

The Prognostic value of trait anger in treatment of methamphetamine dependence

Melissa R. Claire

BA(Psych)(Hons)

**Thesis submitted for the fulfillment of the award of
Doctor of Philosophy**

School of Medicine & Public Health

March 2012

Statement of Originality

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library**, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

**Unless an Embargo has been approved for a determined period.

Signed: _____

Melissa Claire

Date: _____

Acknowledgement of Authorship and Collaboration

I hereby certify that the work embodied in this thesis has been done in collaboration with other researchers and contains published papers/ scholarly work of which I am a joint author. My contribution to the joint publications/ scholarly work includes the acquisition of data, analysis and interpretation of data, drafting and revising manuscripts for publication as per listed below.

Publications arising from the clinical trial

Baker, A., Kay-Lambkin, F., Lee, N., Claire, M. & Jenner, L. (2003). *A brief cognitive behavioural intervention for amphetamine users*. Canberra: Australian Government Department of Health and Ageing.

Baker, A., Lee, N., Claire, M., Lewin, T., Grant, T., Pohlman, S., Saunders, J., Kay-Lambkin, F., Constable, P., Jenner, L., & Carr, V. (2004). Drug use patterns and mental health of regular amphetamine users during a reported ‘heroin drought’. *Addiction*, 99(7), 875-884.

Baker, A., Lee, N., Claire, M., Lewin, T., Grant, T., Pohlman, S., Saunders, J., Kay-Lambkin, F., Constable, P., Jenner, L., & Carr, V. (2005). Brief cognitive behavioural interventions for regular amphetamine users: a step in the right direction. *Addiction* 100(3), 367-378.

These publications are presented separately as Appendices.

Signed: _____

Melissa Claire

Date: _____

Acknowledgements

First and foremost I would like to acknowledge and thank my PhD supervisors Associate Professor Kypros Kypri and Professor Catherine D'Este for their constant support, their expertise and their invaluable guidance. It was a privilege to have been supervised by them and I can not thank them enough for their kindness and consideration through what became a very difficult journey.

I would also like to extend my gratitude to Professor Michael Hensley who provided a much needed sense of humanity at a critical point in this journey.

My thanks also to Terry Lewin for his encouragement and assistance during the early stages of this thesis, to Dr Sylvie Lambert and Dr Patrick McElduff for their valuable comments during the final stages of this research.

This thesis would not have been possible without the patients who volunteered their time and who willingly shared their experiences in the hope of further understanding methamphetamine addiction, anger, aggression and violence.

A special thank you also to Dr Anthony Schwarzer for his medical expertise and care, enabling me to keep working on my thesis.

I wish to thank my parents for their unrelenting support, encouragement and countless hours of child-care. Thank you to family and friends who have also offered their time and kindness throughout this time. Finally, to my beautiful son Jack, you are precious beyond belief and there are no words to describe the joy that you have given me.

Dedication

This thesis is dedicated to my beautiful son Jack.

This thesis traversed several unexpected pathways that inevitably made the journey longer than expected and at times quite arduous. However, at a critical point in this journey my son, in utero, and I survived and that is truly a miracle.

“Take the first step in faith. You don't have to see the whole staircase, just take the first step”. Martin Luther King, Jr.

Table of Contents

CHAPTER 1 METHAMPHETAMINE FORMS, PATTERNS OF USE AND DEPENDENCE	1
1.1 TERMINOLOGY	1
1.2 FORMS OF METHAMPHETAMINE.....	1
1.3 PATTERNS OF USE	2
1.4 DEPENDENCE AND WITHDRAWAL	7
1.5 PREVALENCE	9
1.5.1 A BRIEF HISTORY OF GLOBAL TRENDS	9
1.5.2 RECENT GLOBAL TRENDS.....	11
1.5.3 PREVALENCE OF METHAMPHETAMINE USE IN AUSTRALIA	12
1.6 RISK FACTORS.....	15
1.7 SUMMARY.....	19
 CHAPTER 2 ANGER AND AGGRESSION.....	 21
2.1 DEFINITIONS	21
2.1.1 ANGER	21
2.1.2 HOSTILITY	21
2.1.3 AGGRESSION.....	22
2.1.4 VIOLENCE	22
2.1.5 PATHWAYS FROM ANGER TO AGGRESSION AND VIOLENCE	23
2.2 ANGER, AGGRESSION AND SUBSTANCE USE.....	23
2.2.1 DEVELOPMENTAL FACTORS	27
2.3 CRIMINAL BEHAVIOUR	28
2.4 CO-MORBIDITY	29
2.5 METHAMPHETAMINE USE, ANGER AND AGGRESSION	32
2.6 CONCLUSION	35

CHAPTER 3 AN ASSESSMENT OF THE PSYCHOMETRIC PROPERTIES OF THE STAXI-2.....	36
3.1 THE MEASUREMENT OF ANGER.....	36
3.2 SCALE VALIDITY	40
3.2.1 CONTENT VALIDITY.....	40
3.2.2 FACE VALIDITY	42
3.2.3 CRITERION VALIDITY.....	42
3.3 FACTOR ANALYSIS.....	46
3.3.1 THE COMMON FACTOR MODEL	46
3.3.2 EXPLORATORY FACTOR ANALYSIS.....	47
3.3.3 CONFIRMATORY FACTOR ANALYSIS.....	47
3.3.4 FACTOR ANALYSIS AND CONSTRUCT VALIDITY	48
3.3.5 FACTOR EXTRACTION	50
3.3.6 FACTOR ROTATION	53
3.3.7 SIMPLE FACTOR STRUCTURE.....	56
3.3.8 ITEM LOADINGS AND FACTORS.....	56
3.3.9 DESCRIBING FACTORS	57
3.4 SCALE RELIABILITY	57
3.4.1 THE VALIDITY AND RELIABILITY OF ANGER MEASURES	61
3.5 DEVELOPMENT OF THE STAXI.....	62
3.5.1 STAXI SCALES AND SUBSCALES	62
3.5.2 RELIABILITY AND VALIDITY OF THE STAXI.....	64
3.6 THE STAXI-2.....	71
3.6.1 THE STAXI-2 SCALES AND SUBSCALES	71
3.6.2 VALIDITY AND RELIABILITY OF THE STAXI-2.....	75
3.6.3 STUDIES THAT HAVE EXAMINED THE VALIDITY AND RELIABILITY OF THE STAXI-2	76

3.7 STUDY AIMS.....	76
3.8 METHOD.....	77
3.8.1 DEVELOPMENT OF THE STUDY.....	77
3.8.2 RECRUITMENT	77
3.8.3 CRITERIA FOR INCLUSION AND EXCLUSION.....	77
3.8.4 PROCEDURE.....	78
3.8.5 INTERVIEW SCHEDULE	78
3.9 STATISTICAL METHODS.....	79
3.9.1 DESCRIPTION OF THE SAMPLE.....	79
3.9.2 EXPLORATORY DATA ANALYSIS.....	79
3.9.3 CONSTRUCT VALIDITY	81
3.9.4 FACTOR ANALYSIS	82
3.10 RESULTS	87
3.10.1 THE SAMPLE	87
3.10.2 ASSESSMENT OF NORMALITY	87
3.10.3 SAMPLING ADEQUACY.....	88
3.10.4 CONSTRUCT VALIDITY	88
3.10.5 PRINCIPAL AXIS FACTORING OF SIX SELECTED FACTORS WITH AND WITHOUT OBLIQUE ROTATION.....	92
3.10.6 RELIABILITY ANALYSIS.....	99
3.11 DISCUSSION	102
3.11.1 ASSESSMENT OF DISTRIBUTION OF ITEMS	102
3.11.2 CONSTRUCT VALIDITY	104
3.11.3 RELIABILITY	116
3.11.4 STRENGTHS AND LIMITATIONS OF THE STUDY	117
3.12 CONCLUSION	118

CHAPTER 4 TRAIT ANGER AS A PROGNOSTIC INDICATOR FOR METHAMPHETAMINE TREATMENT OUTCOME	119
4.1 INTRODUCTION	119
4.2 METHODS	120
4.2.1 STUDY DESIGN	120
4.2.2 RECRUITMENT	120
4.2.3 PATIENTS.....	121
4.2.4 PROCEDURE.....	121
4.2.5 DATA COLLECTION SETTINGS AND LOCATIONS	122
4.2.6 MEASURES	123
4.2.7 RANDOMISATION	128
4.2.8 THE INTERVENTION	129
4.3 STATISTICAL METHODS.....	132
4.3.1 PARTICIPANT RECRUITMENT AND FOLLOW-UP	132
4.3.2 TREATMENT OUTCOME.....	133
4.3.3 TRAIT ANGER AS AN EFFECT MODIFIER FOR TREATMENT OUTCOME	134
4.3.4 SAMPLE SIZE/ POWER.....	137
4.3.5 ETHICAL APPROVAL.....	138
4.4 RESULTS	138
4.4.1 PARTICIPANT FLOW	138
4.4.2 COMPARISONS OF THOSE WHO DID AND DID NOT COMPLETE THE STAXI-2 AT BASELINE (153 vs. 61) AND BASELINE CHARACTERISTICS OF THE ANGER STUDY PATIENTS.....	140
4.4.3 CHARACTERISTICS OF THE SAMPLE BASED ON TREATMENT STATUS	142
4.4.4 COMPARISONS OF THOSE WHO COMPLETED BOTH THE STAXI-2 AT BASELINE AND THE FOLLOW-UP ASSESSMENT (N=111) WITH THOSE WHO DID NOT (N=42)	143
4.4.5 TREATMENT OUTCOME AND TREATMENT GROUP	145

4.4.6 BASELINE TRAIT ANGER AND TREATMENT OUTCOME	146
4.5 DISCUSSION	162
4.5.1 SUMMARY OF FINDINGS	162
4.5.2 EPISTEMOLOGICAL FRAMEWORK	165
4.5.3 MEASUREMENT	165
4.5.4 TRAIT ANGER AND TREATMENT FOR ADDICTION.....	167
CHAPTER 5 CONCLUSION	170
REFERENCES	177
GLOSSARY	204

Table of Tables

Table 1.1 Methamphetamine use, persons aged 14 years or older by age and sex, 2007 (AIHW, 2008, p.64).....	13
Table 1.2. Frequency of methamphetamine use, recent users aged 14 years or older, by age, by sex, 2007 (percent) (AIHW, 2008, p64)	13
Table 1.3. Form of methamphetamine used, recent users aged 14 years or older, by sex, 2007 (percent) (AIHW, 2008, p.65)	14
Table 3.1 Measures of validity	41
Table 3.2 Measures of reliability.....	58
Table 3.3 Description of the STAXI (1988) scales and subscales.....	63
Table 3.4 Description of the STAXI (1988) and STAXI-2 (1999) state anger scales.....	71
Table 3.5 Description of the STAXI (1988) and STAXI-2 (1999) trait anger scales.....	72
Table 3.6 Description of STAXI (1988) and STAXI-2 (1999) anger expression scales.....	73
Table 3.7 Description of STAXI (1988) and STAXI-2 (1999) anger control scales	74
Table 3.8 Patients' referral source and recruitment rates by location	87
Table 3.9 Principal Axis Factoring initial solution of STAXI-2 item scores	89
Table 3.10 Principal Axis Factoring initial solution of nine factors item loadings.....	90
Table 3.11 Total variance explained from PAF initial solution before and after rotation	90
Table 3.12 Initial solution factor correlation matrix extraction of nine factors with oblique rotation	91
Table 3.13 Structure matrix correlations for each factor after oblique rotation.....	92
Table 3.14 Total variance explained by PAF extraction of six factors with oblique rotation	93
Table 3.15 Factor correlation matrix extraction of six factors with oblique rotation	94
Table 3.16 Factor loadings for the PAF six factor extraction with oblique rotation.....	95
Table 3.17 Reliability analysis of the PAF six factor extraction oblique rotation by varimax	100
Table 3.18 Reliability analysis of STAXI-2 scales and subscales.....	101

Table 4.1 Assessment instruments included in the Anger Study	124
Table 4.2 Description of variables selected for the general linear models.....	136
Table 4.3 Comparisons between patients who completed the STAXI-2 at baseline and those who did not (n=214).....	141
Table 4.4 Comparisons of patients who completed baseline STAXI-2 by treatment group (n=153).....	144
Table 4.5 Description of patients by completion of follow-up assessment.....	145
Table 4.6 Comparisons between percent abstinent and changes in methamphetamine use by treatment group for patients who completed baseline STAXI-2 and follow-up (n=111).....	146
Table 4.7 Comparisons between high trait anger at baseline and methamphetamine abstinence among patients who completed the STAXI-2 at baseline and follow-up (n=111)	147
Table 4.8 Comparison of baseline trait anger, methamphetamine abstinence and change in methamphetamine use, among patients who completed the STAXI-2 at baseline and follow-up.....	148
Table 4.9 Parameter estimates for Model 1* variables in the equation predicting methamphetamine change scores.....	149
Table 4.10 Parameter estimates for Model 2* variables in the equation predicting methamphetamine change scores.....	154
Table 4.11 Model 3* variables in the equation predicting methamphetamine abstinence	158
Table 4.12 Model 4* variables in the equation predicting methamphetamine abstinence	160

Table of Figures

Figure 2.1 Volavka's Intergenerational Transmission Model of Violence.....	25
Figure 4.1 Patient flow diagram: recruitment and attrition	139
Figure 4.2 Line of best fit for Model 1 variables in the equation predicting methamphetamine change scores.....	151
Figure 4.3 Histogram of residual values for Model 1.....	152
Figure 4.4 Normal quantile-quantile plot of residual values from Model 1	152
Figure 4.5 Scatterplot of Model 1 standardised residuals against predicted values.....	153
Figure 4.6 Graph of Model 2 variables in the equation predicting methamphetamine change scores	155

Table of Appendices

APPENDIX 1 DIAGNOSTIC CRITERIA FOR AMPHETAMINE WITHDRAWAL.....	212
APPENDIX 2 SPIELBERGER'S (1999) FACTOR LOADINGS EIGHT-FACTOR SOLUTION	
NORMAL ADULTS AGES 16 YEARS AND OLDER BY GENDER STAXI-2 57	
ITEMS.....	213
APPENDIX 3 SPIELBERGER STAXI-2 CRONBACH ALPHA COEFFICIENTS	216
APPENDIX 4 INFORMATION FLYER	218
APPENDIX 5 INITIAL SCREENING INSTRUMENT	219
APPENDIX 6 WRITTEN CONSENT.....	221
APPENDIX 7 FREQUENCY DISTRIBUTIONS OF SCORES TO EACH STAXI-2 SCALE AND	
SUBSCALE.....	222
APPENDIX 8 HISTOGRAMS OF BASELINE RESPONSES TO THE 57 ITEMS OF THE STAXI-2	
.....	234
APPENDIX 9 SAMPLING ADEQUACY: KMO INDEX AND BARTLETT'S TEST OF SPHERICITY	
.....	235
APPENDIX 10 CONSTRUCT VALIDITY: CATTELL'S SCREE TEST FROM THE PAF INITIAL	
SOLUTION OF NINE FACTORS WITHOUT ROTATION	236
APPENDIX 11 ITEM COMMUNALITIES: PAF INITIAL SOLUTION OF NINE FACTORS	
WITHOUT ROTATION	237
APPENDIX 12 TOTAL VARIANCE EXPLAINED: PAF INITIAL SOLUTION OF NINE FACTORS	
WITHOUT ROTATION	238

APPENDIX 13 FACTOR MATRIX OF PAF INITIAL SOLUTION OF NINE FACTORS WITHOUT ROTATION	239
APPENDIX 14 CONSTRUCT VALIDITY: PAF INITIAL SOLUTION OF NINE FACTORS WITH PROMAX OBLIQUE ROTATION	240
APPENDIX 15 FACTOR CORRELATION MATRIX: PAF INITIAL SOLUTION OF NINE FACTORS WITH PROMAX OBLIQUE ROTATION	241
APPENDIX 16 STRUCTURE MATRIX: PAF INITIAL SOLUTION NINE FACTORS PROMAX OBLIQUE ROTATION	242
APPENDIX 17 PATTERN MATRIX: PAF INITIAL SOLUTION NINE FACTORS PROMAX OBLIQUE ROTATION	243
APPENDIX 18 CONSTRUCT VALIDITY: CATTELL'S SCREE TEST PAF OF SIX FACTOR EXTRACTION WITHOUT ROTATION	244
APPENDIX 19 KAISER-MEYER-OLKIN MEASURE OF SAMPLING ADEQUACY AND BARTLETT'S TEST OF SPHERICITY: PAF OF SIX FACTOR EXTRACTION WITHOUT ROTATION	245
APPENDIX 20 ITEM COMMUNALITIES: PAF SIX FACTOR EXTRACTION WITHOUT ROTATION	246
APPENDIX 21 TOTAL VARIANCE EXPLAINED: PAF SIX FACTOR EXTRACTION WITHOUT ROTATION	247
APPENDIX 22 FACTOR MATRIX: PAF SIX FACTOR EXTRACTION WITHOUT ROTATION..	248
APPENDIX 23 CONSTRUCT VALIDITY: TOTAL VARIANCE EXPLAINED FROM PAF SIX FACTOR EXTRACTION WITHOUT ROTATION	249

APPENDIX 24 FACTOR CORRELATION MATRIX: PAF SIX FACTOR EXTRACTION WITH OBLIQUE ROTATION	250
APPENDIX 25 STRUCTURE MATRIX: PAF SIX FACTOR EXTRACTION WITH OBLIQUE ROTATION	251
APPENDIX 26 PATTERN MATRIX: PAF SIX FACTOR EXTRACTION WITH OBLIQUE ROTATION	252
APPENDIX 27 RELIABILITY ANALYSIS USING THE PAF SIX FACTOR EXTRACTION WITH OBLIQUE ROTATION	253
APPENDIX 28 RELIABILITY ANALYSIS USING SPIELBERGER'S (1999) STAXI-2 STRUCTURE	256
APPENDIX 29 RELIABILITY ANALYSIS OF THE 57 ITEMS FROM THE STAXI-2	259
APPENDIX 30 PUBLICATION BAKER, KAY-LAMBKIN, LEE, CLAIRE & JENNER (2003)	261
APPENDIX 31 PUBLICATION BAKER, LEE, CLAIRE ET AL., (2004)	262
APPENDIX 32 PUBLICATION BAKER, LEE, CLAIRE ET AL., (2005)	263
APPENDIX 33. MODEL 1. VARIABLES IN THE EQUATION PREDICTING METHAMPHETAMINE CHANGE SCORES: BASELINE TRAIT ANGER, TREATMENT GROUP STATUS, INTERACTION TERM	264
APPENDIX 34 MODEL 1 VARIABLES IN THE EQUATION PREDICTING METHAMPHETAMINE CHANGE SCORES: BASELINE TRAIT ANGER, TREATMENT GROUP STATUS, NON INTERACTION TERM	266

APPENDIX 35 MODEL 2 VARIABLES IN THE EQUATION PREDICTING METHAMPHETAMINE CHANGE SCORES: BASELINE HIGH TRAIT ANGER, TREATMENT GROUP STATUS, INTERACTION TERM.....	267
APPENDIX 36 MODEL 2 VARIABLES IN THE EQUATION PREDICTING METHAMPHETAMINE CHANGE SCORES: BASELINE HIGH TRAIT ANGER, TREATMENT GROUP STATUS, NON INTERACTION TERM	269
APPENDIX 37 MODEL 3 FINAL STEP(12) VARIABLES IN THE EQUATION PREDICTING METHAMPHETAMINE ABSTINENCE: BASELINE TRAIT ANGER, TREATMENT GROUP STATUS, INTERACTION TERM	270
APPENDIX 38 MODEL 3 FINAL STEP(12) VARIABLES IN THE EQUATION PREDICTING METHAMPHETAMINE ABSTINENCE: BASELINE TRAIT ANGER, TREATMENT GROUP STATUS, NON INTERACTION TERM.....	273
APPENDIX 39 MODEL 4 FINAL STEP(12) VARIABLES IN THE EQUATION PREDICTING METHAMPHETAMINE ABSTINENCE: BASELINE HIGH TRAIT ANGER, TREATMENT GROUP STATUS, INTERACTION TERM.....	275
APPENDIX 40 MODEL 4 FINAL STEP(12) VARIABLES IN THE EQUATION PREDICTING METHAMPHETAMINE ABSTINENCE: BASELINE HIGH TRAIT ANGER, TREATMENT GROUP STATUS, NON INTERACTION TERM	278

Abstract

Methamphetamine is a potent stimulant with high abuse potential and is the second most widely used illicit drug in the world, after cannabis. The prevalence of methamphetamine use in Australia is among the highest in the world with an estimated 1.1 million people (6% of those aged 14 years and over) reporting lifetime use. Nearly all users of methamphetamine experience withdrawal and aggression is a common sequela. Methamphetamine use is a risk factor for a wide range of negative consequences including physical, neurological and psychiatric illness, property crime and violence. The relationship between methamphetamine use, anger and violence is complex and moderated by a range of individual, social and environmental factors.

Treatment for methamphetamine use may be hindered by a propensity for anger in patients. This study utilises data from a randomised controlled trial of cognitive behaviour therapy for methamphetamine users to: (1) assess the reliability and validity of a measure of anger (the STAXI-2) in an Australian clinical sample of methamphetamine users; and (2) test the hypothesis that trait anger is prognostic of methamphetamine treatment outcome. A high level of internal consistency and factor analysis established the reliability and validity of the scale in this population group. A series of multivariate statistical models was developed to test whether trait anger upon entry to treatment is prognostic of treatment outcome. Contrary to the hypothesis, patients high in trait anger at baseline did no worse in treatment than patients with low trait anger; that is, trait anger did not modify the effect of treatment. These findings show that the STAXI-2 is a valid measure of anger in this population group and that high levels of trait anger should not be considered a barrier to the delivery of effective treatment to patients with methamphetamine use disorders.