

# All Metrics Are Not Created Equal:

## A Closer Look at Measuring Severity of Need and Well-Being

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# Today's Session

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- Overview of aggregate need & strength metrics
  - Important nuances
  - Findings: how similar/different are these metrics?
  - Relationship between needs- and strengths-based metrics?
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# Why Use Aggregate Metrics?

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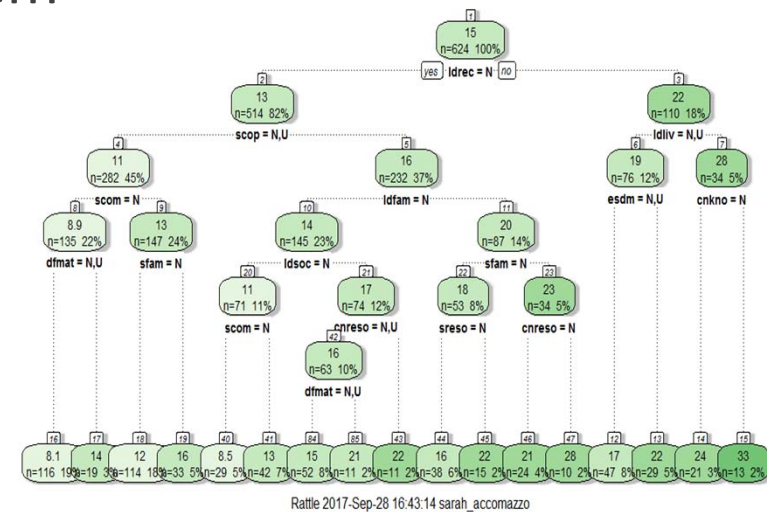
- **Enables many different types of analyses**
  - I.e. Easily identify clients as having “high” or “low” overall need compared to other individuals or groups
- **Highly desired by stakeholders**

# Background

- Prompted by our study of whether certain item scores predict greater overall need

*(Identifying Patterns of Service Need, 2017).*

- Realized that the entire study hinged on the way we calculated severity of need (TAI)
- **Do other metrics express severity of need differently when applied to the same CANS assessment?**



# Different Types of Aggregate CANS Metrics

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Metric	Calculation
<b>Total Actionable Items (TAI)</b>	Count of items with item score of 2 or 3
<b>Sum of Item Scores</b>	Sum total of all item scores (including 1s)
<b>% Actionable</b>	TAI / Number of item scores
<b>Number of Strengths</b>	Count of items with item score of 0 or 1 in Strengths domain
<b>Sum of Strength Domain Item Scores</b>	Sum total of all item scores in Strengths domain. ( <i>Lower sum = more strengths</i> )

# Different CANS Versions and Item Subsets

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The same metric will produce different results when run on different sets of items.

<b>CANS Version / Item Subset</b>	<b>Notes (Seneca's CANS in CA)</b>
<b>Full CANS (Including Ext. Modules)</b>	96 core domain items, up to 189 items total
<b>Core Domain Items Only</b>	96 core domain items
<b>CANS Core 50</b>	50 items, no extension modules
<b>Strengths Domain Only</b>	13 items (9 in Core 50)

# Using the CANS to Measure “Well-Being”

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- What *is* “well-being”?
  - Most broadly, the presence of positive states/outlooks and absence of negative states.  
*Largely based on the individual’s self-perception.*
- Harvard’s “Flourishing” Measure
  - 2 self-report questions in each of the 5 domains:

Happiness and Life Satisfaction

Mental and Physical Health

Meaning and Purpose

Character and Virtue

Close Social Relationships

- We decided to focus on “Strength-related” metrics due to challenges in measuring self-perception in these domains

# Why Sweat the Small Stuff?

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# Findings:

## Metric Comparison

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# Our Dataset

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- Sample:
  - 2,302 CANS assessments
  - Administered between Nov 2015-Mar 2018
  - Youth aged 6-17
- CANS Details
  - All assessments had exactly 96 “core domain” item scores
  - Caveat: Our Core 50-based metrics only include 42 items which were present in Seneca’s full CANS assessments.

# Analytic Approach

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- **Assess correlation of metrics:** run Pearson tests of correlation
  - **Explore similarity of metrics on individual youth-level:** convert each metric into percentile rank to identify where each metric places each youth in the continuum of need within the sample
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# Needs-Related Metrics

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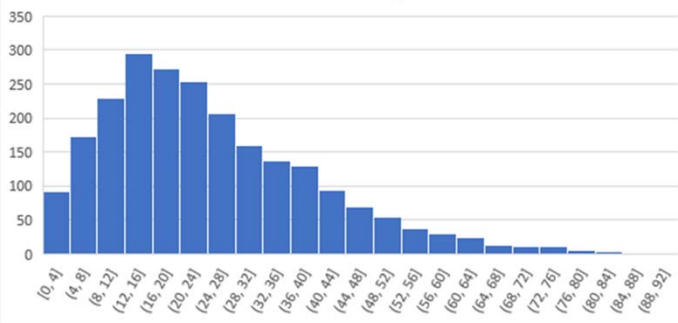
# Summary Stats: Needs Metrics

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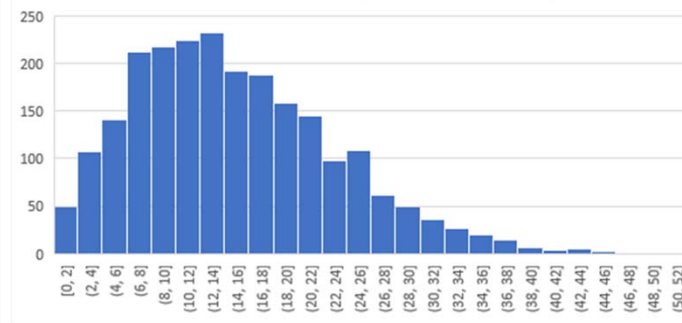
<b>Metric Name</b>	<b>Mean</b>	<b>St Dev.</b>	<b>Range</b>
<b>TAI – Full CANS</b>	24.9	15.3	0 – 90
<b>TAI – Core Domains Only</b>	15.4	8.2	0 – 51
<b>TAI – Core 50</b>	8.8	5	0 – 28
<b>Sum – Full CANS</b>	85.9	39.8	7 – 258
<b>Sum – Core Domains Only</b>	52.5	19.8	6 – 138
<b>Sum – Core 50</b>	30	11.6	2 - 71

# Distributions: Need Metrics

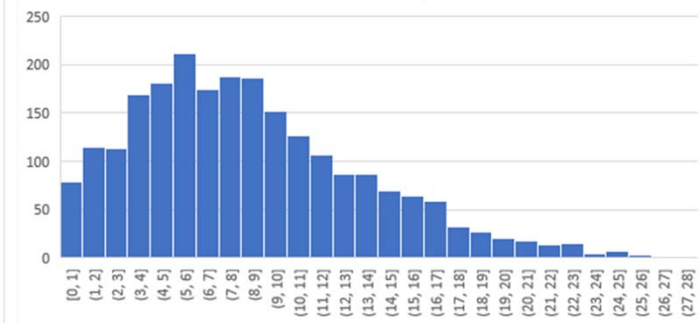
# of Actionable Items, Full CANS



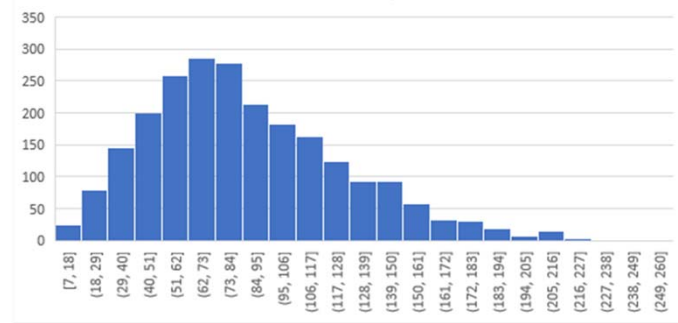
# of Actionable Items, Core Domains Only



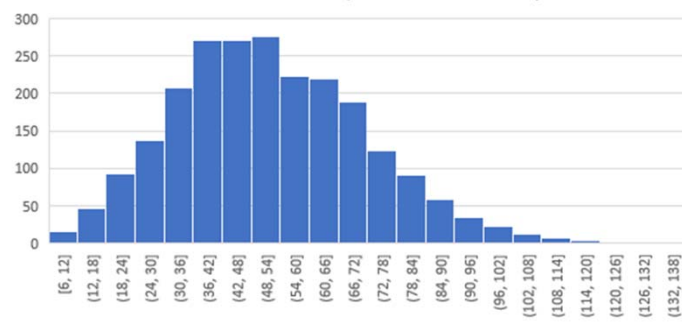
# of Actionable Items, Core 50



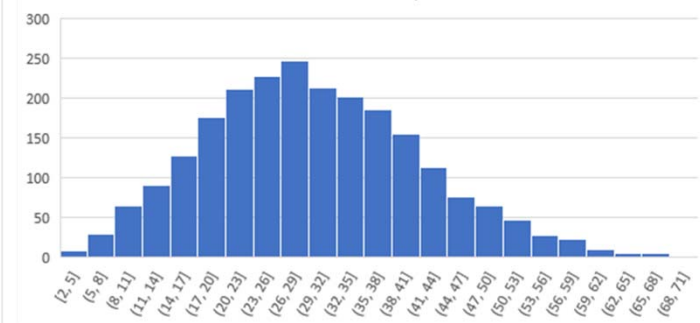
Sum of Item Scores, Full CANS



Sum of Item Scores, Core Domains Only



Sum of Item Scores, Core 50



# Correlation Between Needs Metrics

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- Generally, **strong correlation** across all needs metrics as assessed by Pearson tests of correlation.
  - Correlation coefficient values  $\sim 0.9$
- Slightly less strong correlations when differences in metric type and CANS type are both present
- **BUT, this can look different at the individual level**

# Percentile Ranks: Need Metrics

Placing a client on the continuum of need, relative to others

Median Difference in Percentile Rank Between Two Named Scales

5.7% 8.2% 6.0% 6.0% 7.2% 5.6% 5.6% 6.1% 6.3%

Percentile Ranks - Severity of Need Metrics						Difference in Percentile Ranks: Need Metrics								
Percentile Rank - Full TAI	Percentile Rank - Full CANS Sum	Percentile Rank - Core Domain TAI	Percentile Rank - Core Domain Sur	Percentile Rank - Core 50 TAI	Percentile Rank - Core 50 Sum	Diff by CANS Type					Diff by Metric Type			
						Full TAI - Core Domain TAI	Full TAI - Core 50 TAI	Core Domain TAI - Core 50 TAI	Full Sum - Core Domain Sum	Full Sum - Core 50 Sum	Core Domain Sum - Core 50 Sum	Full TAI - Core Domain TAI	Full TAI - Core 50 TAI	Core Domain TAI - Core 50 TAI
95%	94%	92%	89%	95%	94%	3%	0%	4%	5%	0%	5%	1%	2%	1%
68%	56%	68%	56%	74%	54%	0%	6%	6%	1%	2%	1%	12%	12%	19%
71%	65%	71%	72%	68%	64%	0%	3%	3%	6%	2%	8%	6%	0%	4%
74%	90%	46%	73%	61%	82%	28%	13%	15%	17%	8%	9%	16%	27%	21%
79%	72%	75%	69%	61%	57%	4%	18%	13%	4%	15%	11%	7%	6%	4%
99%	98%	99%	99%	100%	100%	0%	1%	1%	0%	1%	1%	1%	1%	1%
95%	91%	95%	94%	95%	96%	1%	0%	0%	3%	5%	2%	4%	1%	1%

Percentile Ranks - Severity of Need Metrics						Difference in Percentile Ranks: Need Metrics								
Percentile Rank - Full TAI	Percentile Rank - Full CANS Sum	Percentile Rank - Core Domain TAI	Percentile Rank - Core Domain Sur	Percentile Rank - Core 50 TAI	Percentile Rank - Core 50 Sum	Diff by CANS Type					Diff by Metric Type			
						Full TAI - Core Domain TAI	Full TAI - Core 50 TAI	Core Domain TAI - Core 50 TAI	Full Sum - Core Domain Sum	Full Sum - Core 50 Sum	Core Domain Sum - Core 50 Sum	Full TAI - Core Domain TAI	Full TAI - Core 50 TAI	Core Domain TAI - Core 50 TAI
99%	98%	99%	99%	100%	100%	0%	1%	1%	0%	1%	1%	1%	1%	1%
62%	77%	32%	64%	29%	60%	30%	33%	3%	13%	17%	4%	15%	32%	32%



# Key Takeaways: Needs Metrics

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- *In the big picture*, these metrics are generally similar
- *On the individual level*, some metrics will assess youth as having different levels of need relative to others.

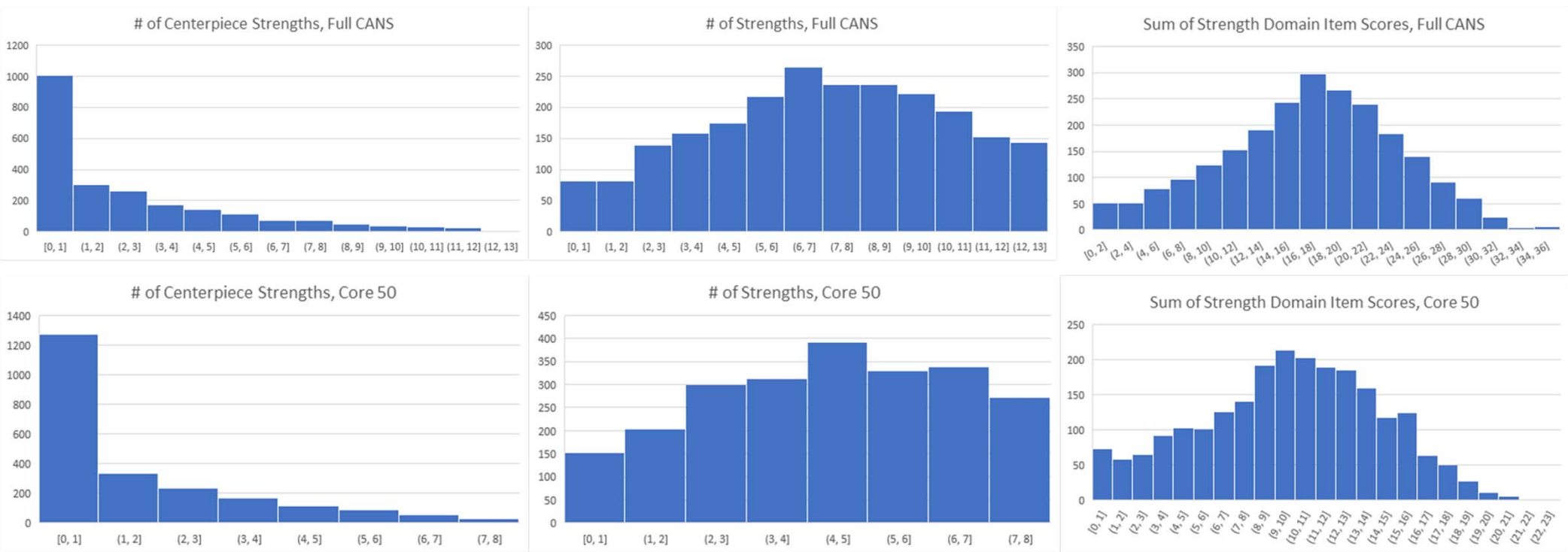
# Strength-Related Metrics

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# Summary Stats: Strength Metrics

Metric Name	Mean	St Dev.	Range
<b>Num of Centerpiece Strengths – Full CANS</b>	2.9	3	0 – 13
<b>Num of Centerpiece Strengths – Core 50</b>	1.9	2	0 – 8
<b>Num of Strengths – Full CANS</b>	7.6	3.3	0 – 13
<b>Num of Strengths – Core 50</b>	4.8	2.1	0 – 8
<b>Sum of Strength Domain Item Scores – Full CANS</b>	17.2	6.9	0 – 35
<b>Sum of Strength Domain Item Scores – Core 50</b>	10.2	4.5	0 - 23

# Distributions: Strength Metrics



# Correlation Between Strength Metrics

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- Generally, strong correlation between these strength-related metrics
  - Correlation coefficient of  $\sim 0.9$  for *non-centerpiece* strength metrics
- Weaker, but still relatively strong, correlations present between centerpiece and non-centerpiece strength metrics
  - Correlation coefficient of  $\sim 0.67$  for *centerpiece* strength metrics

# Percentile Ranks: Strengths Metrics

Median Difference in Percentile Rank Between Two Named Scales

4.4% 5.5% 4.8% 13.1% 10.9% 7.2% 15.4% 12.3% 9.7%

Percentile Ranks - Strength Metrics						Difference in Percentile Ranks: Strength Metrics								
Percentile Rank - #Centerpiece Strengths	Percentile Rank - #Strengths	Percentile Rank - Sum of Strengths Domain (Inverse Scale)	Percentile Rank - Core 50 #Centerpiece Strengths	Percentile Rank - Core 50 #Strengths	Percentile Rank - Core 50 Sum of Strengths Domain (Inverse Scale)	Diff by CANS Type			Diff by Metric Type					
						Full #Center - Core 50	Full #Strengths - Core 50	Full Sum - Core 50 Sum	Full #Center - Full	Full #Center - Full #Strengths - Full Sum	Full Core 50 #Center - Core 50	Full Core 50 #Strengths - Core 50		
0%	7%	96%	0%	2%	98%	0%	5%	2%	7%	4%	3%	2%	2%	0%
44%	4%	89%	33%	2%	88%	10%	1%	1%	40%	33%	7%	31%	21%	10%
44%	13%	78%	33%	15%	76%	10%	2%	2%	31%	21%	9%	18%	9%	9%
0%	13%	86%	0%	15%	83%	0%	2%	3%	13%	14%	1%	15%	17%	2%
0%	49%	50%	0%	59%	41%	0%	11%	8%	49%	51%	2%	59%	59%	0%
25%	4%	78%	33%	2%	76%	8%	1%	2%	22%	3%	19%	31%	9%	22%
25%	1%	82%	33%	2%	76%	8%	1%	6%	24%	7%	17%	31%	9%	22%
0%	28%	73%	0%	29%	68%	0%	1%	5%	28%	27%	0%	29%	32%	4%
0%	37%	56%	0%	59%	41%	0%	22%	15%	37%	44%	7%	59%	59%	0%
25%	20%	67%	0%	29%	68%	25%	9%	0%	5%	7%	13%	29%	32%	4%

Percentile Ranks - Strength Metrics						Difference in Percentile Ranks: Strength Metrics								
Percentile Rank - #Centerpiece Strengths	Percentile Rank - #Strengths	Percentile Rank - Sum of Strengths Domain (Inverse Scale)	Percentile Rank - Core 50 #Centerpiece Strengths	Percentile Rank - Core 50 #Strengths	Percentile Rank - Core 50 Sum of Strengths Domain (Inverse Scale)	Full #Center - Core 50	Full #Strengths - Core 50	Full Sum - Core 50 Sum	Full #Center - Full	Full #Center - Full #Strengths - Full Sum	Full Core 50 #Center - Core 50	Full Core 50 #Strengths - Core 50		
													0%	1%
0%	87%	29%	0%	73%	33%	0%	14%	4%	87%	72%	16%	73%	67%	6%

# Key Takeaways: Strength Metrics

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- Metrics which do not exclusively involve “centerpiece” strengths are generally similar.
- As with needs metrics, *on the individual level*, some metrics will assess youth as having different levels of strength relative to others.

# Needs vs. Strengths Metrics

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# Correlation: Needs and Strength Metrics?

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- Moderately strong negative correlations between needs- and strength-related metrics do exist
  - Correlation coefficient values range from 0.53 - 0.73
- Higher overall need is generally associated with the absence of strengths.

# Implications and Next Steps

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- Aggregate measures are generally similar
  - Challenge of meaningful aggregation
  - Further exploration of using differences in CANS forms
  - Deep dive into measuring “well-being”
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# Questions or thoughts?

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