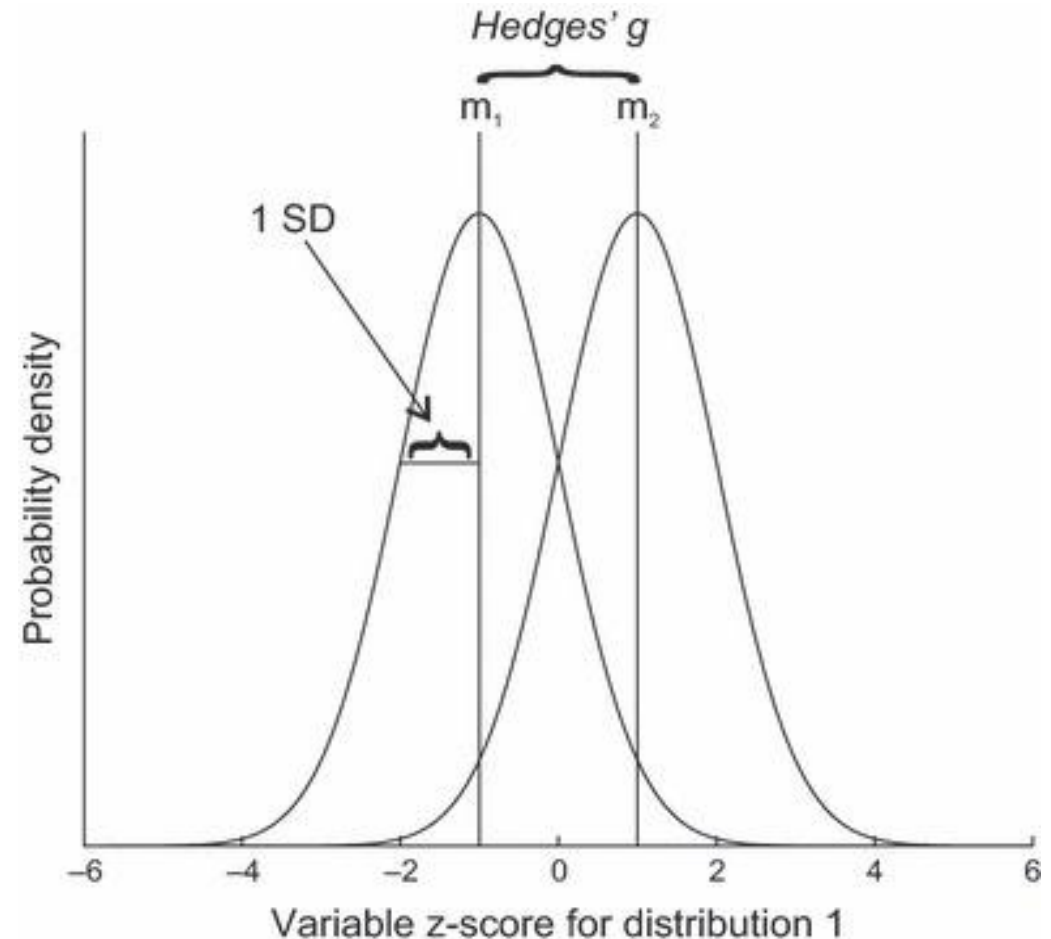
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Thank You!

Questions?

Hedges' g

- Measures effect size
- Size of the difference between means



Effect Size

- Tells how different one group is from another
- Effect size can tell:
 - how large a difference is between groups
 - the difference between outcomes for two groups
 - What the standardized effect is for an outcome