Goal Attainment Scaling

A systematic review of GAS as an outcome measure in drug trials

ISCB Conference Utrecht

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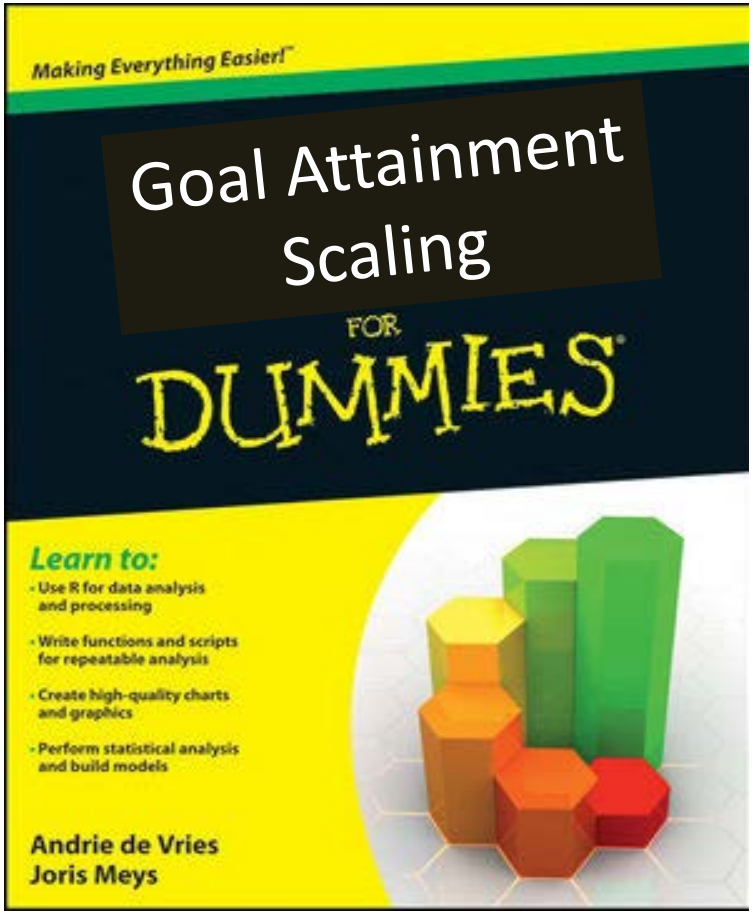
GAS…?


Making Everything Easier!™
Goal Attainment Scaling
FOR DUMMIES
Learn to:
- Use R for data analysis and processing
- Write functions and scripts for repeatable analysis
- Create high-quality charts and graphics
- Perform statistical analysis and build models
Andrie de Vries
Joris Meys

Imagine 3 boys with Duchenne disease:

‘I want to be able to walk’

‘I want to be able to eat independently’

‘I want to breathe independently’

Six minute walk test

-2 Adam is unable to walk

-1 Adam can take 3 steps

0 Adam is able to walk for 5 minutes

1 Adam can walk for 15 minutes

2 Adam can walk longer distances

-2 Chris is unable to breathe independently

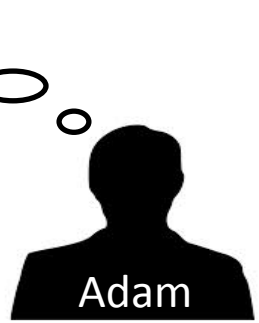
-1 Chris can breathe for 10 minutes

0 Chris can breathe for one hour

1 Chris can breathe for two hours

2 Chris can breathe for at least three hours

‘I want to be able to walk’
‘I want to be able to get dressed in the morning’
‘I want to be able to use my wheelchair without any help’
‘I want to be able to play with friends’

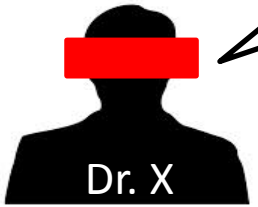


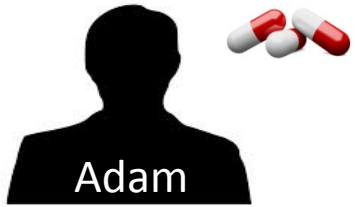
$$T = 50 + \frac{10\,\Sigma w_i x_i}{\sqrt{(1-\rho)\Sigma w_i^{\,2} + \rho(\Sigma w_i)^2}}$$

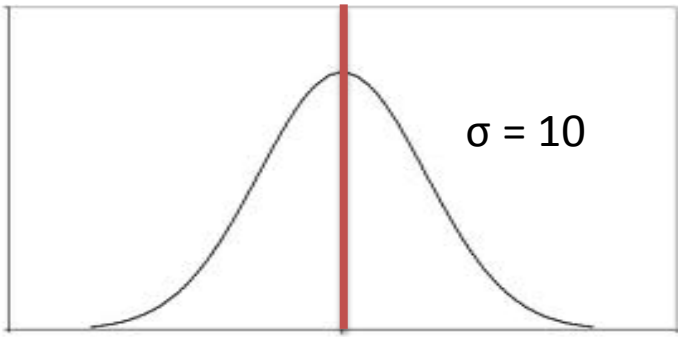
$$T = 50 + \frac{10 \Sigma w_i x_i}{\sqrt{(1-\rho)\Sigma w_i^2 + \rho(\Sigma w_i)^2}}$$

T	=	*GAS score*
x_i	=	*Original score*
w_i	=	*Weight given to the original score*
ρ	=	*Intercorrelation among goal scores (estimated at 0.3)*

1. What are your goals, defined in 5 levels of attainment?
2. Which goals are most important to you?
3. *Intervention*
4. Have you attained your goals?





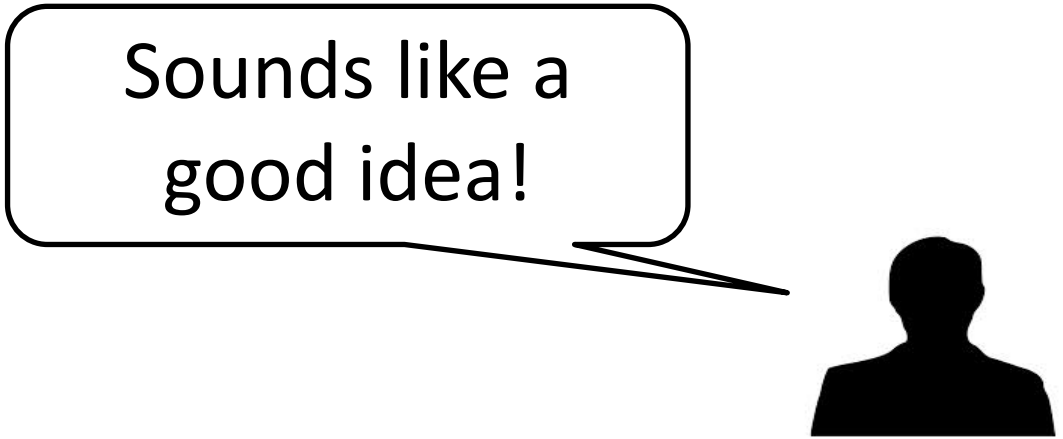

σ = 10
μ = 50


Adam


Chris

asterix

Advances in Small Trials dEsign for Regulatory Innovation and eXcellence



Systematic Review

Is GAS useful in drug trials?

- *Is GAS used in drug trials?*
- *Has GAS been validated in drug trials?*
- *Has GAS been validated in other studies?*

Methods

- Search in Medline, Embase, PsychInfo (with help of a librarian)
- Search terms: Trial, RCT, variations of Goal Attainment Scaling
- Selection by 2 reviewers independently
- Data extraction and critical appraisal by 2 reviewers independently

Results

Primary search: 5459 titles & abstracts

→ 1641 duplicates removed

3818 titles & abstracts assessed for eligibility

→ 3511 articles excluded based on title & abstract

307 full text articles assessed for eligibility

→ 249 articles excluded based on full text

58 articles included

What did all those papers tell us?

- Validation is mainly done in geriatrics/rehabilitation

- Usually in non-drug trials

Drug trials

- Botulinum Toxin (Botox) used in patients with Cerebral Palsy

- Donepezil hydrochloride in Alzheimer Disease patients

Data extraction

Face validity

Content validity

Construct validity

Intra-rater reliability

Inter-rater reliability

Responsiveness

Data extraction

Face validity

Content validity

Construct validity

~~Intra-rater reliability~~

Inter-rater reliability

Responsiveness

Face validity

Content validity

Construct validity

Inter-rater reliability

Responsiveness

Face validity

In drug studies: 1

In GAS validity studies: 0

- *Therapists and intakers evaluated the relevance of the goal area for a patient on a 5-point scale.*
- *‘Goal areas were suitably chosen’*

Content validity

In drug studies: 0

In validity studies: 3

- *Different methods were used*
- *‘Goals were grouped in major categories, and reviewed by clinicians’*

Construct validity

In drug studies: 6

In validity studies: 11

- *Mainly correlations with other relevant measurement instruments*
- *Correlations between change scores: is that construct validity?*

Inter-rater reliability

In drug studies: 2

In validity studies: 10

- *Overall: Good inter-rater reliability (ICC > 0.9, κ >0.5)*
- *Only in one study the ICC calculation was reported*

Responsiveness

In drug studies: 3

In validity studies: 11

- *Responsiveness is usually good to very good: ES > 1*

To summarize…

GAS is an inventive measurement instrument for heterogenous patient groups

Validation of GAS in drug trials needs more research..

..but how?

Questions to consider…

Should we validate GAS in drug trials?

How should GAS be validated in drug trials?

When is GAS ‘valid’?

Thank you for your attention!