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An exploration of theory of mind performance among men convicted of rape

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Several of the known risk factors for sexual violence concern a lack of capacity for engaging in mutually satisfying interpersonal relationships. Socio-cognitive deficits may be approached from a theory of mind (ToM) perspective, where lack of ability to attribute mental states to others is seen as the core feature. This study focuses on imprisoned men (n = 26) convicted of rape against an adult. A video-based measure of ToM (MASC) was applied, depicting social interaction in a dynamic real-life setting. The results showed that the rape-convicted men have a markedly inferior ability to infer the mental states of others. Clinical as well as theoretical implications of the findings are discussed.

Key words: Cognition, prison, rape, sexual violence.

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INTRODUCTION

The World Health Organization (WHO) estimates that 25% of women and 10% of men in the general population in European countries have experienced sexual violence (Krug, Dahlberg, Mercy, Zwi & Lozano, 2002). Consequently, sexual violence ranks among the prioritized health challenges of our time, due both to the extent of the problem and the seriousness of the health consequences involved. Sexual violence covers a range of experiences, with rape, most often defined as "vaginal or anal penetration in the absence of lawful consent" (Gannon *et al.*, 2008), considered a serious sexual crime in most jurisdictions. Although rape may be perpetrated by both genders, men constitute the vast majority of officially registered perpetrators. According to the WHO, factors increasing men's risk of committing rape can be related to individual, relationship, community or societal circumstances (cf. Krug *et al.*, 2002: table 6.4, page 159). For a long time, perpetrators of sexual violence with adult victims were underrepresented in the academic literature (Craissati & Beech, 2004), although the review by Lussier and Cale (2016) shows that development of theories and explanatory models of rape and sexual aggression against women has been continually ongoing for several decades, varying in thematic emphasis between disciplines and research areas. The clinical- and correctional literature on sexual violence has mainly focused on risk factors within the individual and interpersonal domains. Within these domains, research seems to converge on a set of core socio-cognitive features, pertaining to problems in affective, cognitive, and interpersonal functioning, as central in the initiation or maintenance of sexual aggression.

According to Ward, Keenan, and Hudson (2000), there is a common element to the affective, cognitive and interpersonal deficits appearing in studies of sexual offending, namely a "(..) lack of awareness of other peoples' beliefs, desires, perspectives,

and needs (..)" (page 41). Ward and colleagues (2000) suggested that this general lack of awareness for others might arise from an underlying deficit in the fundamentally important human ability to infer mental states of others. The inference of mental states, or theory of mind (ToM), represents one of the central questions in social cognition research: how do we interpret the meaning behind others' behavior?

Social cognition is a field of scientific inquiry covering diverse disciplines and research areas, including the study of serious mental illness (Hörtnagl & Hofer, 2014) and of violent offending (see Gannon, Collie, Ward & Thakker, 2009 for an overview). Although the research questions may be similar across research areas, study samples may be differently categorized and the terminology is far from uniform. In the sexual violence field, Gannon (2009) divides social cognitive approaches into three groups, differing in their respective focal points within the cognitive system: cognitive products, cognitive processing, and cognitive structures. According to Gannon's differentiation, cognitive products are the self-reported outcomes of social-cognitive processes, such as perceptions and specific judgments. Cognitive processing refers to the automatic belief-driven social information processing of for instance ambiguous offense-related information. Cognitive structure refers to the configuration of knowledge, as illustrated by the ease with which one makes offense-supportive categorizations. Within psychopathology research, the term social cognition often refers to four core domains (Pinkham, 2014): emotion processing (perceiving and using emotional information), social perception (decoding and interpreting social cues in others), theory of mind (ToM)/mental state attribution (the ability to understand human mental states or make inferences about others' beliefs and intentions), and attributional style (how individuals interpret, explain and make sense of events encountered in social life). The term ToM, denoted

by Premack and Woodruff (1978), is applied in this paper, while we draw on research from the cognitive processing literature on sexual violence, where investigations of rape in particular have focused on recognition and interpretation of social cues (cf. Gannon, 2009). This also includes studies of emotion/affect recognition, conceptualized as another social cognitive domain, different from ToM, in the psychopathology literature (Pinkham, 2014). ToM refers to the ability to accurately identify the intentions, dispositions, and beliefs of others (Green & Horan, 2010). A differentiation has been made between affective (inferences about the emotions of another) and cognitive (inferences about the thoughts of another) ToM (Shamay-Tsoory, Shur, Barcai-Goodman, Medlovich, Harari & Levkovitz, 2007). Furthermore, ToM errors can occur due to overmentalizing, undermentalizing or a lack of mentalizing. Overmentalizing is excessive, overinterpretive attributions to mental states (exceeding ToM), undermentalizing refers to a reduction in the ability to perform attributions to internal mental states (reduced ToM). Finally, errors of the no mentalizing type occur when no attributions are made to internal mental states (no-ToM) (Abu-Akel & Bailey, 2000).

Social cognition in men convicted of sexual violence

Being able to identify another person's facial expression is important in order to interpret a social situation accurately. According to Marshall, Hudson, Jones and Fernandez's (1995) multicomponent model of empathy, emotional recognition represents the first stage in the empathy unfolding process, and is necessary to decode the social signals conveyed by the other. Thus, the perceptual process of emotion recognition can be seen as a necessary precursor to the interpretive process of mental state inference. In a systematic review of facial affect processing among men imprisoned for violent crimes, including sex crimes, the results supported the presence of a general impairment in the ability to process negative emotional expressions (fear, anger, disgust) (Chapman, Gillespie & Mitchell, 2018). A few studies have investigated emotion recognition skills among persons convicted of sex crimes. Hudson, Marshall, Wales, McDonald, Bakker and McLean (1993) identified relative deficits in emotion recognition when compared to other offender groups, in particular problems related to recognizing fear and surprise. Similar problems were observed by Gery, Miljkovitch, Berthoz and Soussignan (2009); persons convicted of sex crimes were less accurate than both other offenders and non-offender controls in recognising expressions of anger, fear, surprise, and disgust. Fear cues tended to be mixed up with surprise, while disgust tended to be interpreted as anger. In Robinson, Spencer, Thomson *et al.*'s (2012) study, prisoners convicted of sexual crimes were poorer at recognizing surprise, but better at recognizing sadness than those convicted of other types of violence. Gillespie, Rotshtein, Satherley, Beech and Mitchell (2015) also found perpetrators of sexual crimes to have reduced sensitivity to emotional expressions, particularly a lack of sensitivity to female high intensity expressions of fear and anger. This supports previous findings suggesting that sexually aggressive men have difficulties in accurately identifying women's negative affect (Lipton, McDonel & McFall, 1987), misinterpret female expressions of friendliness as seductiveness (Malamuth & Brown, 1994), and tend to interpret

women's communications as deceptive (Polaschek & Gannon, 2004). These latter findings suggest, in ToM terminology, the presence of an overmentalizing tendency in sexually aggressive men. Ward, Keenan & Hudson (2000) and Keenan and Ward (2000) argued theoretically for a ToM perspective as a unifying framework to study the central affective, cognitive and interpersonal problems identified among men convicted of sex crimes. So far, only two studies (Elsegood & Duff, 2010; Castellino, Bosco, Marshall, Marshall & Veglia, 2011) have investigated empirically the hypothesis that perpetrators of sexual violence may have impaired ability to accurately attribute mental states to others, that is, that they have ToM deficits. Elsegood and Duff (2010) used the Reading the Mind in the Eyes test (Baron-Cohen, Castellino, Bosco, Marshall, Marshall & Veglia, 2001) as well as an adapted child version of it (The Mind in a Child's Eyes' task). They found perpetrators of child sexual abuse to be poorer than non-offenders in attributing mental states to adults, but that they performed on par with non-offenders when the subject of their attribution was a child. Intact ability to infer the mental states of children, but not of adults, may lead to an experience of emotional congruence with children, as opposed to with adults. Emotional congruence with children is an empirically supported risk factor for sexual recidivism (Mann, Hanson & Thornton, 2010), and may contribute to increased motivation to establish relationships with children as a proxy for adult intimacy (Elsegood and Duff (2010). Castellino *et al.*, 2011) carried out the other empirical study of ToM in persons convicted of sexual violence. They applied both classical tasks investigating first- and second-order inferences, as well as more advanced tasks represented by six Strange Stories tasks (Happe, 1994) and the Theory of Mind Assessment Scale (Bosco, Colle, De Fazio, Bono, Ruberti & Tirassa, 2009). The tests mainly included adults as stimuli, except from the first-order Sally-Ann task, which involves a vignette with two female dolls. Their results indicated that men convicted of sexual violence performed poorer than the control group on second-order tasks, that is, tasks requiring thinking what another thinks about a third person. The observed inverse association between risk score and problems with mental state inferences is of interest from a prevention point of view; those with poorer skills in inferencing others' mental states had higher risk for future crime (Castellino *et al.*, 2011). This may point to the potential contributing role played by social cognitive deficits in problem behaviors such as impulsivity and aggression, due to misinterpretation of social stimuli, as suggested by Andreou, Kelm, Bierbrodt et al. (2015). The Castellino *et al.* (2011) study included both men convicted of child sexual abuse as well as men convicted of rape against an adult. The latter group scored generally poorer than perpetrators of child sexual abuse, but the potential differences failed to reach significance due to low absolute numbers in each subgroup.

Rationale for the study

In sum, the current evidence support the existence of ToM impairments among men convicted of sexual crimes, primarily in terms of a tendency to overmentalize. Generally, persons convicted of sex crimes seem less accurate at identifying affective cues, particularly related to negative affect, and particularly when expressed by adult women. There is also evidence to suggest

impairments in cognitive ToM, as seen in poorer performance on second-order tasks requiring more complex inferences about others' thinking. There also seems to be some potentially important differences between perpetrators of sexual abuse against adults and children, with more ToM impairments, both in terms of affective and cognitive ToM, among the former group.

There is a need for studies specifically focusing on perpetrators of sexual violence against adults, as our current understanding of ToM performance in this subgroup needs to be advanced. This should be accomplished with empirical studies using ecologically valid instruments presenting social interactions in a dynamic real-life manner.

The Movie for the Assessment of Social Cognition (MASC) (Dziobek, Fleck, Kalbe *et al.*, 2006) is a video-based ToM measure developed to mirror a real-life dinner party situation, involving the need to infer meaning from both verbal and non-verbal behavior. The MASC has shown good psychometric properties both in terms of construct validity and reliability (internal consistency, as well as interrater and test-re-test reliability, for details, see Dziobek *et al.*, 2006). The Norwegian version of MASC, used in this study, has been validated by Fretland, Andersson, Sundet, Andreassen, Melle and Vaskinn (2015). In addition to providing information on affective and cognitive ToM, the MASC instrument differentiates between overmentalizing, undermentalizing and errors of the no mentalizing type. The MASC has been used to investigate ToM in different patient samples, such as persons with schizophrenia (Engelstad, Rund, Torgalsboen, Lau, Ueland and Vaskinn, 2019; Fretland *et al.*, 2015; Montag, Dziobek, Richter *et al.*, 2011, 2012; Vaskinn, Andersson, Ostefjells, Andreassen & Sundet, 2018), depression (Wolkenstein, Schonenberg, Schirm & Hautzinger, 2011), borderline personality disorder (Montag *et al.*, 2010; Vaskinn, Antonsen, Fretland, Dziobek, Sundet & Wilberg, 2015) (Andreou *et al.*, 2015), alcoholism (Maurage, de Timary & D'Hondt, 2017), as well as a general population sample (Lecce, Ceccato & Cavallia, 2019). The instrument has recently been used in two studies involving correctional populations. Newbury-Helps, Feigenbaum, and Fonagy (2017) investigated a sample involving offenders with both violent and non-violent convictions. They found poorer performance in the offender group, with fewer correct responses and more undermentalizing errors compared to a control group. In a study of persons with a violent conviction, Mayer, Justye, Klimechi-Lenz and Schönenberg (2018) did not observe differences in MASC performance when comparing results to a matched control group. A recent study in a sample of severely violent (homicide/attempted homicide) patients with schizophrenia further supports the existence of severe social cognitive impairments among offenders, when measured with the MASC. This was evidenced in reduced ToM compared to both non-violent patients with schizophrenia as well as a healthy comparison group (Engelstad *et al.*, 2019).

Aims of the study

In this study, we investigated the hypothesis that men convicted of sexual abuse of adults (rape) have impaired ability to accurately attribute mental states to other adults, that is, have ToM deficits. We investigated both cognitive and affective ToM, as well as types of errors.

METHOD

Participants

Men sentenced to prison for rape against an adult[1] as an index offense were invited to participate in a personal interview concerning childhood experiences and adult social skills. At any given time, Norwegian prisons hold on average 150 men convicted of rape, representing the population eligible for inclusion in this study. They may serve their sentence in any of the prison facilities designated for male prisoners. For efficiency purposes, we restricted our sampling pool to prisons holding the highest number of rape convicted men, resulting in participants from eight different prisons (two lower security and six higher security units). A total of 26 male prisoners ranging in age from 20–74 (mean = 36.9 ± 13.5) agreed to participate. The interviews took place in designated visiting areas within the prison premises. Victims were female in 23 of the cases, male in two cases, and one prisoner reported both male and female victims in the case he was currently imprisoned for. The respondents reported the victim to be unrelated to him in 18 (72%) cases, and altogether unknown to him in eight of these cases (32% of all cases). A large majority (81%) of the crimes were committed either in the offender's or the victim's home, or on some other private property. The majority of the sample was 40 years or younger, 27% had primary education or less, and according to their self-report, a majority of the sample have been previously charged or convicted of violent crimes. See Table 1 for details.

The performance of our offender sample was evaluated against the published mean scores of a healthy sample (*n* = 71) from the general population (Vaskinn *et al.*, 2018). This comparison group consisted of both men (*n* = 42) and women (*n* = 29). As previous findings indicate that men and women do not perform differently on the MASC test applied in this study (Fretland *et al.*, 2015), we decided to compute standardized scores for our sample based on the scores of this collapsed men/women sample.

Measures

Measure of theory of mind. Theory of mind was measured by the Norwegian version (Fretland *et al.*, 2015) of MASC, developed by (Dziobek *et al.*, 2006). The MASC is a movie depicting two women and two men involved in a social situation developing over the course of an evening together. The movie takes about 15 minutes and is paused 45 times. When paused, the respondent is presented with a multiple-choice question related to the characters' mental state. There are four response options, one correct and three incorrect. The three error types are overmentalizing or over-attribution of mental states (MASCexc),

Table 1. *Descriptive characteristics of the sample (n = 26)*

	%	(n)
Age group		
20–30	34.6	(9)
31–40	30.7	(8)
41–50	19.2	(5)
51 or older	15.4	(4)
Education		
Primary education or less	26.9	(7)
Secondary education (upper and lower)	53.8	(14)
College/university	19.2	(5)
Minority background		
Yes	34.6	(9)
No	65.4	(17)
Previous violent crimes		
Yes	57.7	(15)
No	42.3	(11)
Hayes Ability Screening Index scores		
Below cut-off (<85)	19.2	(5)
Above cut-off (≥85)	76.9	(20)
Missing	–	(1)

undermentalizing or under-attribution of mental states (MASCless) and no mentalizing errors, that is, a complete lack of mental state attribution (MASCno). In addition to an overall total correct score (MASCtot), the MASC further allows for computing affective (MASCaff) and cognitive (MASCcog) ToM modality scores, based on dissociating items related to these two subcomponents. We categorized items as described in Vaskinn *et al.*, (2018). An item was allocated to cognitive or affective ToM, respectively, depending on the mental state referred to in the question (cognitive ToM = "What does X think?" and "Why does Y say this?"; affective ToM = "What does Z feel?"). One item (#35) was not categorized since all response options described factual circumstances (not thoughts, intentions or emotions). This resulted in 26 items comprising *cognitive ToM* (9 items were categorized as thoughts, 17 as intentions), while 18 items were considered as referring to emotions, or *affective ToM*. For further details see Vaskinn *et al.* (2018). MASC was run from a Power Point-file presented on a laptop, and the interviewee responded verbally to the question posed each time the movie was stopped.

Demographic and clinical measures

Only participants who were able to communicate efficiently in Norwegian were included as data were collected through a personal interview. As a proxy for cultural background, the participants were asked for their country of upbringing. Education was measured as the longest completed education and divided into primary education or less; secondary education (lower and upper); and college or university level education. Previous registered violence was investigated by self-report of number of previous violent or sexual charges/convictions. As some may have included the current conviction when responding to this question, only those reporting more than one crime were counted as having a violent record.

As a previous study indicated that MASC performance may be influenced by IQ (Fretland *et al.*, 2015), the Norwegian version (Søndenaa, Bjørgen & Nøttestad, 2007) of the Hayes Ability Screening Index (HASI) was included. Raw scores are transformed into scaled scores, and the HASI cut-off score for adults is 85. This is not to be interpreted as an IQ-score, but rather as a positive screening result, indicating need for a further assessment of intellectual ability for those scoring below the cut-off.

Procedure

Prison officers known to the prisoner and with legal access to confidential information concerning each prisoner's criminal record, contacted potential interviewees and informed them about the study. The prison staff subsequently communicated information about who would like to hear more about the study, and hence could be contacted by the research team. Eventual participation was based on written informed consent. The participants were explicitly made aware that information provided during the interview would be handled confidentially by the interviewers, and not in any case communicated in identifiable form to persons outside the research team. The prisoners were also informed that neither positive nor negative consequences would follow from their participation. All interviews took place in designated visiting rooms within the prisons. Participants were offered soft drinks and a snack during the interview, but no monetary compensation. The study was approved by both the regional committee for medical research ethics as well as the relevant correctional service authorities.

Analyses

All statistical analyses were performed using SPSS for Windows, version 23. In order to compare the rape-convicted sample to the reference sample, scores were standardized (z-transformed). Standardized scores were calculated using the formula $= \frac{X - \mu}{\sigma}$ implying that the mean of the rape-convicted sample is subtracted from the mean of the healthy reference sample and divided by the standard deviation of the reference sample. In order to test the significance of the differences between the samples' means, the presented means and standard deviations were entered into a

freely available online calculator (https://www.mathsisfun.com/data/confidence-interval-calculator.html) to provide the 95% confidence intervals, based on the formula mean ± 1.96 × (SD/SQRT(n)). MASCaff and MASCcog scores were converted to percentages of correctly scores items, in order to achieve the same scaling before conducting a paired samples *t*-test, within the offender sample. Differences in error types within the offender sample were investigated by one-way repeated measures ANOVA with the three error types entered as within-subjects factor. Post hoc comparisons were undertaken with Bonferroni corrections.

Sensitivity analyses

Poor cognitive abilities and lack of proficiency in Norwegian could hamper the ability to respond correctly on the MASC instrument. This was, therefore, subjected to two follow-up analyses. These analyses investigated the association (measured by Spearman's rho) between HASI screening scores and overall ToM. Minority status was used as a proxy for language difficulties, and differences in ToM between ethnic minority and ethnic majority respondents within the rape-convicted sample were investigated by independent samples *t*-tests, with effect sizes indicated by Hedge's g based on the pooled standard deviations.

RESULTS

Table 2 presents the ToM performance, as measured with the MASC test, in the rape-convicted sample, compared to the performance of a healthy reference sample (retrieved from Vaskinn *et al.*, 2018, Table 2).

The rape-convicted sample had a low MASCtot score, indicating a low number of correctly scored items. As indicated by the z-transformed MASC scores, the rape-convicted group deviated substantially from the healthy reference group. For MASCtot, their performance was 2.4 standard deviations below the mean of the healthy reference sample. Compared with this, the error scores were elevated compared to healthy controls, +1.9 standard deviations for MASCless and MASCno, +1.4 standard deviations for MASCexc (which was the most common error type in both groups, see Table 2). The rape-convicted group also differed from the comparison sample in terms of mental state modalities, as seen in their lower scores on both MASCaff and MASCcog. Non-overlapping confidence intervals indicated that the differences between the two samples were significant for all variables presented in Table 2.

Within-group results among the rape-convicted men, indicated that the proportion of correctly scored mental states modalities was significantly different ($t_{25} = -3.93$, $p < 0.001$), with better scores for MASCcog (69.8% correct) than MASCaff (57.7% correct).

Furthermore, results from a one-way repeated measures ANOVA with a Greenhouse-Geisser correction determined that error types differed significantly [$F(1.42, 26) = 9.96$, $p = 0.001$]. Post hoc tests with Bonferroni correction revealed that the difference was caused by significantly fewer MASCno errors than MASCexc and MASCless errors.

Sensitivity analyses

The association between HASI screening scores and MASCtot in the rape-convicted sample was non-significant (Spearman's rho = 0.11, $p = 0.616$). The differences between ethnic minority

Table 2. *Theory of mind (ToM) performance in men convicted of rape compared to a healthy reference sample*

	Men convicted of rape (n = 26)		Healthy reference sample* (n = 71)		Comparison between rape - healthy reference sample z-scores	Comparison between rape** – healthy reference sample z-scores
	Mean (SD)	95% CI	Mean (SD)	95% CI		
MASCtotal	25.4 (6.6)	22.9–27.9	35.1 (4.1)	34.1–36.1	−2.4	−1.9
MASCexc (error)	8.4 (4.9)	6.5–10.3	4.4 (2.8)	3.8-5.1	1.4	1.5
MASCless (error)	7.6 (3.9)	6.1–9.1	3.9 (2.0)	3.4–4.4	1.9	1.2
MASCno (error)	4.2 (2.4)	3.3–5.1	1.6 (1.4)	1.3–1.9	1.9	1.4
MASCaff (range 0-18)	9.8 (2.8)	8.7–10.9	13.6 (1.9)	13.2–14	−2.0	−1.6
MASCcog (range 0-26)	15.3 (4.4)	13.6–17	21.3 (2.7)	20.7–21.9	−2.2	−1.7

*The data for the healthy reference sample is taken from a previous publication Vaskinn *et al.*, (2018).
**Sensitivity analyses based only on ethnic majority (Norwegian) respondents (*n* = 17).

and ethnic majority respondents in MASCtot scores were significant (21.3 versus 27.5; $t(24) = 2.51$, $p = 0.019$), with a large effect size (Hedge's $g = 1.04$). Thus, in order to investigate the influence of immigrant-majority group status on the observed rape-comparison group difference, comparisons with the healthy reference samples, were re-run on a sample including only majority group respondents ($n = 17$). The results are provided in Table 2. Differences between the rape-convicted sample and the general population respondents were attenuated, but remained at a level indicating substantial impairment in the convicted group also when this consisted only of ethnic majority respondents.

DISCUSSION

Main findings

In support of our overall hypothesis, the main finding in this study of men convicted of adult rape was a markedly reduced ability to infer the mental states of others. This ToM impairment was seen in lower mean scores on the MASC test, as well in increased number of mentalizing errors of all types, when compared to the performance of a healthy reference sample. Worth noting is also the similarity in error patterns between the rape-convicted sample and the healthy reference sample; the observed differences are more in terms of degree than in kind. Note also that the deficit was present, although attenuated, when ethnic minority respondents were excluded. Within the rape-convicted sample, errors of the "no mentalizing" type were significantly less prevalent than overmentalizing and undermentalizing errors. The participants performed significantly worse for affective ToM compared to cognitive ToM.

Although the two previous studies of ToM in sexually violent men indicated reduced ToM in this group of offenders (Castellino *et al.*, 2011; Elsegood & Duff, 2010), the deficits were not as pronounced as in our study. Elsegood and Duff (2010) reported that the effect size for the significant difference between their offender sample and healthy control participants was small-medium. The effect size for the total ToM score in our study was very large-huge (Cohen's $d = 1.81$). Our sample performed from 1.4 to 2.4 standard deviations poorer than the healthy comparison sample. A performance level 1.5 standard deviations below the mean of the healthy comparisons, is in clinical neuropsychology

characterized as clinically significant cognitive impairment (Simonsen, Sundet, Vaskinn *et al.*, 2008). This suggests substantial difficulties in understanding social interactions, difficulties that are also likely to impact on the ability to deal adequately with interpersonal situations.

In the Castellino *et al.* (2011) study, men convicted of sexual crimes performed poorer than the comparison sample on tasks requiring more complicated mental state inferences (second-order inference). On the simpler first-order task of identifying another person's mental state, the groups did not differ in their performance. One explanation for the diverging findings is that the first-order task applied in the Castellino study requires less advanced inferences than the MASC measure. Furthermore, Castellino and colleagues' study sample consisted of both persons with crimes involving child victims as well as men convicted of adult rape, while the ToM tasks applied mainly related to adults. This may disguise intra-group differences between sex offender subgroups. The descriptive information provided by Castellino and colleagues on the men convicted of rape, indicated that their ToM abilities tended to be poorer than those of offenders convicted of child sexual abuse, although the observed differences did not reach statistical significance due to small numbers. Elsegood and Duff (2010) provided further support for potential group-specific, rather than global ToM deficits. In their study, persons convicted of child sexual abuse had observable ToM problems only on tasks involving attribution of mental states to adults, not tasks involving the ability to infer mental states in children. A corresponding pattern of potential victim incongruent ToM deficits (being unable to identify mental states only among adults, while having intact abilities for inferring mental states in children) could not be investigated in our data, as the MASC instrument only includes social interactions among adults.

To our knowledge, three previous studies have administered MASC in offender samples (Mayer *et al.*, 2018; Newbury-Helps *et al.*, 2017). Mayer and co-workers (2018) did not find any differences between their violent crime sample and a matched control group on MASC, and no relation between MASC-scores and psychopathy. In the other two studies, impaired social cognitive functioning was observed. The study by Newbury-Helps and colleagues (2017) found similar offender-control differences as in our study in terms of overall MASC performance (markedly poorer among offenders than controls), but some interesting

differences in error profiles. The offender sample seemed particularly prone to make undermentalizing errors, while overmentalizing errors was the most common error type in our sample. In both studies, no mentalizing errors were the least prevalent error type. As the Newbury-Helps and colleagues' study included both violent and non-violent offenders, comparisons with our restricted rape-convicted sample should be done with caution, but potential crime-specific ToM problems may be an area worth further investigation. A similar tendency toward making more undermentalizing errors was evident in the study by Engelstad and colleagues (2019); in fact, overmentalizing errors was the least common error type in their sample of homicide offenders with schizophrenia. Also among their non-violent patient sample, undermentalizing and no mentalizing errors were more common than overmentalizing errors.

Men convicted of rape did not only perform poorer than the healthy reference sample to which they were compared in this study, their performance was also inferior to Norwegian patient samples subjected to the same ToM measure. In the Vaskinn and colleagues' study (2015), the female schizophrenia (SZ-f) patients were the poorest performers compared to both female borderline patients as well as healthy controls. The SZ-f mean of 29.2 correct MASC responses was still considerably better than the mean number of 25.4 correct responses obtained in our present rape convicted sample. The mixed gender schizophrenia sample presented in Fretland *et al.*, (2015) also did better (with a mean number of correct MASC responses of 29.1) than our convicted sample, even if we restrict our sample to non-immigrant rape-convicted men (27.5). So far, only the homicide offenders with schizophrenia in the study by Engelstad *et al.*, (2019) have shown a poorer performance on the MASC instrument (mean MASCtot score = 20.6) than the rape-convicted group investigated in the current study. This attests to the severity of the present findings, given that schizophrenia is a mental illness characterized by social cognitive deficits (Savla, Vella, Armstrong, Penn & Twamley, 2013), with ToM as an important predictor of functioning (Fett, Viechtbauer, Dominguez, Penn, van Os & Krabbendam, 2011).

Methodological considerations

The low sample size involved in the present study represents a serious limitation. Still, several of the sample characteristics concur with previous findings from studies based on register data or larger samples. A generally poor welfare situation among perpetrators of rape, as well as older age and a high percentage with a prior criminal record are findings in line with previous research based on Norwegian data (Friestad & Skardhamar, 2016). In terms of intellectual ability, previous findings on Norwegian prison inmates indicate a slightly lower mean score (85.5) using the same instrument as applied in the present study (Sondenaa, Rasmussen, Palmstierna & Nottestad, 2008).

The fact that the rape crime was most often committed on private property and toward a victim known to the perpetrator, resembles the situation described in another study based on all rapes against adults reported to the police in a Norwegian police district (Hagemann, Stene, Myhre, Ormstad & Schei, 2011).

Although undeniably small, our sample does not diverge from the population from which it is drawn when it comes to central background and crime characteristics, suggesting generalizability to prison populations. Still, imprisoned offenders constitute only a small fraction of those who have committed a rape, and several factors influence the likelihood of reporting a crime to the police (Knoth & Ruback, 2016), as well as the attrition processes in the criminal justice system which operate in relation to rape (cf. Daly & Bouhours, 2010). Consequently, there may be important differences, also on the measures included in this paper, between men who commit rape and those ending up with a formal legal sanction, precluding generalizations beyond convicted populations.

Using a video-based measure of ToM, depicting real-life social interactions is an important strength of the current study, contributing to increased ecological validity. Still, as noted by Newbury-Helps and colleagues (2017) the middle-class language and social rules depicted in the movie may be strange to those (offenders) who may have a different social background, and to offenders with another cultural background. Another potential limitation with the MASC measure is its reliance on proficiency in the language spoken in the movie (Norwegian, in this case). Persons with ethnic minority background scored lower on all ToM variables. This suggests that lack of proficiency in Norwegian could contribute to the observed ToM difficulties. However, the MASC scores among the ethnic majority rape-convicted men only (total score: 27.5) were substantially lower than in the healthy reference sample (total score: 35.1). This indicates that neither language difficulties nor other minority related factors can fully explain the reduced ToM in men convicted of rape. This is also supported by the fact that most of those defined with minority status were raised in Norway, but classified with minority background due to their foreign-born parents.

Implications

According to Ward and colleagues (2000), lack of awareness for others' mental states is a common element to the affective, cognitive and interpersonal deficits observed among perpetrators of sexual crimes. By applying a ToM perspective focusing on the roots or sources of these deficits, attention is directed toward the skills involved in attributing mental states to others. Results indicating that the ability to interpret the meaning behind others' behavior is severely compromised among men convicted of rape may provide important knowledge for developing more efficient interventions, and applying them in an individualized manner. Mentalization-based treatment as described by Bateman, O'Connell, Lorenzini, Gardner and Fonagy (2016) provides one promising example of how the ability to recognise and understand others' mental states may be actively approached in an intervention, improving several risk factors for violence (anger, hostility, paranoia). Importantly, choice of intervention should always be based on thorough individual assessment. The presence of co-morbidities such as severe psychopathy needs to be explicitly investigated in order to clarify if and how a therapeutic intervention may be suitable.

CONCLUSION

The present study found that men convicted of adult rape have a markedly inferior ability to infer the mental states of others, indicative of clinically significant impairment in this social cognitive ability. The findings add to the growing literature on ToM deficits among perpetrators of sexual violence, and support the use of a video-based measure of ToM depicting dynamic real-life situations. More work is needed on how a ToM approach may be practically implemented into current sex offender treatment interventions.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

NOTE

[1]At the time of data collection, rape was regulated in §192 of the Norwegian penal code. In the new penal code, implemented in October 2015, sexual crimes are defined in Chapter 26, with §§291–294 covering rape of adults. In this paper, we refer to the old version of the penal code, as this applied to all persons included in our sample.

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APPENDIX

Examples of MASC response categories.

While the four characters prepare dinner together, one of the male characters insults, tongue-in-cheek, one of the female characters by saying that if it were up to her, they would have added five instead of two cups of cream to the sauce.

Q: What does she feel?

Response options:

A1. Insulted by his comment (correct).

A2. Hates him and wants him to leave (incorrect: overmentalizing).

A3. Amazed that he knows that she likes cream (incorrect: undermentalizing).

A4. Five cups is too much for this sauce (incorrect: no mentalizing).