AN EXAMINATION OF THE LONGITUDINAL STABILITY OF PSYCHOLOGICAL MEASURES CONTAINED IN THE U.S. ARMY'S GLOBAL ASSESSMENT TOOL (GAT)

Joel Thurston, PhD
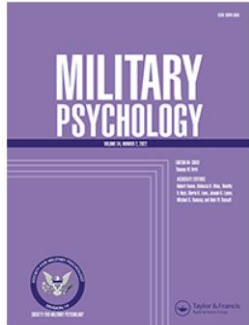Social and Decision Analytics Division (UVA-SDAD)
Army Research Institute for the Behavioral and Social Sciences (ARI)

11 October 2022

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Research Partnership

ARI: WHERE PERSONNEL SCIENCE MEETS PERSONNEL PRACTICE

Driving scientific innovation to enable the Army to acquire, develop, employ, and retain professional Soldiers and enhance personnel readiness.

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BIOCOMPLEXITY INSTITUTE: SOLVING PEOPLE'S PROBLEMS

Team science exploring the behavior of massively interacting living systems to develop practical solutions to real-world problems.

Research Problem

Problem: The Army possesses a trove of administrative data (e.g., personnel records, training scores) but has yet to fully leverage these data.

Purpose: Using modern data science techniques, we are developing models that integrate existing DOD data to make predictions about Soldier behavior and performance.

Payoff: Knowledge about how best to utilize data from disparate sources to form a holistic picture of Soldier and unit performance that can be used to:

— Improve training

— Identify informative performance metrics

— Optimize talent management decisions across Soldier lifecycle
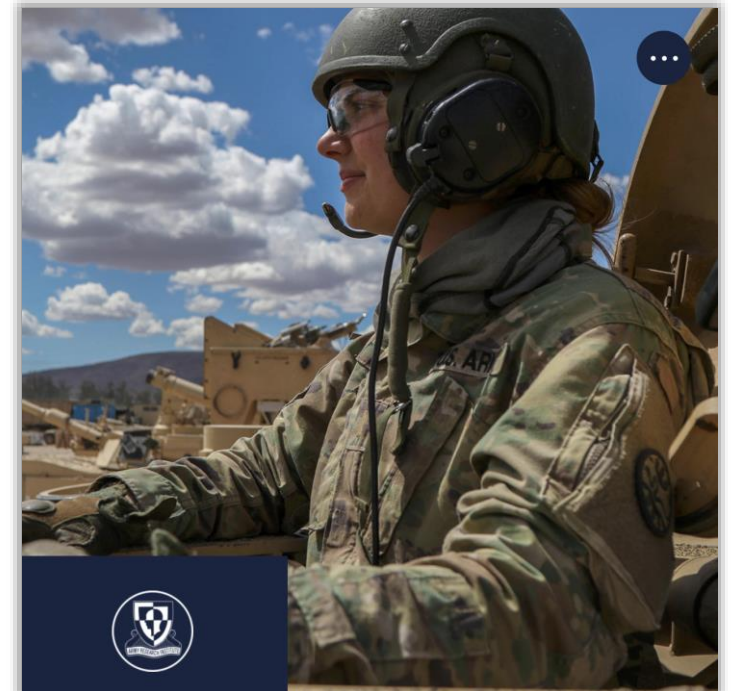
Photo courtesy of Army Cpl. Alisha Grezlik, U.S. Army

Performance in the Army

- Studying Army performance is challenging

- Task-focused performance metrics do not always capture the social component of performance

- Want to expand performance criteria beyond task accomplishment

- **Premise**: Administrative Data Repositories may offer new opportunities to capture Soldiers' social and performance characteristics

Official U.S. Army Flickr:
https://commons.wikimedia.org/wiki/File:Flickr_-_The_U.S._Army_-_Expert_Field_Medical_Badge_testing.jpg

Conceptual Performance Model

Campbell, J. P., McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993). A Theory of Performance. In Schmitt, N. Borman, W., and Associates (Eds.). Personnel Selection in Organizations (pp. 35-70). Jossey–Bass Publishers, San Francisco.

Koopmans, L., Bernaards, C. M., Hildebrandt, V. H., Schaufeli, W. B., de Vet, H. C. W., & van der Beek, A. J. (2011). Conceptual frameworks of individual work performance: A systematic review. Journal of Occupational and Environmental Medicine, 53, 856–866. https://doi.org/10.1097/JOM.0b013e318226a763

Person-Event Data Environment (PDE)

- Data enclave that allows researchers to remotely access data
  - Maintained by Army Analytics Group Research Facilitation Lab (AAG-RFL)

- As researchers we have:
  - Applied for and obtained Common Access Cards (CACs)
  - Registered to work in the PDE environment
  - Requested access to multiple data sources in the PDE

- Army administrative data sources (e.g., demographics, training history, accessions, and attrition data)

- Adding non-DOD data sources (e.g., American Community Survey, Quarterly Census of Employment and Wages)

Data Source Descriptions

| Table Name	Source Name	Description
Master File	Active Duty Military Personnel Master	Master administrative records (e.g., demographics, home location)
MEPCOM	Military Entrance Processing Command	Initial entry records (e.g., accession date, ASVAB)
Climate Survey	Defense Equal Opportunity Management Institute (DEOMI)	Assesses climate within unit (e.g., leadership, sexual assault, discrimination)
TAPAS	Tailor Adaptive Personnel Assessment	Personality test for placement upon entry
GAT 1.0	Global Assessment Tool	Psychosocial characteristics assessment
GAT 2.0	Global Assessment Tool	Psychosocial characteristics assessment
APFT	Army Physical Fitness Test	Physical fitness test scores
Height/Weight	Height & Weight	Height and Weight Test
Derogatory Statements	Interactive Personnel Elective Records Management System (IPERMS)	Negative papers and statements on record
Awards Records	Army Work Force Transaction File	Awards given records
Health	Medical Operational Data System	Periodic Health Assessment, Pre- /Post-Deployment Health Assessments
Unit Risk Inventory	Unit Risk Inventory Survey	Assess risky behaviors related to alcohol, drug, crime
Weapons Training	Digital Training Management System (DTMS)	Reports of training (e.g., weapons training and qualification)
Coursework	Army Training and Requirements Resource System (ATRRS)	Reports coursework taken and completed
Transaction File	Active Duty Military Personnel Transaction	Entry and exit status within the Army
ACS	American Community Survey	CENSUS reports of demographic and social factors within geographies
BLS	Bureau of Labor Statistics	Employment and wages information by job types

Data Source Map and Linkages
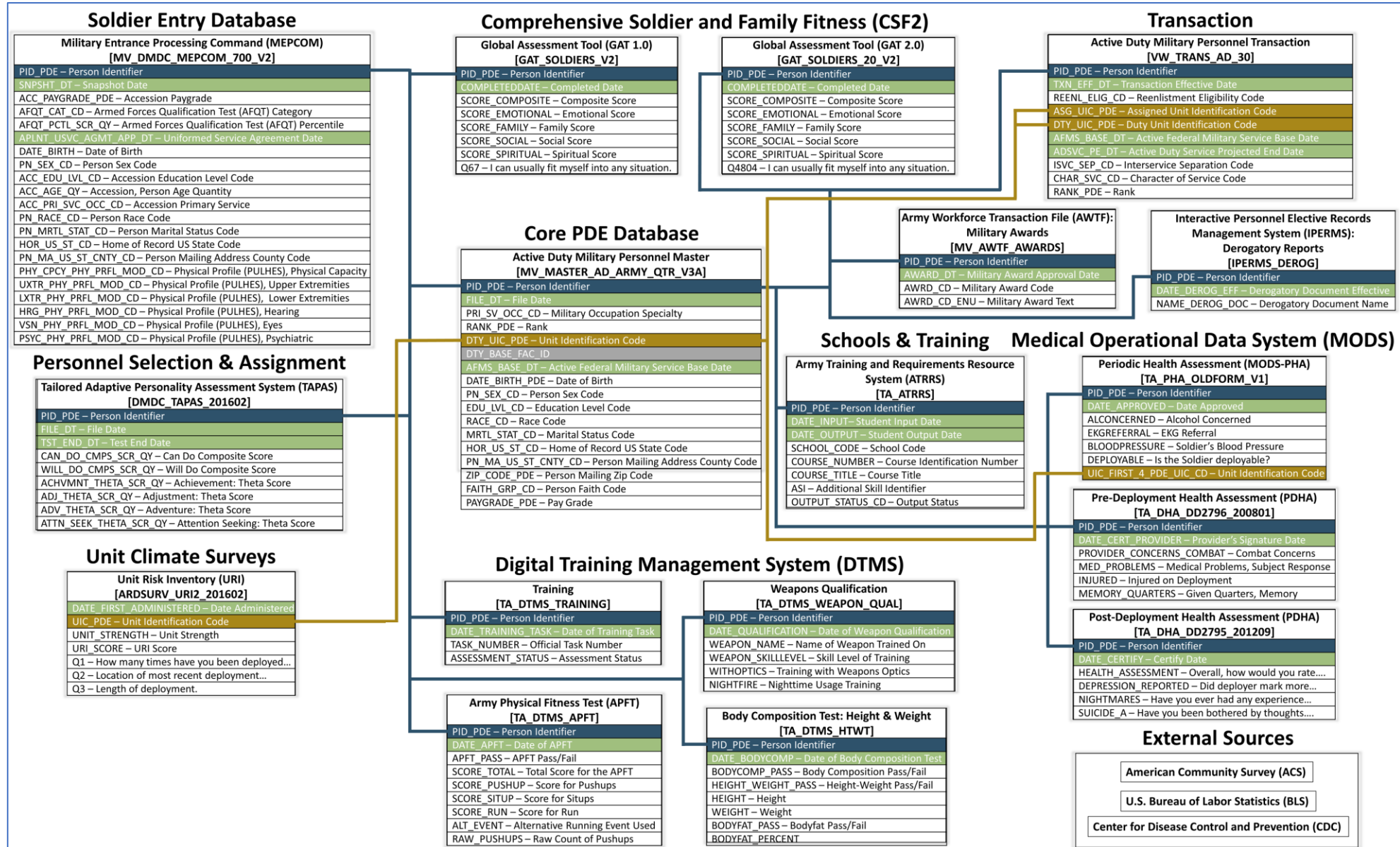
Data Source Map and Linkages
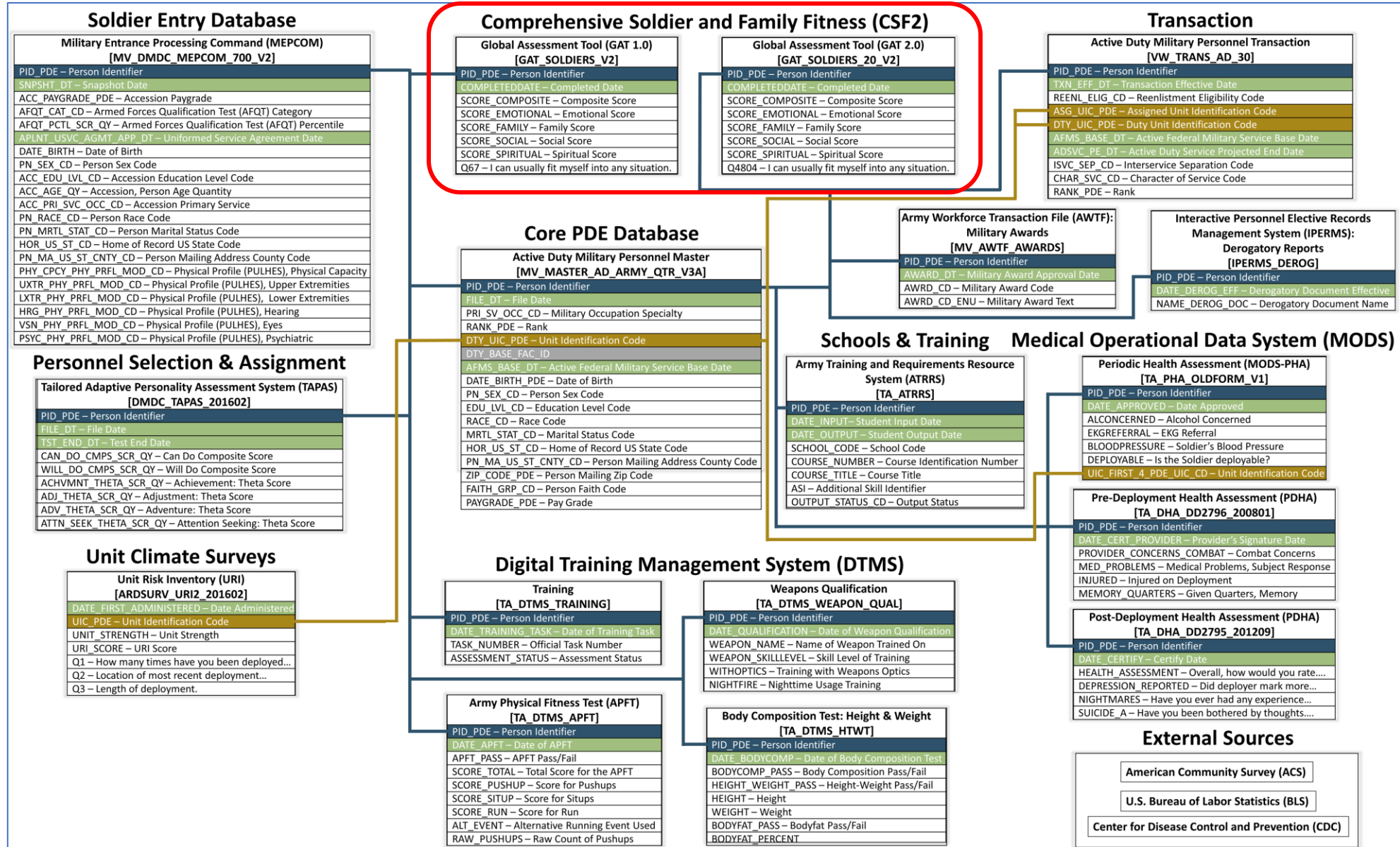
Data Source Coverage & Linkability

Data Source Coverage & Linkability
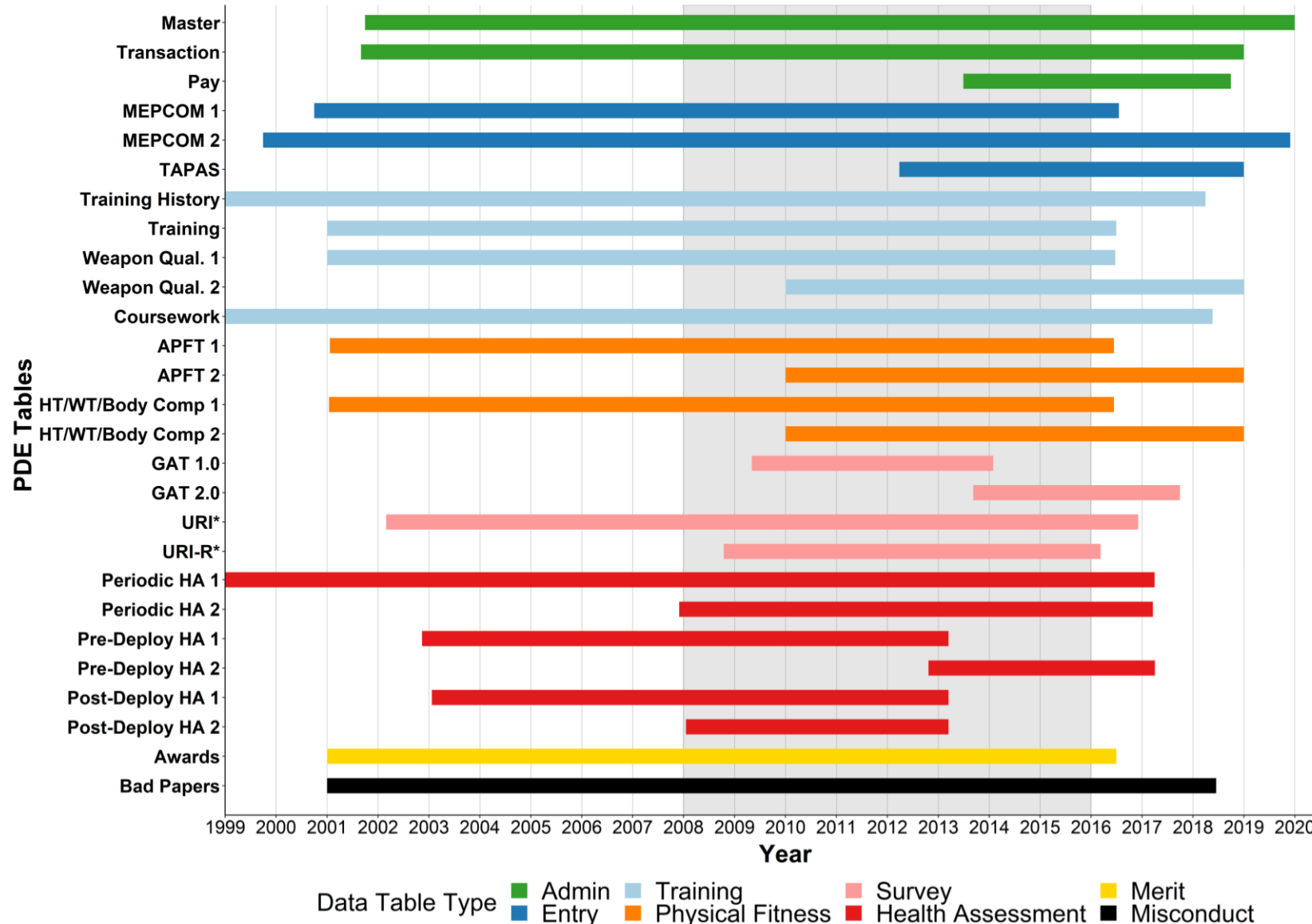
Grey Area –
Time frame of study

Comprehensive Soldier and Family Fitness (CSF2)

- **Background:** In 2008, the high operational tempo of engagements in Iraq and Afghanistan was exceptionally stressful to Soldiers and was contributing to alarming rates of suicide and post-traumatic stress.

- **Program Components**:

  — **Online self-assessment of resiliency in areas of Emotional, Social, Family, and Spiritual Fitness (Global Assessment Tool: GAT)**

  — Self-development modules to help build resiliency skills

  — Training of master resilience trainers for units

  — Introduction of resiliency training at every major leader development school in the Army

The Global Assessment Tool (GAT)

Developed by a committee of experts from the Army, academia, and the private sector, the GAT was designed to serve as the conduit for self-assessment of resilience-related characteristics.

Administration:

- Constellation of measures to assess 'psychosocial' function in the areas of Emotional fitness, Social Fitness, Family Fitness, Spiritual Fitness and Physical Fitness

- Taken online annually by Active Duty Soldiers (optional for Army Civilians and Army Families)

- Designed to be completed in 15 minutes or less

Official U.S. Army:
https://www.army.mil/article/51516/millionth_soldier_takes_the_global_assessment_tool

The Global Assessment Tool (GAT)

A Constellation of Psychosocial Measures

Emotional Fitness
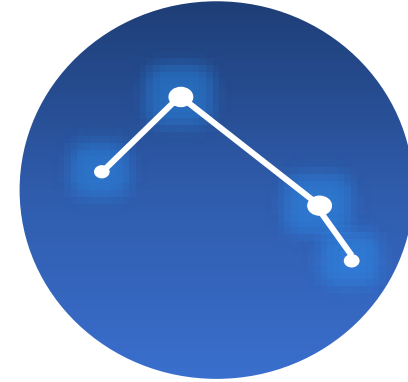
Social Fitness

Physical Fitness
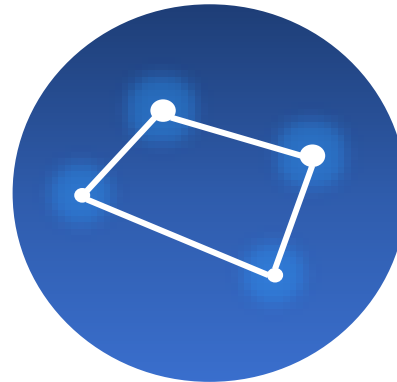
Family Fitness

Spiritual Fitness
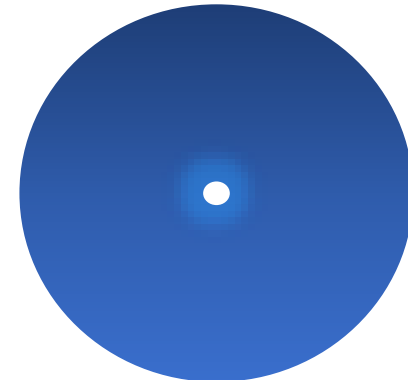
Now called:
The Azimuth Check

Equipping Soldiers with information about current levels of resilience and wellbeing to promote self-awareness and development.

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The Global Assessment Tool (GAT)
A Constellation of Psychosocial Measures

EMOTIONAL FITNESS

9 Measures

Character (24|18 Items)

Depression (10|10 Items)

Adaptability (3|3 Items)

Positive Affect (10|9 Items)

Optimism (4|4 Items)

Catastrophizing (7|3 Items)

Active Coping (5|5 Items)

Negative Affect (11|9 Items)

Passive Coping (3|3 Items)

(# Items for GAT Version 1.0 | # Items for GAT Version 2.0)
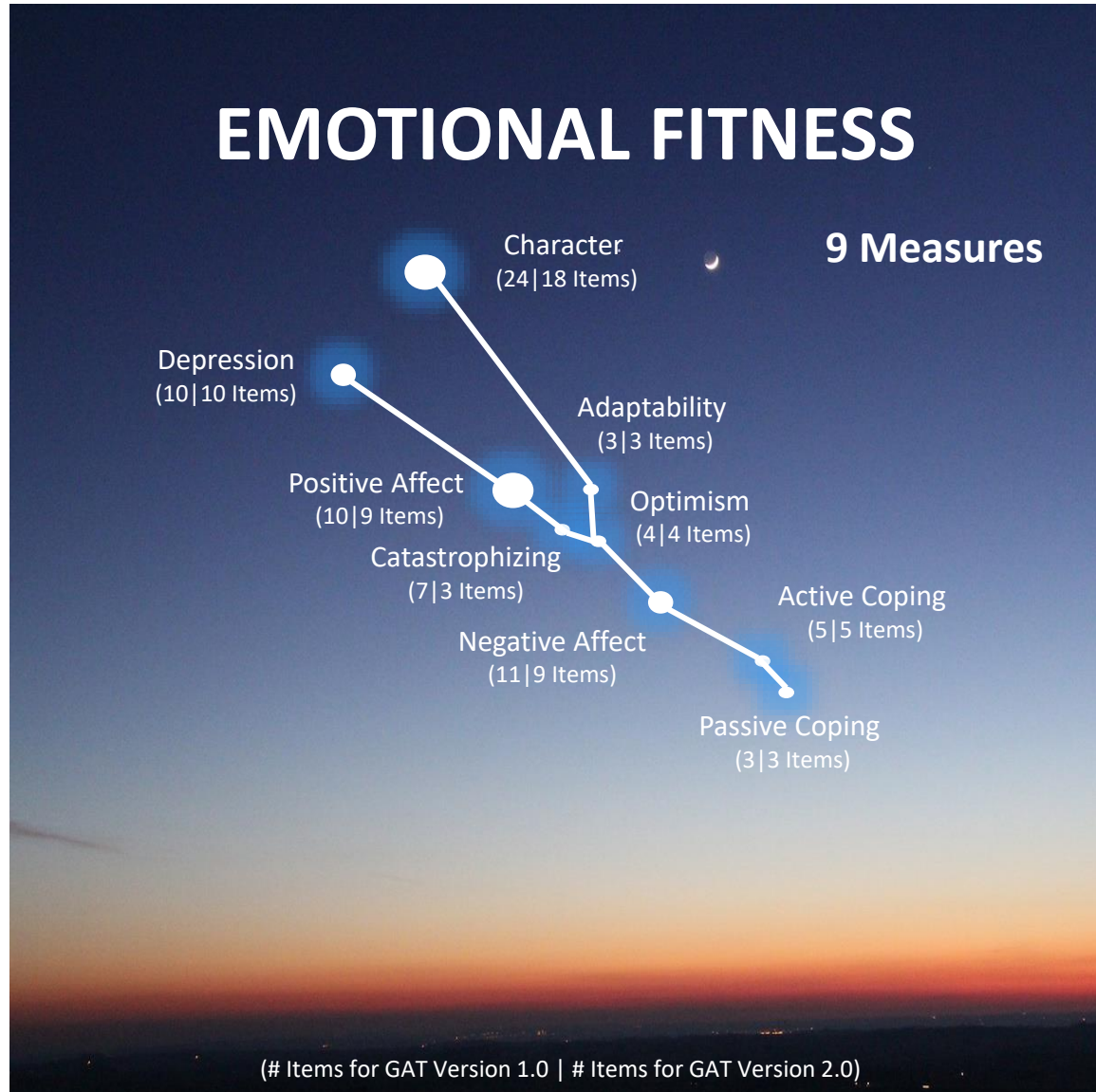
Adaptability: Ability to alter one's course and perceived cognitive flexibility.

Active Coping: Strategies that involve planning or taking directed action.

Passive Coping: Strategies that involve venting or displacement and disengagement.

Character: Character strengths within the virtues of wisdom, courage, humanity, justice, temperance, and transcendence.

Catastrophizing: Internal explanatory style of attributions towards negative events.

Depression: Prevalence of depressive symptoms of feeling down, depressed, or hopeless.

Optimism: Generalized expectation for positive future events.

Positive Affect: Subjective feelings of positive affect.

Negative Affect: Subjective feelings of negative affect.

The Global Assessment Tool (GAT)
A Constellation of Psychosocial Measures

FAMILY FITNESS

2 Measures

Family Satisfaction[†]
(2|2 Items)

Family Support[†]
(3|3 Items)

(# Items for GAT Version 1.0 | # Items for GAT Version 2.0)
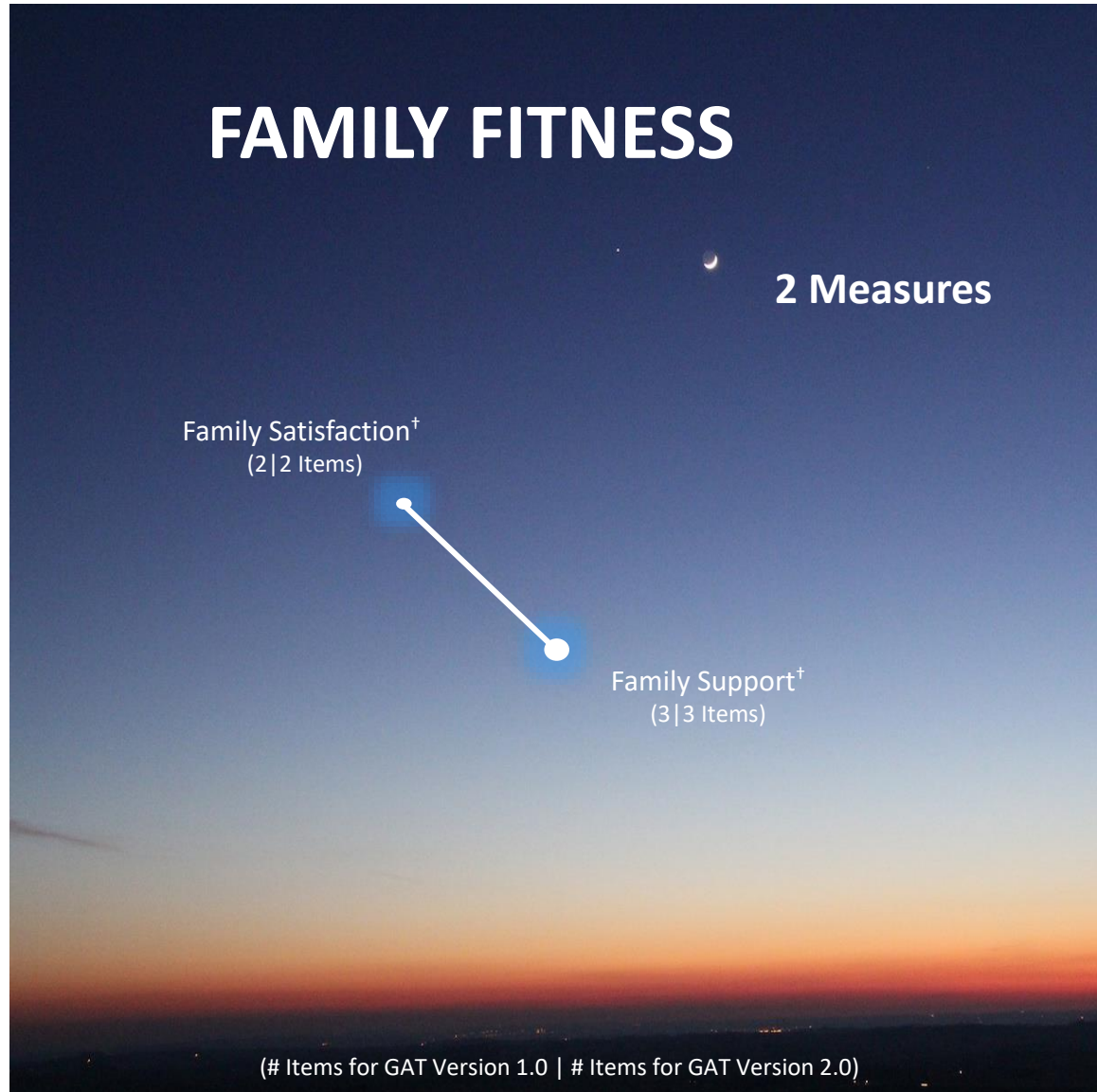
Family Satisfaction[†]:   Satisfaction with family and romantic relationships.

Family Support[†]:   Perception that family supports one's service and that the Army supports one's family.

† = Not analyzed in current study due to conditional nature of questions requiring that Soldiers have a family.

The Global Assessment Tool (GAT)
A Constellation of Psychosocial Measures

SOCIAL FITNESS

4 Measures

Organizational Trust
(5|4 Items)

Work Engagement
(4|4 Items)

Friendship[†]
(6|4 Items)

Loneliness
(3|3 Items)

(# Items for GAT Version 1.0 | # Items for GAT Version 2.0)

Friendship[†]: Degree to which there are people for whom one can depend on for support when needed.

Loneliness: Feelings of being alone and separated from others.

Organizational Trust: Trust in the organization in terms of ability, benevolence, and integrity.

Work Engagement: Satisfaction and commitment to work.

† = Not analyzed in current study due to conditional nature of questions requiring that Soldiers have a friend.

The Global Assessment Tool (GAT)
A Constellation of Psychosocial Measures

SPIRITUAL FITNESS

1 Measure

Life Meaning
(5|5 Items)
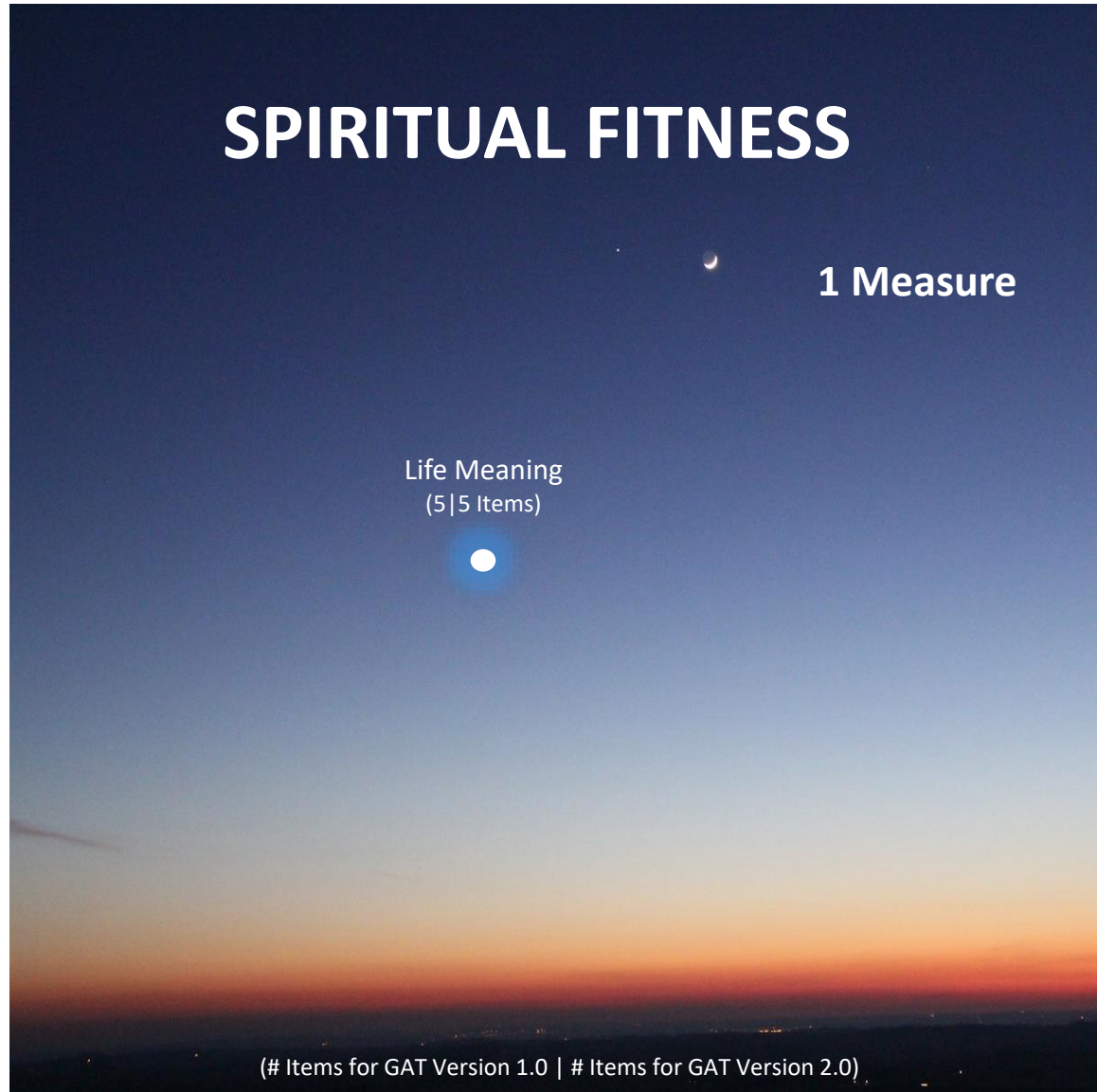
Life Meaning: Sense of purpose and meaning to life and work.

(# Items for GAT Version 1.0 | # Items for GAT Version 2.0)

The Global Assessment Tool (GAT)
A Constellation of Psychosocial Measures

PHYSICAL FITNESS

4 Measures

Lifestyle Behaviors[†]
(0|25 Items)

Nutrition[†]
(0|19 Items)

Risk Factors[†]
(0|18 Items)

Physical Activity[†]
(0|12 Items)
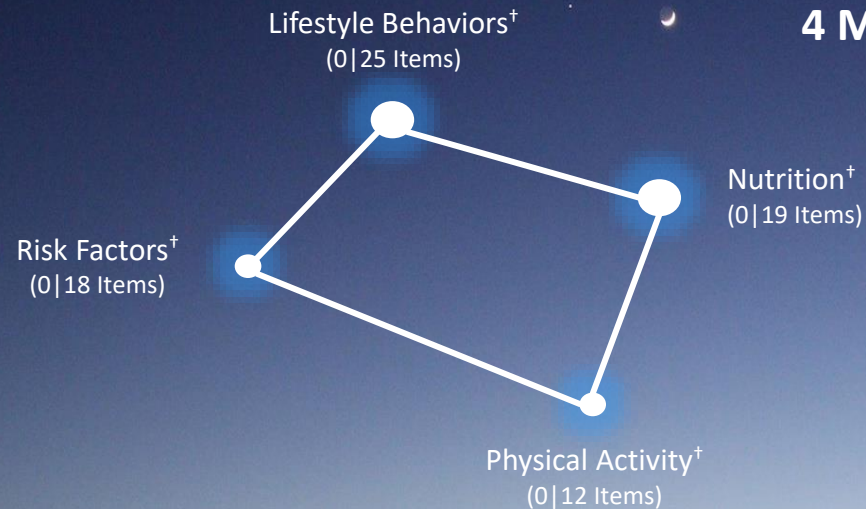
(# Items for GAT Version 1.0 | # Items for GAT Version 2.0)

Physical Activity[†]: Degree and types of physical activity.

Nutrition[†]: Food intake and use of nutritional supplements.

Lifestyle Behaviors[†]: Sleep habits, alcohol consumption, and tobacco use.

Risk Factors[†]: Family history of health problems and willingness to engage in risky behavior.

† = Not analyzed in current study due to disparate items not being conducive to sharing the same measurement scale.

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Prior Research with the GAT

Focused on a single point in time

Found to be internally-consistent, structurally-sound, and invariant to sub-populations

Predictive of important Army outcomes:

- First-Term attrition
- Dishonorable discharge
- Increased rates of suicide and violent offenses
- Likelihood of reenlistment
- Membership into elite occupational roles like the Army Rangers

Vie et al. 2016
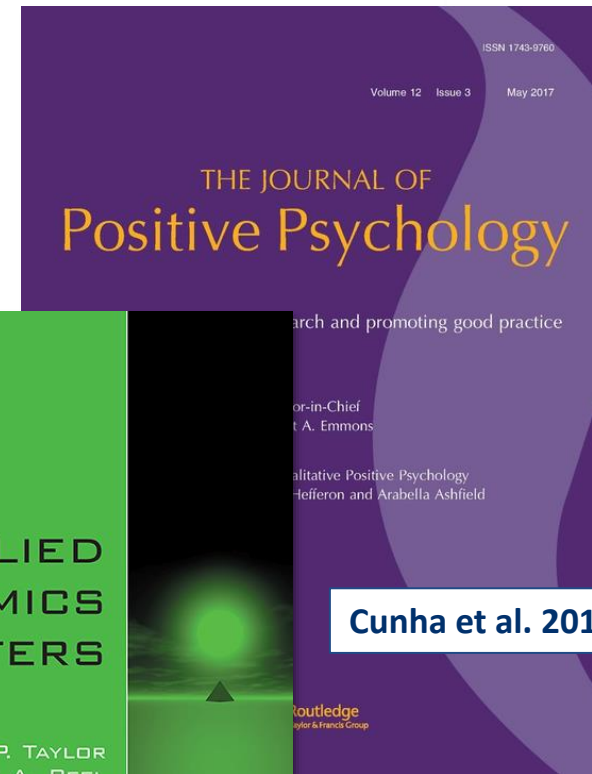
Cunha et al. 2015
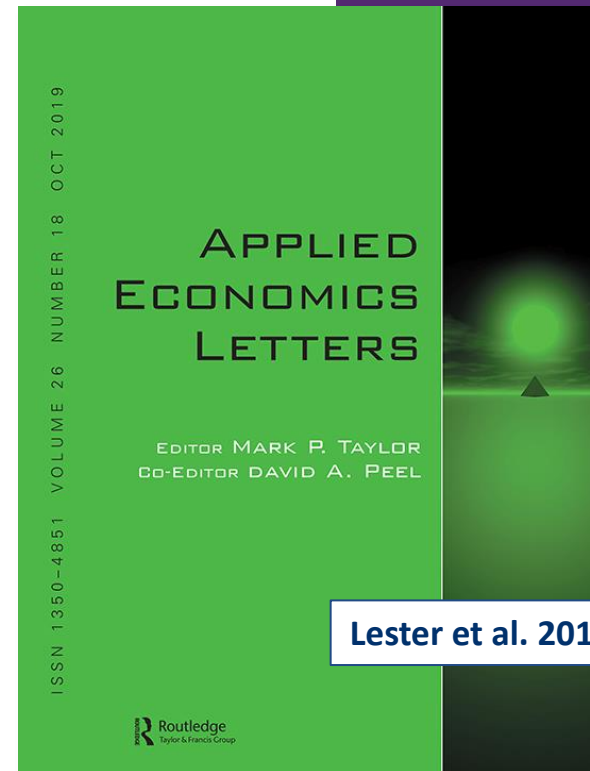
Lester et al. 2015

Shingleton et al. 2015

Impetus of Current Research

Our aim was to **use administrative data** to model Soldier performance.

- The GAT is an administrative data source of interest for predicting performance

- The GAT measured at multiple time points during a Soldiers career (i.e., annually)

- No prior research examining the longitudinal stability of GAT measures

- To inform how to model GAT measures (i.e., treating measures as stable traits using single time point or as time-varying state-like covariates), we tested the longitudinal stability of all measures

Research Questions

Do means of the GAT measures **change across time** for respondents?

Do the GAT measures show **measurement invariance** across time?

- Do measures have similar factor structure, loadings, and item intercepts across time occasions?

Sgt. 1st Class Joseph Rombold (left), Spc. William Ritter (right)
Official U.S. Army Flickr:
https://www.flickr.com/photos/soldiersmediacenter/39073214885/

Data Source Map and Linkages
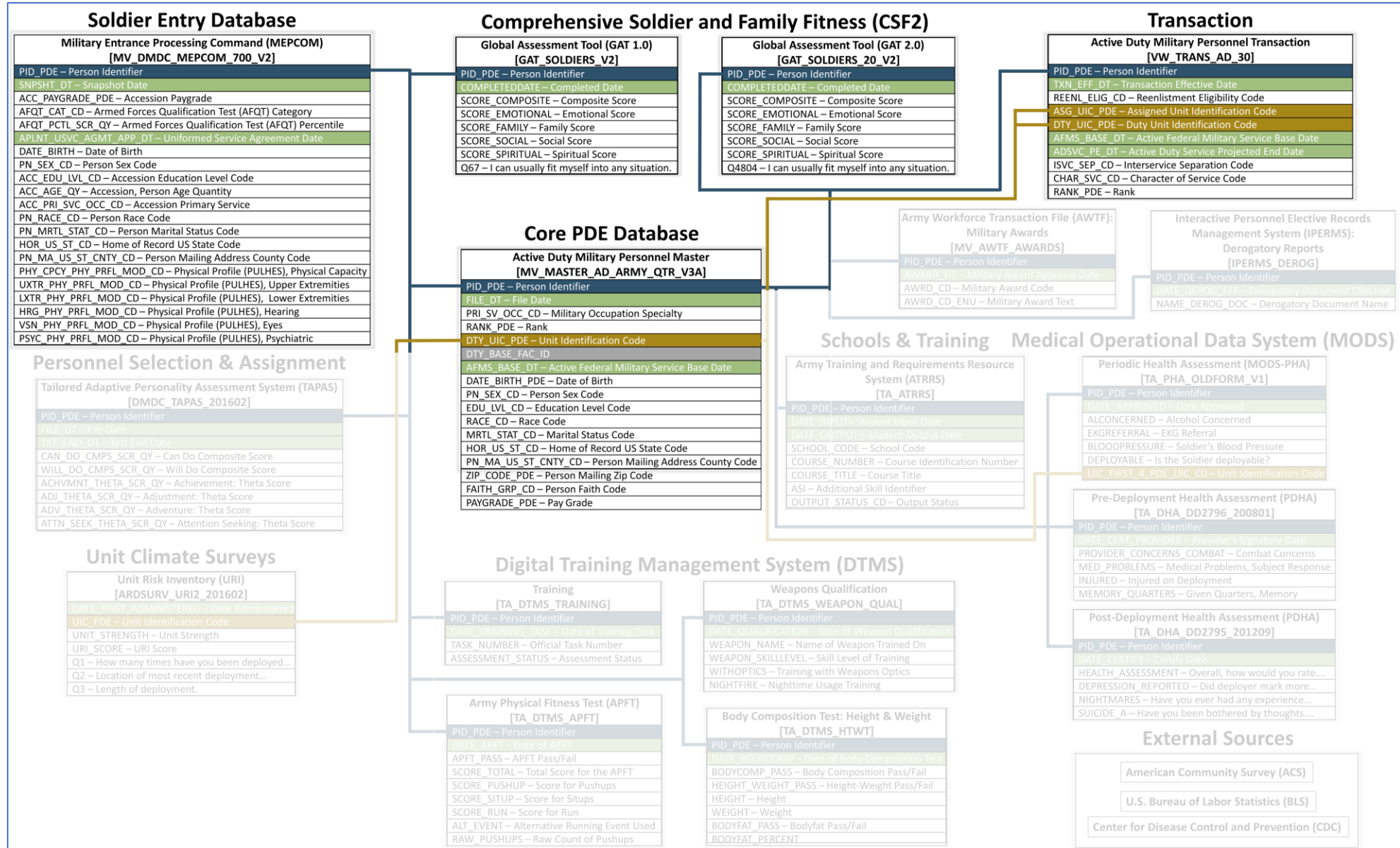
Data Sources Used

Data Source Table

Master File
(MV_MASTER_AD_ARMY_QTR_V3A)

Soldier Entry File
(MEPCOM_USAREC_RA_ANALYST)

GAT 1.0
(GAT_SOLDIERS_V2)

GAT 2.0
(GAT_SOLDIERS_20_V2)

2009 2010 2011 2012 2013 2014 2015 2016 2017 2018
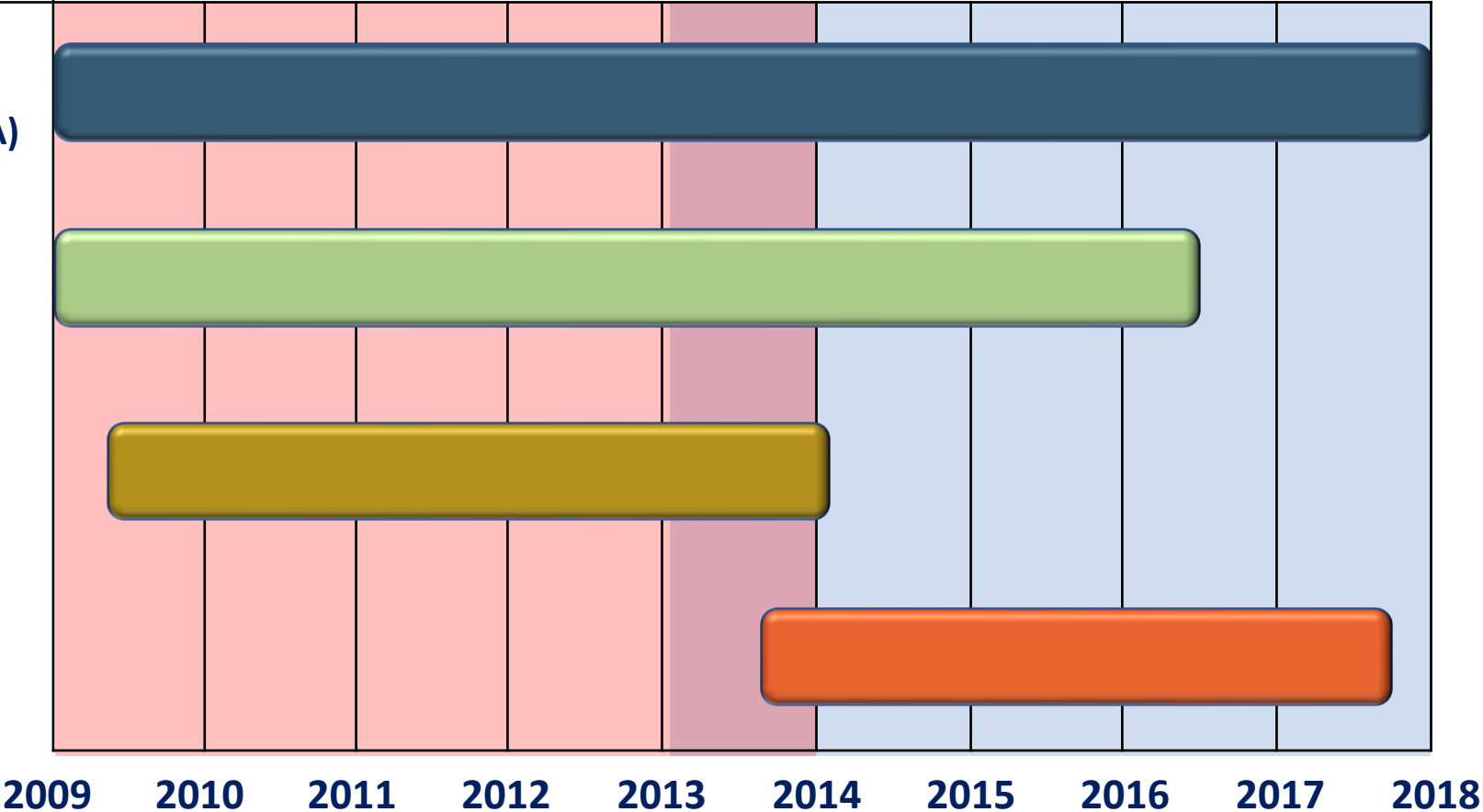
Red Shading is Study 1 Sample
Blue Shading is Study 2 Sample

Sample Overview

Two Studies:

- Study 1 (GAT 1.0)
- Study 2 (GAT 2.0)

Sample Selection Criteria:

Respondent must have

- Enlisted as Active Duty Soldier
- Joined the Army (accessed) in 2009–2014 (Study 1) or in 2013–2017 (Study 2); Average accessions per year for Army Active Duty ~ 80K (~ 74K Enlisted)
- Consented to have GAT data used for research
- At least 2 measured time occasions; took first 5 occasions
- Study 2 sample was independent from Study 1

Sample Size Distributions

		GAT 1.0 (Study 1)	GAT 2.0 (Study 2)	Non-Consenters
Study Sample		95,277	57,771	179,009
Time Occasion Completions	T1	95,277	57,771	—
	T2	95,277	57,771	—
	T3	53,894	19,194	—
	T4	23,274	4,722	—
	T5	4,968	679	—
Time Occasion Characteristics	M_{Diff} (SD)	414.18 (152.01)	398.79 (154.04)	—
	M_{Age} (SD)	23.34 (4.80)	22.46 (3.62)	22.03 (3.73)
MOS Type (%)	Combat Arms	32.15	28.41	38.99
	Combat Support	29.96	29.33	25.88
	Combat Service Support	38.43	38.18	35.13
Gender (%)	Male	84.43	84.03	83.44
	Female	15.57	15.97	16.56
Race & Ethnicity (%)	Caucasian	59.48	51.90	59.47
	African-American	18.44	23.38	18.90
	Hispanic	12.95	16.71	13.90
	Asian	3.10	6.60	3.93
	Native Hawaiian	0.92	0.17	0.55
	Native Indian	0.68	0.67	0.78
	Other	4.39	0.56	2.47

'Triangulating Trends' A Multi-Method Approach

Repeated Measures ANOVA (RM-ANOVA)

- Scale-level composite
- Requires 5 fully-complete time points

Repeated Measures SEM (RM-SEM)

- Scale-level composite
- FIML for missing data

Statistical Trends

- Item-level to latent factors
- FIML for missing data

- Scale-level composite
- Continuous time metric
- Random effects

Measurement Invariance (MI) & Repeated Measures CFA (RM-CFA)

Repeated Measures MLM (RM-MLM)

Descriptive Analysis of Scales

Across all five time occasions:

- Scales close to normal distributions with little skew or kurtosis
  - skew range (−1.23 to 1.96); kurtosis$_{excess}$ (−0.49 to 4.39)

- Scales have good reliability:
  - ω_{Totals} > 0.70; only Adaptability had a range from 0.69 to 0.74

- Scales only have small violations of sphericity
  - Greenhouse-Geisser epsilon (ε) range (0.89 to 0.99)

- Scales have good factor structure
  - First time point only: CFIs (0.83 to 0.99), SRMRs (0.01 to 0.07)
  - All time points: CFIs (0.83 to 0.98), SRMRs (0.06 to 0.14)

Note. ω_{Totals} = Omega Total; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual

Means for Five Time Occasions
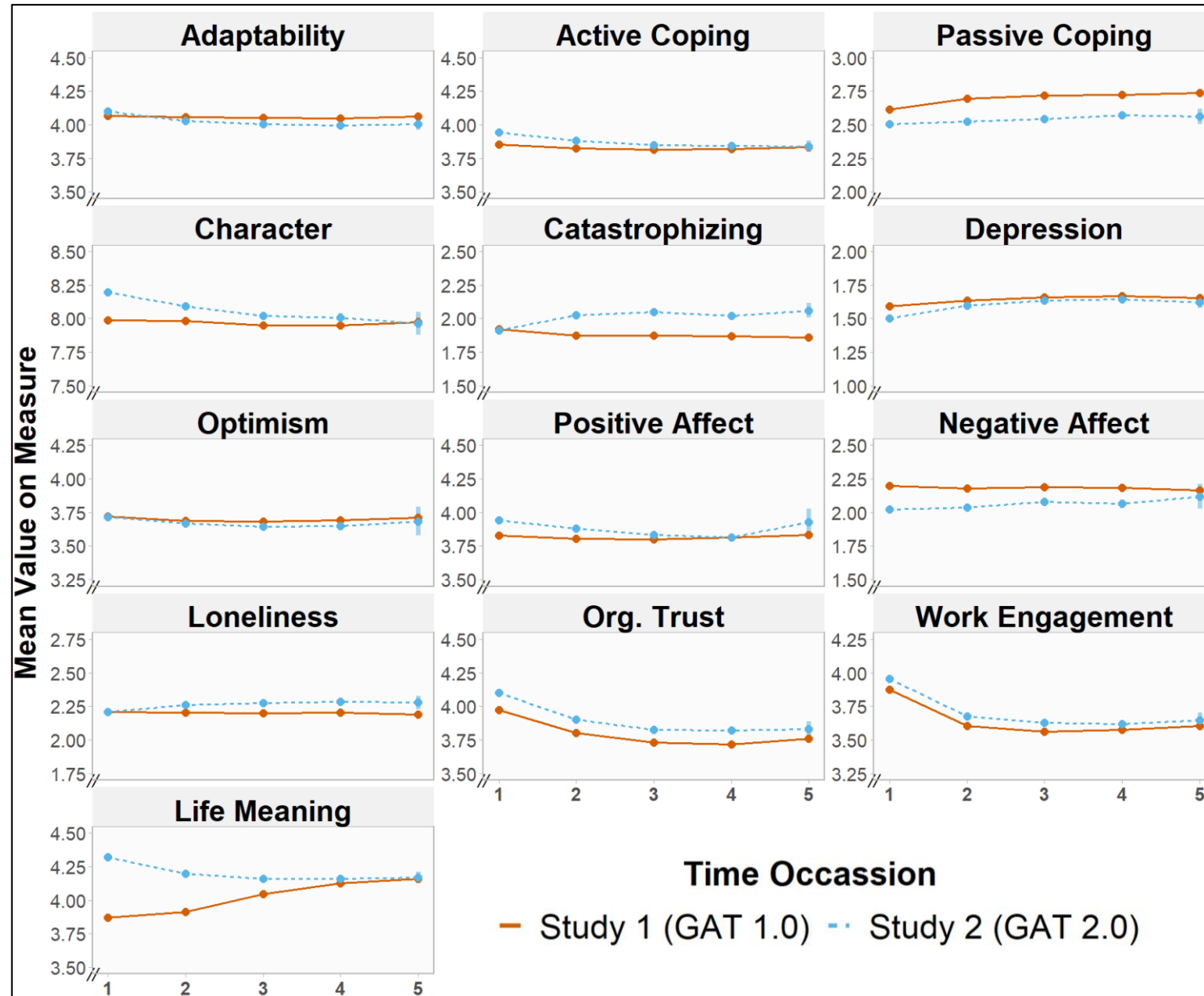
Effect Sizes Across GAT Measures

Study 1 – GAT 1.0
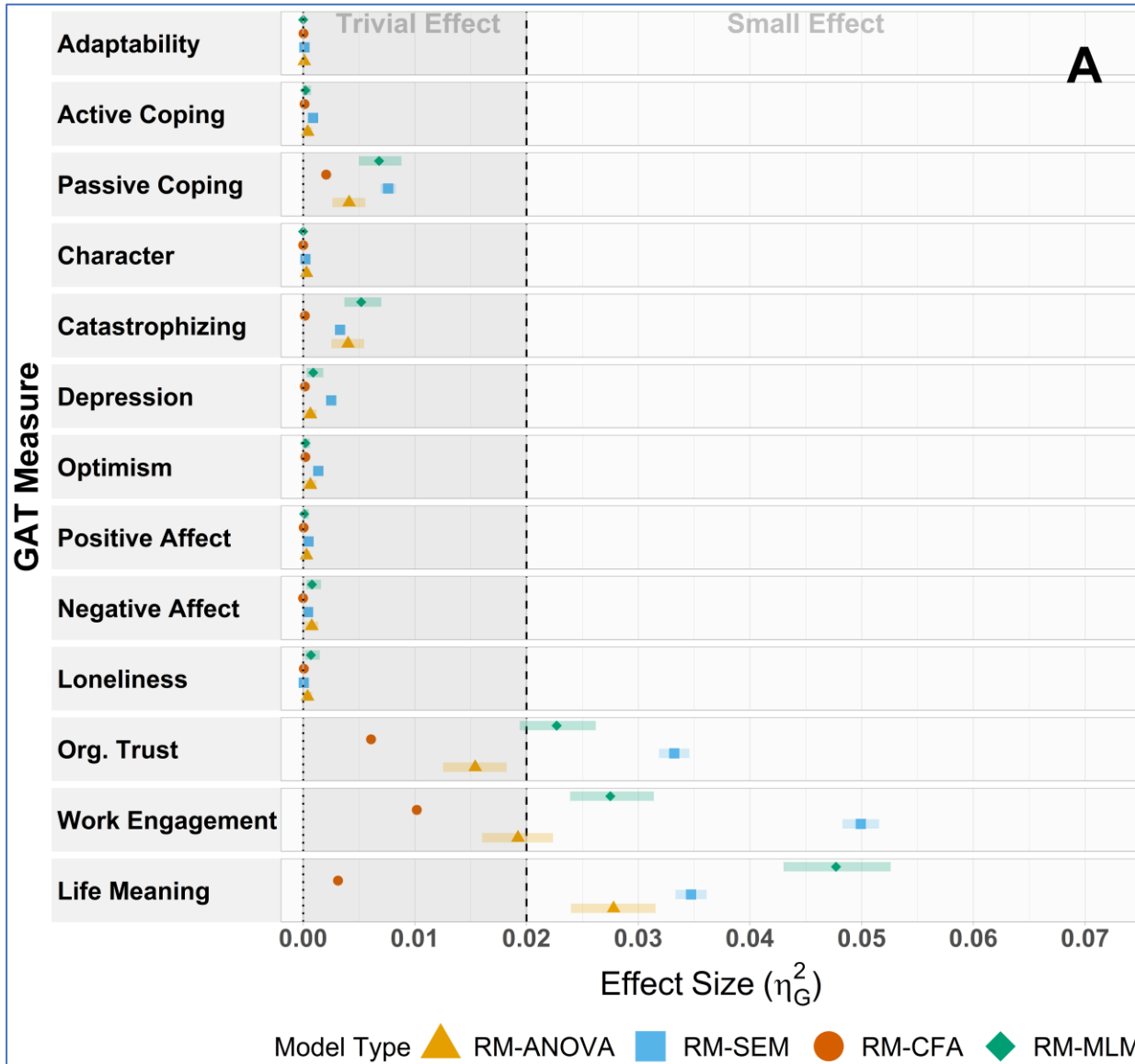
Study 2 – GAT 2.0
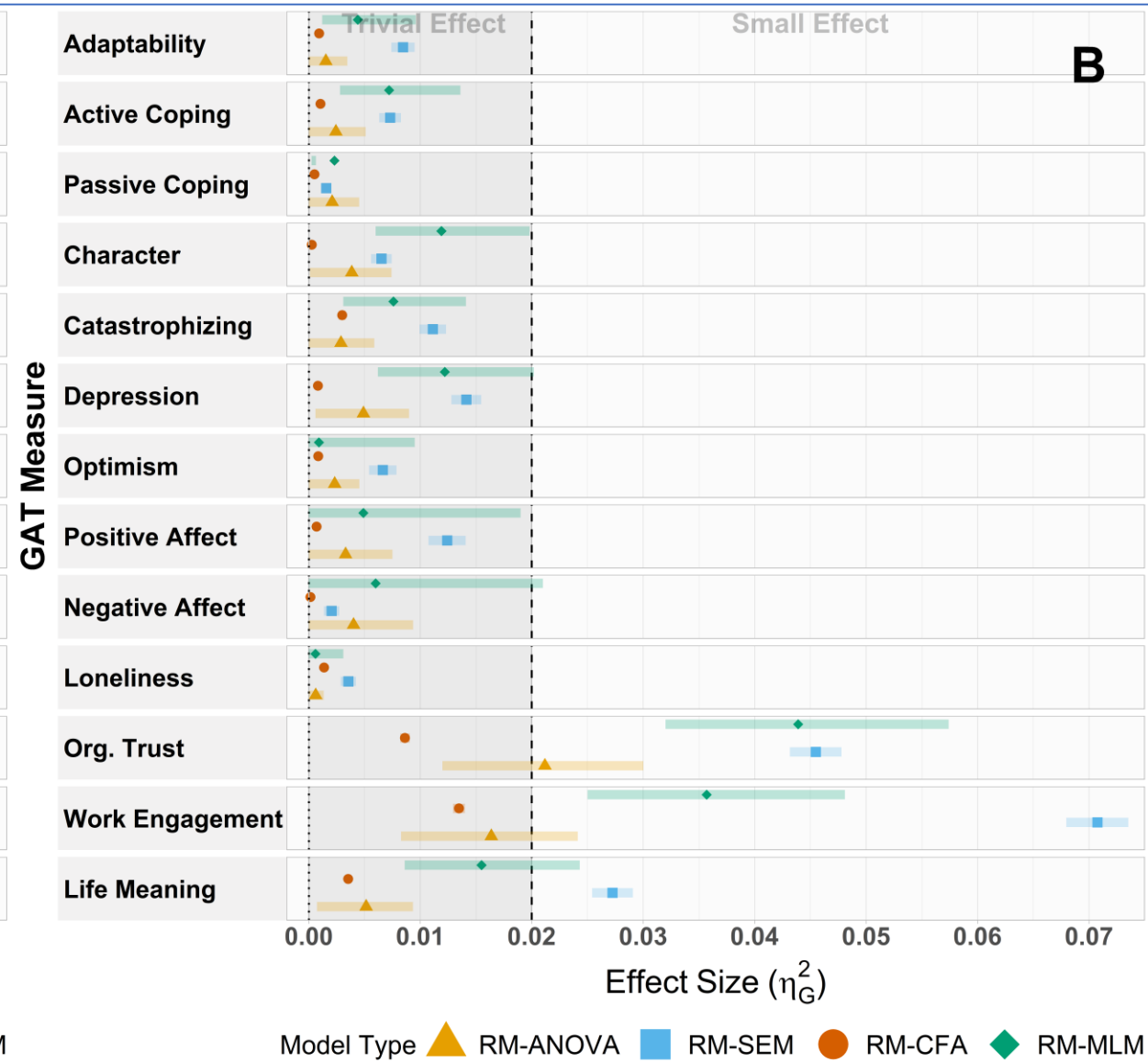
Key Findings and Conclusions

The measures on the GAT are relatively stable over time.

- Exceptions: *Life Meaning, Organizational Trust*, and *Work Engagement*

Measurement invariance held across time for all measures.

For analysts:

- Most GAT measures could be treated like trait measures

- A single time point (i.e., first occasion) used in modeling vs. time-varying variables

U.S. Army 1st Lt. Shaun Lawson, Cpl. Marvin Carson, and Sgt. John Delgado
Official U.S. Army Flickr:
https://www.flickr.com/photos/soldiersmediacenter/39201509615/

Conclusions and Next Steps

Findings **provide clarity on how to model the GAT** measures
in our larger performance modeling effort going forward.

Considerations for future GAT development and administration:

- Use current GAT measures as a single time point tool

- Focus on modifying or generating new items to be more sensitive to changes in time and states

Future analyses of the GAT:

- Focus on first measure time point

- Examine Differences by Groups including Rank Group (Officers vs. Enlisted), Soldier Race, Soldier Sex, Military Occupational Specialty

- Examine if shock events affect GAT measures such as after deployments, after change in marital status, or birth of a child

Developing Predictive Models of U.S. Army Career Pathways

Problem: Critical gap in Army capabilities to manage talent over Soldiers' career lifecycles. Army needs an integrated means to measure talent management.

Completed Research:

- Analysis of Burning Glass Technologies veterans resumes
  - Literature review on the military to civilian career transition with an emphasis on skills
- Develop career pathways modeling framework, extend existing methods
- Refine modeling approach via qualitative analysis
- Application to DoD data in the PDE

Next Steps:

- Assess how these models can enhance and supplement existing Army tools

BACKUP SLIDES

Model Assessments of Fit

- Measure fit of the model specified
  - Absolute: Proportions of the covariances in the sample data matrix explained by the model
  - Comparative: Indicate the relative improvement in fit of the model compared with a statistical baseline mode

Measure	Name	Type	Description	Cut-off for Good Fit
χ^2	Model Chi-square	Absolute	Assess overall fit and the discrepancy between the sample and fitted covariance matrices. Sensitive to sample size. H_0: The model fits perfectly.	p-value > 0.05
TLI	Tucker Lewis index	Comparative	An NFI of .95, indicates the model of interest improves the fit by 95% relative to the null model. NNFI is preferable for smaller samples. Sometimes the NNFI is called the Tucker Lewis index (TLI)	TLI ≥ 0.95
CFI	Comparative Fit Index	Comparative	A revised form of NFI. Not very sensitive to sample size. Compares the fit of a target model to the fit of an independent, or null, model.	CFI ≥ 0.90
RMSEA	Root Mean Square Error of Approximation	Absolute	A parsimony-adjusted index. Values closer to 0 represent a good fit.	RMSEA < 0.08
(S)RMR	(Standardized) Root Mean Square Residual	Absolute	The square-root of the difference between the residuals of the sample covariance matrix and the hypothesized model. If items vary in range (i.e. some items are 1-5, others 1-7) then RMR is hard to interpret, better to use SRMR.	SRMR < 0.08

GAT Sample Items and Sources

Component	Component Measures	Sample Item	Source
Emotional Fitness			
	Adaptability	"I am good at changing myself to adjust to changes in my life." [a]	Inspired by prior research (Martin & Rubin, 1995)
	Active Coping (Problem-Focused)	"When something stresses me out, I try to solve the problem." [a]	Adapted from Brief COPE (Carver, 1997; Carver et al., 1989)
	Passive Coping (Emotion-Focused)	"I usually keep my emotions to myself." (reverse-coded) [a]	Adapted from Brief COPE (Carver, 1997; Carver et al., 1989)
	Character	"Critical thinking." [b]	Adapted from Character Strengths Test (Peterson, 2007; Peterson & Seligman, 2004)
	Catastrophizing	"When bad things happen to me, I expect more bad things to happen." [a]	Adapted from the Attributional Style Questionnaire (Peterson et al., 1982; Peterson et al., 2001)
	Depression	"Feeling down, depressed, or hopeless." [c]	Adapted from the Patient Health Questionnaire (Kroenke et al., 2001; Spitzer et al., 1999)
	Optimism	"In uncertain times, I usually expect the best." [d]	From the Life Orientation Test (Scheier & Carver, 1985; Scheier et al., 1994)
	Positive Affect	"Inspired." [e]	From PANAS-X (Watson & Clark, 1999; Watson et al., 1988)
	Negative Affect	"Upset." [e]	From PANAS-X (Watson & Clark, 1999; Watson et al., 1988)
Family Fitness			
	Family Satisfaction [‡]	"How satisfied are you with your family?" [f]	Directorate of Basic Combat Training's Experimentation and Analysis Element, Fort Jackson
	Family Support [‡]	"My family supports my decision to serve in the Army." [d]	Directorate of Basic Combat Training's Experimentation and Analysis Element, Fort Jackson
Social Fitness			
	Friendship [‡]	"I have someone to talk to when I feel down." [g]	Original items
	Loneliness	"How often do you feel left out?" [e]	Adapted from the UCLA Loneliness Scale (Russell et al., 1978)
	Organizational Trust	"I trust my fellow Soldiers in my unit to look out for my welfare and safety." [d]	Inspired by prior research (Mayer & Davis, 1999; Mayer et al., 1995; Sweeney et al., 2009)
	Work Engagement	"My work is one of the most important things in my life." [a]	Adapted from the Work as a Calling Scale (Wrzesniewski et al., 1997) and the Orientations to Happiness Scale (Peterson et al., 2005)
Spiritual Fitness			
	Life Meaning	"I believe there is a purpose for my life." [a]	Adapted from the Brief Multidimensional Measure of Religiousness/Spirituality (Fetzer Institute, 1999) and Purpose in Life Scale (Crumbaugh, 1968)
Physical Fitness			
	Physical Activity [‡]	"How many days per week did you perform the vigorous activity in the last 30 days?" [g]	Various DOD questionnaires
	Nutrition [‡]	"Do you take dietary supplements?" [g]	Various DOD questionnaires
	Lifestyle Behaviors [‡]	"How would you rate your satisfaction with your sleep?" [g]	Various DOD questionnaires
	Risk Factors [‡]	"How often do you text while driving?" [g]	Various DOD questionnaires

Study 1: Descriptive Statistics

Table S1. *Scale-level pairwise correlation matrices, descriptive statistics, and reliabilities GAT 1.0 measures across time occasions*

Measure		T1	T2	T3	T4	T5	No. of Items	n	M	95% CI$_M$	SD	ω_{Total}	95% CI ω_{Total}
Adaptability	T1	—					3	95,274	4.06	[4.06, 4.06]	0.74	.721	[.717, .725]
	T2	.421	—				3	95,261	4.05	[4.04, 4.05]	0.77	.722	[.718, .726]
	T3	.379	.482	—			3	53,890	4.06	[4.06, 4.07]	0.78	.729	[.724, .735]
	T4	.348	.424	.495	—		3	23,266	4.07	[4.06, 4.08]	0.78	.729	[.721, .736]
	T5	.349	.411	.455	.524	—	3	4,967	4.09	[4.07, 4.11]	0.77	.726	[.709, .743]
Active Coping	T1	—					5	95,272	3.85	[3.84, 3.85]	0.71	.753	[.750, .756]
	T2	.429	—				5	95,261	3.82	[3.81, 3.82]	0.79	.825	[.822, .827]
	T3	.383	.498	—			5	53,890	3.82	[3.82, 3.83]	0.80	.839	[.836, .841]
	T4	.358	.446	.529	—		5	23,266	3.84	[3.83, 3.85]	0.81	.851	[.847, .855]
	T5	.362	.429	.500	.547	—	5	4,967	3.87	[3.84, 3.89]	0.80	.857	[.849, .865]
Passive Coping	T1	—					3	95,272	2.60	[2.60, 2.61]	0.92	.703	[.699, .706]
	T2	.373	—				3	95,261	2.68	[2.68, 2.69]	0.96	.739	[.736, .742]
	T3	.344	.414	—			3	53,890	2.74	[2.73, 2.75]	0.97	.747	[.743, .751]
	T4	.335	.369	.436	—		3	23,266	2.77	[2.75, 2.78]	0.98	.753	[.747, .759]
	T5	.321	.365	.415	.452	—	3	4,967	2.80	[2.77, 2.82]	1.00	.757	[.744, .771]
Character	T1	—					24	95,273	7.98	[7.97, 7.99]	1.37	.952	[.951, .952]
	T2	.434	—				24	95,258	7.97	[7.96, 7.98]	1.60	.971	[.970, .971]
	T3	.378	.510	—			24	53,884	7.96	[7.95, 7.98]	1.66	.974	[.974, .975]
	T4	.352	.443	.543	—		24	23,267	7.99	[7.96, 8.01]	1.69	.977	[.977, .978]
	T5	.338	.428	.484	.571	—	24	4,966	8.02	[7.97, 8.06]	1.70	.978	[.977, .980]
Catastrophizing	T1	—					7	95,274	1.93	[1.93, 1.93]	0.73	.833	[.831, .835]
	T2	.394	—				7	95,263	1.88	[1.87, 1.88]	0.80	.877	[.875, .878]
	T3	.366	.452	—			7	53,890	1.86	[1.85, 1.87]	0.81	.887	[.885, .889]
	T4	.345	.414	.492	—		7	23,269	1.85	[1.83, 1.86]	0.82	.894	[.891, .897]
	T5	.330	.399	.446	.490	—	7	4,968	1.84	[1.81, 1.86]	0.84	.904	[.899, .910]
Depression	T1	—					10	95,273	1.60	[1.60, 1.61]	0.72	.911	[.909, .912]
	T2	.356	—				10	95,267	1.65	[1.64, 1.65]	0.81	.935	[.934, .936]
	T3	.303	.439	—			10	53,893	1.64	[1.64, 1.65]	0.80	.935	[.933, .936]
	T4	.272	.386	.481	—		10	23,270	1.64	[1.63, 1.65]	0.81	.937	[.935, .939]
	T5	.267	.358	.412	.482	—	10	4,967	1.63	[1.61, 1.66]	0.81	.940	[.936, .944]
Optimism	T1	—					4	95,273	3.71	[3.71, 3.72]	0.79	.711	[.707, .714]
	T2	.467	—				4	95,263	3.68	[3.67, 3.68]	0.80	.764	[.761, .767]
	T3	.429	.541	—			4	53,890	3.70	[3.69, 3.70]	0.81	.772	[.768, .776]
	T4	.410	.493	.573	—		4	23,269	3.73	[3.72, 3.74]	0.82	.777	[.771, .784]
	T5	.413	.478	.534	.604	—	4	4,968	3.74	[3.72, 3.77]	0.83	.783	[.769, .797]

Note. GAT = Global Assessment Tool. All bivariate correlations, *p*s < .001; *n* = number of non-missing observations for a given measure and time occasion; CI = confidence interval; ω_{Total} = Omega Total;

Study 1: Descriptive Statistics (cont.)

Table S1 (continued). *Scale-level pairwise correlation matrices, descriptive statistics, and reliabilities GAT 1.0 measures across time occasions*

Measure	Time Occasion	Bivariate Correlations T1	T2	T3	T4	T5	No. of Items	Descriptive Statistics *n*	*M*	95% CI$_M$	*SD*	Reliabilities ω_{Total}	95% CI ω_{Total}
Positive Affect	T1	—					10	95,276	3.82	[3.81, 3.82]	0.77	.919	[.918, .920]
	T2	.446	—				10	95,270	3.80	[3.79, 3.80]	0.84	.945	[.945, .946]
	T3	.396	.526	—			10	53,891	3.81	[3.80, 3.82]	0.84	.949	[.948, .950]
	T4	.371	.466	.563	—		10	23,271	3.84	[3.83, 3.85]	0.85	.953	[.951, .954]
	T5	.375	.455	.513	.589	—	10	4,968	3.86	[3.84, 3.88]	0.87	.956	[.954, .958]
Negative Affect	T1	—					11	95,276	2.20	[2.20, 2.21]	0.68	.879	[.878, .881]
	T2	.397	—				11	95,270	2.19	[2.18, 2.19]	0.73	.907	[.906, .908]
	T3	.347	.473	—			11	53,891	2.18	[2.17, 2.19]	0.73	.910	[.909, .911]
	T4	.321	.423	.509	—		11	23,271	2.16	[2.15, 2.17]	0.73	.912	[.910, .914]
	T5	.316	.402	.422	.505	—	11	4,968	2.14	[2.11, 2.16]	0.74	.916	[.911, .920]
Loneliness	T1	—					3	95,273	2.21	[2.20, 2.21]	0.85	.801	[.799, .804]
	T2	.465	—				3	95,263	2.21	[2.20, 2.21]	0.90	.826	[.823, .828]
	T3	.420	.524	—			3	53,890	2.20	[2.19, 2.20]	0.91	.834	[.831, .837]
	T4	.409	.473	.552	—		3	23,269	2.20	[2.18, 2.21]	0.92	.840	[.835, .844]
	T5	.415	.469	.513	.573	—	3	4,968	2.20	[2.17, 2.22]	0.92	.837	[.827, .847]
Organizational Trust	T1	—					5	95,274	3.98	[3.97, 3.98]	0.75	.814	[.811, .817]
	T2	.308	—				5	95,265	3.81	[3.80, 3.81]	0.90	.874	[.873, .876]
	T3	.240	.373	—			5	53,889	3.72	[3.72, 3.73]	0.93	.875	[.873, .877]
	T4	.217	.306	.401	—		5	23,269	3.70	[3.69, 3.71]	0.94	.884	[.881, .887]
	T5	.202	.288	.329	.425	—	5	4,968	3.72	[3.70, 3.75]	0.94	.892	[.885, .898]
Work Engagement	T1	—					4	95,273	3.87	[3.86, 3.87]	0.88	.796	[.794, .799]
	T2	.388	—				4	95,263	3.60	[3.59, 3.60]	1.01	.842	[.840, .844]
	T3	.310	.498	—			4	53,890	3.57	[3.56, 3.58]	1.01	.843	[.840, .845]
	T4	.279	.417	.522	—		4	23,269	3.61	[3.59, 3.62]	1.00	.841	[.837, .845]
	T5	.292	.386	.476	.567	—	4	4,968	3.65	[3.62, 3.67]	1.00	.847	[.838, .855]
Life Meaning	T1	—					5	95,272	3.87	[3.86, 3.88]	0.86	.795	[.793, .798]
	T2	.501	—				5	95,261	3.91	[3.91, 3.92]	0.92	.837	[.835, .839]
	T3	.402	.523	—			5	53,890	4.04	[4.03, 4.05]	0.88	.849	[.846, .852]
	T4	.374	.462	.557	—		5	23,266	4.13	[4.12, 4.14]	0.86	.866	[.862, .870]
	T5	.359	.438	.517	.577	—	5	4,967	4.15	[4.13, 4.18]	0.86	.876	[.868, .884]

Note. GAT = Global Assessment Tool. All bivariate correlations, *p*s < .001; *n* = number of non-missing observations for a given measure and time occasion; CI = confidence interval; ω_{Total} = Omega Total;

Study 1: RM-ANOVA Results

- Null hypothesis: Scale-level means across time occasions do not differ.

- One-way rANOVA with five levels for each time occasion

Table S3. *Table of repeated measures ANOVA (RM-ANOVA) tests across five time occasions for each GAT 1.0 measure*

Measure	$\varepsilon_{G\text{-}G}$	F (df)	p	η^2	90% CI η^2
Adaptability	0.98	1.07 (4, 19,864)	.369	.000	[.000, .001]
Active Coping	0.99	4.64 (4, 19,864)	.001	.000	[.000, .001]
Passive Coping	0.98	42.12 (4, 19,864)	< .001*	.004	[.003, .006]
Character	0.96	3.37 (4, 19,860)	.010	.000	[.000, .001]
Catastrophizing	0.97	42.92 (4, 19,860)	< .001*	.004	[.003, .005]
Depression	0.98	6.50 (4, 19,864)	< .001*	.001	[.000, .001]
Optimism	0.97	8.09 (4, 19,860)	< .001*	.001	[.000, .001]
Positive Affect	0.95	3.60 (4, 19,868)	.006	.000	[.000, .001]
Negative Affect	0.98	8.21 (4, 19,868)	< .001*	.001	[.000, .001]
Loneliness	0.94	4.87 (4, 19,860)	.001	.000	[.000, .001]
Organizational Trust	0.96	141.60 (4, 19,864)	< .001*	.015	[.013, .018]
Work Engagement	0.96	210.07 (4, 19,860)	< .001*	.016	[.016, .022]
Life Meaning	0.98	351.78 (4, 19,864)	< .001*	.028	[.024, .032]

Note. GAT = Global Assessment Tool; Model ns = 4,966–4,968; $\varepsilon_{G\text{-}G}$ = Greenhouse-Geisser epsilon estimate of sphericity; *p < .05 after applying family-wise Bonferroni correction (α/130 = .0004); Guidelines for η^2 effect size interpretation: .02 = small, .13 = medium, .26 = large (43); CI = confidence interval.

Additional Sample Characteristics

Variable	Levels	GAT 1.0 (Study 1)	GAT 2.0 (Study 2)	Any GAT	No GAT
Raw Count	*N*	95,277	57,773	301,911	179,009
Age_ACC	Mean Age at Accession (SD)	22.33 (4.43)	21.31 (3.32)	22.44 (4.02)	22.03 (3.73)
AFQT	Mean AFQT Score (SD)	62.34 (19.80)	60.48 (19.30)	60.32 (19.36)	57.84 (18.81)
Overall Bad Papers	Mean Overall Bad Papers (SD)	0.03 (0.20)	0.003 (0.06)	0.02 (0.15)	0.02 (0.14)
Award Count	Mean Award Count (SD)	1.11 (1.88)	2.24 (1.78)	2.44 (2.75)	1.66 (2.50)
MOS Type	Combat Service Support	38.15	38.18	36.68	25.20
MOS Type	Combat Arms	32.15	29.33	33.16	37.98
MOS Type	Combat Cupport	28.96	28.41	27.42	25.20
MOS Type	NA	0.74	4.08	2.75	2.61
Character of Service	Honorable	84.72	16.56	78.34	64.78
Character of Service	Dishonorable	0.73	0.06	0.97	1.38
Character of Service	NA	14.55	83.38	20.69	33.84
Soldier Sex	Male	84.43	84.03	84.58	83.44
Soldier Sex	Female	15.57	15.97	15.42	16.56
Soldier Race	caucasian	59.48	51.90	56.63	59.46
Soldier Race	african-american	18.44	23.38	20.92	18.89
Soldier Race	hispanic	12.95	16.71	14.45	13.89
Soldier Race	other	4.39	6.60	2.45	2.47
Soldier Race	asian	3.10	0.67	4.31	3.93
Soldier Race	native hawaiian	0.92	0.56	0.54	0.55
Soldier Race	native indian	0.68	0.17	0.68	0.78
Soldier Race	NA	0.04	0.01	0.03	0.02
Education at ACC	H.S. or equivalent	74.11	85.27	84.90	81.23
Education at ACC	bachelor degree	10.00	7.79	7.31	4.86
Education at ACC	some college	8.82	2.91	3.43	3.37
Education at ACC	associate or prof. degree	4.43	2.95	2.32	1.94
Education at ACC	master degree	1.59	0.87	0.69	0.49
Education at ACC	less than H.S.	0.53	0.13	0.43	0.45
Education at ACC	doctorate degree	0.14	0.03	0.04	0.03
Education at ACC	unknown	0.09	0.01	0.08	0.08
Education at ACC	NA	0.29	0.03	0.80	7.56

RM-SEM Model Diagram
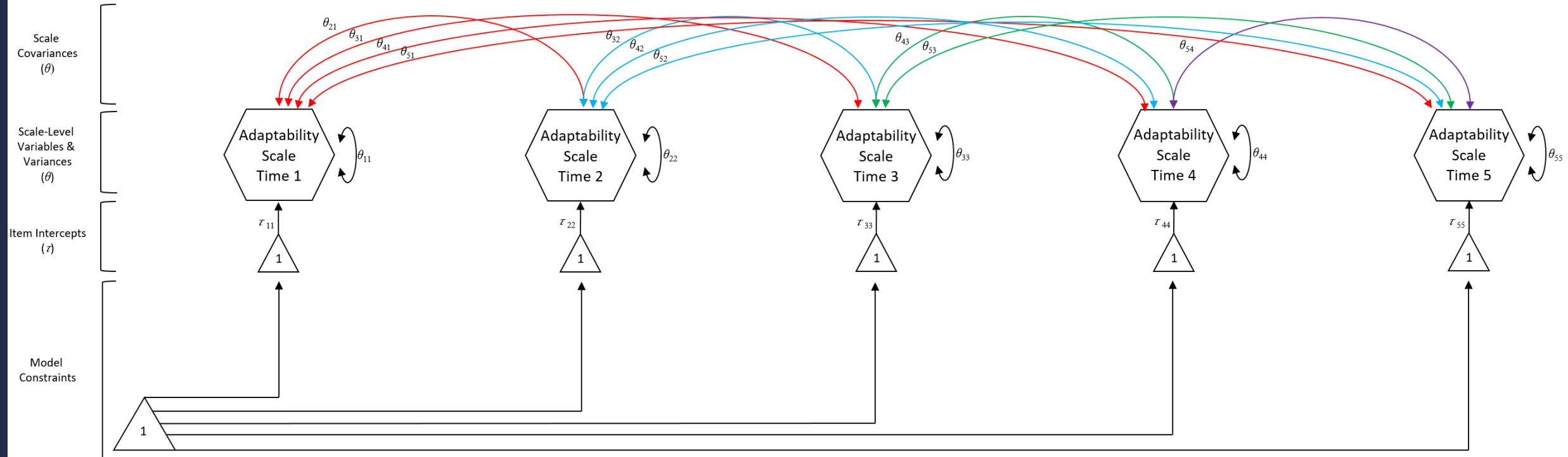
Study 1: RM-SEM Results

**Table S5.** *Table of repeated measures SEM (RM-SEM) tests across five time occasions for each GAT 1.0 measure*

Measure	Model	χ² (df)	CFI	TLI	RMSEA	90% CI_RMSEA	SRMR	CM	Δχ² (Δdf)	ΔCFI	ΔTLI	ΔRMSEA	ω	η²	90% CI η²
Adaptability	M1a: Full	1,675.09 (13)	.964	.979	.032	[.031, .034]	.061	—	—	—	—	—	—	—	—
	M1b: Null	1,696.21 (17)	.964	.972	.037	[.035, .038]	.060	M1a	21.12 (4)*	.000	−.007	.005	0.007	.000	[.000, .000]
Active Coping	M2a: Full	3,417.43 (13)	.931	.947	.052	[.051, .054]	.096	—	—	—	—	—	—	—	—
	M2b: Null	3,575.89 (17)	.928	.957	.047	[.046, .048]	.097	M2a	158.46 (4)*	−.003	.010	−.005	0.020	.001	[.001, .001]
Passive Coping	M3a: Full	903.76 (13)	.975	.981	.027	[.025, .028]	.049	—	—	—	—	—	—	—	—
	M3b: Null	2,264.93 (17)	.937	.963	.037	[.036, .039]	.062	M3a	1,361.17 (4)*	−.038	.018	−.010	0.060	.008	[.007, .008]
Character	M4a: Full	6,554.48 (13)	.871	.900	.073	[.071, .074]	.135	—	—	—	—	—	—	—	—
	M4b: Null	6,591.70 (17)	.870	.923	.064	[.062, .065]	.135	M4a	37.22 (4)*	−.001	.023	−.009	0.010	.000	[.000, .000]
Catastrophizing	M5a: Full	2,404.38 (13)	.943	.956	.044	[.042, .045]	.084	—	—	—	—	—	—	—	—
	M5b: Null	2,994.30 (17)	.928	.958	.043	[.042, .044]	.086	M5a	589.93 (4)*	−.015	.002	−.001	0.039	.003	[.003, .004]
Depression	M6a: Full	3,532.08 (13)	.901	.924	.053	[.052, ..055]	.095	—	—	—	—	—	—	—	—
	M6b: Null	3,980.32 (17)	.888	.934	.049	[.048, .051]	.098	M6a	448.24 (4)*	−.013	.010	−.004	0.034	.003	[.002, .003]
Optimism	M7a: Full	2,208.40 (13)	.963	.972	.042	[.041, .044]	.067	—	—	—	—	—	—	—	—
	M7b: Null	2,449.93 (17)	.959	.976	.039	[.037, .040]	.067	M7a	241.52 (4)*	−.004	.004	−.003	0.025	.001	[.001, .002]
Positive Affect	M8a: Full	3,470.49 (13)	.937	.951	.053	[.051, .054]	.094	—	—	—	—	—	—	—	—
	M8b: Null	3,558.09 (17)	.935	.962	.047	[.045, .048]	.095	M8a	87.60 (4)*	−.002	.011	−.006	0.015	.000	[.000, .001]
Negative Affect	M9a: Full	2,524.46 (13)	.941	.955	.045	[.044, .047]	.077	—	—	—	—	—	—	—	—
	M9b: Null	2,605.04 (17)	.940	.964	.040	[.039, .041]	.077	M9a	80.58 (4)*	−.001	.009	−.005	0.015	.000	[.000, .001]
Loneliness	M10a: Full	2,215.80 (13)	.961	.970	.042	[.041, .044]	.072	—	—	—	—	—	—	—	—
	M10b: Null	2,225.99 (17)	.961	.977	.037	[.036, .038]	.072	M10a	10.19 (4)	.000	.007	−.005	0.005	.000	[.000, .000]
Organizational Trust	M11a: Full	6,376.37 (13)	.747	.806	.072	[.070, .073]	.126	—	—	—	—	—	—	—	—
	M11b: Null	12,472.71 (17)	.506	.709	.088	[.086, .089]	.147	M11a	6,096.34 (4)*	−.241	−.097	.016	0.126	.033	[.032, .035]
Work Engagement	M12a: Full	5,913.11 (13)	.864	.895	.069	[.068, .071]	.120	—	—	—	—	—	—	—	—
	M12b: Null	15,234.48 (17)	.648	.793	.097	[.096, .098]	.143	M12a	9,321.37 (4)*	−.216	−.102	.028	0.156	.050	[.048, .052]
Life Meaning	M13a: Full	3,195.99 (13)	.946	.959	.051	[.049, .052]	.074	—	—	—	—	—	—	—	—
	M13b: Null	9,578.14 (17)	.838	.905	.077	[.076, .078]	.133	M13a	6,382.15 (4)*	−.108	−.054	.026	0.129	.035	[.033, .036]

Note. GAT = Global Assessment Tool; Model *n*s = 95,277; All Δχ² *p*s < .05, **p* < .05 after applying family-wise Bonferroni correction (α/130 = .0004); *df* = degrees of freedom; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; CM = comparison model; Δ = change; Guidelines for η² effect size interpretation: .02 = small, .13 = medium, .26 = large (43); ω = Cohen's ω; Guidelines for ω effect size interpretation: 0.10 = small, 0.30 = medium, 0.50 = large (43).

Configural Measurement Invariance (MI)
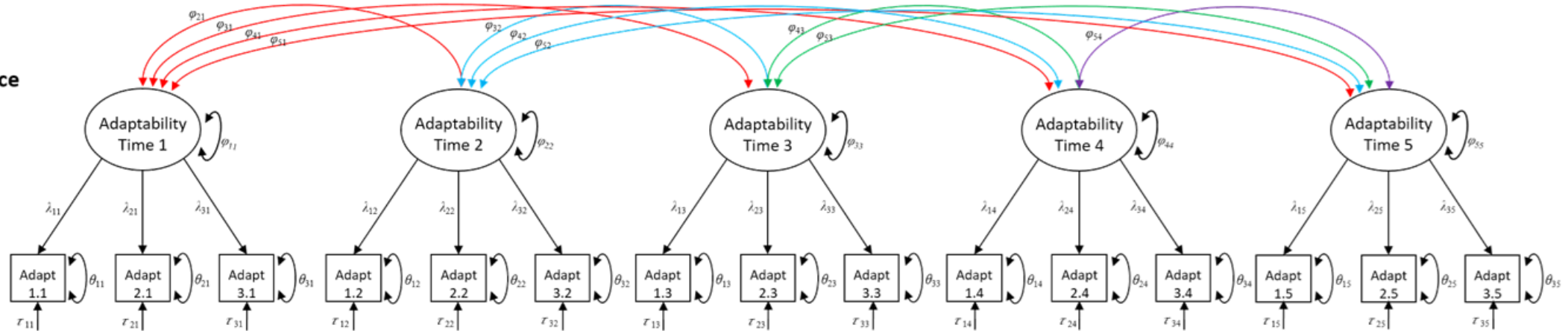
Metric (Weak) MI
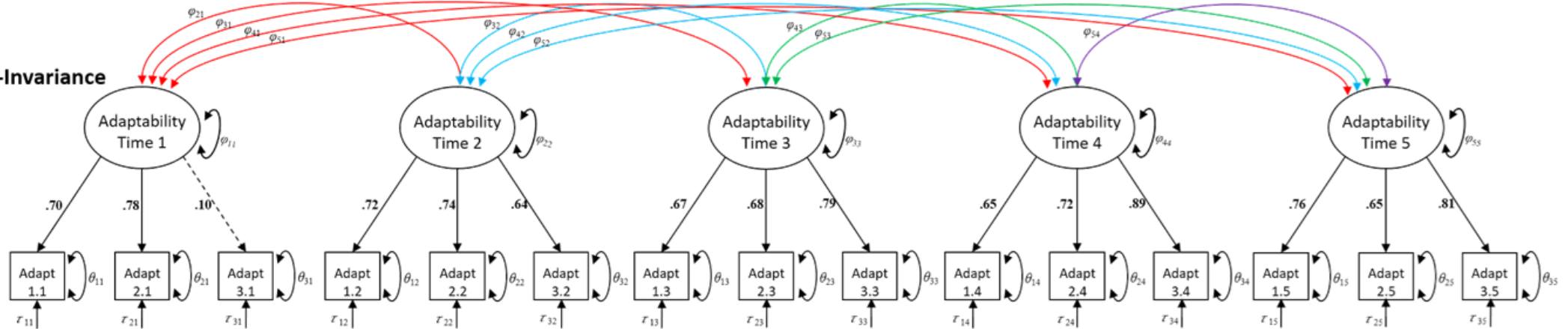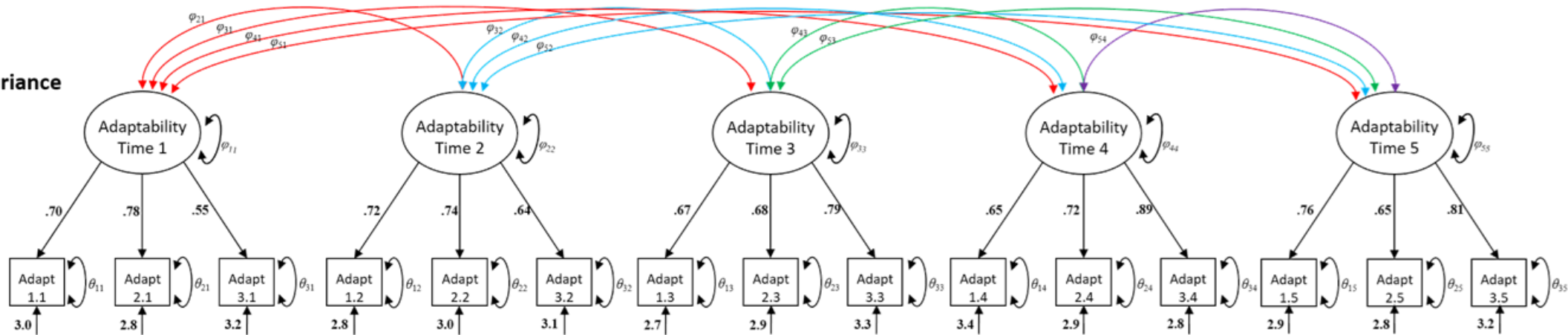
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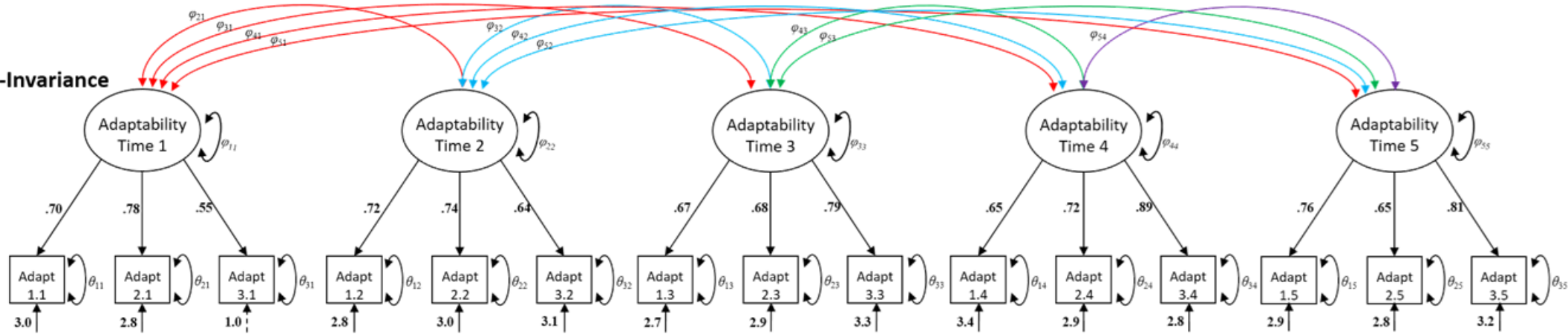
Study 1: MI Results

Table S7. *Table of measurement invariance (MI) tests across five time occasions for each GAT 1.0 measure*

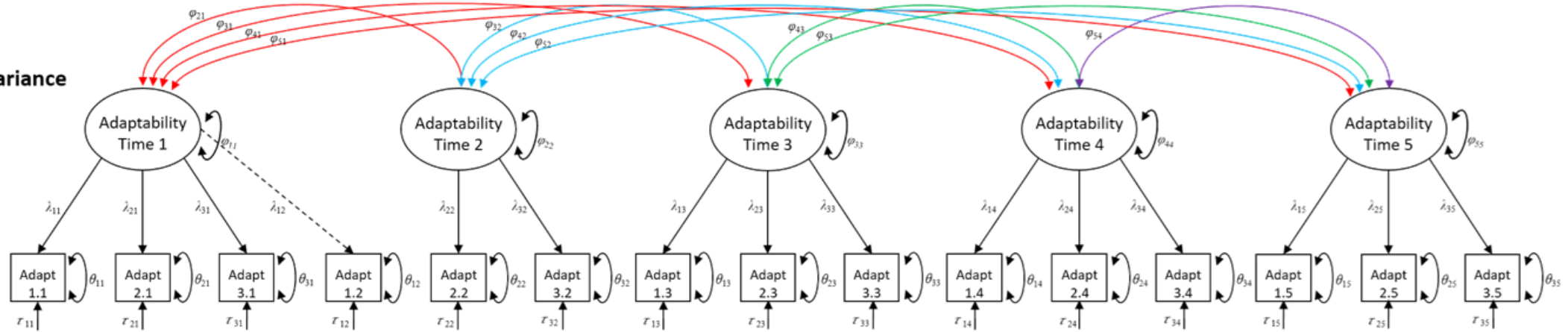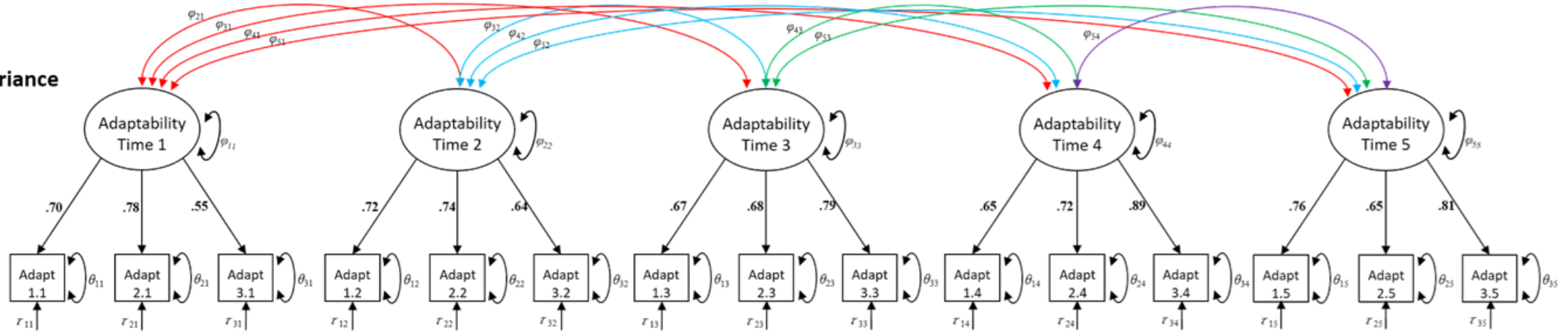| Measure	Model	χ^2 (df)	CFI	TLI	RMSEA	90% CI$_{RMSEA}$	SRMR	CM	$\Delta\chi^2$ (Δdf)	ΔCFI	ΔTLI	ΔRMSEA	ω	η^2	90% CI η^2
						Model Fit Statistics				Model Comparison					Measures of Effect Size
Adaptability	M1a: Configural	7,633.69 (68)	.971	.955	.034	[.034, .035]	.042	—	—	—	—	—	—	—	—
	M1b: Weak ($\lambda = \lambda$)	8,104.96 (76)	.969	.958	.033	[.033, .034]	.047	M1a	471.27 (8)*	−.002	.003	−.001	0.025	.001	[.001, .001]
	M1c: Strong ($\tau = \tau$)	8,240.99 (84)	.969	.961	.032	[.031, .033]	.048	M1b	136.03 (8)*	.000	.003	−.001	0.013	.000	[.000, .000]
Active Coping	M2a: Configural	36,940.13 (245)	.928	.911	.040	[.039, .040]	.037	—	—	—	—	—	—	—	—
	M2b: Weak ($\lambda = \lambda$)	37,091.44 (261)	.927	.917	.038	[.038, .039]	.038	M2a	151.31 (16)*	−.001	.006	−.002	0.010	.000	[.000, .000]
	M2c: Strong ($\tau = \tau$)	38,179.79 (277)	.925	.919	.038	[.038, .038]	.038	M2b	1,088.35 (16)*	−.002	.002	.000	0.027	.001	[.001, .001]
Passive Coping	M3a: Configural	9,368.01 (68)	.967	.949	.038	[.037, .039]	.055	—	—	—	—	—	—	—	—
	M3b: Weak ($\lambda = \lambda$)	9,639.41 (76)	.966	.953	.036	[.036, .037]	.058	M3a	271.40 (8)*	−.001	.004	−.002	0.019	.000	[.000, .000]
	M3c: Strong ($\tau = \tau$)	9,681.77 (84)	.966	.958	.034	[.034, .035]	.057	M3b	42.36 (8)*	.000	.005	−.002	0.007	.000	[.000, .000]
Character	M4a: Configural	887,156.65 (6,914)	.846	.841	.037	[.036, .037]	.032	—	—	—	—	—	—	—	—
	M4b: Weak ($\lambda = \lambda$)	888,891.32 (7,006)	.846	.843	.036	[.036, .036]	.032	M4a	1,734.68 (92)*	.000	.002	−.001	0.014	.000	[.000, .000]
	M4c: Strong ($\tau = \tau$)	924,647.94 (7,098)	.840	.839	.037	[.037, .037]	.034	M4b	35,756.62 (92)*	−.006	−.004	.001	0.064	.006	[.005, .006]
Catastrophizing	M5a: Configural	94,241.55 (522)	.902	.888	.043	[.043, .044]	.041	—	—	—	—	—	—	—	—
	M5b: Weak ($\lambda = \lambda$)	94,952.60 (546)	.901	.892	.043	[.042, .043]	.041	M5a	711.05 (24)*	−.001	.004	.000	0.018	.000	[.000, .000]
	M5c: Strong ($\tau = \tau$)	101,186.94 (570)	.895	.890	.043	[.043, .043]	.042	M5b	6,234.34 (24)*	−.006	−.002	.000	0.052	.003	[.003, .004]
Depression	M6a: Configural	182,019.56 (1,125)	.902	.894	.041	[.041, .041]	.036	—	—	—	—	—	—	—	—
	M6b: Weak ($\lambda = \lambda$)	183,409.77 (1,161)	.902	.896	.041	[.040, .041]	.038	M6a	1,390.20 (36)*	.000	.002	.000	0.020	.000	[.000, .001]
	M6c: Strong ($\tau = \tau$)	189,019.30 (1,197)	.899	.896	.041	[.040, .041]	.038	M6b	5,609.53 (36)*	−.003	.000	.000	0.040	.002	[.002, .002]
Optimism	M7a: Configural	50,277.61 (144)	.858	.813	.060	[.060, .061]	.053	—	—	—	—	—	—	—	—
	M7b: Weak ($\lambda = \lambda$)	50,625.00 (156)	.858	.826	.058	[.058, .059]	.056	M7a	347.40 (12)*	.000	.013	−.002	0.017	.000	[.000, .000]
	M7c: Strong ($\tau = \tau$)	51,120.78 (168)	.856	.837	.056	[.056, .057]	.056	M7b	495.77 (12)*	−.002	.011	−.002	0.021	.000	[.000, .001]
Positive Affect	M8a: Configural	120,909.35 (1,125)	.943	.938	.033	[.033, .034]	.025	—	—	—	—	—	—	—	—
	M8b: Weak ($\lambda = \lambda$)	121,751.52 (1,161)	.942	.939	.033	[.033, .033]	.026	M8a	842.17 (36)*	−.001	.001	.000	0.016	.000	[.000, .000]
	M8c: Strong ($\tau = \tau$)	137,254.35 (1,197)	.935	.934	.035	[.034, .035]	.028	M8b	15,502.82 (36)*	−.007	−.005	.002	0.067	.006	[.006, .006]
Negative Affect	M9a: Configural	241,523.24 (1,376)	.850	.838	.043	[.043, .043]	.046	—	—	—	—	—	—	—	—
	M9b: Weak ($\lambda = \lambda$)	242,876.00 (1,416)	.849	.842	.042	[.042, .042]	.048	M9a	1,352.76 (40)*	−.001	.004	−.001	0.019	.000	[.000, .000]
	M9c: Strong ($\tau = \tau$)	259,231.66 (1,456)	.839	.836	.043	[.043, .043]	.049	M9b	16,355.66 (40)*	−.010	−.006	.001	0.066	.006	[.005, .006]
Loneliness	M10a: Configural	16,757.39 (68)	.957	.934	.051	[.050, .051]	.077	—	—	—	—	—	—	—	—
	M10b: Weak ($\lambda = \lambda$)	16,865.37 (76)	.957	.941	.048	[.048, .049]	.077	M10a	107.98 (8)*	.000	.007	−.003	0.012	.000	[.000, .000]
	M10c: Strong ($\tau = \tau$)	18,442.48 (84)	.953	.941	.048	[.047, .048]	.078	M10b	1,577.11 (8)*	−.004	.000	.000	0.045	.002	[.002, .002]
Organizational Trust	M11a: Configural	62,206.72 (245)	.909	.888	.052	[.051, .052]	.049	—	—	—	—	—	—	—	—
	M11b: Weak ($\lambda = \lambda$)	62,407.86 (261)	.908	.895	.050	[.050, .050]	.051	M11a	201.14 (16)*	−.001	.007	−.002	0.011	.000	[.000, .000]
	M11c: Strong ($\tau = \tau$)	73,360.13 (277)	.892	.883	.053	[.052, .053]	.055	M11b	10,952.26 (16)*	−.016	−.012	.003	0.085	.009	[.008, .009]
Work Engagement	M12a: Configural	22,096.72 (144)	.955	.941	.040	[.040, .040]	.034	—	—	—	—	—	—	—	—
	M12b: Weak ($\lambda = \lambda$)	22,199.05 (156)	.955	.945	.039	[.038, .039]	.034	M12a	102.33 (12)*	.000	.004	−.001	0.009	.000	[.000, .000]
	M12c: Strong ($\tau = \tau$)	22,520.88 (168)	.954	.948	.037	[.037, .038]	.034	M12b	321.82 (12)*	−.001	.003	−.002	0.017	.000	[.000, .000]
Life Meaning	M13a: Configural	53,679.79 (245)	.925	.908	.048	[.048, .048]	.058	—	—	—	—	—	—	—	—
	M13b: Weak ($\lambda = \lambda$)	56,534.79 (261)	.921	.909	.048	[.047, .048]	.070	M13a	2,855.00 (16)*	−.004	.001	.000	0.043	.002	[.002, .002]
	M13c: Strong ($\tau = \tau$)	100,545.82 (277)	.859	.847	.062	[.061, .062]	.104	M13b	44,011.02 (16)*	−.062	−.062	.014	0.170	.034	[.033, .034]

Note. GAT = Global Assessment Tool; Model *n*s = 95,277; All $\Delta\chi^2$ *p*s < .001, **p* < .05 after applying family-wise Bonferroni correction (α/130 = .0004); *df* = degrees of freedom; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; CM = comparison model; Δ = change; Guidelines for η^2 effect size interpretation: .02 = small, .13 = medium, .26 = large (43); ω = Cohen's ω; Guidelines for ω effect size interpretation: 0.10 = small, 0.30 = medium, 0.50 = large (43).

RM-CFA Model Diagram
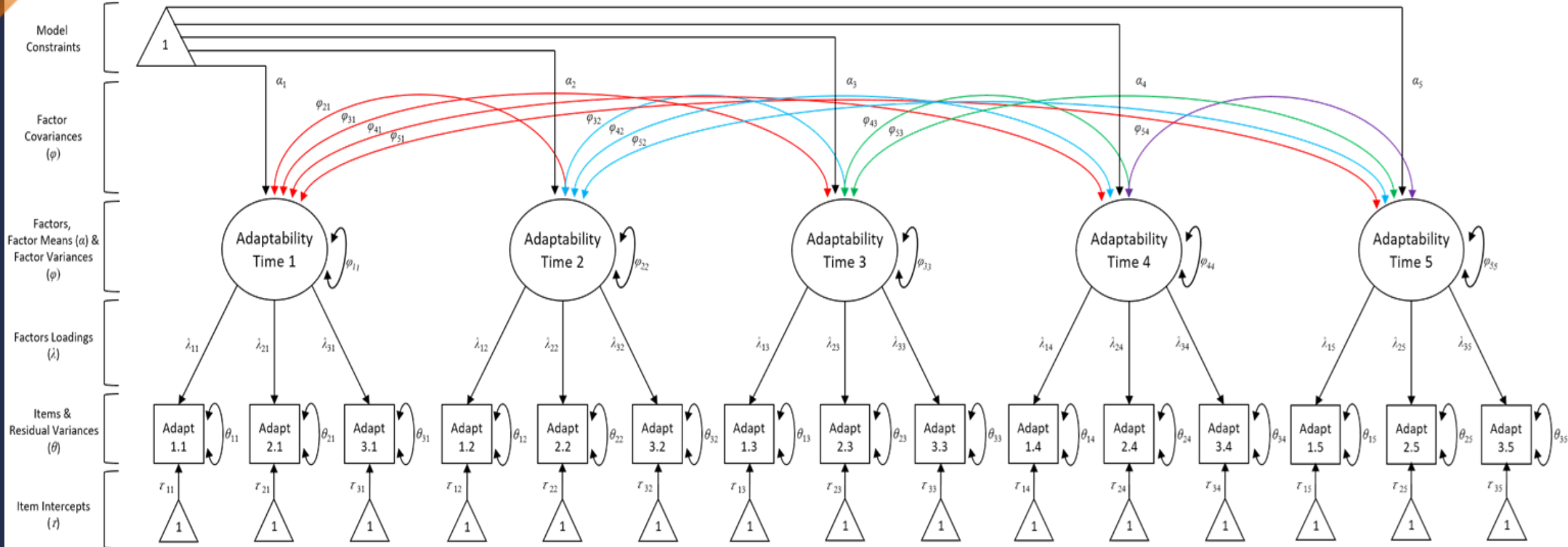
Study 1: RM-CFA Results

Table S9. *Table of repeated measures CFA (RM-CFA) tests across five time occasions for each GAT 1.0 measure*

Measure	Model	χ^2 (df)	CFI	TLI	RMSEA	90% CI$_{RMSEA}$	SRMR	CM	$\Delta\chi^2$ (Δdf)	ΔCFI	ΔTLI	ΔRMSEA	ω	η^2	90% CI η^2
Adaptability	M1a: Full	10,220.54 (97)	.961	.958	.033	[.033, .034]	.072	—	—	—	—	—	—	—	—
	M1b: Null	10,249.20 (101)	.961	.960	.032	[.032, .033]	.071	M1a	28.67 (4)*	.000	.002	−.001	0.009	.000	[.000, .000]
Active Coping	M2a: Full	42,420.77 (290)	.917	.914	.039	[.039, .039]	.078	—	—	—	—	—	—	—	—
	M2b: Null	42,590.62 (294)	.917	.914	.039	[.039, .039]	.079	M2a	169.85 (4)*	.000	.000	.000	0.021	.000	[.000, .000]
Passive Coping	M3a: Full	10,561.91 (97)	.963	.960	.034	[.033,.034]	.065	—	—	—	—	—	—	—	—
	M3b: Null	12,062.56 (101)	.958	.956	.035	[.035, .036]	.065	M3a	1,500.65 (4)*	−.005	−.004	.001	0.063	.002	[.002, .002]
Character	M4a: Full	931,371.90 (7,111)	.839	.838	.037	[.037, .037]	.082	—	—	—	—	—	—	—	—
	M4b: Null	931,450.58 (7,115)	.839	.838	.037	[.037, .037]	.082	M4a	78.68 (4)*	.000	.000	.000	0.014	.000	[.000, .000]
Catastrophizing	M5a: Full	103,974.29 (583)	.892	.889	.043	[.043, .043]	.064	—	—	—	—	—	—	—	—
	M5b: Null	104,273.15 (587)	.891	.890	.043	[.043, .043]	.066	M5a	298.86 (4)*	−.001	.001	.000	0.028	.000	[.000, .000]
Depression	M6a: Full	192,589.06 (1,210)	.897	.895	.041	[.041, .041]	.068	—	—	—	—	—	—	—	—
	M6b: Null	193,010.88 (1,214)	.896	.895	.041	[.041, .041]	.068	M6a	421.82 (4)*	−.001	.000	.000	0.033	.000	[.000, .000]
Optimism	M7a: Full	53,842.22 (181)	.849	.841	.056	[.055, .056]	.077	—	—	—	—	—	—	—	—
	M7b: Null	5,4052.50 (185)	.848	.844	.055	[.055, .056]	.077	M7a	210.27 (4)*	−.001	.003	−.001	0.023	.000	[.000, .000]
Positive Affect	M8a: Full	14,0961.80 (1,210)	.933	.932	.035	[.035, .035]	.071	—	—	—	—	—	—	—	—
	M8b: Null	141,129.07 (1,214)	.933	.933	.035	[.035, .035]	.071	M8a	167.27 (4)*	.000	.001	.000	0.021	.000	[.000, .000]
Negative Affect	M9a: Full	261,852.60 (1,469)	.837	.835	.043	[.043, .043]	.066	—	—	—	—	—	—	—	—
	M9b: Null	261,867.03 (1,473)	.837	.836	.043	[.043, .043]	.066	M9a	14.43 (4)	.000	.001	.000	0.006	.000	[.000, .000]
Loneliness	M10a: Full	20,548.89 (97)	.948	.943	.047	[.047, .048]	.099	—	—	—	—	—	—	—	—
	M10b: Null	20,597.83 (101)	.947	.945	.046	[.046, .047]	.098	M10a	48.94 (4)*	−.001	.002	−.001	0.011	.000	[.000, .000]
Organizational Trust	M11a: Full	79,862.38 (290)	.883	.879	.054	[.053, .054]	.109	—	—	—	—	—	—	—	—
	M11b: Null	87,630.69 (294)	.871	.869	.056	[.056, .056]	.132	M11a	7,768.31 (4)*	−.012	−.010	.002	0.143	.006	[.006, .006]
Work Engagement	M12a: Full	29,064.22 (181)	.941	.938	.041	[.041, .041]	.098	—	—	—	—	—	—	—	—
	M12b: Null	39,313.03 (185)	.920	.918	.047	[.047, .048]	.121	M12a	10,248.81 (4)*	−.021	−.020	.006	0.164	.010	[.010, .011]
Life Meaning	M13a: Full	103,072.88 (290)	.856	.851	.061	[.061, .061]	.113	—	—	—	—	—	—	—	—
	M13b: Null	107,051.68 (294)	.850	.847	.062	[.061, .062]	.125	M13a	3,978.80 (4)*	−.006	−.004	.001	0.102	.003	[.003, .003]

Note. GAT = Global Assessment Tool; Model ns = 95,277; All $\Delta\chi^2$ ps < .01, *p < .05 after applying family-wise Bonferroni correction (α/130 = .0004); df = degrees of freedom; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; CM = comparison model; Δ = change; Guidelines for η^2 effect size interpretation: .02 = small, .13 = medium, .26 = large (43); ω = Cohen's ω; Guidelines for ω effect size interpretation: 0.10 = small, 0.30 = medium, 0.50 = large (43).
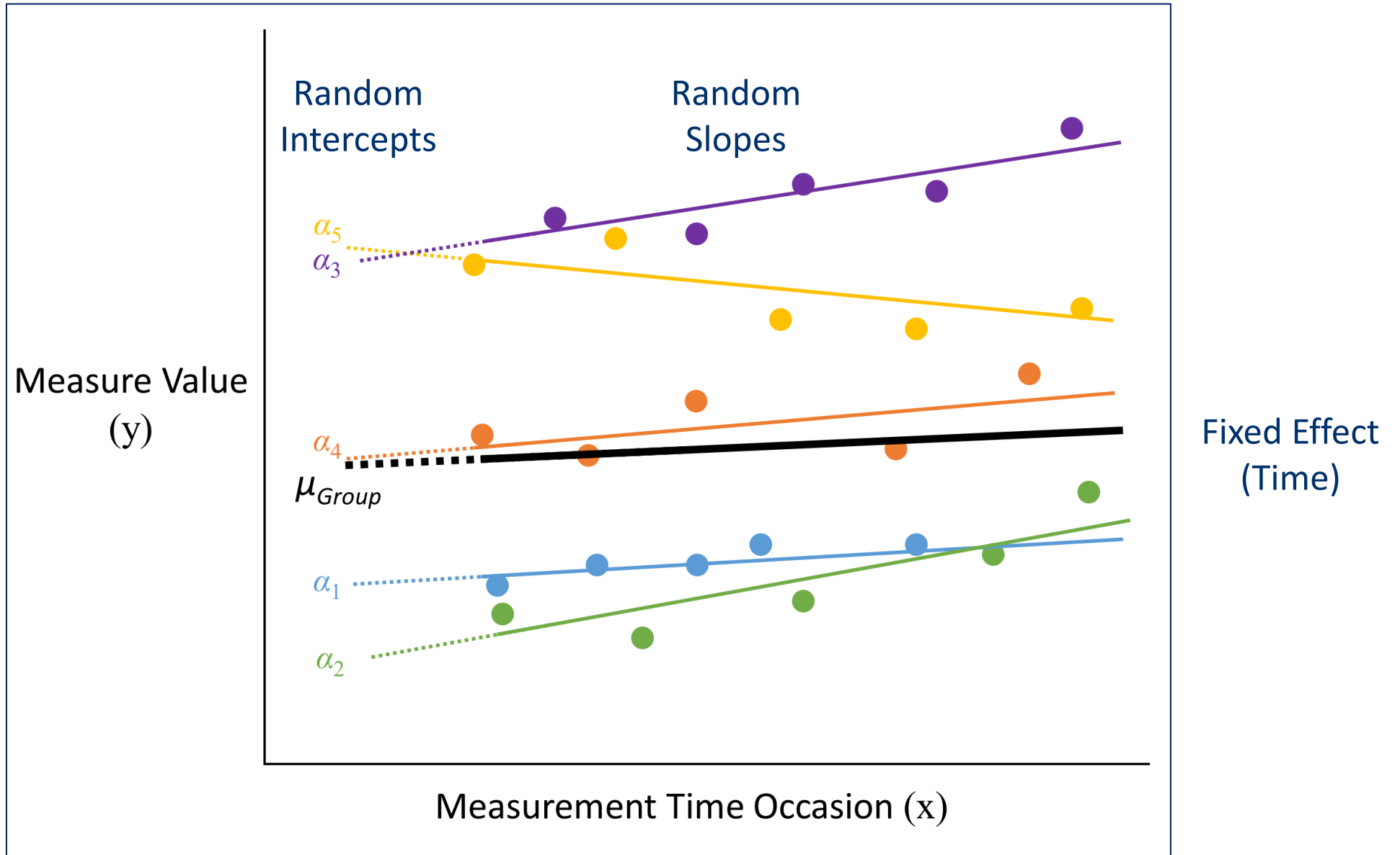
Study 1: Multi-Level Model Time as Individually-Continuous and Random Slope

Table S11. *Table of repeated measures MLM (RM-MLM) tests across individually-continuous time occasions for each GAT 1.0 measure*

Measure	Model	Model Random Effects		Model Fit			Test of Fixed Effect of Time (Continuous)				Model Comparisons		
		Intercept s^2	Slope s^2	AIC	BIC	LogLik	b (SE)	p	η^2	90% CI η^2	CM	$\Delta\chi^2$ (Δdf)	Pseudo R^2
Adaptability	M1a: Slp.	0.23	0.01	49,400	49,457	−24,693	−0.00 (0.003)	.761	.000	[.000, .000]	—	—	—
	M1b: Int.	0.24	—	49,643	49,684	−24,817	−0.00 (0.003)	.746	.000	[.000, .000]	M1a	247.41 (2)	.005
Active Coping	M2a: Slp.	0.21	0.01	49,835	49,139	−24,534	−0.01 (0.003)	.036	.000	[.000, .001]	—	—	—
	M2b: Int.	0.26	—	49,468	49,509	−24,729	−0.01 (0.003)	.030	.000	[.000, .001]	M2a	389.73 (2)	.008
Passive Coping	M3a: Slp.	0.34	0.02	63,249	63,306	−31,618	0.05 (0.004)	<.001	.006	[.004, .008]	—	—	—
	M3b: Int.	0.36	—	63,378	63,419	−31,684	0.05 (0.004)	<.001	.007	[.005, .009]	M3a	132.53 (2)	.002
Character	M4a: Slp.	0.86	0.08	84,491	84,548	−42,239	−0.00 (0.007)	.749	.000	[.000, .000]	—	—	—
	M4b: Int.	1.08	—	85,081	85,122	−42,536	−0.00 (0.006)	.989	.000	[.000, .000]	M4a	593.86 (2)	.007
Catastrophizing	M5a: Slp.	0.23	0.01	52,692	52,749	−26,339	−0.03 (0.004)	<.001	.004	[.003, .006]	—	—	—
	M5b: Int.	0.26	—	52,926	52,967	−26,458	−0.03 (0.003)	<.001	.005	[.004, .007]	M5a	237.93 (2)	.005
Depression	M6a: Slp.	0.23	0.01	52,692	52,749	−26,339	−0.03 (0.004)	<.001	.004	[.003, .006]	—	—	—
	M6b: Int.	0.26	—	52,926	52,967	−26,458	−0.03 (0.003)	<.001	.005	[.004, .007]	M6a	237.93 (2)	.005
Optimism	M7a: Slp.	0.36	0.02	51,248	51,305	−25,617	−0.01 (0.004)	.126	.000	[.000, .001]	—	—	—
	M7b: Int.	0.33	—	51,574	51,615	−25,782	−0.01 (0.003)	.081	.000	[.000, .001]	M7a	330.44 (2)	.006
Positive Affect	M8a: Slp.	0.27	0.02	51,943	52,000	−25,965	0.00 (0.004)	.194	.000	[.000, .000]	—	—	—
	M8b: Int.	0.31	—	52,382	52,422	−26,186	0.01 (0.003)	.101	.000	[.000, .001]	M8a	442.47 (2)	.008
Negative Affect	M9a: Slp.	0.20	0.01	46,443	46,500	−23,215	−0.01 (0.003)	<.001	.001	[.000, .001]	—	—	—
	M9b: Int.	0.20	—	46,729	46,770	−23,360	−0.01 (0.003)	<.001	.001	[.000, .002]	M9a	290.12 (2)	.006
Loneliness	M10a: Slp.	0.38	0.02	56,106	56,163	−28,046	−0.01 (0.004)	.001	.001	[.000, .001]	—	—	—
	M10b: Int.	0.39	—	56,372	56,412	−28,181	−0.01 (0.003)	<.001	.001	[.000, .002]	M10a	269.80 (2)	.005
Organizational Trust	M11a: Slp.	0.15	0.02	59,507	59,564	−29,747	−0.08 (0.004)	<.001	.019	[.016, .023]	—	—	—
	M11b: Int.	0.23	—	59,924	59,965	−29,957	−0.08 (0.004)	<.001	.023	[.019, .026]	M11a	420.95 (2)	.007
Work Engagement	M12a: Slp.	0.28	0.03	60,292	60,349	−30,139	−0.09 (0.004)	<.001	.022	[.019, .025]	—	—	—
	M12b: Int.	0.36	—	60,892	60,933	−30,441	−0.09 (0.004)	<.001	.028	[.024, .031]	M12a	603.97 (2)	.010
Life Meaning	M13a: Slp.	0.46	0.03	56,074	56,131	−28,030	0.11 (0.004)	<.001	.035	[.031, .040]	—	—	—
	M13b: Int.	0.38	—	56,409	56,449	−28,199	0.11 (0.003)	<.001	.048	[.043, .053]	M13a	338.88 (2)	.006

Note. GAT = Global Assessment Tool; Model ns = 4,966–4,968; df = degrees of freedom; Int. = random intercept only model; Slp. = random intercept and slope model; AIC = Akaike information criterion; BIC = Bayesian information criterion; LogLik = log likelihood; CM = comparison model; Δ = change; All $\Delta\chi^2$ ps < .001; pseudo R^2 calculated using McFadden approximation; Guidelines for η^2 effect size interpretation: .02 = small, .13 = medium, .26 = large (Cohen, 1988).

SEM Random Slope Diagram
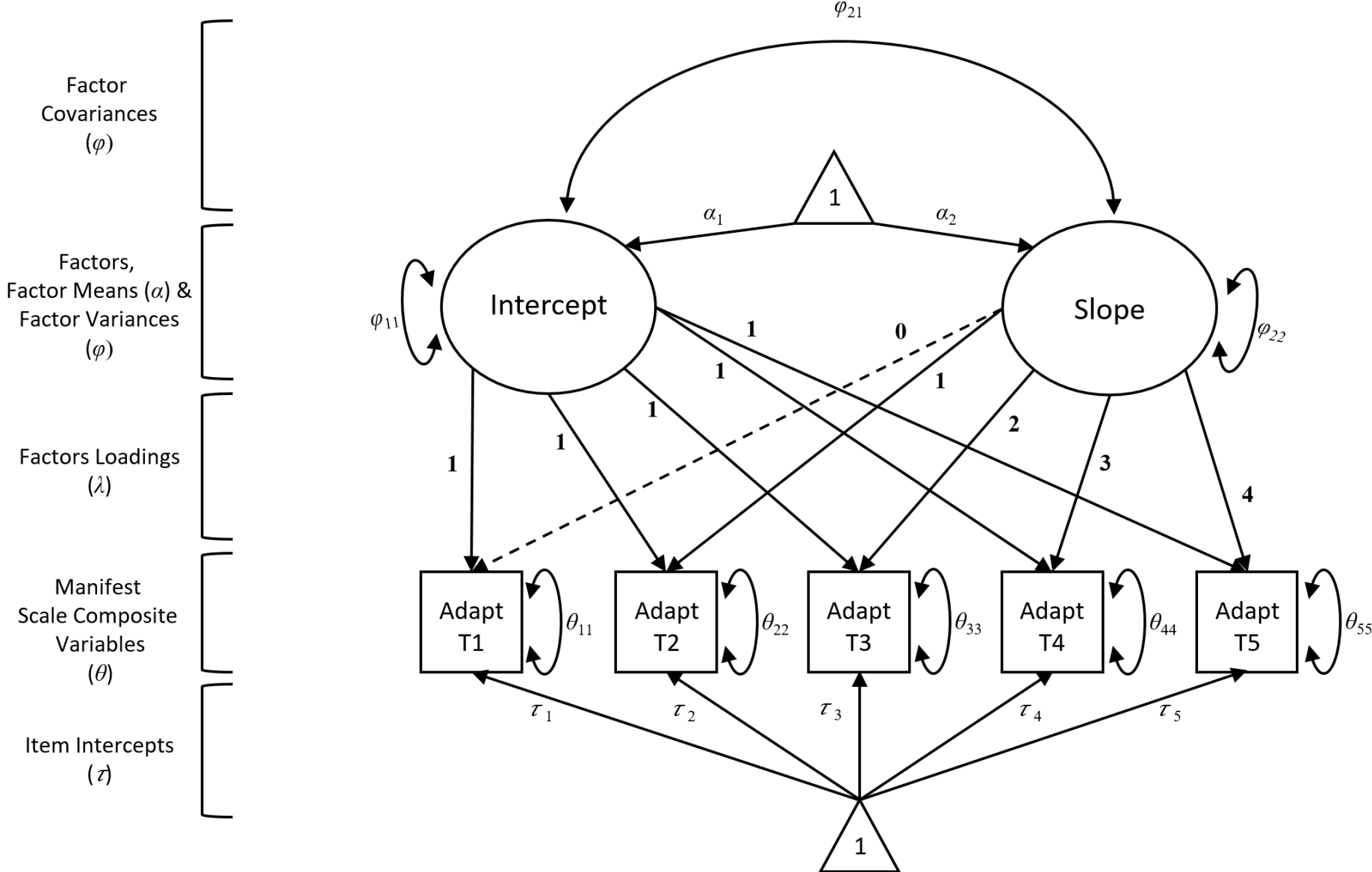
Study 1: SEM Random Slope

Table S13. *Table of random intercept and random slope SEM tests across five time occasions for each GAT 1.0 measure*

		Model Random Effects		Model Fit Statistics					Model Comparisons					Measures of Effect Size		
		Intercept s^2	Slope s^2													
Measure	Model	(*SE* of Est.)	(*SE* of Est.)	χ^2 (*df*)	CFI	TLI	RMSEA	SRMR	CM	$\Delta\chi^2$ (Δdf)	ΔCFI	ΔTLI	ΔRMSEA	ω	η^2	90% CI η^2
Adaptability	M1a: Slp.	0.24 (0.002)	0.01 (0.001)	704.97 (14)	.985	.989	.023	.072	—	—	—	—	—	—	—	—
	M1b: Int.	0.25 (0.002)	FS	1,688.72 (16)	.964	.977	.033	.061	M1a	983.75 (2)	−.021	−.012	.010	0.072	.011	[.010, .012]
Active Coping	M2a: Slp.	0.22 (0.002)	0.01 (0.001)	1,119.03 (14)	.977	.984	.029	.098	—	—	—	—	—	—	—	—
	M2b: Int.	0.26 (0.002)	FS	3,492.18 (16)	.929	.956	.048	.097	M2a	2,373.14 (2)	−.048	−.028	.019	0.112	.026	[.025, .027]
Passive Coping	M3a: Slp.	0.32 (0.004)	0.01 (0.001)	459.03 (14)	.987	.991	.018	.043	—	—	—	—	—	—	—	—
	M3b: Int.	0.34 (0.003)	FS	1,016.37 (16)	.972	.982	.026	.051	M3a	557.34 (2)	−.015	−.009	.008	0.054	.006	[.006, .007]
Character	M4a: Slp.	0.81 (0.009)	0.08 (0.003)	1,844.04 (14)	.964	.974	.037	.128	—	—	—	—	—	—	—	—
	M4b: Int.	1.06 (0.007)	FS	6,566.51 (16)	.870	.919	.066	.135	M4a	4,722.47 (2)	−.094	−.055	.029	0.157	.051	[.049, .052]
Catastrophizing	M5a: Slp.	0.21 (0.002)	0.01 (0.001)	865.52 (14)	.980	.985	.025	.073	—	—	—	—	—	—	—	—
	M5b: Int.	0.25 (0.002)	FS	2,504.27 (16)	.940	.963	.040	.085	M5a	1,638.74 (2)	−.040	−.022	.015	0.093	.018	[.017, .019]
Depression	M6a: Slp.	0.19 (0.002)	0.01 (0.001)	1,512.10 (14)	.958	.970	.034	.107	—	—	—	—	—	—	—	—
	M6b: Int.	0.23 (0.002)	FS	3,602.06 (16)	.899	.937	.049	.095	M6a	2,089.96 (2)	−.059	−.033	.015	0.105	.023	[.022, .024]
Optimism	M7a: Slp.	0.31 (0.003)	0.02 (0.001)	1,073.19 (14)	.982	.987	.028	.061	—	—	—	—	—	—	—	—
	M7b: Int.	0.31 (0.002)	FS	2,384.76 (16)	.960	.975	.041	.068	M7a	1,311.57 (2)	−.022	−.012	.011	0.083	.015	[.014, .015]
Positive Affect	M8a: Slp.	0.27 (0.003)	0.02 (0.001)	1,285.70 (14)	.977	.983	.031	.090	—	—	—	—	—	—	—	—
	M8b: Int.	0.31 (0.002)	FS	3,550.42 (16)	.935	.959	.048	.095	M8a	2,264.72 (2)	−.042	−.024	.017	0.109	.025	[.024, .026]
Negative Affect	M9a: Slp.	0.19 (0.002)	0.01 (0.001)	1,077.66 (14)	.975	.982	.028	.085	—	—	—	—	—	—	—	—
	M9b: Int.	0.21 (0.002)	FS	2,541.12 (16)	.941	.963	.041	.077	M9a	1,463.46 (2)	−.034	−.019	.013	0.088	.016	[.015, .017]
Loneliness	M10a: Slp.	0.34 (0.003)	0.02 (0.001)	789.89 (14)	.986	.990	.024	.072	—	—	—	—	—	—	—	—
	M10b: Int.	0.37 (0.002)	FS	2,217.28 (16)	.961	.976	.038	.072	M10a	1,427.39 (2)	−.025	−.014	.014	0.087	.016	[.015, .017]
Organizational Trust	M11a: Slp.	0.14 (0.003)	0.02 (0.001)	3,100.57 (14)	.877	.912	.048	.142	—	—	—	—	—	—	—	—
	M11b: Int.	0.23 (0.002)	FS	7,151.64 (16)	.717	.823	.068	.133	M11a	4,051.07 (2)	−.160	−.089	.020	0.146	.044	[.042, .045]
Work Engagement	M12a: Slp.	0.30 (0.004)	0.03 (0.001)	4,938.29 (14)	.886	.919	.061	.173	—	—	—	—	—	—	—	—
	M12b: Int.	0.38 (0.003)	FS	8,738.50 (16)	.798	.874	.076	.135	M12a	3,800.21 (2)	−.088	−.045	.015	0.141	.041	[.040, .043]
Life Meaning	M13a: Slp.	0.40 (0.003)	0.02 (0.001)	2,757.23 (14)	.954	.967	.045	.105	—	—	—	—	—	—	—	—
	M13b: Int.	0.37 (0.002)	FS	3,731.07 (16)	.937	.961	.049	.075	M13a	973.84 (2)	−.017	−.006	.004	0.071	.011	[.010, .012]

Note. GAT = Global Assessment Tool; Model *n*s = 95,277; All random effect estimate *p*s < .001; All $\Delta\chi^2$ *p*s < .001; *df* = degrees of freedom; Int. = random intercept with fixed slope; Slp. = random intercept and slope; FS = fixed slope to 0; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; CM = comparison model; Δ = change; Guidelines for η^2 effect size interpretation: .02 = small, .13 = medium, .26 = large (Cohen, 1988); ω = Cohen's ω; Guidelines for ω effect size interpretation: 0.10 = small, 0.30 = medium, 0.50 = large (Cohen, 1988).