Results from an umbrella review of the evidence underpinning RNR principles: inconsistent and poor quality

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Introduction

The Risk-Need-Responsivity (RNR) model developed by Bonta & Andrews (2024) has been one of the leading approaches to offender management and rehabilitation over the past decades. Reviews have been published in support, including many written by the developers themselves, The model is constructed around three core principles:

- The *risk* principle (who to treat) holds that the level of intervention should be matched to the offender's risk of reoffending; more intensive treatment should be reserved for those at high risk.
- The *need* principle (what to treat) describes the dynamic risk factors ("criminogenic needs") associated with recidivism that interventions should target, including antisocial personality patterns, pro-criminal attitudes and associates, substance use, and problems related to family, leisure, and work/school domains.
- The *responsivity* principle (how to treat) states that cognitive-behavioural and social learning interventions are most effective in reducing recidivism (general responsivity) and that treatment should be tailored to individual characteristics (such as gender, ethnicity, and motivation) in order to maximize its impact (specific responsivity).

Much of the popularity of the RNR model derives from statements about its underlying evidence base, which is often contrasted to newer models with less well-developed research in support. But is this claim really evidence-based?

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Aims and Methods

We aimed to synthesise and appraise the underlying evidence base of the RNR model. To do so, we conducted a 'review of reviews' (also called an umbrella review) to assess the quality and consistency of the published evidence (Fazel et al., 2024). After searching key bibliographic databases for reviews published in the past 20 years, we identified 26 eligible reviews and meta-analyses published from 2002 to 2023 that examined at least one of the model's core principles. We assessed the robustness of this evidence using some validated measures such as the degree of uncertainty, whether there was publication bias, adequate sample sizes to test principles, and methodological quality of the reviews.

Results

For the *risk* principle, based on seven meta-analyses, we found that individuals deemed to pose high risk who adhered to treatment had a decreased risk of recidivism compared to low-risk persons. However, in meta-analyses conducted by independent researchers, around half the effect sizes were not significant for this principle.

In terms of the *need* principle, six meta-analyses indicated small but significant effects for recidivism risk according to the criminogenic needs. In relation to assessing recidivism risk, the discriminative accuracy (as measured using a statistic called Area under the curve [AUC]) of risk assessment tools based on the need principle was modest at best (around 65%, where 50% would be a chance level of such accuracy and 100% perfect discrimination).

We identified 15 eligible meta-analyses on the *general responsivity* principle, for which a third of effect sizes were not significant. Based on five reviews without overlapping samples and potential authorship bias (i.e. those not written by developers and others with potential conflicts of interest), the pooled odds ratio was 1.4 (95% CI 1.2-1.7). This indicates a small but significant effect size (where odds ratios above 1 are deemed higher risk than the comparison).

Based on four reviews, we identified poorer outcomes (attrition or recidivism) in certain subgroups (non-white individuals, ethnic minorities, aboriginal populations, and other sociodemographic subpopulations based on gender and education), indicating some support for the *specific responsivity* principle. In addition, low motivation was associated with higher levels of attrition and recidivism.

Across the different principles, the evidence was mostly of poor quality. One exception was reviews assessing risk assessment tools based on the need principle, which were of moderate to high quality.

Interpretation

We synthesised findings from 26 meta-analyses published over two decades, based on data from more than 450 primary studies. Overall, the statistical support for the individual RNR principles was inconsistent, and the quality of the underlying evidence base was mostly low. Our findings question the long-held claims that the RNR model is evidence-based.

We outline five key limitations related to the reliability and validity of the extant research testing the RNR model and its core principles: potential authorship bias, lack of transparency, substandard primary research, limited subgroup analyses, and conflation of prediction with causality.

First, the primary studies supporting the RNR model largely rely on research conducted by the model developers (Andrews and Bonta) and their colleagues, which raises concerns about possible authorship bias. For example, of the meta-analyses on the need and general responsivity principles, those authored by the model developers reported the highest effect sizes, suggesting overestimation of effects. Reviews with potential authorship bias also had the lowest quality score. In addition, it is notable that in many of the articles authored by the model developers and their colleagues, potential (financial) conflicts of interest were not reported.

Second, there were important limitations in the reporting standards of the included reviews. Many provided incomplete or no information regarding search strategy, sample size and characteristics, treatments given to control groups, or primary study characteristics and results. This makes assessing the quality of the evidence and the robustness of the findings challenging.

Third, the quality of the primary research underpinning the RNR model is generally low. Most included studies had a case-control design, which is prone to bias. Randomized controlled trials in this area were rare – and the few trials that were included were of poor quality, in particular with regard to control group treatment and reporting.

Fourth, in terms of subgroup analyses, the identified meta-analyses commonly rely on a statistical approach called meta-regression to examine what works, in what circumstances, and for whom. However, these analyses are typically underpowered and prone to confounding owing to differences in study settings and populations. Furthermore, as the RNR literature has primarily investigated recidivism as a binary outcome, more fine-grained examination of the prevalence, frequency, severity, and imminence of reoffending is warranted.

Fifth, the RNR model often conflates prediction with causality, assuming that factors with high predictive power for recidivism also have a causal role. This is problematic because predictive factors, such as socioeconomic status or ethnicity, may serve as proxies for broader structural issues rather than direct causes of criminal behaviour. This can lead to misguided policy implications and interventions that do not address the underlying causes of recidivism.

Conclusion

This umbrella review of meta-analyses examined the quality and consistency of the extant evidence that examines the RNR model. Despite its widespread use in criminal justice and claims from experts, we found that the evidence base in support of the RNR model is mostly low quality and inconsistent.

We outlined five key limitations underlying this low quality that are primarily based on reliability and validity of empirical findings testing the model, and nature of the conclusions drawn. These findings raise important and timely questions regarding the continued application and utility of RNR as a model informing criminal justice services. Higher quality and independent research is needed to support the claims of the RNR principles. Without such evidence, introducing RNR into new jurisdictions should not be recommended. Although it was beyond the scope of this specific review to present alternatives, other research has suggested that (1) risk assessment models for sentencing should not be used in isolation from professional judgement, and that simple scalable models, such as OxRec (violent recidivism) and OxRIS (sexual offending), should be considered (see https://oxrisk.com) (Beaudry et al, 2023; Yu et al, 2022), (2) there is now increasing and converging lines of evidence for certain medication classes to reduce recidivism risk: antipsychotics for people with severe mental illness (Sariaslan et al, 2022), and medications for drug and alcohol use disorders.

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