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An Evaluation of a Solution Focused Computer Game in Adolescent Interventions

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ABSTRACT

Many adolescents experience difficulties with traditional face-to-face mental health care approaches. Personal Investigator (PI) is a 3D computer game specifically designed for use in adolescent interventions. The game implements a model of Solution Focused Therapy. It aims to assist in easing the difficulties experienced by adolescents with direct face-to-face approaches. In sessions a therapist and adolescent sit together at a computer and play PI. Issues raised in the game serve as a context for more detailed discussions between the therapist and client. This paper describes a study in which PI was used with 22 adolescent clients, attending mental health care services due to a variety of difficulties. Whilst further trials are required, results indicate positive benefits of using PI. PI can help in building an effective client–therapist relationship, can assist in structuring sessions, and can assist in improving client engagement in the therapeutic process.

KEYWORDS

adolescent mental health, computer gaming, Solution Focused Therapy

Introduction

MENTAL HEALTH CARE (MHC) SERVICES worldwide are faced with a pressing need to find new ways of working successfully with adolescent clients. Although mental health problems increase markedly during adolescent years, studies suggest that the majority of disturbed adolescents do not receive professional assistance and that of those who do fewer still will fully engage with the therapeutic process (BMA, 2006; Offer, Howard, Schonert, & Ostrov, 1991; US Surgeon General, 1999). Therapeutic models and approaches that exist for children and adults are not always successful in adolescent interventions (BMA, 2006). Adolescents are generally more private and self-conscious,

CLINICAL CHILD PSYCHOLOGY AND PSYCHIATRY 14(2)

and often more confrontational, than either younger children or adults, and many experience difficulties with traditional forms of direct, face-to-face approaches. Recent research has suggested that computer-assisted mental health interventions (MHIs) may provide one potential way of working more successfully with adolescent groups.

Many MHC researchers and practitioners are sceptical of the potential benefits of technology, citing fears such as damage to the client-therapist relationship, ethical and security issues and worries that the current skills of therapists may become obsolete. Others fear that technology in and of itself has a damaging impact on the mental health of society (Caspar, 2004). However, whilst these fears must be considered, recent years have seen a growth in research on the use of computers in MHIs, and there are strong initial indications that the potential is substantial (see, for example, Coyle, Doherty, Sharry, & Matthews, 2007; Goss & Anthony, 2003; Marks, Cavanagh, & Gega, 2007). It is also important to note that technology-based interventions do not in general seek to replace existing methods. They may, however, offer new and complementary options.

Research suggests that the choice of technology used with given client groups is a critical factor in the success of computer-assisted interventions. For example Coyle et al. (2007) suggest that 'a quality therapeutic process will actively engage the client's participation, by involving their interests, strengths and ideas. Similarly, technologies are most likely to prove effective if they are designed to be client-centred'. Whilst much attention in recent years has focused on the potential negative effects of computer games, a review of literature and an initial pilot study (Coyle, Matthews, Sharry, Nisbet, & Doherty, 2005) provides strong initial indications that appropriately designed games may have potential

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COYLE ET AL.: EVALUATION OF A SOLUTION FOCUSED COMPUTER GAME

to assist in adolescent interventions. Therapeutic computer games offer the opportunity to engage adolescents through a medium with which they are comfortable. A recent UK survey reported that 53 per cent of 11 to 14 year olds play games four times a week or more, and that 44 per cent play for more than one hour at a time (McFarlane, Sparrowhawk, & Heald, 2002). Further surveys in the US and the UK indicate that adolescents rank computer gaming as their number one entertainment form (Gentile & Walsh, 2002; Pratchett, 2005).

This paper begins by briefly reviewing previous research on the use of computer games in MHC settings. It then describes a game called Personal Investigator (PI), specifically designed for use in adolescent interventions. The results of a study in which eight therapists used PI with a total of 22 clients are then presented.

Previous uses of computer games

Initial research on the use of computer games in MHC settings was conducted in the 1980s and early 1990s. Several researchers from a psychology/psychotherapy background developed their own games (Allen, 1984; Clark & Schoech, 1984; Griffiths, 1997; Oakley, 1994; Resnick & Sherer, 1994), while others examined the potential of off-the-shelf commercial games (Allen, 1984; Gardner, 1991). Suggested benefits included:

- Games can successfully engage clients previously difficult to engage by other means. Clients were more cooperative with their therapists, with whom they developed effective therapeutic relationships. Session attendance rates greatly improved and the stigma felt in attending therapy was reduced (Allen, 1984; Clark et al., 1984).
- Games can help adolescents develop 'more self-confidence, a sense of mastery, more willingness to accept responsibility' (Allen, 1984).
- Games can help children displace their aggression, develop problem solving skills and deal with negative and positive outcomes in the game (Gardner, 1991).

These findings must be viewed with a large degree of caution. Early research was largely uncoordinated, and difficulties surrounding clinical evaluations meant that trials typically had limited user numbers. Increases in the costs, development time and technical expertise involved in developing modern games were key factors in the decline of this early work.

As stated in the introduction, much attention in recent years has focused on the potential negative effects of computer games. Risks such as addiction and increased aggressiveness and violence have been suggested (Gentile, Lynch, Linder, & Walsh, 2004). However, MHC researchers have begun to show a renewed interest in the potential of suitably designed games (Griffiths, 2004; Parkin, 2000). Research on the use of biofeedback-based games for the treatment of anxiety disorders and attention problems has received specific attention (Pope & Paison, 2001). Researchers at McGill University have also developed a series of games targeting self-esteem issues (Dandeneau & Baldwin, 2004). Substantially more work has also been conducted in educational and other health care areas. Suggested benefits of computer games in these areas include increased motivation, increased self-esteem, increased health care knowledge and self efficacy, improved problem solving and discussion skills and improved storytelling skills (Bers, 2001; Gee, 2003; HopeLab, 2006; Robertson & Oberlander, 2002). It is an open question as to whether these benefits are transferable to MHC settings.

Personal Investigator

Personal Investigator (PI) is a 3D computer game which incorporates the goal-oriented, strengths-based intervention model Solution Focused Therapy (SFT). PI represents the first time this intervention approach has been integrated into a 3D game. Figure 1 shows several screenshots of the completed game. PI implements SFT in an open manner and does not target a specific mental health difficulty. The game employs a detective metaphor. Adolescents visit the Detective Academy and play the role of a 'personal investigator' hunting for the clues that will help them solve a personal problem. The game is designed for use in individual sessions involving one therapist and one adolescent. To date PI has been used with both male and female clients, ageing from 10 to 16 years and experiencing a broad variety of mental health difficulties.

PI was designed by a multi-disciplinary team, involving both technical and mental health care professionals. A critical factor in the design was to ensure that the game would not distract from the therapeutic process. While adolescents can find computer games engaging, there was little point in developing a game which, while deeply engaging for the adolescent, does little to assist in achieving therapeutic objectives, such as engagement with the therapist and with the therapeutic process. To be successful, the aim was to achieve a balance, whereby an appropriate level of engagement with the game enhances the client's engagement with the overall therapeutic process.



Figure 1. Screenshots of Personal Investigator.

A detailed description of the decisions made in developing PI – for example why was SFT chosen – is beyond the scope of this paper (for more detailed description see Coyle, 2007; Coyle et al., 2005). It is, however, important to state that PI is primarily a character-based game. Rather than containing fast paced action, which is typical of many popular commercial games, PI is based around a series of conversations with characters who the player meets in the game. At the beginning on the game the player is given an in-game detective notebook. As they move through the game they keep a record of their own thoughts and ideas in this notebook. Solution focused conversational strategies are mapped into six distinct game areas (see Table 1). In each area the player meets a character who talks with them in an informal way and asks them various questions, which they answer by typing in their notebook. Three of the conversations incorporate video-based stories in which adolescents describe how they overcame personal problems using the strategies described in the game. To complete the game and graduate from the detective academy players must talk with each character and answer their questions. Upon completing the game, they receive a printout of their notebook.

The primary aim of PI is to raise therapeutic issues through a medium with which adolescents are comfortable. It was hoped that in-game conversations would help in creating a context for more detailed conversations between the therapist and client. In

COYLE ET AL.: EVALUATION OF A SOLUTION FOCUSED COMPUTER GAME

Table 1. A summary of the dialogues and characters used in Personal Investigator

<i>Strategy</i>	<i>Game character</i>	<i>Brief description</i>
Setting goals	The Goal Setter, based on Professor Charles Xavier from the X-Men movies.	This is the first character players meet. He helps clients to identify a problem in their lives and then convert that problem into a goal they want to achieve. Achieving this goal becomes the objective of the game.
Recognizing exceptions	Damini, a forensic scientist, who specialises in spotting hidden evidence.	Exceptions are times when the client's problem is not present or is less acute. This character helps clients to recognize and explore these times, with a view to repeating them more often.
Coping	Inspector Cluso, a younger version of Inspector Colombo from the US TV series.	This character encourages clients to recognize ways they currently have of dealing with their problem, suggests positive alternatives and explores how they have successfully overcome past problems.
Identifying resources	Detective Spade, a New York policeman, who knows the importance of backup.	This character helps clients identify resources, in particular support from family and friends, which they can draw upon. Resources refer also to the client's own strengths i.e. things they are good at.
The Miracle Question	Siobhán, an artist who helps people visualise their life without their current problems.	'Imagine you woke up tomorrow and the problem was solved, how would your life be different?' By imagining a future without their problems, clients are motivated to seek a solution.
Wrapping up	The Goal Setter.	Having met all the other characters, the player meets the Goal Setter again. This character congratulates the player, reviews their progress and shows them how to print their game notebook.

this way the game can become a third party in the therapeutic interaction and take the focus off direct face-to-face dialogue with a therapist.

Using personal investigator in clinical sessions

In clinical sessions the therapist and adolescent sit together at a computer, but the adolescent has full control of the keyboard and mouse. The adolescent chooses a username and logs in to the game. The game creates an individual account for each adolescent, automatically saving their progress and allowing them to return to saved games at a later date. The adolescent has full control over the game; they play at their own pace and choose their own path through the world. Throughout the game the therapist is a partner in the exploration of the game world and is no longer an interlocutor. If the adolescent asks for help, the therapist can elaborate on the subjects brought up by the game or answer more specific questions from the adolescent in relation to their situation. Whilst it was initially envisioned that PI would be completed in one session, evaluations have shown that it typically takes between 2 and 4 sessions to complete the game. This is primarily due to the amount of conversation the game has generated between therapists and clients.

Evaluating personal investigator

To date there have been two distinct stages in the clinical evaluation of PI. A pilot study, in which therapists used PI with four clients, was first conducted in the Department of

CLINICAL CHILD PSYCHOLOGY AND PSYCHIATRY 14(2)

Table 2. Numbers of clients with whom each participating mental health care professionals used PI

Therapist	T1	T2	T3	T4	T5	T6	T7	T8
Client numbers	1	1	2	2	7	2	3	4

Child and Family Psychiatry of large public hospital. The results of this study are described in Coyle et al. (2005). This paper describes the results of a larger scale evaluation in which PI was made available to therapists in 10 clinics. In total, feedback has been received from eight therapists, who used PI with 22 adolescents (see Table 2). Each participating therapist works with adolescents on a regular basis, with roles including clinical psychologist, counselling psychologist, psychotherapist and psychiatric social worker. Feedback was collected via written questionnaires completed by therapists. Therapists were also asked to administer a feedback form to clients, provided they felt it was appropriate to do so, on a client-by-client basis.

The scope and limitations of this evaluation

Before presenting the results of this evaluation it is important to clarify its scope and make a note of its limitations. The study presented in this paper was designed to provide initial evidence of the therapeutic potential of PI. The focus was placed on exploring the effects of PI on broad therapeutic factors such as the client-therapist relationship and client engagement. The study is limited by the lack of a control group. However, given the very limited amount of previous research on therapeutic computer games, such a trial was deemed necessary to justify the time, resources and expense required to run larger scale and more detailed clinical evaluations, such as randomized controlled trials. Depending on the nature of the results more detailed studies may be justified. It is likely that such studies would use standardized pre- and post-trial measures to monitor the impacts of interventions, and would also involve questionnaires and interviews not just with the therapists and clients involved, but also with parents and potentially with teachers and others familiar with clients' situations.

As will be seen, the majority of therapists were unable to collect questionnaires from the young people who played PI. There is also a broad variation in the numbers of clients with whom participating therapists used PI. For example, whilst T5 used the game with seven clients, T1 and T2 used the game only once. There was further variation in the age range and presenting issues of the adolescents.

Client details

During the evaluations presented in this paper therapists used PI with a total of 22 adolescents. Details including gender, age and presenting issues were requested for each client. In the case of several participating clinics – where PI was used with a total of seven clients – confidentiality requirements meant that such details could not be revealed. Of the remaining 15 clients, eight were male and seven were female. They ranged in age from 10 to 16 years and were identified as experiencing a broad range of difficulties. For example, five were identified as having anger management difficulties, six as experiencing low moods. Other identified issues included low self-esteem, behavioural problems, lack of problem solving and coping skills, bullying, sexual abuse, attention difficulties (including ADHD), and suicidal ideation.

Individual client results and client feedback

Therapists were asked to complete a brief feedback form for each client with whom they used PI. In each case they were asked to rate the helpfulness of PI. Figure 2

COYLE ET AL.: EVALUATION OF A SOLUTION FOCUSED COMPUTER GAME

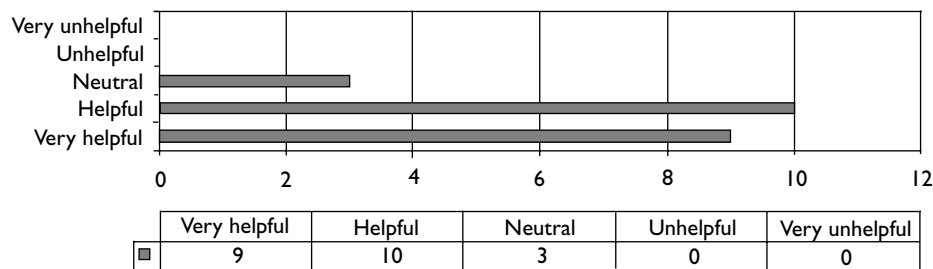


Figure 2. Helpful ratings for Personal Investigator on a client-by-client basis.

summarizes therapist helpfulness ratings on a client-by-client basis. PI was found to be helpful in 19 of the 22 cases. Whilst three neutral rating were given, there were no cases in which PI was found to be unhelpful. The cases in which therapists gave PI a neutral rating are discussed in greater detail below.

Alongside helpfulness ratings, therapists also gave open comments on PI for individual clients. In the main these comments were positive, reflecting the helpfulness ratings. For example:

He was very tired . . . and ambivalent about having a conversation with me. I suggested we do something different. He played PI right through and it became a kind of reflection on the work done so far. In particular it helped him recognize the support people in his life. In this way it was very positive for him.

Therapists were asked to administer a brief questionnaire to each client with whom they used PI. In the majority of cases the questionnaire was not administered. In many cases this was due to the time constraints of sessions. In other cases the therapists felt it was inappropriate to administer the questionnaire. In total, questionnaires were collected from five adolescents. A brief description of this feedback is now given. The collection of more detailed client feedback will be a key objective of future studies.

The adolescents were first asked to rate how easy PI was to use and if they felt the game was helpful (see Table 3). Table 3 also includes responses to different aspects of the design of PI. Two open questions were also asked:

- 1) What did you like most about Personal Investigator?
- 2) Is there anything you think should be different in Personal Investigator?

The fact that PI is a game and that it takes the emphasis off face-to-face dialogue with a therapist was identified as positive by several clients:

It's a computer game and is easier than talking one to one.

It's easier than just sitting and talking to someone.

Watching the videos about other adolescents' experiences was also identified as positive. Several respondents also made reference to the sound effects used in the game and liked receiving rewards for talking to game characters:

My character shouting yippee when she got a key!

Writing in the in-game notebook was the feature which several adolescents felt could be changed. Comments included:

The writing might have to be a bit shorter.

Writing was boring, wanted to keep going.

CLINICAL CHILD PSYCHOLOGY AND PSYCHIATRY 14(2)

Table 3. Adolescents' responses to statements about Personal Investigator

	Very easy	Easy	Not sure	Difficult	Very difficult
Please circle how easy it was to play PI	1	4	0	0	0
	Very helpful	Helpful	Not sure	Unhelpful	Very unhelpful
Please rate how helpful PI was in assisting you to think about and solve a personal problem	2	2	1	0	0
<i>Please rate how helpful the following aspects of PI were</i>					
	Very helpful	Helpful	Not sure	Unhelpful	Very unhelpful
The 3D environment	1	4	0	0	0
Writing in the notebook	1	2	0	0	1
Watching the videos	0	5	0	0	0
Listening to characters	1	3	1	0	0

This feedback, regarding the amount of reading and writing required in PI, is in line with the concerns of therapists described below.

Feedback from therapists

Therapists were asked to complete an 'overall opinions' feedback questionnaire once, based on their overall experience of using PI with clients. The questionnaire gathered feedback in three main areas:

- 1) Overall impressions – this section recorded the MHC professionals' overall impression of PI.
- 2) Specific therapeutic issues – this section asked MHC professionals to consider PI's impact on specific therapeutic issues, e.g. the client–therapist relationship.
- 3) Design features, positive and negative factors – this section was designed to identify which features of the design of PI are helpful or unhelpful.

Overall impressions Table 4 summarizes therapists' responses to four overall impression statements. Each therapist agreed that PI had a positive impact in the majority of sessions in which it was used. All but one stated that PI complemented their traditional ways of working and that they would like to continue using the game. Two therapists gave neutral ratings to their own level of comfort in using PI. In one case the therapist used PI on a PC below the minimum recommended specifications and which crashed during game play. The second therapist works with clients who experience learning difficulties and expressed reservations about appropriateness of PI based on the level of literacy required to play the game.

Whilst T8 rated the game as either 'helpful' or 'very helpful' when used with individual clients, she stated that she is unlikely to continue using PI, and also rated as neutral PI's ability to complement her traditional working methods. This therapist generally adopts narrative rather than solution focused approaches and stated that 'my biggest difficulty is that PI does not fit with my way of working . . . What excites me is working this way rather than the PI game'.

Specific therapeutic issues Table 5 summarizes therapists' responses to 10 statements about specific ways in which playing PI can impact interventions. The statements were

COYLE ET AL.: EVALUATION OF A SOLUTION FOCUSED COMPUTER GAME

Table 4. Mental health care professionals' overall impression ratings for Personal Investigator

	<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
Overall PI had a positive impact in the majority of sessions in which it was used.	T2, T5, T6, T7	T1, T3, T4, T8			
I felt comfortable using PI with clients.	T1, T5, T6	T2, T3, T8	T4, T7		
PI complemented my traditional ways of working with clients.	T1, T2, T5, T6	T3, T4, T7	T8		
I would like to continue using PI with further clients.	T1, T5, T6, T7	T2, T3, T4		T8	

divided into subsections as follows: an icebreaker (1–2), the therapeutic relationship (3), structure (4), a distraction (5), engagement (6–9), ownership (10).

The therapists agreed that while PI is a useful icebreaker, it is also more than just an icebreaker. Each also agreed that playing PI can have a positive impact on the client–therapist relationship and can help in structuring sessions. All but one therapist disagreed with the statement that PI is a distraction from beneficial therapeutic processes. The reasons for one therapist's neutral opinion are discussed later.

Whilst no negative ratings were given, therapists expressed a greater degree of ambivalence about statements on engagement (statements 6–9) and ownership (statement 10). Many agreed that PI can help with engagement, can help in maintaining the interest of the young person and can increase the amount of conversation between the therapist and young person. In several cases therapists explained their neutral responses by stating that they had insufficient experience of using PI to give more definitive opinions. For example, T1 and T2 used PI with only one client each and stated:

Haven't really managed to use PI enough to form a clear view on most of the above section I'm afraid. (T1 – referring to statements 6–9)

Don't think I have used it enough to have strong views on these questions. (T2 – referring to statements 6, 7 and 9)

T5, the therapist who used PI most often, expressed the most positive opinions on the issues of engagement and ownership. This therapist's views are discussed in greater detail below.

Positive factors The final section of the professional questionnaire contained open questions in which therapists were asked to identify the most positive aspects of PI and identify any concerns they might have about the game. This section discusses the positive factors identified by therapists.

The ability of the game to assist in building a client–therapist relationship and the three-way dynamic created between the therapist, client and computer received the most positive comments. Comments included:

The flexibility to use computer games instead of straight talk is valuable. It emphasises opening communication barriers and joining adolescents at their level. It provides a focus, and is in line with their interest level and adolescent methods of communicating.

CLINICAL CHILD PSYCHOLOGY AND PSYCHIATRY 14(2)

Table 5. Therapists' responses to statements on the impact of PI on specific therapeutic issues

	<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
1 PI is a useful icebreaker.	T5, T8	T1, T2, T3, T4, T6, T7			
2 PI is a useful icebreaker, but it is also more than that.	T2, T5, T8	T1, T3, T4, T6, T7			
3 Playing PI can have a positive impact on the client-therapist relationship.	T5, T7	T1, T2, T3, T4, T6, T8			
4 Playing PI can help in structuring sessions with young people.	T2, T6	T1, T3, T4, T5, T7, T8			
5 PI is a distraction from beneficial therapeutic processes.			T4	T2, T3, T5, T6, T7	T1, T8
6 Playing PI can make it easier to engage constructively with adolescent clients.	T5, T6, T8	T1, T3, T7	T2, T4		
7 When PI was used clients were more enthusiastic about sessions than is usually the case.	T6	T5, T3, T7, T8	T1, T2, T4		
8 PI can help in maintaining the interest of young people during sessions.	T6	T2, T3, T4, T5, T7, T8	T1		
9 Playing PI helped to increase the amount of conversation between me and my clients.	T5, T8	T3, T6, T7	T1, T2, T4		
10 Young people playing PI experienced a greater sense of ownership of the therapeutic process than is usually the case.	T5	T2, T6, T8	T1, T3, T4, T7		

It helps to create a rapport and a three way dynamic. Therapist is not directly posing the questions. You sit alongside each other facing the problem. The computer screen becomes the third party in the room allowing sessions to be less directive and more relaxed, opening up the lines of communication.

Table 6 summarizes therapists' responses to statements about specific aspects of the design of PI. Whilst the incorporation of video-based peer stories was identified as particularly effective, several therapists gave neutral ratings to the effectiveness of the in-game notebook. This reservation was directly related to the concern about difficulties clients experienced in reading from and writing to the in-game notebook.

Therapists' concerns Whilst therapists' opinions of PI were largely positive, several concerns were raised by the group. The three most frequently identified concerns were:

COYLE ET AL.: EVALUATION OF A SOLUTION FOCUSED COMPUTER GAME

Table 6. Therapists' responses to statements about design features in Personal Investigator

	<i>Strongly agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly disagree</i>
The 3D environment was helpful.	T1, T7, T8	T2, T3, T4, T5, T6			
Watching videos of other teenagers' stories was helpful.	T2, T3, T4, T5, T6, T7, T8	T1			
Listening to the characters' dialogue was helpful.	T4, T5, T7, T8	T1, T3, T2, T6			
Receiving rewards (e.g. keys) was helpful.	T2, T7	T4, T5, T6, T8	T1, T3		
Answering questions in the notebook was helpful.	T2, T3, T5, T7	T6, T8	T1, T4		
Receiving a printed record of the notebook was helpful.	T2, T5, T7	T3, T6, T8	T1, T4		

- 1) The difficulties some clients experienced reading from and writing in the in-game notebook.
- 2) That adolescents did not engage sufficiently with the therapeutic issues raised in the game.
- 3) That adolescents could use the game as another way of excluding the therapist.

The three cases in which PI received neutral helpfulness ratings were directly related to these issues. The therapists' comments in these cases were:

The client has poor literacy skills and lost interest, but enjoyed going into rooms and watching videos.

Client has a big interest in computer games + I found that he was playing the game to get the keys to move on rather than focusing on content or the development of his knowledge or skills. It was not used as a tool in this incidence but more as a 'game' i.e. not to be taken seriously.

Young person is very troubled and currently not engaging with workers. PI did help get her to focus on some issues and take time to do so, but she chose to try to exclude me, interacting only with the computer. Subsequent discussion with her of her experience of this was also helpful to a certain extent. Difficult to assess impact at this stage. Need to do a lot more work with PI (and with this particular young person).

The design of PI did not take account of the learning and literacy difficulties experienced by many adolescents attending MHC services. This is an issue which should be addressed in future versions of PI and other new games. For example, PI currently uses open questions which require typed answers. Future versions will likely include increased use of multiple-choice and scaled questions, which require lesser literacy skills. Modifications will also be made such that at any point where reading is required, a 'read aloud' button will appear. By pressing this button players will have the relevant text read out to them by the computer.

Steps are also being taken to address the second and third concerns identified above. For example, one possibility is that future games will include questions which the

CLINICAL CHILD PSYCHOLOGY AND PSYCHIATRY 14(2)

therapist is required to answer, rather than all the questions being addressed towards the client. In this way the therapist could become more directly involved in the game and is offered the opportunity to make observations and even talk out loud about ideas before answering questions. As discussed in the next section, the therapist's role in introducing and using the game can also be a critical factor helping to overcome the concerns discussed in this section.

Protocols for use and the importance of the therapist's role A key finding to emerge from the evaluation of PI is the importance of the therapist's role in using the game effectively. The real benefit of PI is that it can help to raise issues in a client-centred way and create a context for more detailed discussions between by the therapist and client. The game can serve as a therapeutic tool, but the work jointly undertaken by the therapist and client remains critical. This factor is highlighted in comments made by one therapist:

I feel PI does not have a life of its own. It is part of a team working together: PI – the therapist – the young person. The pace was not dictated by PI but by the whole team. It was helpful that PI was there so that a decision could be made – do we continue the game or do we talk a bit more about this part etc. It is good then to have the game to go back to.

Another therapist has established rules for using PI with clients. This therapist described the initial discussion she has with clients prior to using PI as follows:

Prior to commencing the game we have a discussion about the game – and I gauge the interest level. If they are very interested I outline some important things to remember. I describe it as a thinking game. I talk about needing to take time to think before we write down our answers [in the game notebook]. So rule no 1 is the therapist or child reads out the question – and we have a talk about it before we write anything down. Once we have decided we type it, and only then press next. Rule 2 – if we are going too fast and not taking our time we may need to stop the game completely and work from a page instead. This is a good strategy for assisting with patience in the game.

Collating and sharing experiences such as this, and creating guidelines for using games, will be an important aspect of future work.

Case studies

In order to provide a more detailed account of therapists' use of PI, two case studies are now presented. The first describes the difficulties one therapist experienced when using PI with clients with learning difficulties. The second is on the therapist who used PI most often.

Case study 1

This therapist works with adolescents experiencing both mental health and learning difficulties. PI was used with two clients and difficulties arose in both cases. In the first case the client was identified as having ADHD and anger management problems and also has mild learning difficulties. Overall the therapist felt that playing PI was helpful for this client and stated:

Client had attention difficulties – is a heavy hash user and has ADHD. Found PI was useful tool in keeping his attention for longer + giving him a focus. When we use the game his body language suggests he is more attentive. PI helped this client to open up, to organize his own mind, to sit for longer, to engage with me + his own problem solving skills.

COYLE ET AL.: EVALUATION OF A SOLUTION FOCUSED COMPUTER GAME

However, the amount of reading and writing in PI did cause difficulties:

A lot of reading + writing required which client found difficult. For this client literacy and comprehension levels are quite low so it was quite difficult for him to read the blurbs in the journal (most of which I did), and also understanding what it meant at times was difficult for him. Led client to become frustrated.

The second client also had learning difficulties and again had difficulties with the game. The therapist states that whilst 'the client himself liked the game and was very keen to play it, he sees it just as that, i.e. he is more concerned with getting the keys and moving on than understanding and reflecting on the concept of the questions posed to him. Again he did not understand some of the language used and could not read the blurbs'.

When required to deal with issues in the game notebook the client became bored. In this case PI received a neutral helpfulness rating and the therapist chose not to complete the game. This was partially because of the issues outlined above, but also because issues arose which were not compatible with the game.

The therapist in this case study is currently participating in a project to create a modified version of PI. The contents of the game notebook are being simplified and open questions have been replaced by multi-choice and scaled questions. The therapists stated:

In the current version of the game I am working on I will try to change some of these features [referring to notebook issues] to accommodate my clients better.

Alongside modifications such as those made by this therapist, future iterations of PI and other games will benefit from taking account of the learning difficulties experienced by many adolescent clients.

Case study 2

This case study describes the opinions of the therapist who has used PI most often. In all, this therapist used PI with seven clients and found it to be either 'helpful' or 'very helpful' in each case. He states:

The notable benefit has to be removing the impact of face-to-face grilling, which for young people who want to oppose adults has to be a plus.

The therapist strongly agreed with statements on PI benefits as an icebreaker, as an aid to the therapeutic relationship and to client engagement. He is also the therapist who expressed the strongest opinions of PI's ability to help clients take ownership of the therapeutic process:

The cognitive goal of PI is to enable and encourage the client towards ownership of the problem. Talking therapy alone can take up to 3 or 4 times longer to reach the same small part of understanding that PI can bring out in 1 session.

One of the issues also addressed in feedback is the importance of the therapist's role in using PI effectively. For example he states:

Skilful use of the introduction of PI into a session just makes for better and better interventions that students/clients can handle at their own pace. Any tool in a therapists 'toolkit' that can open a dialogue of any sort can only be of benefit if used with skill.

The therapist describes the way in which he used PI to complement some of his other day-to-day techniques. For example, if he feels that a client has a moment of significant understanding while playing PI, he will move away from the computer and address this issue in more detail:

CLINICAL CHILD PSYCHOLOGY AND PSYCHIATRY 14(2)

Playing PI created some nice 'Aha moments' . . . Moving away from the PC at these points, using reflection flowcharts, mind maps etc helped to solidify the new learning and turn what was once a block or problem into a manageable challenge that can be dealt with one piece at a time.

What is significant here is that this therapist has integrated the game with his traditional working methods and has begun to use PI as a context for, and complement to, other forms of therapeutic work. As such PI has become part of this therapist's overall therapeutic 'toolkit', rather than a standalone game used in isolation.

When asked to identify situations in which PI proved particularly useful, the therapist identified work with clients who are 'elective mutes'. Elective mutes are clients who repeatedly choose not to talk with therapists during sessions. One client with whom this therapist used PI was described as an elective mute. When PI was introduced this client began to engage in conversations, where none had previously occurred. It is worth noting at this point that a similar case arose during the initial pilot evaluation of PI described in Coyle et al. (2005). In this case a client, with whom the therapist had had only limited conversation during seven previous sessions, engaged in substantially more conversation after PI was introduced. If these cases are corroborated by future evaluations, this could be a significant finding, as it would indicate that games such as PI offer therapists a new way of working with a client group which has proven difficult to engage by traditional means.

Discussion, conclusions and future work

In spite of the recognized limitations of the study presented in this paper, there are strong initial grounds to suggest that games such as PI offer several therapeutic benefits. Feedback has been received from therapists working independently in eight different MHC services. This feedback suggests that PI can serve as a useful icebreaker, can assist with the client-therapist relationship, can help in structuring sessions and offers the potential to assist in engaging adolescent clients. The results of this study agree with those of the smaller scale pilot study described in Coyle et al. (2005). Further studies are now required to confirm these initial findings. An important aspect of future studies will be to gather increased amounts of feedback from the young people who play the games. As a detailed examination of specific issues has been beyond the scope of the present study, it will also be beneficial if future studies use established methods for measuring specific aspects of interventions. For example, the Working Alliance Inventory is an established method for measuring the strength of the client-therapist relationship (Horvath & Greenberg, 1989). It will also be beneficial to undertake more targeted evaluations, which will help in identifying the degree of impact of games on interventions with specific target groups, for example on male versus female clients or with client groups experiencing particular difficulties. Several formal evaluations of this type have now been initiated.

It is worth briefly noting that the version of PI used in this evaluation was created using PlayWrite, a system developed by the authors of this paper, which allows MHC professionals to create and adapt therapeutic 3D games. Using PlayWrite it is now possible to modify games such as PI to implement particular therapeutic approaches, target particular mental health difficulties, or meet the needs of specific groups or individual clients. Further details of PlayWrite are available in Coyle (2007) and Coyle and Doherty (2008). Alongside PI several new games have now been created using PlayWrite. For example, one game implements core aspects of Cognitive Behavioural Therapy and targets difficulties such as depression and anxiety. Another uses Narrative Therapy techniques to address issues of anger management. Studies of these new games,

COYLE ET AL.: EVALUATION OF A SOLUTION FOCUSED COMPUTER GAME

including randomized controlled trials, and further evaluations of PI will seek to measure the impact of games on a range of specific therapeutic outcomes with a range of adolescent groups. The study presented in this paper has assisted in providing the evidence necessary to justify such evaluations.

Alongside providing initial evidence of therapeutic benefits, the evaluation described in this paper has assisted in identifying several design features which should be addressed in future games, and also other systems designed for adolescent interventions, for example the need to take account of the literacy difficulties experienced by many adolescent clients. In addressing such issues it will be beneficial to draw on lessons of other research areas such as human computer interaction (HCI), where large bodies of literature exist on issues such as person-centred design, designing for engagement and the measurement and improvement of user experience. In the specific case of literacy difficulties, Bernsen and Dybkjaer (1997) and McTear (2002) discuss many of the possibilities offered by interactive spoken dialogue systems. A more general discussion of the potential of the various technologies and of the application of HCI design approaches in the MHC area is available in Coyle et al. (2007). Lessons from such areas are now being incorporated into new versions of PI, and other games created with PlayWrite, and will be completed prior to the next stage of clinical trials.

Finally, as discussed above, the evaluation described in this paper highlighted the importance of protocol for use and of the therapist's role in using PI effectively. The development of clear protocols for using any particular technology (e.g. With which clients is a given technology most effective? How and when should a technology be introduced and used? Are there clients with whom a given technology should not be used?) will be a critical factor in the success of any system, and developing such protocol should be a key aspect of any evaluations. Such research is being undertaken as part of the ongoing developing and evaluation of PlayWrite and PI.

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CLINICAL CHILD PSYCHOLOGY AND PSYCHIATRY 14(2)

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