Predictive validity of the Motivation To Stop Scale (MTSS): a single-item measure of motivation to stop smoking

CAHAG Conference, Utrecht, 24 January 2013

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Background

- Motivation to stop as measure for
  - effect of (population) interventions
  - tracking trends over time
  - comparing populations or subgroups
- Various (ad hoc) measures exist, many used in clinical samples
- No current standard with proven validity exists for population samples
MTSS

• Motivation To Stop Scale (MTSS)
  – Prof. Robert West and
  – English Department of Health
  – Central Office of Information

• Single-item measure of key elements of motivation (West, Theory of addiction 2005)
  – intention
  – desire
  – belief
Aims of this study

• Data from "Smoking Toolkit Study"
• Predictive validity
  – baseline > quit attempts during 6 months
• Diagnostic accuracy
  – sensitivity, specificity, \( \text{ROC}_{\text{AUC}} \)
• Divergent validity (no gold standard)
  – comparison measures of dependence
Smoking Toolkit Study

- All current smokers surveys November 2008 – January 2011
- 2,483 respondents to 6-month follow-up questionnaire (21% response)

www.SmokingInEngland.info
MTSS categories

"Which of the following describes you?"

1. "I don't want to stop smoking"
2. "I think I should stop smoking but don't really want to"
3. "I want to stop smoking but haven't thought about when"
4. "I really want to stop smoking but I don't know when I will"
5. "I want to stop smoking and hope to soon"
6. "I really want to stop smoking and intend to in the next 3 months"
7. "I really want to stop smoking and intend to in the next month".

(1=lowest, 7=highest level of motivation to stop)
MTSS categories

"Which of the following describes you?"

1. "I don't want to stop smoking"
2. "I think I **should** stop smoking but don't really want to"
3. "I **want** to stop smoking but haven't thought about when"
4. "I **really want** to stop smoking but I don't know when I will"
5. "I **want** to stop smoking and **hope to soon**"
6. "I **really want** to stop smoking and **intend to in the next 3 months**"
7. "I **really want** to stop smoking and **intend to in the next month**."

*(belief, desire, intention)*
Outcome and covariates

- Any serious quit attempt between baseline and 6-month follow-up
- Sensitivity: 3-month follow-up
- Covariates
  - age, sex, social grade
  - Heaviness of Smoking Index (Kozlowski, Drug Alcohol Depend 1994)
  - Strength of urges to smoke (Fidler, Addiction 2011)
Distribution scores baseline

- 21%: Not want to stop
- 17%: Should stop but don't really want to
- 11%: Want to stop but not thought about when
- 9%: REALLY want to stop but dont know when
- 9%: Want to stop and hope to soon
- 24%: REALLY want to stop and intend to in <3 months
- 9%: REALLY want to stop and intend to in <1 month
Attempts according to MTSS

692 (28%) made attempt

Percentage of smokers who made a quit attempt between baseline and 6-month follow-up

1. Not want to stop
2. Should stop but don't really want to
3. Want to stop but not thought about when
4. REALLY want to stop but dont know when
5. Want to stop and hope to soon
6. REALLY want to stop and intend to in <3 months
7. REALLY want to stop and intend to in <1 month

Motivation to quit measured at baseline
# Odds of making an attempt

1. **OR** | **95% CI** | **aOR** | **95% CI**
---|---|---|---
1 | 1.0 | 1.0 | 
2 | 1.65 | (1.16-2.36) | 1.70 | (1.19-2.44) |
3 | 1.74 | (1.15-2.63) | 1.75 | (1.14-2.69) |
4 | 2.92 | (2.14-4.00) | 2.96 | (2.14-4.09) |
5 | 4.07 | (2.85-5.81) | 4.20 | (2.90-6.08) |
6 | 6.43 | (4.46-9.28) | 6.30 | (4.31-9.22) |
7 | 6.83 | (4.70-9.92) | 7.16 | (4.87-10.53) |

(1=lowest, 7=highest level of motivation to stop)
ROC for MTSS

**MTSS**
\[ \text{ROC}_{AUC} = 0.67 \]
\[ \text{(95\% CI} = 0.65 - 0.70) \]

**HSI**
\[ \text{ROC}_{AUC} = 0.47 \]
\[ \text{(0.45 - 0.50)} \]

**Urges**
\[ \text{ROC}_{AUC} = 0.53 \]
\[ \text{(0.50 - 0.55)} \]
Sensitivity analysis

- MTSS baseline, quit attempt 3 months
- Association slightly stronger
  - OR level 7 = 9.2 (vs. 6.8)
- Accuracy similar
  - ROC_{AUC} = 0.69 (vs. 0.67)
Strengths & limitations

- Low response (21%) to follow-up (association underestimated?)
- Retrospective self-report attempts over 6 months (small bias according to 3m data)
- No other measure for comparison (divergent validity)
+ Large sample, long follow-up
Conclusions

- MTSS single-item measure combining belief, desire and intention to quit
- Strong ordinal association with quit attempts
- Acceptable level of accuracy for this field of research
- Valuable, cost-efficient tool for studies on motivation to stop
- Future research: external validation
Disclosures

Role of funding source
The Smoking Toolkit Study is funded by the English Department of Health, Cancer Research UK, Pfizer, GlaxoSmithKline, and J&J. Pfizer, J&J, and GlaxoSmithKline are manufacturers of smoking cessation products who had no involvement in the design of the study, collection, analysis or interpretation of the data, the writing of the report, or the decision to submit the paper for publication.

Conflict of interest
Robert West undertakes research and consultancy for, and has received travel expenses and hospitality from, companies that develop and market smoking cessation medications. He has a share on a patent for a novel nicotine delivery device. Daniel Kotz and Jamie Brown have no conflict of interest to declare.

Acknowledgements
We would like to thank Jennifer Fidler for her contribution to the design and coordinating of the Smoking Toolkit Study.
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