

Assessing offender change over treatment: The influence of treatment context on self-reported antisocial attitudes

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Aims

The current study examined how offenders' self-reports of dynamic risk factors related to antisocial attitudes are influenced by differing contexts of assessment over the course of treatment.

Methods

The sample consisted of male offenders ($n = 139$) who had completed at least two EQUIPS programs, and who had completed the Measures of Criminal Attitudes and Associates (MCAA: Mills & Kroner, 2001) before and after each program. Offender responses across assessments were analysed using descriptive statistics, analyses of variance (ANOVAs) and analyses of covariance (ANCOVAs). Residual change scores were calculated as indices of individual within-treatment change. A series of cox proportional hazard models were used to assess the relationship between change in MCAA scores and recidivism.

Results and Conclusion

Results indicated that responses on the MCAA were influenced by the context of administration (pre-treatment vs post-treatment), with a rebound in scores observed between completion of program one and commencement of program two that was not accounted for by time-variant declines in treatment gains. Variation in the predictive validity of MCAA scores at each time point also suggested that changing treatment context had an impact on the risk relevance of offenders' self-reports. There was no evidence that change in MCAA scores over treatment was associated with risk of reoffending, even after including an index of context-related response bias as a statistical covariate in the model. The pattern of results suggests that contextual biases may affect the validity of self-report measures such as the MCAA in assessing treatment change and associated indications of risk. Implications of the findings are discussed.

INTRODUCTION

A fundamental principle of offender intervention is to address dynamic risk factors that have an established relationship with future likelihood of reoffending and are capable of change over treatment. Within Corrective Services New South Wales (CSNSW), the EQUIPS suite of programs has been developed as a primary strategy for achieving change in dynamic risk factors among large numbers of offenders supervised in custody and in the community. The EQUIPS programs are delivered to medium to high risk offenders and aim to address risk factors associated with general reoffending behaviour in addition to domestic abuse, aggression, and addiction.

One of the most common dynamic risk factors targeted by the EQUIPS and other offender programs is that of antisocial or offence supportive attitudes. This is not unexpected considering the established empirical association between antisocial attitudes and future offending behaviour (Banse, Koppehele-Gossel, Kistemaker, Werner, & Schmidt, 2013). According to the results of meta-analytic research, antisocial attitudes are one of the strongest predictors of recidivism (Gendreau, Little, & Goggin, 1996). Similarly, offence-specific pro-criminal attitudes have been associated with an increased risk of recidivism in domains such as sexual reoffending (Banse et al., 2013; Helmus, Hanson, Bibchishin, & Mann, 2013). In addition, previous studies have indicated that offenders engaged in rehabilitation targeting antisocial attitudes show declines in rates of recidivism relative to controls (Andrews & Bonta, 2010; Serin, Lloyd, Helmus, Derkzen, & Luong, 2013).

Change in antisocial attitudes over the course of treatment is an anticipated outcome and causal mechanism of the EQUIPS programs. Consequently, severity of antisocial attitudes and treatment progress is assessed by administering the MCAA to offenders at pre-treatment and at post-treatment. In particular, Part B of the MCAA is

a self-report measure of domains of antisocial thought content including attitudes towards violence, attitudes of entitlement, attitudes towards antisocial intent, and attitudes towards antisocial associates (Mills & Kroner, 2001). Research has indicated that antisocial attitude factors assessed by the MCAA are relevant to risk of reoffending, whereby scores have significant predictive validity for recidivism outcomes (Mills, Kroner, & Hemmati, 2004; see also Howard & van Doorn, 2018; Mills & Kroner, 2006; Van Hiel, Hautman, Cornelis, & De Clerq, 2007).

Although antisocial attitudes are an empirically established dynamic risk factor and target of programs such as EQUIPS, there is surprisingly little evidence that observable change in attitudes over the course of treatment has a relationship with change in risk of reoffending (Banse et al., 2013; Klepsfisz, O'Brien, & Daffern, 2014). It may be expected that effective treatment of antisocial attitudes would correspond with a change in relevant measures such as the MCAA between pre-treatment and post-treatment, and that the magnitude of this change would be associated with reductions in the offender's likelihood of reoffending. However, a recent review of available studies found that within-treatment change in antisocial attitudes typically has poor or non-significant predictive validity for likelihood of reoffending (Banse et al., 2013; see also Serin et al., 2013).

While a small number of studies have examined within-treatment change in measures of antisocial attitudes and reoffending outcomes (e.g. Banse et al., 2013; Beggs & Grace, 2011; Klepsfisz et al., 2014; Simourd, Olver, & Brandenburg, 2016), only two have examined these relationships using the MCAA in particular. A study by Kroner and Yessine (2013) examined within-treatment change on the MCAA in a sample of 118 community-based offenders who completed treatment targeting antisocial attitudes. Results indicated that reliable within-treatment change on the Associates factor

of the MCAA had a small but significant bivariate correlation with reoffending outcomes.

In a more recent study, Howard and van Doorn (2018) examined the predictive validity of MCAA scores for general reoffending in a large sample of custodial and community-based offenders who completed EQUIPS programs. They found that discrete scores at pre-treatment on the MCAA Part B Total score and Entitlement, Antisocial Intent, and Associates factors significantly predicted reoffending. In contrast, none of the MCAA scores predicted reoffending at post-treatment. Substantial proportions of offenders also showed significant change in MCAA scores over the course of treatment. There was no association between within-treatment change on any of the measures and reoffending outcomes, however. The authors suggested that these findings may be attributable to contextual influences on offender self-report that change between assessment at pre-treatment and at post-treatment. For instance, offenders may become more prone to impression management and other response biases at the completion of treatment in an attempt to demonstrate successful treatment gains or obtain benefits such as parole. Consequently, actual change in antisocial attitudes between pre-treatment and post-treatment may have been confounded by concurrent change in response style across contexts, resulting in the absence of significant associations between change scores and likelihood of reoffending.

The existing literature indicates that additional research is needed to examine factors that influence offenders' self-reports on measures of dynamic risk factors such as the MCAA, and in particular how changes in the context of administration affect measurement and interpretation of within-treatment change. Effective measurement of change over treatment is important to assess how an offender's risk and needs have been moderated by completion of interventions and their future case management requirements. More broadly, the current lack of evidence for associations between within-

treatment change and reoffending outcomes has implications for our understanding of mechanisms of change in effective interventions with offenders (Kroner & Yessine, 2013).

The aim of the current study was to expand on the results and conclusions reported by Howard and van Doorn (2018) by exploring the influence of changes in treatment context on offender's self-reported antisocial attitudes. A critical challenge is that when self-reports are assessed only at pre-treatment and post-treatment, it is difficult to make a distinction between change in scores resulting from actual treatment gains and the effect of differences in the context of assessment on offenders' responses. For example, both effective treatment and increased subjective incentives to respond in a manner that suggests treatment gains may be expected to result in reporting of reduced antisocial attitudes at post-treatment.

To address this issue and gather insights into how context affects responding we utilised a novel design that examined trends in offender responses over multiple pre-treatment and post-treatment settings as they completed a sequence of two or more EQUIPS programs. A secondary aim of the study was to explore the potential for applying information about context-related response bias to improve the interpretation and validity of change over treatment. The study intended to explore the following research questions:

- What does the pattern of MCAA scores across multiple administrations and programs indicate about the influence of treatment context on offenders' responses?
- Can variation in offenders' responses across multiple administrations be meaningfully attributed to effects of treatment?
- What is the predictive validity of the MCAA in predicting recidivism at pre and post-treatment across multiple programs?

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- Does within-treatment change in MCAA scores across multiple programs predict reoffending outcomes?
 - Is it possible to adjust for the influence of treatment context on responses in order to improve the predictive validity of within-treatment change on the MCAA?

METHODS

Participants

The study employed archival data to identify a sample of 139 adult male offenders who were supervised in custody ($n = 107$) and the community ($n = 32$) between 1 January 2015 and 20 December 2016. Eligibility criteria included completion of two EQUIPS programs only during their index episode of supervision, as well as completion of the MCAA at pre-treatment and post-treatment for each of the programs (giving a total of four administrations per offender). The age of offenders at the completion of the second EQUIPS program ranged between 19 and 58 years with an average age of 32.42 years ($SD = 9.14$ years). Of the 139 offenders, 38.1% ($n = 53$) were of Aboriginal or Torres Strait Islander background.

The EQUIPS suite of programs was developed by CSNSW as a primary platform for rehabilitative intervention with supervised offenders in custodial and community settings. They include EQUIPS Foundation, EQUIPS Domestic Abuse, EQUIPS Aggression, and EQUIPS Addiction. The EQUIPS Foundation program is suitable for all offence types with the exception of sex offences, and primarily targets an offender's motivation for treatment, their understanding of the link between cognitions, emotions, and offending behaviour, and behaviour change. EQUIPS Domestic Abuse is suitable for offenders with intimate partner violence offences and focuses on identifying abuse, offence mapping, managing emotions and cognitions, and developing self-management and

relationship skills. EQUIPS Aggression addresses expressive and instrumental aggression for violent offenders by addressing an offender's emotion regulation, anger management and communication skills, and by assisting offenders with understanding the link between their aggression and offending behaviour. EQUIPS Addiction addresses addictive behaviour and targets an offender's motivation for abstinence and coping and problem-solving skills.

To be eligible to attend EQUIPS programs, participants in this sample were required to have an assessed medium or higher risk of general recidivism as measured by the Level of Service Inventory- Revised (LSI-R: Andrews & Bonta, 1995). Offenders eligible for the EQUIPS programs were also required to have a minimum of six months remaining on their total sentence as to allow sufficient time to complete the program. Exclusion criteria for the EQUIPS programs included offenders experiencing active psychotic symptoms, alcohol or drug intoxication and/or withdrawal symptoms. The proportion of offenders in the study sample who completed each EQUIPS program type, for their first and second program respectively, are as follows: 49.6% and 32.4% completed EQUIPS Addiction, 13.7% and 25.9% completed EQUIPS Aggression, 13.7% and 13.7% completed EQUIPS Domestic Abuse, and 23% and 27.3% completed EQUIPS Foundation.

Measures

Measures of Criminal Attitudes and Associates (MCAA). The MCAA is a self-report measure of antisocial attitudes and associates developed by Mills and Kroner (2001). The measure is separated into two parts; Part A provides an index of the individual's criminal associates and Part B measures antisocial attitudes. The Part B measure of antisocial attitudes was the focus of the present study.

Part B comprises a total of 46 items requiring agree/disagree responses and is composed of four

factors; attitudes towards Violence (12 items), Entitlement (12 items), Antisocial Intent (12 items), and Associates (10 items). The Violence factor assesses attitudes that support violence (“It’s understandable to hit someone who insults you”). The Entitlement factor assesses an individual’s belief about what they deserve (“Stealing to survive is understandable”). The Antisocial Intent factor measures a person’s belief about whether they would engage in antisocial behaviour in the future (“I am not likely to commit a crime in the future”). Lastly, the Associates factor measures attitudes towards antisocial individuals involved in criminal activity (“I know several people who have committed crimes”). The four factors can be aggregated to compute a MCAA Total score, ranging from 0 to 46, with scores between 7-22 considered to be average for normative samples of incarcerated offenders, and scores equal to or greater than 23 considered to be elevated (Mills & Kroner, 2001). The MCAA has shown to have moderate test-retest reliability with correlations of .82 for the MCAA Total score, .74 for the Violence factor, .77 for Entitlement, .79 for Antisocial Intent, and .66 for Associates, indicating the measures to be stable over time (Mills & Kroner, 2001).

Recidivism. Recidivism data were obtained from the NSW Bureau of Crime Statistics and Research (BOCSAR). Recidivism was defined as any conviction for an offence during the survival period and preceding the recidivism data census date of 30 June 2017. The survival period for custodial offenders was computed by calculating the time from release into the community to reoffence or the recidivism data census date. The survival period for community-based offenders was calculated from the completion of their last program and reoffence or recidivism data census date. The mean survival period in the community was 334.20 days (SD= 170.90 days) with a range of 9 to 759 days. A total of 22 offenders reoffended within the survival follow-up period, corresponding to 15.8% of the sample.

Analytical Plan

Patterns of responses on the MCAA across administrations were analysed using descriptive statistics in addition to repeated measures analyses of variance (ANOVAs) and analyses of covariance (ANCOVAs) in cases where adjustment for covariates was warranted. Scores on the MCAA were normally distributed and we therefore report on the results of parametric statistics and analyses. It is noted that some MCAA response data violated assumptions of sphericity, in which case we applied a Greenhouse-Geisser correction to results.

Relationships between within-treatment change on MCAA responses and outcome variables of interest were analysed using residual change scores. Residual change scores are calculated by first deriving simple difference scores (post-treatment score – pre-treatment score), after which the pre-treatment score is regressed onto the difference score. The residual, or difference between predicted and observed change scores after adjusting for pre-treatment scores, is then used as the index of change. This approach was applied because the magnitude of change in responses tends to be highly correlated with, and prone to statistical biases such as regression to the mean and floor effects as a function of, the pre-treatment score (e.g., Beggs & Grace, 2011; Cook & Campbell, 1979). In accordance with the assessment of offenders over multiple programs, change scores were calculated from the difference between pre-treatment scores of program 1 and post-treatment scores of program 2. Higher negative scores indicated an increasing magnitude of reduction in antisocial attitudes over treatment, whereas higher positive scores indicated growth in antisocial attitudes over treatment.

Offenders in the sample differed in their maximum survival period between release into the community (custodial offenders) or post-treatment administration of the MCAA (community offenders) and the data census date. To account

for variation in survival period, analyses of reoffending outcomes applied Cox proportional hazard regression modelling and corresponding hazard ratios are reported.

RESULTS

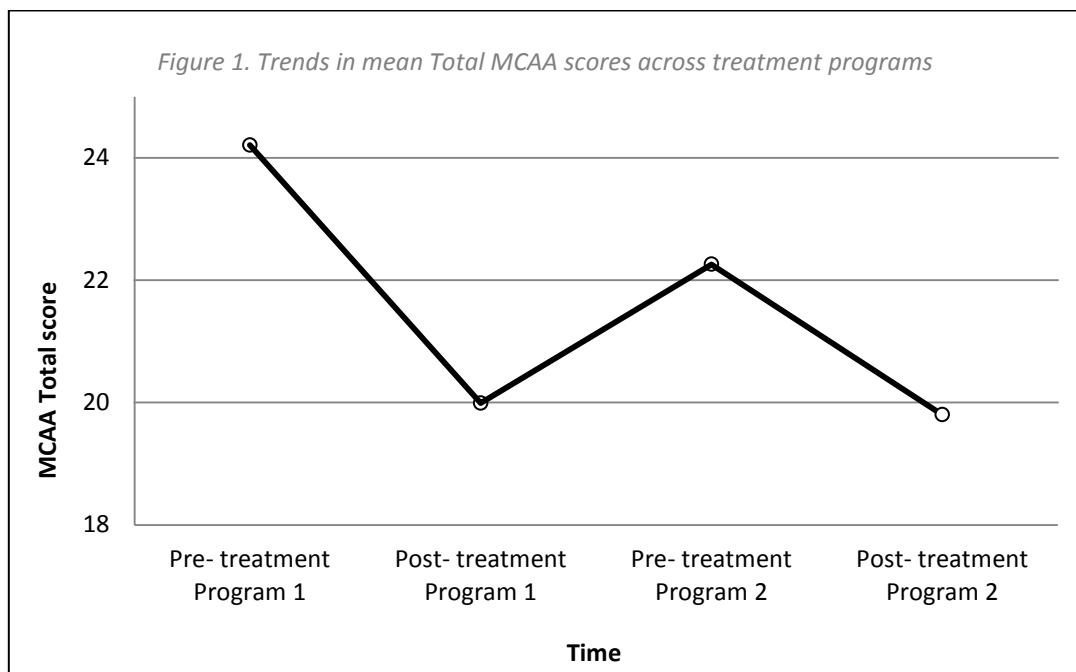
How do MCAA scores vary across treatment context and time?

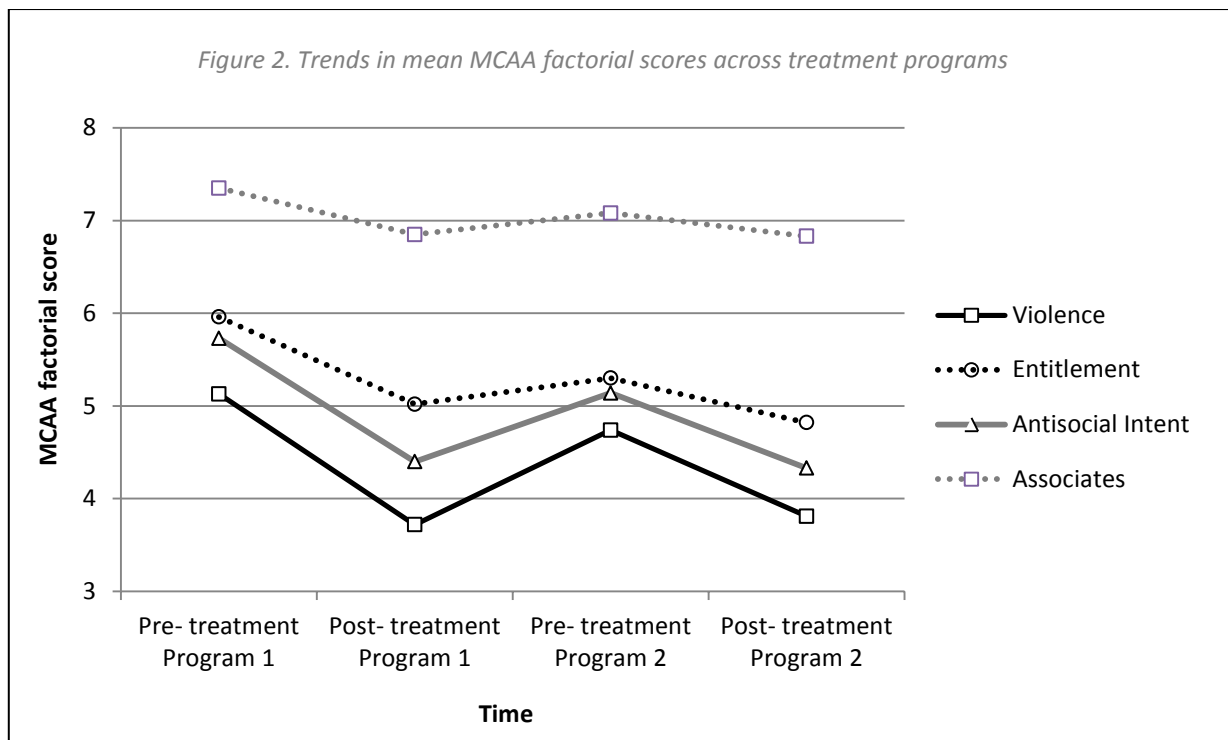
A primary objective of this study was to explore whether offenders' self-reports on the MCAA were influenced by treatment context in a way that could not be accounted for by the effects of treatment gains or progress over time. In the case of repeated assessment over participation in multiple EQUIPS programs, if offenders' self-reports represented change in antisocial attitudes alone we may predict that MCAA scores would typically improve during treatment and remain relatively stable in the interval between programs. However, if treatment context influences responding (with a bias towards over-reporting of treatment gains at post-treatment), we might expect disparities between post-treatment of

program 1 and pre-treatment of program 2 that occur in the absence of any treatment effects.

To begin we examined patterns of responses on the MCAA at the pre-treatment and post-treatment phases of both EQUIPS programs. Average distribution of MCAA Total and factorial scores over the sequence of two programs are shown in Figures 1 and 2. It can be seen from Figure 1 that average MCAA Total scores did not show a general trend towards improvement (decreases) over time; rather there was evidence of an increase or rebound in scores between post-treatment of program 1 and pre-treatment of program 2.

A similar pattern of findings was observed for the mean factorial scores (see Figure 2). A number of factors also exhibited a rebound effect marked by increased pre-treatment scores at program 2 compared to post-treatment scores at program 1. This pattern was more pronounced for the Violence and Antisocial Intent factors and relatively flat for the Entitlement and Associates factors.





The presence of a rebound effect between post-treatment of program 1 and pre-treatment of program 2 suggests that the context of assessment may have influenced offenders' self-reports of antisocial attitudes. That is, offenders tended to report reduced antisocial attitudes at post-treatment of program 1 that did not persist to pre-treatment of program 2, in the absence of intervening factors. One alternative possibility is that this pattern is a result of random measurement error. To examine the statistical significance of observed rebound effects, a one-way repeated measures analysis of variance (ANOVA) was conducted on MCAA scores across the programs. For the MCAA Total score, a significant full model effect ($F(2.679, 358.98) = 19.94, p < .001, \eta_p^2 = .13$) showed that responses differed significantly over the four points of assessment. A follow up pairwise comparison between post-treatment of program 2 and pre-treatment of program 1 showed that the observed rebound effect was statistically significant ($M_{diff} = 2.23, p = .004, \text{Sidak } 95\% \text{ CI } [3.96, .50]$).

A second repeated measures ANOVA was conducted for all four MCAA factors simultaneously. The full model was significant ($F(8.79, 1178.17) = 32.41, p < .001, \eta_p^2 = .20$), indicating that the pattern of responses over time varied across the factors. Follow up comparisons showed that there was a significant rebound effect between program 1 post-treatment and program 2 pre-treatment on the Violence factor ($M_{diff} = 1.04, p = .03, 95\% \text{ CI } [2.03, .43]$). Differences in scores between these two time points were not significant for any of the other factors (p 's $> .05$).

Rebound effects and loss of treatment gains

It is also possible that the observed rebound in MCAA scores between post-treatment of program 1 and pre-treatment of program 2 may be attributable to a therapeutically meaningful loss in treatment gains over time. Offenders may exhibit deterioration in antisocial attitudes in the interval between concluding participation in program 1 and commencing participation in program 2. In this

case it may be expected that loss of treatment gains would increase as a function of the amount of time passed since attending programs. The average interval between post-treatment of program 1 and pre-treatment of program 2 varied substantially across individuals with a mean of 69.76 days (SD = 106.34 days).

To address this possibility we developed the alternative hypothesis that as the interval between program 1 and program 2 increases the extent of rebound in MCAA scores would also increase. Simple bivariate correlations indicated that there were no significant associations between interval between programs and magnitude of change in scores between post-treatment of program 1 and pre-treatment of program 2, however (r 's $-.08$ - $.02$; ns).

In addition, one-way repeated measures analyses of covariance (ANCOVAs) were conducted on the difference between program 1 post-treatment scores and program 2 pre-treatment scores, using the interval between programs as a covariate. The interval covariate was not found to be a significant predictor of magnitude of change in scores for either the MCAA Total or factorial scores (all p 's $> .05$).

MCAA scores and reoffending outcomes

Another way of assessing how context influenced offenders' self-reports is to explore the relationship between MCAA scores and reoffending at each of the administration time points. The risk relevance or predictive validity of measures such as the MCAA is important because it assesses the extent to which self-reported scores reflect dynamic risk factors that have an association with likelihood of reoffending. On the other hand, it may be expected that as responses become increasingly influenced by factors that are not risk relevant, the predictive validity of scores would correspondingly decline (e.g. Howard & van Doorn, 2018).

In the context of the current study, we hypothesised that the relationship between MCAA scores and reoffending outcomes should improve with each successive administration because later scores are more proximate to time at risk and should account for any treatment gains made over the course of participating in the EQUIPS programs.

Results of Cox proportional hazard models for each of the MCAA scores are given in Table 1. It can be seen that for program 1 there were a number of significant associations between MCAA scores and reoffending at pre-treatment. Higher MCAA Total scores were associated with a seven percent increase in risk of reoffending. The Violence, Entitlement and Antisocial Intent factors at pre-treatment were also significantly associated with hazard in the expected direction, whereby each unit increase in scores was associated with an increase in the adjusted odds of reoffending by 17.3%, 19% and 17.5% respectively. The Associates factor at pre-treatment was not significantly associated with hazard of reoffending. Each of the MCAA Total and factorial scores at post-treatment in program 1 were not significantly associated with hazard of reoffending (p 's $> .05$), however.

The pattern of results was less clear when assessed for program 2. At pre-treatment, only scores on the Entitlement factor were associated with a significant increase in the hazard of reoffending. Interestingly, at post-treatment each of the Violence, Entitlement and Antisocial Intent factors had statistically significant relationships with hazard of reoffending, where each unit increase in scores was predicted to be associated with an increase in the adjusted odds of reoffending by 14.2%, 20.4% and 13.9% respectively.

Table 1. Associations between MCAA scores and hazard of reoffending at pre-treatment and at post-treatment of program 1 and program 2.

MCAA measure	Pre-treatment			Post-treatment		
	M	Exp(B)	95% CI	M	Exp(B)	95% CI
Total						
Program 1	24.21	1.07*	[1.02 – 1.12]	19.99	1.02	[.97 – 1.07]
Program 2	22.26	1.04	[.99 – 1.09]	19.80	1.05	[1.00 – 1.09]
Violence						
Program 1	5.13	1.17*	[1.04 – 1.33]	3.72	1.05	[.92 – 1.19]
Program 2	4.74	1.08	[.96 – 1.21]	3.81	1.14*	[1.01 – 1.29]
Entitlement						
Program 1	5.96	1.19*	[1.02 – 1.40]	5.02	1.08	[.92 – 1.26]
Program 2	5.30	1.19*	[1.03 – 1.38]	4.82	1.20*	[1.03 – 1.41]
Antisocial Intent						
Program 1	5.73	1.18*	[1.04 – 1.33]	4.40	1.07	[.95 – 1.21]
Program 2	5.14	1.11	[.99 – 1.26]	4.33	1.14*	[1.01 – 1.29]
Associates						
Program 1	7.35	1.04	[.85 – 1.26]	6.85	.94	[.78 – 1.13]
Program 2	7.08	.94	[.78 – 1.13]	6.84	.89	[.76 – 1.05]

Note: Exp(B) = hazard ratio; CI = confidence interval. * $p < .05$.

Within-treatment change and reoffending

As previously described, residual change scores were calculated to obtain an index of within-treatment change on the MCAA between pre-treatment at program 1 and post-treatment at program 2. Residual change scores were calculated so that higher negative values reflect a greater magnitude of improvement in antisocial attitudes over treatment, whereas higher positive values reflect increases in antisocial attitudes over treatment.

Residual change scores were then regressed onto reoffending outcomes in a series of Cox proportional hazard models to assess the presence of relationships between within-treatment change and recidivism. Results for each of the MCAA Total and factorial scores are given in Table 2. It can be seen that none of the MCAA scores had a

significant association with hazard of reoffending (all p 's $> .05$).

Although the results did not yield statistical significance, hazard ratios revealed an association in the expected direction for the MCAA Total scores, with higher positive scores (indicating an increase in antisocial attitudes), associated with an increase in hazard of reoffending. This direction of association was also observed for the factorial scores with the exception of the Associates factor, whereby greater negative scores (indicating a greater reduction in antisocial attitudes) were associated with a greater risk of reoffending.

Adjusting for context effects in within-treatment change

Following from previous analyses, it may be reasoned that the rebound effect observed between post-treatment of program 1 and pre-treatment of program 2 contains information

about the extent to which offenders' responses were influenced by the context of assessment. In the event that offenders applied similar response styles when assessed at pre-treatment and post-treatment (and taking into account other factors such as effects of treatment and subsequent deterioration of treatment gains over time), we would expect that scores would remain similar between post-treatment of program 1 and pre-treatment of program 2. The extent of rebound may therefore be considered a potential index of how much offenders bias their responses or under-report risk when assessed in the post-treatment context. Assuming that such context effects are constant at the post-treatment stage of multiple programs, it may then be possible to statistically isolate and adjust for this index of bias to improve the predictive validity of overall change scores that encompass the entirety of treatment change over multiple programs.

Our index of context effect was quantified by first computing change scores on each of the MCAA measures to represent the magnitude of the rebound effect. This was achieved by subtracting program 1 post-treatment scores from program 2 pre-treatment scores. To account for any meaningful change in scores over this period

associated with progressive loss of treatment gains, we also regressed the interval in days between the post-assessment for program 1 and pre-assessment for program 2 on the change scores. The unstandardised residuals were then used as the final index of context effect for each of the MCAA measures.

To adjust for context effects on responding we repeated Cox proportional hazard models with residual change scores between pre-treatment of program 1 and post-treatment of program 2 entered as the predictor, reoffending entered as the outcome, and the context effect index entered as a covariate (see Table 2). Results indicated that none of the MCAA Total and factorial residual change scores were significantly associated with hazard of reoffending after adjusting for the index of context effects (p 's >.05).

The hazard ratios were in the expected direction for the MCAA Total and most factorial scores, with higher positive change scores associated with a greater risk of reoffending. An exception was the hazard ratio for the Antisocial Associates factor, which indicated negative change scores were associated with higher risk of reoffending.

Table 2. Associations between residual change scores and reoffending outcomes before and after adjusting for the index of context effects

MCAA measure	Without adjustment		With adjustment	
	Exp(B)	95% CI	Exp(B)	95% CI
Total	1.09	[.96 – 1.08]	1.04	[.98 – 1.10]
Violence	1.09	[.94 – 1.26]	1.06	[.93 – 1.21]
Entitlement	1.16	[.96 – 1.40]	1.14	[.96 – 1.34]
Antisocial Intent	1.08	[.93 – 1.24]	1.05	[.91 – 1.20]
Associates	.85	[.71 – 1.01]	.98	[.78 – 1.24]

Note: Exp(B) = hazard ratio; CI = confidence interval.

DISCUSSION

Offenders' self-reports of within-treatment change typically have poor associations with reoffending outcomes (e.g. Banse et al., 2013; Serin et al., 2013), which may be related to the influence of changes in offenders' response style across the differing contexts of assessment at pre-treatment and at post-treatment. The aim of this study was to explore the influence of context on offender self-reports by examining patterns of scores on the MCAA at the pre-treatment and post-treatment stages of multiple successive programs. This study also aimed to test relationships between within-treatment change on the MCAA and reoffending outcomes, and potentially improve predictive validity of change scores by adjusting for observed context effects on responding.

The results of this study indicated that offenders' responses across multiple administrations of the MCAA corresponded with changes in treatment context. MCAA scores were observed in particular to show an increase or rebound effect that occurred between post-treatment at program one and pre-treatment at program two, and therefore may not be directly attributable to treatment effects. This rebound effect was statistically significant for the MCAA Total score and Violence factor. Subsequent analyses indicated that the magnitude of rebound was not mediated by a therapeutically meaningful progressive loss of treatment gains over time.

The observed variation in MCAA scores across multiple treatment programs is consistent with conclusions put forward by Howard and Van Doorn (2018) that offender self-report may be differentially impacted by changing contextual factors that are unrelated to risk, with post-treatment assessments more likely to be influenced by increased impression management or other under-reporting of risk compared to pre-treatment assessments. As such, trajectories of decline in reporting of antisocial attitudes between

pre-treatment and post-treatment may not reflect actual changes in offenders' severity of antisocial attitudes.

The results of this study do demonstrate that under certain conditions offender self-reports can provide relevant information about their likelihood of reoffending. In line with previous research (Howard & van Doorn, 2018; Mills & Kroner, 2006; Mills et al., 2004; Van Hiel et al., 2007), a number of scores derived from the MCAA had significant associations with reoffending. In particular, pre-treatment scores on the MCAA Total and Violence, Entitlement and Antisocial Intent factors at program one were each positively associated with significant increases in risk of reoffending. In contrast, post-treatment scores at program one consistently had non-significant relationships with reoffending. Previous studies have also indicated that pre-treatment scores tend to be better predictors of reoffending compared to post-treatment scores (Barnett, Wakeling, Mandeville-Norden, & Rakestrow, 2012; Hanson & Wallace-Capretta, 2000; Howard & van Doorn, 2018). The disparity in predictive validity between pre-treatment and post-treatment scores observed here and elsewhere provides additional support for the proposal that offenders' responses at post-treatment are more likely to be influenced by factors that are not relevant to risk.

A more complex pattern emerges when examining the risk relevance of MCAA scores across multiple programs. Whereas post-treatment scores at program one were not associated with hazard of reoffending, there were significant relationships between the Violence, Entitlement and Antisocial Intent factors and reoffending outcomes at post-treatment of program two. From the perspective of context effects on responding, it is possible that offenders were less influenced by the context of treatment completion at the end of program two than at the end of program one. It may be the case that offenders tend to habituate to the process of engaging in the treatment process and the demand characteristics and expected outcomes of

completing programs as they do so multiple times, resulting in lower impression management and more accurate reporting of risk relevant attitudes. A related interpretation is that offenders' self-reports are less likely to be influenced by short-lived sentiments of treatment success or achieving gains after completing a second program relative to the first program (e.g. Nunes, Pettersen, Hermann, Looman, & Spape, 2014). A potential implication is that the validity of self-reports may be improved by conducting multiple assessments with offenders as part of their engagement in treatment, possibly including additional measurement at the end of relevant modules or at a follow-up interval after completion of treatment.

Despite the observed predictive validity of MCAA scores at post-treatment of program two, however, there was no indication that change in scores over the entirety of programming was associated with hazard of reoffending. Residual change scores had non-significant associations in the expected direction whereby increased antisocial attitudes were associated with greater hazard of reoffending, with the exception of the Associates factor which indicated an inverse relationship with reoffending. This is in contrast to the findings of Kroner and Yessine (2013) which showed a significant positive association between change on the Associates factor and reoffending. Nevertheless, the current findings are consistent with the majority of the extant literature demonstrating a lack of association between within-treatment change in antisocial attitudes and reoffending outcomes (Banse et al., 2013; Howard and van Doorn, 2018; Serin et al., 2013).

The lack of associations between within-treatment change in MCAA measures and likelihood of reoffending was also evident after adjusting for our calculated index of the effect of context on offenders' self-reports. The limited utility of adjusting for context effects may be due to the novel approach used to quantify the influence of treatment context. It is possible that the statistical method did not adequately capture or

underadjusted for changing response styles between pre-treatment and post-treatment. As previously mentioned, the results of this study suggest that offenders may have differed in the validity of their responding between post-treatment of program one and post-treatment of program two; therefore our index of context effects as derived from the extent of rebound between post-treatment of program one and pre-treatment of program two may not be adequately representative of context effects or response style at the end of program two. Of course, there remains the alternative possibility that change in antisocial attitudes over treatment was not sufficient to result in a measurable reduction in the likelihood of reoffending, regardless of the confounding effects of context or other response biases on MCAA scores.

There are other limitations to the current study that may account for the observed absence of associations between within-treatment change in antisocial attitudes and reoffending. First, the statistical power of this study was limited by the low rate of reoffending and small cohort of offenders who had completed multiple EQUIPS programs. Secondly, due to the small sample size and the intervening objective of statistically adjusting for context effects, the use of more advanced methods of assessing within-treatment change such as clinically significant change (CSC) analyses was not feasible. Simple or residual change scores are limited in that they cannot discern whether individual offenders exhibited statistically reliable change that is not attributable to measurement error or chance alone (Nunes, Babschishin, & Cortoni, 2011). As reliable change was not measured in this study, it is possible that many offenders did not experience the magnitude of change in antisocial attitudes that may be expected to have a relationship with reoffending outcomes.

Further, difference scores cannot be used to assess pre- and post-treatment levels of functioning. This is particularly important as functional change, or

declines in antisocial attitudes from dysfunctional to functional levels over treatment, may be considered a primary therapeutic objective in reducing risk. It is possible that offenders in this sample were largely within functional ranges for antisocial attitudes at pre-treatment and therefore had limited opportunity to achieve substantial benefit in this domain of risk over treatment, or alternatively tended to have highly dysfunctional attitudes at pre-treatment that improved but nonetheless remained dysfunctional at the conclusion of treatment. In this regard, change across treatment may only be relevant to an offender's risk of reoffending when change is clinically meaningful (Nunes et al., 2011).

Conclusion

The results of this study indicate that self-reported antisocial attitudes may be susceptible to contextual biases that change over the course of treatment and therefore limit the validity of measures in assessing within-treatment change. When administered over multiple programs, MCAA scores were observed to vary according to the pre-treatment or post-treatment context of assessment in a manner that was not related to the expected effects of treatment. The patterns of variation are consistent with previous observations that at post-treatment offenders may be more likely to give responses that under-report risk or do not reflect actual severity of antisocial attitudes (Howard & van Doorn, 2018).

However, there were novel indications that offenders gave more valid or risk relevant responses at post-treatment when completing multiple programs, compared to at the conclusion of their first or only program. This suggests that increased exposure to the post-treatment context across sequential treatment programs or over multiple assessments may result in more accurate reporting of antisocial attitudes. Unfortunately, under the relatively unique conditions of treatment gains across multiple programs, the results of this study were consistent with previous

research in nonetheless showing that within-treatment change did not have a significant association with hazard of reoffending.

Overall, the current study adds to the literature pertaining to within-treatment change in dynamic risk factors and our understanding of influences on offender self-report. Findings from the current study may help to inform correctional policy and procedures regarding methods of assessment that improve the validity of responses and reduce context-related bias. This may involve multiple administrations of assessments at times that do not coincide with or otherwise minimise effects of the context of treatment completion on offenders' self-reports. There is a need for more accurate assessment of dynamic risk factors in addition to increased awareness of and adjustment for potential context-related influences on self-report, in order to improve measurement of potential mechanisms of change in treatment and how offenders' progress in programs corresponds to changes in reoffending risk.

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