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Clinicians' Perceptions of Virtual Reality for Deliberate Firesetting

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Abstract

Purpose

VR is a novel technology that could be used in the assessment and/or treatment of deliberate firesetting. This study aimed to develop an understanding of clinicians' views of VR for deliberate firesetting, in order to identify areas where VR could potentially add value to current practice and any particular barriers to using VR in this context.

Methodology

Through an online survey, 73 clinicians rated their agreement with nine potential benefits of using VR for firesetting and 11 potential barriers to using it. They also provided free text responses detailing the greatest perceived potential benefit and the greatest perceived barrier. Factors related to intent to use VR for firesetting in the future were explored.

Findings

Clinicians perceived the ability to safely expose clients to fire-related stimuli to be highly beneficial. However, clinicians were concerned about the possibility of re-traumatisation and logistic barriers. Previous experience of using VR with individuals who have set fires was significantly related to using it in the future.

Practical implications

Further research establishing the feasibility and effectiveness of using VR with individuals who have set fires may help alleviate clinicians' concerns. Increasing opportunities for clinicians to experience a firesetting VR programme may widen implementation of firesetting VR.

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Originality/value

Previous research has only focused on clinicians' perceptions of VR in the general field of forensic mental health and has failed to consider offence-specific applications.

Keywords: firesetting, virtual reality, VR, forensic mental health

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The potential of Virtual Reality

Virtual Reality (VR) refers to technology that allows users to navigate through and interact with a three-dimensional, computer-generated environment (Freeman et al., 2017). This environment is immersive and designed to elicit a sense of presence, wherein users experience the virtual setting as real (Diemer et al., 2015). In recent years the application of VR has expanded, with its use within the assessment and treatment of mental health disorders becoming more abundant (Geraets et al., 2021). VR also appears to have potential for the care and management of individuals who have offended (Benbouriche et al., 2014). In particular, VR offers the possibility to expose individuals to stimuli relevant to their offending, allowing clinicians to safely observe clients within simulated offence-related situations (Cornet & Van Gelder, 2020). For instance, VR has been used to expose individuals with a history of sexual offending to unclothed child avatars to facilitate assessment of inappropriate sexual arousal (Renaud et al., 2014). VR may also add value to treatments for forensic clients, since it can allow relapse-prevention skills to be practiced within a controllable environment (see Fromberger, Meyer, et al., 2018).

Identifying barriers to wider implementation of VR

Despite the potential of VR, its use within secure settings has been limited (Fromberger, Jordan, et al., 2018). Therefore, it is imperative that a thorough understanding of the obstacles preventing wider implementation is established. One approach to recognising possible impediments to more extensive use is to appreciate clinicians' perceptions of this novel technology. This tactic has been undertaken in a variety of non-forensic contexts, including examining clinicians' views of VR for exposure therapy (e.g., Lindner et al., 2019; Segal et al., 2010), which has highlighted key avenues to facilitate broader application of VR.

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For example, Segal and colleagues (2010) found clinicians with greater self-reported knowledge of VR had more positive perceptions of its use. This suggests that increasing clinicians' familiarity with the technology could be an important tactic for enhancing their views of VR. However, Lindner and colleagues (2019) found positive attitudes towards VR were a lesser predictor of the likelihood of future use of VR than negative attitudes. Therefore, Lindner et al. argued that efforts to distribute information about VR should directly address potential negative aspects, rather than placing emphasis on the positive qualities.

While these studies yield important suggestions to improve implementation, their applicability to forensic contexts is unknown. To date, there has been one investigation of clinicians' views of the use of VR in forensic mental health settings. Kip and colleagues (2019) conducted semi-structured interviews with eight therapists and three patients to elicit treatment situations that could be improved by utilising VR. These scenarios were subsequently presented to 89 therapists and 19 patients, who were asked open questions about positive and negative aspects of the VR scenarios. This qualitative data revealed participants held a range of positive views about VR, including the potential to improve treatments and the visual realism of stimuli presented through this technology. They also discussed patient-focused advantages, including allowing patients to gain greater insight into their own or others' behaviour, and increasing their motivation. In contrast, potential negative aspects of VR included a lack of fit with current treatments, lack of universal suitability, and the possibility of eliciting unnecessary negative feelings. Participants were also concerned about the generalisability of skills learnt within a virtual environment, and logistical issues including costs.

Overall, Kip et al. (2019) concluded VR could add value to assessment and treatment within forensic mental health settings, provided it is adapted to the characteristics of patients,

clinicians, and the forensic context. Consequently, they suggested a “one-size fits all” approach to the use of VR with forensic clients is not suitable. This emphasis on a need for an individualised approach is not sufficiently reflected in the current literature; most published VR studies have focused on individuals with a history of sexual offending (e.g., Fromberger, Jordan, et al., 2018), and currently little is known about the application of VR to other offences (Kip et al., 2019). Indeed, one major limitation of Kip et al.’s study was a lack of information about the types of offending in which VR could be applied. The scenarios presented to participants did not detail a specific offending context. In addition, therapists did not indicate what types of offending they worked with, and limited information was available about the offending history of patient participants.

The need for a specialist approach to deliberate firesetting

This lack of knowledge regarding VR and different types of offending represents a significant issue because offence-specific treatments are essential when working with forensic clients (see Mallion et al., 2020). This is particularly concerning when considering the offence of deliberate firesetting¹, since there is a wealth of empirical evidence supporting the need for a specialist approach to tackling this behaviour. Research has demonstrated that individuals who have engaged in deliberate firesetting significantly differ from individuals who have committed other offences on several psychological variables, including interest in serious fires (Gannon et al., 2013). These differences represent unique treatment needs and therefore specialised firesetting assessments and treatments are necessary (Tyler, Gannon, & Sambrooks, 2019).

Deliberate firesetting accounted for more than 63,000 fires and resulted in 59 fatalities and over 880 casualties in a 12-month period in England (Home Office, 2021a, 2021b).

¹ Deliberate firesetting refers to all acts of intentionally starting fires, irrespective of whether they have been legally recorded as arson (see Gannon et al., 2013).

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Similarly problematic rates are reported across countries and thus it has been argued deliberate firesetting is an international public health issue (Tyler, Gannon, Ó Ciardha, et al., 2019). Deliberate firesetting is also a behaviour of particular concern to forensic clinicians due to the high incidence across secure psychiatric and criminal justice settings (Gannon et al., 2022). However, despite the prevalence and devastating consequences of deliberate firesetting, the development of specialist assessment tools and treatments has been limited (Sambrooks & Tyler, 2019).

VR could represent a novel technology for the assessment and/or treatment of deliberate firesetting, but it would need to be tailored for use with individuals with a history of firesetting. Therefore, it would be beneficial to develop a clear understanding of clinicians' views specifically with regards to VR use with individuals who have set fires. This is crucial to identify areas where VR could potentially add value to current practice when dealing with deliberate firesetting, as well as highlighting any particular barriers to using VR in this context. Hence, the current research examined the views of clinicians involved in the assessment or treatment of individuals with a history of deliberate firesetting about the use of VR with this population.

Method

Ethics approval for this study was granted by the university research ethics committee (reference: 202116135638437059).

Participants

Participants were recruited from advertisements placed on social media (i.e., Twitter, Facebook, LinkedIn), as well as through listservs, and emails to individuals known to work in the field of deliberate firesetting. Participants had to be involved in the assessment and/or treatment of individuals with a history of deliberate firesetting. Originally, 3,509 survey

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responses were received. However, after screening for completeness and fulfilment of the inclusion criterion, 73 participants remained. Included responses were from participants known to the authors as practicing clinicians or those that had used an email address that indicated they worked in an appropriate environment. For any submissions where eligibility was unclear, participants were contacted via email and asked to provide evidence of their clinician status. All participants were asked to complete the survey in a personal capacity and were offered a £10 Amazon.co.uk voucher. Participants were primarily female and from the UK. The majority worked as psychologists within healthcare settings, across a variety of security levels. See Table I for additional sample characteristics.

<Table I here>

Survey

The survey was completed online via Qualtrics. The survey began with questions on demographics, professional background, and current job role. The second section included questions on participants' experience with VR, and their current work with individuals with a history of deliberate firesetting.

Participants were then asked to rate their agreement with nine potential benefits of VR and 11 potential barriers to using VR with individuals with a history of firesetting on a 5-point scale, ranging from 1 (*Strongly Agree*) to 5 (*Strongly Disagree*). See Table IV for included items. This item pool was created by adapting statements from Kip et al.'s (2019) research, which were adjusted to explicitly refer to deliberate firesetting. Additional items were constructed by the authors from our experience of administering a VR application with adults who have set fires and anecdotal feedback from their multi-disciplinary teams. The order in which these items were presented to participants was randomised. Cronbach's alpha

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for the benefit items was 0.86 [95% CI: 0.81–0.90] and 0.72 [95% CI: 0.63–0.81] for the barrier items, revealing mean scores to be appropriate.

In addition, participants were asked what they considered to be the greatest potential benefit and the greatest barrier to using VR with this population. These were free-text responses. Finally, participants were asked whether they intended to use VR with individuals with a history of deliberate firesetting in the future (yes/no response).

Results

Current Work with Individuals with a History Of Firesetting

As shown in Table II, participants worked with individuals with a history of firesetting in a variety of capacities. The majority of participants engaged in some form of assessment; either treatment needs assessments ($n = 46$) or risk assessments ($n = 57$). Many participants also reported being involved in delivering treatment for individuals with a history of firesetting, with involvement in general treatments ($n = 44$) more common than offence-specific treatment ($n = 36$).

<Table II here>

Familiarity with VR

Almost half of participants had no personal experience of using Virtual Reality (i.e., for recreational purposes). Additionally, the vast majority had no experience of using VR with clients. However, as Table III shows, eight participants had used VR in their clinical practice. When asked specifically if they had experience of using VR with individuals with a history of firesetting, only five participants had.

<Table III here>

Views of VR

Table IV shows response distributions and descriptive statistics for each benefit and each barrier item. Lower mean scores indicate greater endorsement of the item (i.e., strongly agree).

<Table IV here>

Benefits of Using VR

Quantitative Responses. As Table 4 shows, the most highly endorsed benefit of using VR with individuals with a history of firesetting referred to the ability to expose clients to otherwise inaccessible stimuli. Over half of the participants (51%) strongly agreed and almost 40% somewhat agreed with this item. The second most endorsed benefit was that VR allows clients to practice skills in a safe but realistic environment. Approximately 90% of participants strongly or somewhat agreed with this item. In contrast, only 57% strongly or somewhat agreed with the item concerning the fit of VR with current assessments and treatments.

Qualitative Responses. The responses provided by clinicians in the free text responses were coded by the lead author. A coding scheme was initially developed from the items presented in the survey, with additional codes added when new concepts were apparent in participant responses. Definitions and frequencies of each main and sub code can be found in Table V. As many participant responses touched on multiple potential benefits or barriers, the total frequency counts exceed the number of responses.

<Table V here>

The most frequently reported benefit was related to being able to expose individuals with a history of firesetting to relevant stimuli, with 29 clinicians mentioning this. For

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example, one clinician stated the greatest benefit would be “to be able to expose someone to situations which could not be created in reality (particularly within a closed/secure environment)”. This emphasis on overcoming the difficulties that would prohibit using these stimuli in other manners was common ($n = 21$). In addition, nine clinicians specifically commented on the benefits of VR stimuli being realistic.

Many clinicians commented on how VR could be used to add value to assessments ($n = 27$). For example, one clinician stated the greatest benefit would be “being able to see how [the] client interacts with the environment to inform assessments”. Nine clinicians described how VR could elicit emotions not tapped into via other assessment modalities; for example, “eliciting thought processes and emotional responses for assessment and treatment that may not be available through interview”.

Around one quarter of participants ($n = 17$) focused on the use of VR to teach and practice skills. Three of these clinicians described how this could be useful for increasing clients' confidence; for instance, “clients would be able to put into practice coping skills in challenging situations that they otherwise would not be able to use until they are in a risky situation. This could build confidence in their own coping skills.”

Clinicians frequently described how VR could provide them with greater insight into their clients' thought processes and behaviour ($n = 17$). For example, one clinician said, “The greatest potential benefit of using VR in the treatment of individuals with a history of firesetting is that it would provide useful clinical information for case conceptualization and enhance insights into the behavior for both the clinician and client.” Similarly, other clinicians ($n = 5$) commented on the benefits of using VR for increasing clients' insight into their own behaviour; VR could be used “to help understanding of possible consequences and effects on themselves and/or others.”

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Sixteen clinicians discussed the potential VR presented to add value to firesetting treatments. For example, one clinician stated, "I also think it could be useful for teaching about the effects of fire", while another said the greatest potential benefit "may be being able to provide specific treatment in relation to fire interest".

Four clinicians commented on VR potentially increasing client motivation. For example, one individual said, "Novelty may be a motivator for some clients". Two commented on how VR may be beneficial in terms of improving the accessibility of assessment and treatment. One said, "This method may also be particularly useful for individuals who have an intellectual disability."

Barriers to Using VR

Quantitative Responses. Response distributions and descriptive statistics for the 11 barrier items can be seen in Table IV. One of the most highly endorsed barriers to using VR with individuals with a history of firesetting was that a virtual environment involving a fire has the potential to bring back traumatic memories. Over 87% of participants strongly or somewhat agreed with this item. Similarly highly endorsed was the item related to issues with the appropriateness or feasibility of using VR. In contrast, just 14% of participants somewhat or strongly agreed that skills learnt or practiced within VR cannot be transferred to real life.

Qualitative Responses. Table V shows the codes identified from participants' free text responses, detailing the greatest potential barrier to using VR with individuals who have a history of deliberate firesetting within their service. The most frequently mentioned barrier to using VR with individuals with a history of firesetting was related to financial implications ($n = 35$). For example, clinicians were concerned the expense would be "prohibitive". Two clinicians discussed how the fiscal barrier may be lessened if a firesetting VR programme was accompanied by other VR applications. One said, "To justify the expense and cost, I

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believe the VR package may need add on packages for other offence types, to make this more cost effective and useful for the whole population”.

Participants were also concerned about other logistical barriers, including having access to appropriate resources and technology (e.g., “poor internet connection”; $n = 11$) and security issues ($n = 17$). For instance, one clinician stated the greatest barrier to implementing VR stemmed from “the security restrictions of having such equipment available in secure environments”.

Ten clinicians were concerned about the potential of VR being traumatising for individuals with a history of firesetting. For example, one clinician said, “I think that this could be too realistic and potentially re-traumatising...”. Two clinicians were also concerned about the VR eliciting negative emotions; for example, one was worried about “not being able to control how they may react emotionally/physically to experiencing fire.”

Eight clinicians described barriers relating to a lack of research regarding VR for deliberate firesetting. For example, one clinician considered the use of VR in this context to be “underdeveloped and under researched, therefore the longer-term impact to the individual is unknown”. Potential side effects were also mentioned by other clinicians ($n = 4$).

Five clinicians raised the possibility that opposition from management may represent a barrier, with clinicians discussing issues with “red tape” and “bureaucracy”. One clinician discussed that a potential barrier may be “staff perceptions of it worsening behaviour”. Indeed, clinicians were concerned that using VR for firesetting may increase clients' inappropriate interest in fire ($n = 4$); for example, “some firesetters may find it exciting and feed their desire to set fires”.

Four clinicians noted feasibility issues. One clinician considered the greatest barrier to using VR for firesetting stemmed from difficulties with “making it accessible for all – my

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firesetting clients have often had additional needs including hard of hearing and [autism spectrum disorders]”. Another clinician considered “using it with patients who are psychotic and aggressive” would be a barrier to use within their service.

Benefits vs. Barriers

To determine if clinicians perceived the benefits of using VR with individuals with a history of firesetting as outweighing the potential barriers, average scores were calculated by averaging participants' responses from the nine individual benefit items and then the eleven individual barrier items. Average benefit scores ($M = 2.00$, $SD = 0.55$) were significantly lower than average barrier scores ($M = 2.76$, $SD = 0.47$); $t(72) = -8.44$, $p < .001$, $d = 0.99$, indicating significantly greater endorsement of benefits than barriers.

Factors Associated with Intent to Use VR in the Future

The majority of participants reported they did not plan on using VR with individuals with a history of firesetting in the future. However, 43.84% ($n = 32$) reported they intended to use VR with this population. Exploratory tests were undertaken to examine which factors, if any, were associated with intent to use. Due to the small sample size, Fisher's Exact Tests were conducted for categorical variables (see Supplementary Materials for contingency table), while point biserial correlations were calculated where the variable examined was continuous.

In terms of participants' job roles, there was no significant association between the proportion of participants who intended to use VR for firesetting and participant profession ($p = .207$), organisation type ($p = .711$), client gender ($p = .713$) or service security level ($p = .394$). In addition, participants' years of practice was not significantly associated with intent to use VR in the future; $r(69) = .22$, $p = .062$.

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To examine the impact of familiarity with VR, categories of experience were collapsed into two levels: no experience, and any experience. There was no significant association between the proportion of participants who intended to use VR and personal experience with VR ($p = .343$) or experience of using VR with clients ($p = .127$). The number of clients participants had previously used VR with was not significantly correlated with intent to use, $r(5) = -.39, p = .393$. However, experience of using VR with individuals with a history of firesetting was significantly associated with intent to use in the future ($p = .013$).

With regards to the influence of participants' views of VR for deliberate firesetting, there were small, non-significant correlation between intent to use VR with individuals with a history of firesetting in the future and average benefit and average barrier scores ($r(71) = .18, p = .129; r(71) = -.20, p = .087$).

Discussion

Deliberate firesetting is a highly prevalent, problematic behaviour that requires a specialised approach to assessment and treatment. However, until the present study there had been no exploration of clinicians' perceptions of VR use in this context. Overall, clinicians who work with individuals who have set fires perceived potential benefits of using VR with these clients as outweighing potential barriers. This suggests that, on balance, VR for deliberate firesetting is viewed positively by clinicians.

Potential benefits of VR for firesetting

A wide range of potential benefits of using VR for deliberate firesetting emerged. First, it was apparent that the ability to safely expose clients who have set fires to relevant stimuli was highly valued by clinicians. This was also viewed as a primary benefit in research examining clinicians' views of VR use in broader clinical contexts (e.g., Kip et al., 2019; Segal et al., 2010). The possibility of safe exposure to fire-related stimuli has a clear potential

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application, given that current assessments of fire-specific treatment needs require clients to imagine such stimuli and self-report their affect and cognitions (Ó Ciardha et al., 2015).

Clinicians perceived that using VR could allow greater insight into the cognitions and affect underlying their clients' behaviour, which could add value to assessments. Therefore, the development of a VR-based assessment for deliberate firesetting should be a priority for future research.

Clinicians also highlighted a number of ways in which VR could improve treatment for deliberate firesetting. The potential of VR to allow clients with a history of firesetting to practice new skills was considered to be a strong benefit. Again, this is consistent with previous findings regarding views of VR use in forensic mental health settings (Kip et al., 2019). While VR has been established as an effective methodology for learning and practicing skills in a variety of contexts (e.g., Çakiroğlu & Gökoğlu, 2019), there is currently a dearth of empirical evidence to support skill acquisition through VR in forensic contexts. This may explain why forensic mental health clinicians have previously voiced reservations about whether skills learnt in VR transfer to real life (Kip et al., 2019). However, this did not seem to be as pressing of a concern for clinicians dealing with deliberate firesetting.

Clinicians also appreciated the possibility that VR could facilitate key tasks aimed at reducing firesetting-specific risk factors. For example, clinicians viewed VR as potentially a good methodology for addressing fire interest, which is a well-established risk factor for repeat firesetting in both adults and juveniles (MacKay et al., 2006; Tyler et al., 2015). However, other clinicians were concerned that using VR may exacerbate pre-existing issues with fire interest. Clearly, any VR-based firesetting applications need to be carefully evaluated to examine the impact on fire interest.

Potential barriers to using firesetting VR

While some clinicians suggested that using VR may improve the accessibility of firesetting treatments, others were concerned about the feasibility of using VR with a population characterised by high co-morbidity rates. For example, clinicians were worried about using VR with individuals with a diagnosis of psychosis. In light of the high prevalence of psychosis among individuals with a history of firesetting (Sambrooks et al., 2021), this is a legitimate concern. Although there is a growing body of research examining the use of VR with individuals with psychosis (e.g., Freeman et al., 2019), there is currently a lack of research investigating the utility of VR applications for both psychosis and offending behaviours (Dellazizzo et al., 2019). The overall lack of an evidence base concerning the application of VR to deliberate firesetting was a common apprehension for clinicians. Thus, it should be a priority to advance research to improve clinicians' knowledge of the appropriateness and effectiveness of VR in this context.

There were numerous other barriers identified that would potentially prevent clinicians from implementing the technology for firesetting, including the possibility of evoking trauma. Trauma has been noted as a particular challenge when delivering firesetting treatment (Gannon et al., 2022), so this is not a concern unique to VR-based interventions or assessments. With the current firesetting treatment offerings, it is advised that clients with high likelihood of re-traumatisation undergo trauma-focused therapy before engaging with firesetting-specific treatment (Gannon, 2012; Gannon & Lockerbie, 2014). Therefore, this is likely to be a strategy that needs to be employed with VR-based treatment for firesetting.

In line with the potential negative aspects of VR identified in forensic mental health settings (Kip et al., 2019), economic concerns were highly prevalent among clinicians. . Although the costs associated with VR equipment have vastly reduced in recent years, the

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costs of developing VR applications for specific contexts is still considered to be prohibitive (Grochowska et al., 2019). Indeed, several clinicians discussed how having a VR application that could be applied to multiple behaviours would make it more feasible, and thus an avenue that may need to be explored to facilitate wider implementation.

Concerns about bringing the necessary technology into forensic settings were also rife. Historically, prison services across countries have been hesitant to adopt digital technologies (Teng & Gordon, 2021). However, more recently prisons in both the US and the UK have begun to pilot VR applications (Teng & Gordon, 2021; van Rijn et al., 2017), as have forensic inpatient settings (Klein Tuente et al., 2020), demonstrating the feasibility of VR in these secure facilities.

Increasing the likelihood of use

It is not clear to what extent clinicians in this study were aware of these pilots establishing the practicability of using VR with forensic populations. However, given that previous research has suggested knowledge may be important for improving views of VR (Segal et al., 2010), it is likely that greater dissemination of such studies may be beneficial. However, the present study did not find a significant correlation between positive views of VR for firesetting and intent to use in the future. We did measure familiarity with VR, and our findings suggest a potential role for familiarity with firesetting VR applications in the likelihood of using VR for deliberate firesetting in the future. This suggests increasing opportunities for clinicians to experience a firesetting VR programme may be a vital strategy for widening the implementation of VR in this context.

Limitations

The current study is limited as the sample size was relatively small, in part due to the research being conducted during the COVID-19 pandemic. During this time, many forensic

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clinicians were overwhelmed by additional demands on their workloads (Liebrenz et al., 2020), and thus had little time spare to participate in research. In addition, the sample was predominately made up of psychologists, with other disciplines underrepresented. This could be an issue since the importance of a multi-disciplinary approach to the care of forensic clients has been emphasised (Haines et al., 2018), and therefore understanding the views of all members of the clients' multi-disciplinary teams is essential. Finally, we did not ask participants whether they worked with adults or children. Adults and children are responsible for a similar proportion of firesetting incidents (see Kennedy et al., 2006; Lambie & Randell, 2011), and consequently both age groups should be the target of specialised firesetting assessment and treatment. However, the items included in the survey may have been biased towards adult provision, due to the authors working exclusively with adults. Future research should investigate any perceived differences in the appropriateness or effectiveness of VR for children in comparison to adults who have set fires.

Conclusion

The current study has clearly identified the primary perceived benefits of using VR for firesetting assessments and treatments which should be capitalised on in any applications developed. It has also highlighted the main barriers that need to be addressed before wider implementation of VR for firesetting can be achieved. Building the evidence base regarding the feasibility and effectiveness of using VR with individuals with a history of firesetting, and widely disseminating this information to clinicians, may help alleviate some of their concerns.

Implications for practice

- On balance, front-line clinicians view the use of VR for the assessment and treatment of deliberate firesetting positively.

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- The ability to safely expose clients who have set fires to fire-related stimuli could add value to both assessments and treatments for deliberate firesetting.
- The evidence base for firesetting VR needs to expand before barriers for its use can be overcome.
- Providing opportunities for clinicians to experience a firesetting VR application may increase likelihood of future use.

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Table I

Sample descriptives

Variable	Mean (SD) or %	N
Gender		
Male	28.77	21
Female	69.86	51
Non-Binary	1.37	1
Age	36.04 (8.61)	71
Country of practice		
UK	90.28	65
USA	6.94	5
Australia	2.78	2
Profession/Discipline		
Psychology	78.08	57
Psychiatry	6.85	5
Nursing	4.11	3
Social Work	1.37	1
Occupational Health	0	0
Fire and Rescue Service	5.48	4
Other	4.11	3
Years of Practice	8.20 (7.51)	71
Organisation Type		
Criminal Justice	28.77	21
Healthcare	58.90	43
Independent Practice	4.11	3
Fire and Rescue Service	5.48	4
Other	2.74	2
Service Security Level		
Low	15.07	11
Medium	34.25	25
High	17.81	13
Locked Rehab	5.48	4
Community	17.81	13
Other	9.59	7
Client Gender		
Male	56.16	41
Female	4.11	3
Male and Female	39.73	29

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Table II

Current work with individuals with a history of firesetting

Variable	% of sample	<i>N</i>
Capacity		
Formulation	73.97	54
Treatment needs assessment	63.01	46
Risk assessment	78.08	57
Offence-specific treatment	49.32	36
General treatment	60.27	44
Other	5.48	4
Current assessments		
Fire Interest Rating Scale (FIRS; Murphy & Clare, 1996)	42.47	31
Fire Attitude Scale (FAS; Muckley, 1997)	35.62	26
Four Factor Fire Scales (Ó Ciardha et al., 2015)	23.29	17
St Andrews Fire and Arson Risk Instrument (SAFARI; Long et al., 2013)	9.59	6
Pathological Fire-Setters Interview (PFSI; Taylor et al., 2004)	9.59	7
Northgate Firesetter Risk Assessment (NFRA; Taylor & Thorne, 2013)	9.59	7
HCR-20 (Douglas et al., 2013)	75.34	55
Other	16.44	12
Not applicable	10.96	8
Current Treatments		
The Firesetting Intervention Programme for Prisoners (FIPP; Gannon, 2012)	15.07	11
The Firesetting Intervention Programme for Mentally Disordered Offenders (FIP-MO; Gannon & Lockerbie, 2014)	43.84	32
Other specialised firesetting treatment	10.96	8
General offender behaviour programmes	32.88	24
Not applicable	20.55	15

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Table III

Familiarity with Virtual Reality

Variable	Mean (SD) or %	N
Personal Experience		
No Experience	45.21	33
Some Experience (<1 hour)	27.40	20
Moderate Experience (1 to 5 hours)	17.81	13
Quite a bit of Experience (5 to 10 hours)	4.11	3
Lots of Experience (10+ hours)	5.48	4
Experience of using VR with clients		
No Experience	89.04	65
Some Experience (<1 hour)	2.74	2
Moderate Experience (1 to 5 hours)	2.74	2
Quite a bit of Experience (5 to 10 hours)	4.11	3
Lots of Experience (10+ hours)	1.37	1
Purpose of VR use with clients		
Assessment	44.44	4
Treatment	22.22	2
Research	22.22	2
Other	11.11	1
Number of clients VR used with	10.43 (8.73)	7
Experience of using VR with firesetters		
No Experience	93.15	68
Some Experience (<1 hour)	4.11	3
Moderate Experience (1 to 5 hours)	1.37	1
Quite a bit of Experience (5 to 10 hours)	0	0
Lots of Experience (10+ hours)	1.37	1

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Table IV

Response distributions for benefit and barrier items

Item		Strongly Agree (1)	Somewhat Agree (2)	Neither Agree nor Disagree (3)	Somewhat Disagree (4)	Strongly Disagree (5)	<i>M</i>	<i>SD</i>
BENEFITS		% (n)	% (n)	% (n)	% (n)	% (n)		
Exposure	Using VR would allow exposure to specific scenarios that would otherwise be impractical or difficult to assess	50.69 (37)	39.73 (29)	6.85 (5)	0 (0)	2.74 (2)	1.64	0.84
Practice skills	Using VR allows clients to practice skills and behaviours in safe but realistic environment	38.36 (28)	52.06 (38)	6.85 (5)	1.37 (1)	1.37 (1)	1.75	0.76
Treatment value	A virtual environment involving a fire has the potential to add value to treatment	24.66 (18)	60.27 (44)	12.33 (9)	1.37 (1)	1.37 (1)	1.95	0.74
Assessment Value	A virtual environment involving a fire has the potential to add value to assessments	34.25 (25)	43.84 (32)	17.81 (13)	1.37 (1)	2.74 (2)	1.95	0.91
Clinician Insight	Observing a client within a virtual environment with a fire would allow the clinician greater insight into their problematic behaviour	24.66 (18)	58.90 (43)	10.96 (8)	4.11 (3)	1.37 (1)	1.99	0.81
Client Insight	Using VR would allow the client to gain insight into their own behaviour and its consequences	19.18 (14)	60.27 (44)	17.81 (13)	0 (0)	2.74 (2)	2.07	0.79
Elicit Emotions	A virtual environment involving a fire has the potential to elicit thoughts and emotions in clients that wouldn't be elicited via other means	20.55 (15)	56.16 (41)	19.18 (14)	2.74 (2)	1.37 (1)	2.08	0.80
Motivation	Using VR would increase clients' motivation to actively participate in assessments and treatment	13.70 (10)	52.06 (38)	30.14 (22)	2.74 (2)	1.37 (1)	2.26	0.78
Fit	VR would fit within existing assessment or treatment for individuals with a history of firesetting	15.07 (11)	42.47 (31)	35.62 (25)	6.85 (5)	0 (0)	2.34	0.82

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Item		Strongly Agree (1)	Somewhat Agree (2)	Neither Agree nor Disagree (3)	Somewhat Disagree (4)	Strongly Disagree (5)	<i>M</i>	<i>SD</i>
BARRIERS		% (n)	% (n)	% (n)	% (n)	% (n)		
Trauma	A virtual environment involving a fire has the potential to bring back traumatic memories for clients	32.88 (24)	54.79 (40)	8.22 (6)	4.11 (3)	0 (0)	1.84	0.75
Feasibility	The use of VR may not be appropriate or feasible for some clients	31.51 (23)	56.16 (41)	9.59 (7)	2.74 (2)	0 (0)	1.84	0.71
Research	Further research is needed before VR is used with individuals with a history of firesetting	32.88 (24)	34.25 (25)	23.29 (17)	8.22 (6)	1.37 (1)	2.11	1.01
Side effects	Using VR with firesetting clients has the potential to cause adverse side effects (e.g., motion sickness)	12.33 (9)	34.25 (25)	43.84 (32)	6.85 (5)	2.74 (2)	2.53	0.90
Ethics	The use of VR has potential ethical or legal concerns due to the newness of the technology	12.33 (9)	34.25 (25)	28.77 (21)	23.29 (17)	1.37 (1)	2.67	1.01
Negative emotions	Using VR has the potential to elicit unnecessary negative emotions	4.11 (3)	38.36 (28)	39.73 (29)	13.70 (10)	4.11 (3)	2.75	0.89
Expensive	Using VR with individuals with history of firesetting would be too expensive	9.59 (7)	13.70 (10)	50.69 (37)	21.92 (16)	4.11 (3)	2.97	0.75
Effectiveness	VR is no more effective than current treatment and assessment approaches	1.37 (1)	2.74 (2)	78.08 (57)	16.44 (12)	1.37 (1)	3.14	0.54
Technical	Using VR with individuals with history of firesetting would be too technically difficult	4.11 (3)	21.92 (16)	26.03 (18)	32.88 (24)	15.07 (11)	3.33	1.11
Therapeutic alliance	The use of VR may negatively affect therapeutic alliance	4.11 (3)	6.85 (5)	34.25 (25)	43.84 (32)	10.96 (8)	3.51	0.93
Skills	Skills learnt or practiced within VR cannot be transferred to real life	4.11 (3)	9.59 (7)	19.18 (14)	53.43 (39)	13.70 (10)	3.63	0.98

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Table V

Frequency of codes in qualitative responses

Code	Definition	<i>Number of mentions</i>
BENEFITS		
Exposure	Using VR would allow exposure to relevant stimuli	29
Otherwise inaccessible	Allows exposure to stimuli that would otherwise be inaccessible or too risky	21
Realistic	The stimuli would be realistic	9
Assessment	Using VR has the potential to inform assessments and/or formulations	27
Skills	VR would allow clients to be taught and practice skills	17
Confidence	Using VR would build clients' confidence in their skills	3
Clinician insight	VR would allow the clinician greater insight into their clients' emotions, thoughts, and behaviour	17
Treatment	A virtual environment involving a fire has the potential to add value to treatment	16
Elicit emotions	Using VR would elicit thoughts and emotions in clients that wouldn't be elicited via other means	9
Motivation	Using VR would increase clients' motivation to actively participate in assessments and treatment	4
Client insight	Using VR would allow the client to gain insight into their own behaviour and its consequences	5
Accessibility	VR would make treatment more accessible for certain individuals	2
Tailoring	Using VR would allow treatment to be tailored according to individual needs	1
Fit	VR would fit within existing assessment or treatment	0

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Code	Definition	<i>Number of mentions</i>
BARRIERS		
Expensive	Using VR with individuals with history of firesetting would be too expensive	35
Security	Security protocols within secure settings would prohibit use of VR	17
Trauma	A virtual environment involving a fire has the potential to bring back traumatic memories for clients	10
Technical	Using VR with individuals with history of firesetting would be too technically difficult due to lack of resources	11
Research	Further research is needed before VR is used with individuals with a history of firesetting	8
Management	Opposition from management may prohibit the use of VR	5
Fire interest	The virtual fire may increase inappropriate fire interest/fantasising about fire	4
Feasibility	The use of VR may not be appropriate or feasible for some clients	4
Side effects	Using VR with firesetting clients has the potential to cause adverse side effects (e.g., motion sickness)	4
Negative emotions	Using VR has the potential to elicit unnecessary negative emotions	2
Ethics	The use of VR has potential ethical or legal concerns due to the newness of the technology	1
Effectiveness	VR is no more effective than current treatment and assessment approaches	1
Skills	Skills learnt or practiced within VR cannot be transferred to real life	1
Infection control	Shared equipment may pose an infection control risk	1
Therapeutic alliance	The use of VR may negatively affect therapeutic alliance	0