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CONTENTS

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Emotional Labour in Mental Health Field Workers

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Emotional labour among fieldworkers (n=6) at a community mental health organisation was explored using semi-structured interviews and thematic analysis. Participants were found to regulate their emotions both in terms of experience and display. Emotions were regulated through 'deep acting' to enhance the internal experience of empathy and other positive emotions, and the control of negative emotions. Fieldworkers typically regulated the intensity of genuine emotions during their interactions with clients. Emotional labour was described as performed for the sake of clients, to mitigate risk to the field worker and emerged from workload issues and the multiple requirements of fieldworkers' roles.

Key words: Emotional labour, field workers, mental health

Hochschild (1983) introduced the term *emotional labour* and offered a theoretical and conceptual framework to contextualise the use of this term, though other frameworks have since been proposed (Ashforth & Humphrey, 1993; Morris & Feldman, 1996; Grandey, 2000). Generally, emotional labour is seen as a forced affective performance that may result in negative consequences for the performer (Hochschild, 1983), ranging from decreased job satisfaction to burnout. Emotional labour is performed when disparity occurs between workers' felt emotions and displayed emotions in a given occupational and organisational context. The type of emotional labour performed is shaped by the context in which it occurs (James, 1992).

Emotional labour is an important concept as it relates to burnout among mental health field workers and has been applied to a range of occupational contexts: the airline industry (Whitelegg, 2002; Williams, 2003), call centre workers (Korczynski, 2003), criminal interrogators (Rafali & Sutton, 1991), legal professions (Harris, 2002; Livley, 2002), teaching (Price, 2001), nursing (Aldridge, 1994), and the medical profession (Larson & Yao, 2005). Although Hochschild (1983) did not apply the concept of emotional labour to mental health professionals, she claimed it would likely be a component within these professions. There are few studies investigating issues of emotional labour among mental health professionals (Mann & Cowburn, 2005; Karabanow, 1999; Yanay & Shahar, 1998), and this article aims to partially address the deficiency by exploring emotional labour in the context of mental health fieldwork at the Auckland branch of a community mental health organisation in New Zealand. Clarifying the role of emotional labour in mental health service delivery, and its relationship to burnout is important in developing pro-active support structures for employees.

Existing research

Two qualitative studies have investigated emotional labour in the contexts and occupations similar to the current research (Karabanow, 1999; Yanay & Shahr, 1998). Karabanow (1999) explored the concept of emotional labour in Canadian workers at a youth shelter. Clear links were shown between organisational demands or display rules placed upon workers' expressions and emotional labour performance. Display rules tend to prescribe the expression of emotions (Ashforth & Humphrey, 1995) and "specify the range, intensity, duration and object of emotions that are expected to be experienced – or at least displayed." (Mann, 2006, p. 553).

The negative consequences of emotional labour described by Karabanow (1999) were tied to workers' beliefs that, for management, what the workers did was never good enough. Perceived non-appreciation combined with pressure created by display rules produced feelings of always needing to give more. Interestingly, little was discussed around performance of emotional labour with clients or youth at the shelter. Rather, emotional labour seemed to arise in interactions with management and in accordance with the display rules of the organisation. This suggests that emotional labour is not performed only with clients and its negative impact can result from the overall organisational structure.

Yanay and Shahr (1998) investigated emotional labour performed by third year psychology students at a residential psychiatric facility in Israel. Feeling rules (display rules) were seen as professional modes of feeling and behaving in relation to residents of the facility. The difficulties students encountered related to the uncertainty of what it was to be a professional. Performance of emotional labour was a constant negotiation between having a 'normal' emotional reaction, like anger and desire to yell at provocations from the residents, and the discourse of appropriate professional feelings and behaviour (Yanay & Shahr, 1998). Thus students tried to control their emotions according to their perceptions of what was professionally appropriate.

Brotheridge and Gradney (2002) divided emotional labour into *job-focused* and *employee-focused* labour to investigate their predictive relationship to burnout in five occupational groupings. Job-focused emotional labour describes interactions with customers and perceived control over expression of specific emotions (also known as display rules), while the employee-focused emotional labour was conceptualised as managing both emotions and their expressions internally (through surface and/or deep acting). Human service workers were found to have the highest levels of work demands for control over emotional

expressions. Occupation type was not found to predict emotional exhaustion. The only factor that was significantly related to exhaustion was a perceived need to hide negative emotions such as anger and fear.

Theoretical Framework

In this research the conceptualisation of emotional labour as a form of emotional regulation proposed by Grandey (2000) will be used as the starting point. This approach includes the theoretical concepts of emotional labour as emotional regulation, presence of display rules, impact on emotional labour from individual and organisational factors, and impact of emotional labour on a person's wellbeing (see Figure 1).

Method

Organisational Context

The community mental health organisation was formed with the purpose of assisting families whose member was diagnosed with a mental illness (n.d., Fieldwork Orientation Manual, 2007). The organisation supports families whose member(s) are experiencing mental health issues rather than consumer – users of mental health services. The organisation provides families with free support, advocacy, education as well as information about mental illness and various service providers. The delivery of day-to-day services to families and actual work with families, either at the offices of the organisation or at families' private residential addresses, is done by fieldworkers. Half of the workload carried by each individual fieldworker includes direct work with families and includes aspects of support mentioned previously. The direct work includes visiting families at their residences, telephone work, and write up of case notes. The other half is a combination of "shared team objectives/meetings, facilitating family/whānau support groups, promotional events, networking with local agencies, keeping up with new readings and presenting the organisation or training programmes to other services.

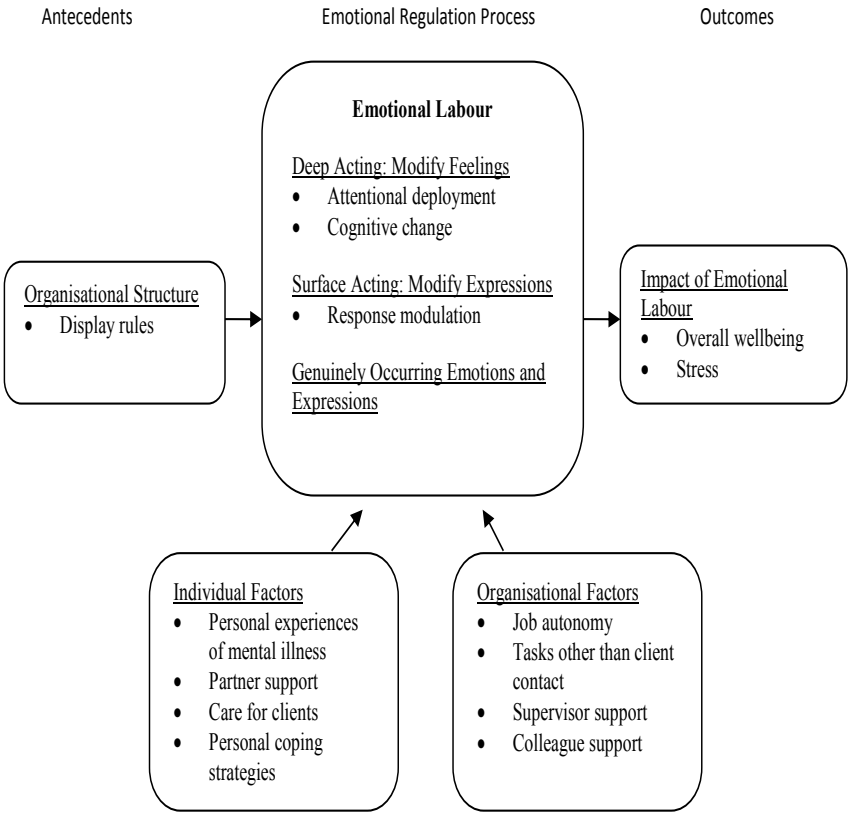

Figure 1. Conceptual framework of emotional labour in the current study (Adapted from Grandey, 2000, p. 101).

Recruitment

After consultation with the manager of the community mental health organisation the researcher gave a presentation to all fieldworkers on the proposed research study. Copies of the participant information sheet were provided and no incentive to participate was offered to fieldworkers. They were asked to contact the researcher to express their interest in participating in the research project.

Six fieldworkers from the Auckland branch of a community mental health organisation volunteered to take part following the presentation. Four identified as New Zealand European, one as Māori, and one as a Pacific Islander.

Data Collection

Data collection was undertaken as a two-stage process. The first stage included a focus-group interview with all six participants that lasted for approximately an hour-and-a-half. The second stage of data collection consisted of interviews with each participant. The duration of the interviews ranged from approximately 50 minutes to an hour-and-a half. Both the focus-group interview and the individual interviews were semi-structured and conducted by the researcher and first author.

Interviews were audio recorded and later transcribed by the researcher. Participants were offered the opportunity to review their own transcribed interview and the focus group transcript in order to ensure their accounts were as authentic as possible, as well as to comply with ethical guidelines and give participants a chance to withdraw some of the information from the interviews. No changes were requested to be made to the transcripts.

Data Analysis

Data analysis was conducted using Thematic Analysis (TA). TA was chosen as an analytic approach because as a research tool TA provides a rich and complex representation of the data. Data was processed using the six steps outlined in Braun and Clarke (2006): familiarising oneself with the data; generating initial codes; searching for themes; reviewing themes; defining and naming themes. Coding was done manually by the researcher until broader level themes were identified. Codes that were seen as falling into a theme were written using the same colour. Numbers were assigned to each code and the same number and colour were given to repeating codes; for instance, every time participants spoke about training it was written in red and assigned number ten.

Results

Theme 1: Displaying emotions with clients

All fieldworkers agreed that some of the emotions they experience with clients are negative. Negative emotions identified were anger, frustration, disgust, annoyance, and fear, whereas fieldworkers believe they needed to project other emotional states, like calmness. They felt that these should not be displayed for mainly two reasons – the expression of these emotions might interfere with the therapeutic alliance and as such are seen as damaging to clients' progress and for the sake of their own safety, as to not escalate challenging interaction with clients.

P3: ...sometimes you know you've got a husband for example a husband who suffers from say bipolar and say antisocial disorders (..) he really dislikes the fact that you are there with his wife, so he is yelling abuse at you and you are standing there (...) and you (--) inside you're like shaking cause you're really really scared cause this is this guy this big, and you stand there, have you finished yet? could you please stop yelling at me, still shaking inside [laughs] but the the, the look is you're calm you're collected (..) if not for anybody else's safety but your own

The importance of showing calmness and staying neutral is seen in the narratives of all participants.

P5: ...in the past that I've discovered that if you (..) you know, remain calm then you're modelling for the other person and they (..) they normally calm down

Field workers also reported that clients' stories triggered their emotions. All participants mentioned hearing accounts that were sometimes difficult, horrible, painful, or hideous, and conveyed a sense of 'feeling for' the clients.

Three important aspects of being with clients become apparent: awareness, prioritising clients and maintaining a safe therapeutic alliance for the field worker. Awareness is needed in order to identify what it is the support workers are feeling and why; whether to display the emotion and how to display it; and who the displaying is about – the client or themselves – and whom it will serve. It is also needed in order to be able to take a step back and observe the clients' emotional expressions.

P2: …your feelings aren't that important in this process, it's the other person's feeling and the other person's beliefs and the other (--) so you need to (...) let go… you're there to work towards a solution or work alongside a person rather than dominate and tell what to do

Generally, participants thought that expressing emotion which was not felt is not a sign of inauthenticity:

P2: I don't know if we fake it... I think there's a professional level of what's appropriate like we talked earlier what emotions to share with our (..) (--) I I just [sigh] (--) there's times when you do get frustrated with your ah (--) and you've got to value that person...

Described in this theme are the emotions fieldworkers can experience with clients. Some emotions were seen as negative and believed should not be disclosed to clients. Other emotions were seen as appropriate given they reflect what the client is going through, while others were necessary to both experience and display. The negative emotions participants described do not constitute the majority of their experience of client-contact. These emotions arise only with difficult clients and difficult situations. Insincerity versus being genuine, displaying felt or produced emotions with clients is a complex interaction of multiple factors, and it is clear that fieldworkers need to manage and control their emotions so they can manage clients' emotions, the process of the interaction as well as their own safety.

Theme 2: Controlling emotions, managing clients and setting boundaries

Fieldworkers have to deal with clients' emotions, their own emotions, as well as monitor the process of face-to-face meetings. One of the participants mentioned that she does not normally dwell on a negative emotion as her logic sets in almost immediately, increasing her control of the situation. Different participants utilised different strategies in order to control their emotions. One looks at meetings with clients from "...a business point of view because that's my job, and then I don't get that emotional".

Fieldworkers believed negative affective states, as well as the display of negative emotions, needed to be concealed, while only the intensity of the display of positive emotions needed to be modulated. The control of felt and displayed emotions took several forms: self-talk in order to stay on track with clients, boundaries, and awareness of their role and purpose when with clients.

P5: I'm thinking oh, you know, this lady sounds tired and she just (..) you know um-m (..) because she was she's suffering from cancer as well and um-m yeah and so you know (..) her frustration is (..) quite valid (..) because she is probably just tired

Participants also talked about controlling their emotions in terms of inducing a desired emotion. Most participants talked about how seeing clients as victims or someone going through difficult times could by itself produce empathy or compassion, even following feelings of frustration or anger toward the client. Another way to induce the necessary emotion, like empathy, was done by verbalising it to the client "...it must've been really sucky". It is about trying to understand the client's experience and to look at a situation from their point of view.

One of the fieldworkers also talked

about the value of sometimes "saying the hard thing" and sharing what is being felt with the client. This is a compromise, based on professional judgement, between not showing frustration or anger, but acknowledging it nonetheless.

P2: ...it's not the thing that's the nicest thing to say is, sometimes is saying I am really (--) I am finding this a really frustrating situation, how about you? owning what you feel (..) which is sometimes really hard to identify because you can be so concentrating on this other person...

Theme 3: Areas of impact on client work

Workload

Workload was dependent on fieldworkers' individual work ethics and choices. Fieldworkers need to manage their workload and not take on too many tasks. However, this argument is negated by some participants, who expressed the need to do more for clients due to perceived deficiencies in the mental health system. Additionally, their area of operation has multiple fieldworkers, which means they can share the caseload and negotiate other aspects of their workload.

Workload was also seen to affect client work, something participants saw as their priority. Participant 5 for instance, said that back-to-back meetings can make it more difficult for her to work. "...clients all they want to do is just (..) offload". Managing both the client, him or herself, and the process, can lead to tiredness. For Participant 5 this meant more chances of being triggered by clients' stories.

Influences outside of work

Apart from aspects within the work environment that can impact on work with clients there are outside factors that also exert an influence. One participant disclosed that her mental state prior to the meeting and whether she is already feeling tired impacts on how well she copes with family meetings and how "drained" she feels afterwards. It seems that for her, managing client meetings when already feeling tired requires a higher level of emotional labour. Consequently, she would feel more fatigued after the meeting if her baseline tiredness at the beginning of the meeting is higher than usual.

Most participants talked about life outside of work impacting their client relationships. Two participants, who have children living with them, talked about how sometimes, when they are with clients, their thoughts are with their clients or household chores, and this interferes with their field work.

Theme 4: Impact of work on fieldworkers

This theme seems to be the most controversial in terms of difference of opinions and experience in relation to the impact of work. A lot of what participants experienced appears to be related to individual differences and abilities to cope, as well as personal preferences and dislikes of certain aspects of their job. When talking about how work impacts on them, participants mainly talked about a combination of work-related and external factors.

Part of their stories related to the impact of client work and part to the overall responsibilities of their role as fieldworkers. Participant 3 said that trying to do too much for clients and trying too hard "can emotionally drain you" and sometimes she can come home "…tired, mentally and physically exhausted... and it's not so much the physical stuff, it's the mental drainage". This "mental drainage" seems to result from both the workload and the nature of face-to-face work and dealing with the emotional difficulties of other people. As it was shown in the second theme, participants' own emotions at times were triggered during sessions with clients, and that required more active management of both emotions and the process of the meeting.

Another participant, while talking about the need to be non-judgemental with clients, stated that because of full days spent with clients "I get home and I say - I am out of nice". There appears to be an effort involved in being non-judgemental and being genuine, whether on an intellectual or an emotional level. As a result, at least for some participants, maintaining a level of genuineness and understanding can result in them not having tolerance or 'niceness' outside of work.

Discussion

The discussion of the results is based on an integration of the themes with the theoretical model of emotional labour provided in Figure 1.

Organisational Structure: Display Rules

Client Contact

Fieldworkers' understanding about how to behave with clients, what is appropriate and what is not, what emotions are desirable and need to be displayed with clients can be defined as display rules.

The range of emotions fieldworkers are expected to display is fairly large. Positive emotions that fieldworkers experienced and displayed appear to be 'appropriate emotions' that are congruent with the clients and can be displayed at appropriate times, and 'necessary emotions' that fieldworkers are required to display. Fieldworkers are expected to display positive emotions that are considered necessary and acceptable, which also need to be authentic and genuine and thus 'felt'. Furthermore, they must conceal emotions that are unacceptable and negative, and regulate the intensity of the display of positive acceptable and necessary emotions. However, they are not required to only display positive emotions like empathy, concern, or compassion, though these are displayed most of the time. Situations act as cues for the activation of specific display rules that may have been applicable to one situation but not another (Sutton, 1991).

Outside of Client Contact

There also seemed to be expectations about appropriate display of emotion and behaviour outside of client contact. When interacting with other mental health professionals fieldworkers are there to represent the organisation or to ensure the best results for their clients. Participants did not indicate that these display rules were overtly stated within the organisation, but that some display rules can be learnt from professional norms (Tschan, Rochat, & Zapf, 2000).

When interacting with supervisors or managers, and especially with colleagues, fieldworkers' accounts

spoke of more relaxed display rules regarding emotional expressions. Frustration and anger regarding clients could be expressed, with colleagues and supervisors providing support. Tschan, Rochat, and Zapf (2000) showed that deviating from display rules was more likely to occur with one's colleagues than clients. It still seemed, however, that display rules dictating what needs to be thought or felt for clients still partially applied.

Display Rules: Where do They Come From?

Display rules or emotional prescriptions, according to Ashforth and Humphrey (1995), represent a blend of influence from within as well as outside the organisation. Some of the display rules, evident in fieldworkers' stories, seemed to be located within the organisation in the form of the mission statement and policies around client contact, which includes supporting clients and empowering them.

Display rules were also procured from training and were reinforced by supervisors and other fieldworkers. Immersion of the worker into display rules often begins during training (Hochschild, 1983), for example, fieldworkers learning to establish and maintain boundaries with clients. Boundaries, as display rules, specify how fieldworkers need to engage with clients while maintaining a professional relationship. Fieldworkers set boundaries, as much for clients as for themselves, to ensure that display rules are being adhered to and thus their conduct with clients is appropriate and professional.

Fieldworkers also referred to display rules that seemed to be located outside the organisation and within the larger professional mental health practice. One of the participants, for instance, talked about being "guided by the code of (..) ethics which is you know, do no harm and um-m (..) (--) yeah but you can be friendly with people (..) yeah but at the same time maintaining that you know (..) work relationship". Ideas around emotional management strategies and specific professional attitudes can be assimilated through professional socialisation (Brown, 1991).

Fieldworkers seemed to embrace the display rules, especially around appropriate and inappropriate emotional displays with clients. Commitment to display rules ensures changes in behaviour in accordance with these rules (Gosserand & Diefendorff, 2005). In the case of fieldworkers it did not affect only the observable emotional expressions but the internal experience of emotions as well. Fieldworkers saw genuine emotions like empathy, compassion, concern, respect, care, and the desire to help – all of which are display rules pertaining to both the organisation and seemingly wider context of mental health work – as necessary aspects of their work, without which their capacity to help clients would be impaired. These display rules are not just about appropriate displays when with clients. They are about the actual feeling and experiencing of the emotions that are seen as desired and needing to be portrayed to clients.

Performance of Emotional Labour by Fieldworker

Client Contact

Displaying, shaping, masking, or suppressing emotions (Erickson & Ritter, 2001) happens in accordance with display rules and constitutes management or regulation of emotions. All of the aforementioned display rules govern fieldworkers' behaviour, emotional experiences, and expressions with clients. Fieldworkers' accounts of controlling and managing emotions are examples of emotional regulation performed through types of acting. Control and management are the ways fieldworkers regulate their emotions. In Figure 1 two types of acting are presented – deep acting and surface acting – as well as the expression of genuine, naturally occurring emotions.

Surface acting

All participants reported showing emotions they do not feel to clients. When they are feeling angry, scared or frustrated they mask those emotions and attempt not to display them. Instead they use facial expressions and body language to project feelings they may not have been feeling at the time (Theodosius, 2008), like calmness and neutrality. Technically speaking, this represents surface acting. In the literature, surface acting has been described as 'pretending' (Martinez-Inigo, Totterdell, Alcover, & Holman, 2007) and 'faking' (Brotheridge & Grandey, 2002). These descriptions give a distinct impression of the performer being insincere and not attempting to feel or express a genuine emotion. According to fieldworkers, they do not feel like they fake but rather feel genuine when they are with clients. 'Faking', as was reported by one fieldworker, related to sometimes not having the energy to be completely present with her clients. And although she described it as faking it does not relate to the conceptualisation of surface acting but rather to a sense of somehow minimising the value of that session for her clients and thus possible feelings of guilt.

Fieldworkers, therefore, 'surface act' for the clients' sake, but only when what they are experiencing would not be beneficial for clients. To say that fieldworkers are genuine in their surface acting may appear to be an oxymoron, but nevertheless seems to be true. They do not attempt to deliver fake emotions, but rather to present a more appropriate emotional display that can calm an agitated situation.

Deep acting

Deep acting "is the process of controlling internal thoughts and feelings to meet mandated display rules" (Brotheridge & Grandey, 2002). Fieldworkers performed deep acting through self-talk when they tried to think about their clients' experiences. It was particularly obvious when fieldworkers talked about dealing with more difficult clients. Deep acting enabled fieldworkers to regulate their negative emotions not just in terms of display but also in terms of experience, and increased their ability to be non-judgemental and empathic. As a result, they were able to manage the session so that it did not deteriorate and remained helpful to the clients. Seeing clients as victims, explaining clients' anger displays as symptomatic of their psychological difficulties, and looking at the situation from the clients' point of view were the discourses utilised when attempting to enhance positive emotions while deep acting. These are similar to what Hochschild (1983) described in flight attendants when they were trying to conform with the display rules and exhibit positive emotions when in reality feeling negative.

Automatic regulation

Hochschild (1983) believed that people can learn to deep act extremely well, to the point where they would not be aware of the emotional work they put into creating a required emotion. For fieldworkers, learning to competently deep act can arise from self-monitoring. Self-monitoring relates to self-reflection (Shepard & Morrow, 2003), which, in turn, promotes awareness. The self-monitoring that participants reported mirrored those reported elsewhere (Riggio & Friedman, 1982): the ability "to 'read' the demands of the particular social situation, monitor, and control (or disguise) inappropriate information or feelings and usually express oneself in a positive and socially approved manner" (p. 33). Brotheridge and Lee (2003) and Diefendorff, Croyle, and Gosserand (2005) found self-monitoring to be a predictor of surface acting. However, in fieldworkers, self-monitoring seemed to be a process that enabled emotional labour and allowed fieldworkers to monitor other aspects of the meeting as it unfolded. Through self-monitoring, which was directed at self and others (Riggio & Friedman, 1982), they were consciously aware of the process of the meeting and whether the boundaries were in place or being pushed by either party. It did not automatically imply a display of unfelt emotions; rather, it made fieldworkers more attuned to the needs of their clients.

Genuine emotions

Another aspect of emotional management that was included in the framework of emotional labour was around genuinely occurring emotions that comply with display rules. Displaying naturally occurring emotions requires little effort, according to Ashforth and Humphrey (1993). Fieldworkers felt that the display of these emotions constituted the majority of their interactions with clients.

Showing empathy to clients was one of the more important emotions that needed to be displayed and felt. Empathy can be thought of as one of the acting methods in emotional labour (Larson & Yao, 2005). As Larson and Yao (2005) point out "empathy should characterise all health care professions" (p. 1100). The authors further argue that empathising with clients or patients makes physicians better 'healers'. Fieldworkers seemed to hold a similar opinion. They believed that without genuine empathy and concern, they would feel like they were not doing their job, that is, helping clients to move on and live a happier existence.

The majority of the studies on emotional labour do not consider the display of naturally felt emotions when investigating emotional labour (Diefendorff, Croyle, & Gosserand, 2005). Diefendorff, Croyle, and Gosserand (2005) argue that the display of naturally felt emotions is more predominant than research would suggest, and surface and deep acting are more compensatory strategies that "occur in response to difficult situations" (p. 348). It coincides with participants' discourses of needing to manage their emotions and displays through deep acting when they are with a challenging client.

Outside of Client Work

The idea that emotional labour counts as emotional labour only when the object at whom it is directed is a client, a customer, or a patient is widespread throughout the literature (Bailey & McCollough, 2000; Gorman, 2000; Sass, 2000; Williams, 2003). It is not that the sentiment is often overtly stated, but the predominance of research and theory considering emotional labour in relational work with customers or clients makes the argument for itself. However, emotional energy is exerted during interactions with colleagues, supervisors, and managers (Maslach, 1982), and some of the display rules regarding these interactions have been described previously. These are evident in fieldworkers when interacting with other mental health professionals, with supervisors, management, and within the team.

Several participants disclosed having had unexpressed negative emotions when working within a clinical team. It was not explored how or why participants knew they needed to conceal these emotions. Often though, when it comes to work-related interactions, general societal rules take presence, which normally dictate being polite and not exhibiting displays that can be conceived as rude and bad-mannered (Leary, 1996, as cited in Tschan, Rochat, & Zapf, 2000).

The reciprocal nature of emotional labour

Factors that were identified as impacting on emotional labour and explanations of the impact of emotional labour on fieldworkers are arguably interconnected. Emotional work performed by the caring professions is complex (Bolton, 2001). For fieldworkers it involves frequent negotiation between display rules pertaining to when and what emotions need to be displayed and felt, and the regulation of both displayed and felt emotions. It is also impacted by factors inside and outside of work.

Organisational factors

Control at work

Several factors were found to impact on emotional labour in fieldworkers at an organisational level. Attending several meetings a day left fieldworkers feeling exhausted and drained because dealing with a number of people is strenuous (Maslach, 1982). In such situations they would exert even more effort to regulate their emotions. However, fieldworkers had a degree of control, and could reschedule a meeting with their clients if they were already feeling tired before the meeting.

Having control over decisions around work performance is negatively related to burnout (Schaufeli & Enzmann, 1998), and makes workers less likely to experience emotional exhaustion (Wharton, 1993). Fieldworkers in this study had control over how they work with their clients, including modifying boundaries and choosing which training to incorporate into their practice.

Support

de Jonge et al., (2008) found that having sufficient job resources is negatively related to emotional exhaustion. Fieldworkers' accounts indicated that there was a high level of resources available. Social support, especially supervisor and, to a lesser extent colleague support, is associated with lower strain produced by stressors at work (Dormann & Zapf, 1999). In this study fieldworkers placed more importance on colleague support when it came to debriefing after a difficult meeting with clients or asking for more practical advice regarding client work. Colleague support is what Korczynski

(2003) referred to as communities of coping, where workers form a collective mechanism through which they provide each other with the necessary support to be able to withstand the difficulties associated with people work.

Workload

Workload, another organisation factor, impacts emotional labour both directly and indirectly. The indirect impact occurs via training, and the majority of fieldworkers expressed ideas regarding improvements to the training. They specifically highlighted the need for more peer discussions and reflections after a training session in order to summarise the information and discover the best ways to integrate it into their practice. The more direct impact of workload on emotional labour results from having too much to do, not in terms of client work but other aspects of the fieldworker role.

Fieldworkers did not report any significant long-term negative effect of emotional labour with clients. Some short-term negative consequences, however, were associated with the combination of other aspects of work. Edwards, Burnard, Coyle, Fothergill, and Hannigan (2000) report that mental health community nurses experience stress and burnout because of high workloads and a lack of resources. Zapf (2002) also argues that empirical research shows that it is organisational job stressors, like workload and time pressures, that are the strongest predictors of burnout and stress rather than emotional job demands. This is consistent with the information collected from participants. Feelings of tiredness and exhaustion in fieldworkers were mainly related to workload, and specifically to the workload associated with non-client contact, and a sense of never having enough time to finish tasks. Client contact was something that the majority of fieldworkers experienced as positive and enjoyable, despite admitting that it could be very difficult at times.

Wharton (1993) found that jobs involving emotional labour with clients are seen as more satisfying than similar jobs without emotional labour. Fieldworkers' stories indicated a sense of pride and satisfaction with the work they with their clients. Challenges at work and their ability to meet these challenges, the ability to help people, and an opportunity to interact with a variety of people are some of the things that made work enjoyable despite the difficulties associated with emotional regulation (Wharton, 1996). Making a difference for another human being is a powerful experience that made it worth doing for all fieldworkers but one. It was the sense of making a difference that differentiated a fieldworker who intended to leave the organisation from the others, as she had lost faith that a perceptible difference could be made on a larger societal scale.

Individual Factors

Work and family

Individual factors that impact on emotional labour were also apparent in participants' narratives. For some participants, having outside family commitments, at times, made it difficult to be present with their clients. This either led to feelings of job inadequacy and thus exerting more effort to be present, or rescheduling meetings. Interaction between competing roles at work and at home can be a source of strain (Majomi, Brown, & Crawford, 2003).

Ways of coping

Coping involves both cognitive and behavioural efforts at managing or reducing external demands and internal negative emotional reactions (Folkman & Lazarus, 1980). It is necessary for mental health workers to have coping strategies to combat stress, which can include increased social support, exercise, relaxation, or deep breathing (Kottler & Schofield, 2001). Support from a partner, to assist with coping during difficult days at work, was mentioned by two fieldworkers. It seems that having understanding and supportive partners could help fieldworkers to express some of their frustrations with clients and to talk about their experiences. Having personal coping strategies also assists with not taking on clients' stories or negative emotional reactions and helps to 'let go' of them.

Some of the coping strategies fieldworkers mentioned can be used during client contact and affords neutrality, for example, being conscious of the fact that a difficult meeting is time-limited and will be over, or using 'a cloak of protection' to not take on clients' negative emotions. Other coping strategies can be used for eliminating the emotional residue that can linger after a particularly difficult meeting, like having a bath or doing physical work in the garden.

Experience of mental illness

Some fieldworkers had experienced mental illness in their own lives. As a result, it made it easier for them to better understand clients and what they were going through. This understanding assisted in not having to exert much effort in trying to put themselves in the client's situation, when the client was acting angry or was uncontrollably upset, thus making it possible to maintain a degree of genuine emotions that corresponded with display rules. Other fieldworkers also modelled the attitude of respect for the clients from the fieldworkers who had a personal experience of mental illness in their own family. This also allowed them to better understand their clients and commiserate, which, again, could promote genuinely occurring emotions.

Care

Care for clients, the desire to help, and a more general desire to do this type of work also seemed to make emotional labour, specifically with 'difficult' clients, easier. If there was no consideration for the wellbeing of the family then the expression of unfelt emotions, not being genuine, and not feeling genuine empathy would go against the display rules. It was the compliance with the expectations specified in display rules, through identification with their roles, that made workers feel authentic (Ashforth & Tomiuk, 2000). Several research studies found that expression of naturally felt emotions is negatively related to emotional exhaustion and stress, and is positively associated with satisfaction from client or patient interactions (Kim & Han, 2009; Martinez-Inigo, Totterdell, Alcover, & Holman, 2007; Zapf, 2002). The fact that fieldworkers reported face-to-face work with clients as enjoyable, despite the difficulties and short-term sense of being overwhelmed that it could cause, may be as a result of finding interactions rewarding and satisfying.

Self-monitoring

The self-monitoring described by fieldworkers was another aspect of work that was likely to mitigate the

negative impact of emotional labour. Workers who are high self-monitors were less negatively affected by the performance of emotional labour (Wharton, 1993). Another possible reason why fieldworkers did not report significant negative impact from their interactions with clients compared to occupations in the service sector, was the long term nature of their relationships. Tschan, Rochat and Zapf (2000) discuss the impact of the length of relationships in terms of interactions with colleagues, where violation of display rules can be restored. Fieldworkers' narratives indicated a similar possibility with their clients. Several fieldworkers expressed that even when mistakes were made with their clients they could go away, reflect on the issue with either supervisors, colleagues, or by themselves, and address it during the next meeting with their clients.

Emotional regulation

The way emotional labour is performed, or what type of regulation is used, can also account for the presence or absence of a long term, significant negative impact of emotional labour (Mauss, Cook, & Gross, 2007). Fieldworkers did not utilise fake emotions, or what surface acting is normally referred to, but they did utilise deep acting. Deep acting is normally associated with a lack of negative consequences of emotional labour, like emotional exhaustion (Grandey, 2002) and presence of positive consequences, like a sense of personal accomplishment (Brotheridge & Grandey, 2002).

Automatic emotional regulation is more or less effortless. The conscious regulation of emotions during specific situations when performed over a period of time with the same goal or plan in mind can become automatic (Bargh & Chartrand, 1999). Mauss, Cook, and Gross (2007) argue that compared to controlled regulation, automatic emotional regulation comes at a smaller cost, or none at all. Perhaps the reason why fieldworkers' performing what resembled surface acting did not produce the negative impact normally associated with this type of acting is because they had learnt to do it automatically – to display calmness when feeling anxious or frustrated – and may only have needed to reverse back to deep acting when a situation was more challenging for them.

Limitations of the study

The small sample size in this study was due to the small scale of the research project and the results may not be generalisable to all fieldworkers although the results do resonate with existing research on emotional labour. To develop a better and a more complete understanding of emotional labour in fieldworkers a national study with fieldworkers from different work contexts would be valuable.

Conclusion

This study aimed to explore emotional labour in fieldworkers at a community mental health organisation. Emotional labour and its performance by fieldworkers was found to be shaped by display rules that originate both within the organisation and within the wider context of professional practice. Fieldworkers demonstrated conformity with the display rules because they saw them as best practice and thus the most appropriate way to help their clients. Regulation of negative emotions through control and management and the display of other, more appropriate emotions (e.g., calmness), was seen as necessary for the clients and to maintain the safety of fieldworkers. Fieldworkers' own emotions were considered secondary during meetings with clients. Deep acting, accomplished through self-talk, was enacted when a client was perceived as challenging and genuine empathy needed to be enhanced.

Emotional labour in mental health fieldworkers is therefore about prioritising client experiences and regulating negative emotions so that they are not displayed and cannot impact on clients or increase risk for the field worker. Emotional labour is also about regulating the intensity of the display of genuine positive emotions for the same purpose as the regulation of negative emotions. While the driving force behind emotional regulation is the desire to help, care for and respect clients it is also important to consider the role of emotional labour in maintaining a safe work context. The relationship between emotional labour and the high rate of burnout amongst mental health field workers might be mitigated when field workers are able to employ emotional labour not only for their clients' sake, but also to increase their own sense of agency and safety in the therapeutic interactions with clients.

Conflicts of interest

The authors state that there are no conflicts of interest.

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Maximising Potential: The Psychological Effects of the Youth Development Programme Project K

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Project K is a positive youth development programme targeting 13-15 year old students with low self-efficacy. It involves three components: wilderness adventure, community challenge and individual mentoring. This longitudinal study aimed to investigate changes in self-efficacy, resilience, connectedness and wellbeing in students participating in Project K. Eighty students (59% male) were recruited from five secondary schools across the North Island of New Zealand for a quasi-experimental study. Participants displaying delinquent behaviour, self-harm, suicidal ideation, or an eating disorder were excluded. Over 14 months, six waves of measurement were completed by Project K participants (n = 49), while four waves of measurement were completed by a control group (n = 31). Analyses using multilevel models showed that completion of Project K had substantial positive effects on self-efficacy, resilience, and wellbeing, although the effect on connectedness was not significant. We conclude that Project K appears to be an effective positive youth development programme for adolescents with low self-efficacy.

Keywords: Adolescence; adventure education; wellbeing; connectedness; resilience; self-efficacy.

Adolescence is associated with many changes, including changing schools, physical changes, shifts in identity, cognitive changes, social/emotional changes, and others. Successful negotiation of key developmental tasks associated with this period can be challenging. Adolescents can engage in risky and damaging behaviours for a variety of biological, social, and developmental reasons (Jessor, 1991; Leather, 2009). Programmes designed to reduce the incidence of risky behaviours such as substance abuse, smoking, dangerous driving and unprotected sex in adolescents can have value. However, focusing solely on remedying deficits or reducing engagement in risky behaviours is not the only possible strategy for improving the outcomes for at-risk adolescents. Another strategy is to work on enhancing protective factors, with the goal of enhancing thriving and helping adolescents to acquire personal and psychosocial assets that can help protect them from negative outcomes. These are the goals of *positive youth development programmes.*[1]

Positive youth development is a strengths-based approach that can be conceptualised as a process of preparing youth to face the challenges of adulthood. These programmes aim to help youth meet their essential needs of building caring relationships, connections to community and basic safety, while at the same time building personal assets which include social, personal, academic, and vocational skills (Eccles & Gootman, 2002).

Project K

Project K, the focus of this study, was created in 1996 as a positive youth development programme by Graeme Dingle, a well-known New Zealand mountaineer, and Jo-anne Wilkinson, a lawyer. The programme has focused on improving outcomes for New Zealand youth, with a particular focus on improving self-efficacy (an individual's perception of their own ability to exert control over behaviour to successfully achieve tasks and goals; Bandura, 1997). Project K has developed to become a national multi-site youth development programme delivered through local licensees across New Zealand. Each Project K programme runs over 14 months and has three components: a three week residential wilderness adventure, a non-residential 10-day community challenge, and a 12-month mentoring partnership (Moore, 2005); these components are described in more detail below. Project K aims to improve social, psychological, and physical wellbeing in 13–15 year old students identified as having low self-efficacy, but who do not demonstrate high risk behaviours such as significant mental health or behavioural problems.

Project K Components

Wilderness adventure

In the wilderness adventure, participants engage in outdoor activities over the course of two to three weeks, such as abseiling, kayaking, hiking/tramping, mountain biking, and camping. This component of the programme is residential and participants have limited contact with parents and others not on the wilderness adventure. Using experiential learning, participants develop skills such as goal setting, teamwork, problem solving, and leadership. The wilderness adventure component of Project K falls within the broader domain of *adventure education*. There is good evidence that adventure education has positive effects on youth. Neill and Richard's (1998) meta-analysis of adventure education included over 12,000 participants from 96 studies and revealed small to medium positive impacts on self-confidence, self-concept, and locus of control. Similarly, a more recent meta-analysis of the effect of adventure therapy found evidence of moderate positive effects on psychological, behaviour, emotional and interpersonal variables (Bowen &

1 Of course, positive youth development programmes and risk-prevention programmes can often have overlapping goals and make use of overlapping strategies; see Guerra and Bradshaw (2008) for an edited book discussing these related literatures.

Neill, 2013).

Community challenge

The next component of the programme, the community challenge, encourages participants to transfer what they have learnt in the wilderness adventure to their communities and undertake a community project. This part of the programme is non-residential, with each student meeting with the rest of their Project K group to work on the challenge approximately ten times. Project K participants are encouraged to connect with and meet key members of their communities, and to visit local organisations. The community challenge can be considered a form of *service learning*, a common component of positive youth development programmes that combines other forms of teaching and learning with meaningful community service (Billig, 2000). There is evidence that this type of intervention has small to moderate positive effects on social, personal, citizenship and academic outcomes for students (see the meta-analysis by Conway, Amel, & Gerwien, 2009).

Mentoring

In the mentoring component of Project K, each participant is paired with a mentor who meets with the participant at least once monthly over the course of 12 months. Support from a caring adult outside the family can assist adolescents in a number of ways. For example, mentors can help set academic goals, act as role models, provide emotional support, and provide advice and guidance on topics adolescents may be unwilling to discuss with their parents. Mentoring programmes have demonstrated positive effects on school outcomes (Teasley, 2004), reductions in risky behaviours (Vreeman & Carroll, 2007), and improved wellbeing and connections to others. This is especially true of mentoring relationships of longer duration, such as those developed in this study (Jekielek, Moore, Hair, & Scarupa, 2002).

Outcome Variables and Hypotheses

Project K "focusses on building confidence, teaching life skills, promoting good health and encouraging a positive attitude" (Graeme Dingle Foundation, n.d.). Four specific criterion variables were selected based on these goals to assess the psychological effects of participation in Project K.

Self-efficacy

Self-efficacy is the psychological variable most directly targeted by Project K; indeed, participants are selected largely on the basis of having low self-efficacy. Bandura (1997) defines self-efficacy as an individual's perception of their own ability to exert control over behaviour to successfully achieve tasks and goals. Empirical evidence suggests that self-efficacy can positively influence adolescents' achievement (Moore, 2005), motivation, regulation of thought and behaviour, coping with adversity, and reduce vulnerability to stress and depression (Bandura, 1997). Project K incorporates a number of features that seem likely to increase self-efficacy. For example, the wilderness adventure component provides an opportunity for participants to experience competence and mastery when faced with challenging tasks such as abseiling and team leadership, while the mentoring partnership involves mentors assisting participants with setting and achieving a range of goals.

Given Project K's central focus on self-efficacy, prior research has evaluated the effects of Project K on self-efficacy, with positive results. A randomised control study conducted with 1177 students found that Project K participants had higher academic and social self-efficacy scores at the end of the programme when compared to a control group, and these changes were maintained at a one-year follow up (Deane, Harré, Moore, & Courtney, 2016). Although there thus exists evidence suggesting that Project K has a positive effect on self-efficacy, it is nevertheless important to investigate independent evidence to confirm these findings, particularly given the increasing drive for replication of findings in psychology (see Pashler & Wagenmakers, 2012), and the crucial status of this particular claim to the evidence basis for Project K. In addition, the current study attempts to extend the current evidence basis for Project K by investigating the effects of Project K on three other variables: resilience, connectedness, and wellbeing.

Resilience

Resilience is the ability to overcome obstacles or bounce back from challenges. Resilient adolescents are more likely to successfully transition through developmental tasks such as adjustment at school, academic achievement, involvement in extracurricular activities, developing close friendships, and formation of a sense of self (Resnick, 2000). Conversely, low resilience is related to low self-efficacy, low self-esteem, increased risk of mental illness, lower levels of connectedness (social support/relatedness), lower levels of persistence, poorer adaption, and less effective coping (Ahern, Kiehl, Sole, & Byers, 2006). The three Project K components focus on goal setting, effective problem solving, effective communication and social skills, all of which are important for building resilience (see Masten, Best, & Garmezy, 1990; Werner, 1982). Involvement in Project K also widens social support networks by introducing participants to others in the school and wider community. We therefore hypothesised that Project K would lead to increased resilience in adolescents.

Connectedness

Adolescent connectedness refers to adolescents' emotional connections to the communities that they live in. Adolescents who report strong connectedness report lower levels of risk-taking behaviour and higher levels of prosocial behaviours (Whitlock, 2007). In Project K, connections between students and the wider community are facilitated in multiple ways. Firstly, teachers at the students' schools connect with students to help them access Project K and attend the project components. Secondly, staff running the wilderness adventure connect with students as primary caregivers during their time spent away from home. Thirdly, performing the community challenge provides students with an opportunity to connect with volunteer services and other organisations in the community. Finally, the mentoring component of the project allows students to connect with experienced mentors. We therefore hypothesised that Project K would lead to increases in feelings of connectedness.

Wellbeing

There were two broad reasons to expect that participation in Project K might result in higher levels of subjective wellbeing. Indeed, given our previous hypotheses (of positive effects on self-efficacy, resilience, and connectedness), we would expect a positive effect of Project K on wellbeing as wellbeing is positively correlated with all three of these variables (Caprara, Steca, Gerbino, Paciello, & Vecchio, 2006; Jose, Ryan, & Pryor, 2012; Mak, Ng, & Wong, 2011). Secondly, there is some existing evidence that experiences with nature (Maller & Townsend, 2006), civic engagement (Albanesi, Cicognani, & Zani, 2007), and mentoring (Jekielek, Moore, & Hair, 2002) can improve wellbeing. Project K's inclusion of wilderness adventure, community challenge and mentoring components therefore provide a basis to hypothesise that completion of Project K would be associated with improvements in general wellbeing.

Method

Participants and Procedure

Project K (intervention) group

Participants in the Project K group were recruited between July and September 2010 from four schools: two co-educational schools and two single sex state boys' schools located in the North Island of New Zealand. The average decile rating of the four schools was 6.2. In order to identify students with low self-efficacy, a self-report self-efficacy questionnaire was administered to all Year 10 students in these schools. Two teachers also completed a screening report for each student. Students whose self-efficacy scores were the lowest (when combined across student and teacher ratings) were allocated highest priority for Project K participation. However, if a student met one or more of the four exclusion criteria (presence of delinquent behaviour, suicidal ideation, self-harm, or an eating disorder), as agreed by at least two Project K team members, the student would be excluded, as Project K does not target very high-risk youth.

The final sample size for the Project K group was $n = 49$. This was made up of 47 students who were approached at the start of the study (including the two who later withdrew), and the two replacement students who were selected into the programme one month after it began. Of the Project K students 63% ($n = 31$) were male. Students were 13 or 14 years old at the start of the study and 15 or 16 years old at the completion of the study. Participants identified with a range of ethnicities, with the most common identifications being European or Pākehā (78%), NZ Māori (24%), and Samoan (12%)[2]

Control group

This study used a quasi-experimental non-equivalent control group design, in which a group similar to the Project K group served as a control group. The control group was selected based on similarity to the Project K group in participant age, school decile, and participant availability during the timeframe of the study. Participants in the control group were recruited from a co-educational state decile 4 high school located in the North Island of New Zealand. Participant recruitment was from two Year 9 classes, with students aged 13 years at the start of the study and 15 years at the end (thus slightly younger than the intervention group). In total, 55 students were approached and 31 (56%) consented to take part in the current research. Self-efficacy scores were not used to include or exclude students for the control group. The final sample for the control group ($n = 31$) consisted of 52% ($n = 16$) male and 48% ($n = 15$) female participants. The control group had a similar ethnic composition to the intervention group, with the most common identifications being European or Pākehā (74%), NZ Māori (26%), and Cook Island Māori (10%).

Procedure

Project K (intervention) group

Once 10-12 students from each school had been selected using the approach described above, students and their families were invited to a Project K introduction meeting, at which students who wanted to participate in Project K as well as their parents provided written consent. The first measurement point (i.e., survey completion) for each participant also took place at this meeting.

Control group

Control group students were invited to participate through a teacher at their secondary school. To participate in the study, written consent was required from students and parents. Those who provided written consent then completed surveys during school time on a total of four occasions.

The programme and data collection started at slightly different times for each of the five participating schools, but with similar spacing between data collection points for all groups (see Table 1). Specifically, Time 1 took place in July 2010 for Project K school 1, in September 2010 for Project K schools 2-4, and December 2010 for the control group. The slightly delayed start for the control group occurred due to this control strategy only being decided on and implemented relatively late in the design process.

Data collection was timed so that most collection points coincided with important transitions in the Project K programme, such as the start and finish of the programme as a whole and transitions from one phase of the programme to another. The exceptions to this rule were at Times 4 and 5, at which data were collected during the ongoing mentorship phase rather than at a phase transition. This occurred because the mentoring phase was longer (12 months) in comparison to the other components and we wished to ensure that the data collection procedure facilitated adequate sensitivity to change over this long period. Data were collected from the control group only four times (rather than six) over the programme. Not asking the control group to provide data for two of the time points allowed us to minimise the time burden on the control participants who were contributing to the research project without receiving any material intervention. There was also some variance in data collection time points across schools due to the process of data collection being controlled to some degree by teachers at the schools.

Given the variation in the timing of data collection points, the individual waves of measurement were not treated in the analysis as occurring at the same

2 These percentages do not sum to 100% due to the fact that some participants identified with multiple ethnicities.

point for all participants. Rather, the timing of each measurement point for each individual was coded according to the length of time (in days) between the date of that measurement point and the first measurement point for that participant (i.e., when he or she entered the study). This allowed us to more accurately estimate the "effect of time"—i.e., the rate of change on each dependent variable.

Table 1

Data Collection Dates[1]

		Project K schools				Control
Time	Project phase[2]	School 1	School 2	School 3	School 4	School
1	Baseline	27/07/2010	17/09/2010	16/09/2010	08/09/2010	06/12/2010
2	Near start of community challenge	12/10/2010	25/11/2010	27/10/2010	19/10/2010	01/04/2011
3	Near start of mentoring	02/12/2010	30/11/2010	09/11/2010	01/11/2010	10/06/2011
4	Near mentoring 6-month mark	14/06/2011	05/05/2011	19/05/2011	10/05/2011	
5	Near mentoring 9-month mark	06/09/2011	10/09/2011	22/08/2011	01/09/2011	
6	End of programme	25/10/2011	27/09/2011	26/11/2011	06/10/2011	01/11/2011

Notes. Data collection dates are modal (some individual students returned surveys on slightly different dates to the remainder of the students within their school). [2]These phases apply only to the Project K schools.

Measures

Self-efficacy

Self-efficacy was measured by the revised Project K Self-efficacy Questionnaire (PKSEQ), a 20-item self-report scale specifically designed for Project K (Moore, 2005). The questionnaire has three subscales, based on a factor analysis by Moore: *academic* (e.g., "How well can you study for a test?"; 8 items), *social* (e.g., "How well can you become friends with other people?"; 8 items), and *help-seeking* (e.g., "How well can you get adults to help you with a problem?"; 4 items). This said, a subsequent study by Deane et al. (2016) failed to find evidence for a 3-factor solution and focused their analysis only on the academic and social subscales. Given the ambiguity regarding the scales' factor structure and the fact that our study had a number of other distinct criterion variables, for parsimony's sake we focused our analysis on total scores on the PKSEQ rather than domain scores. However, an analysis of the estimated effects of Project K on each subscale is also briefly reported. PKSEQ items are scored on a 6-point scale from 1 = *not well at all* to 6 = *quite well*. Across time points, Cronbach's alpha ranged from .86 to .90 for the academic subscale, .81 to .90 for the social subscale, .71 to .84 for the help-seeking subscale, and .87 to .94 for the total scale.

Resilience

Resilience was measured by the 25-item Resilience Scale (Wagnild & Young, 1993). All of the questions were positively worded, with example items including "I usually manage one way or another" and "When I am in a difficult situation I usually find my way out of it". The scale uses a 7-point Likert response scale from 1 = *strongly disagree* to 7 = *strongly agree*. Previous research has provided evidence for the reliability and concurrent validity of this scale (Wagnild, 2009, 2011). In this study, the Cronbach's alpha ranged across time phases from .90 to .96.

Connectedness

Connectedness was measured by the Hemingway Adolescent Connectedness Scale (HACS), a 57-item self-report scale (Karcher & Lee, 2002; Karcher & Sass, 2010). Example items include, "I get along with the kids in my neighbourhood" and response options range from *not at all true* (1) to *very true* (5). The scale also has a *not clear* option for respondents who were unsure how to answer a particular item; such responses were treated as missing data. The HACS has ten subscales (Karcher & Sass, 2010); for the sake of parsimony we analysed only the total scale score in this study. Cronbach's alpha for the HACS ranged across time phases from 0.87 to 0.92.

Wellbeing

Overall psychological wellbeing was measured by the Affectometer 2 (Kammann & Flett, 1983), a 20 item scale with a 5-option rating scale format with endpoints of *not at all* and a*ll of the time*. The Affectometer 2 includes both positively worded items (e.g., "My life is on the right track") and negatively worded items (e.g., "I feel like a failure"). Possible scores range from 20 to 100. In this study, the Cronbach's alpha for the Affectometer 2 was .82 at time 1 and 0.87 at time 6. As the Affectometer 2 was considered a supplementary measure for this project, it was administered only twice (at the first and last data collection points for each person).

Data Analysis

Data were analysed in R version 3.2.4 (R Core Team, 2016), using the *nlme* package version 3.1-125 (Pinheiro et al., 2016) for multilevel models. Missing individual item responses were imputed using (single) expectation-maximisation in the *mice* (multivariate imputation by chained equations) package version 2.22 (Buuren & Groothuis-Oudshoorn, 2011). Just 3.3% of the possible responses to the items used in this study were missing (for returned surveys). Where an entire survey was completely missing for a participant for a given time point, the data point was excluded from analysis (surveys were missing for 12% of the total of 418 measurement points across times and students). Multilevel models can provide maximum likelihood estimates based on all the data that is available without completely excluding participants that had some missing time points.

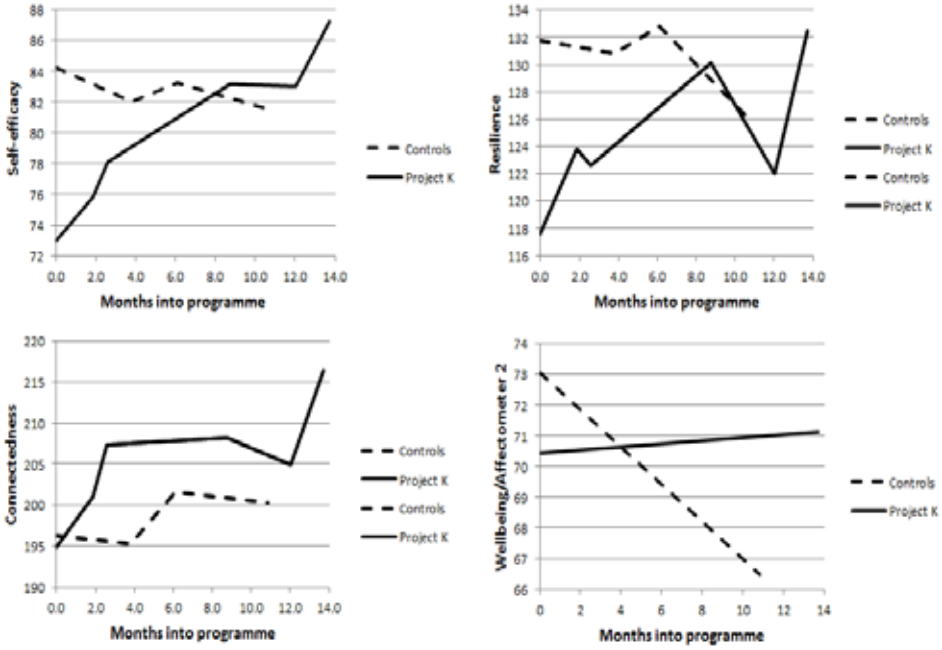
Results

Self-efficacy

At the beginning of the programme, Project K participants had a mean score of 73 on the self-efficacy scale (*SD* = 15), improving to a mean of 87 (*SD* = 12) at

the end of the programme (a difference of Cohen's $d = 0.93$)[3]. In contrast, control participants started with a higher self-efficacy levels (M = 84, SD = 13), but showed a slight fall in self-efficacy levels over the course of the programme (time 6 M = 82, SD = 18, d for change = -0.20). Changes in self-efficacy scores over the course of the programme are displayed in the top left panel of Figure 1. At the end of the programme Project K participants' mean self-efficacy level was above that of the control group.

Figure 1. Time series for each of the dependent variables over the course of the programme. Each data point represents the mean for a particular group and time phase. Only 2 time phases (pre and post) were completed for the wellbeing measure (bottom right panel).



The graphed results in Figure 1 provide a simple description of how students in the Project K and control groups changed over the course of the intervention. However, in order to draw statistical inferences about the effect of Project K on self-efficacy, a multilevel model was utilised. Multilevel models allow for the estimation of effects that vary across participants, and help deal with issues with statistical dependence that can arise when data is "nested" (e.g., multiple time points nested within an individual). Good introductions can be found in Singer and Willett (2003) or Gelman and Hill (2007).

In the multilevel model, a key independent variable was *time*, operationalised as the time period elapsed between the participant entering the programme, and the data collection point. The goal was to determine if the rate of change over the course of the programme was different for Project K participants than for control participants. This was assessed by specifying an interaction between group and rate of change. The rate of change and the intercept (i.e., the self-efficacy level at the start of the programme) were permitted to vary randomly across participants. In addition, these two parameters were allowed to covary, such that the rate of change could differ across different starting levels of self-efficacy. As Project K participants started with lower levels of self-efficacy, regression to the mean presented a potential threat to internal validity, which was addressed by allowing the rate and intercept to covary. The coefficients for this model are displayed in Table 2.

In Table 2, the estimate of -9.11 for Project K means that the Project K group started with self-efficacy scores approximately 9 points lower than those in the control group. The rate of change of -0.31 means that control participants showed very slight reductions in self-efficacy over the course of the programme, with self-efficacy scores falling by approximately 0.3 points per month. The Group*Rate of change interaction of 1.21 means that the Project K group showed increases of approximately -0.31 + 1.21 = 0.90 points per month in self-efficacy scores (measured on a scale from 20 to 120) during the programme. The fact that the 95% confidence interval for the interaction term excludes zero indicates that there is sufficient evidence to reject a null hypothesis of no difference in rate of change between the groups. The correlation of -.36 between the intercept and rate of change also suggests that participants who started with lower self-efficacy tended to improve more over time, but the inclusion of this parameter (as in the model shown in Table 2) did not remove the effect of Project K on rate of change—suggesting that the positive effect of the programme was unlikely to be due solely to a selection-regression interaction. The multilevel findings thus reinforce the impression visible in the top-left panel of Figure 1: Self-efficacy levels improved in the Project K group, but not the control group.

When we estimated the effects of Project K on the three subscales of the PKSEQ scale in a supplementary analysis, the crucial Group*Rate of change coefficient was positive and statistically significant in each case: $\hat{\beta}$= 0.52, 95% CI [0.24, 0.80] for academic self-efficacy, $\hat{\beta}$ = 0.38, 95% CI [0.13,

Table 2
Multilevel Model for Self-Efficacy

	95% CI lower	Estimate	95% CI upper	Standardised estimate
Fixed effects				
Intercept	79.10	83.81	88.53	-
Group (Project K)	-15.11	-9.11	-3.12	-0.09
Rate of change (per month, controls)	-0.76	-0.31	0.15	-0.03
Group*Rate of change	0.66	1.21	1.75	0.09
Random effects (SDs)				
Intercept | Participant	9.52	11.59	14.12	0.14
Rate of change | Participant	0.55	0.79	1.13	0.07
Correlation (intercept, rate of change)	-.62	-.36	-.03	-.36

Note. N = 369 observations across 80 participants. Possible scale range of dependent variable: 20–120.

3 Cohen's d scaled in terms of the time 1 standard deviation; see Cumming (2013).

0.62] for social self-efficacy, and $\hat{\beta}$ = 0.30, 95% CI [0.16, 0.44] for help-seeking self-efficacy.

Resilience

At the beginning of the programme, Project K participants had a mean score of 118 on the resilience scale (*SD* = 21), improving to a mean of 132 (*SD* = 19) at the end of the programme (a difference of *d* = 0.70). Control group participants started the programme with higher levels of resilience than those in the Project K group (*M* = 132, *SD* = 17), but their mean scores declined over the course of the programme (time 6 *M* = 126, *SD* = 26, *d* for change = -0.36). Change in resilience scores over the course of the programme are displayed in the top right panel of Figure 1. As is visible in the figure, despite starting with lower levels of resilience, the Project K participants ended the programme with higher average levels of resilience than those in the control group. The effect of Project K on resilience was again investigated using a multilevel model. The coefficients for this model are displayed in Table 3.

In Table 3, the rate of change of -0.63 means that control participants showed slight reductions in resilience over time, reinforcing the pattern visible in the graphed results. The Group*Rate of change interaction of 1.32 means that the Project K group showed increases of -0.63 + 1.32 = 0.69 points in resilience scores per month in the programme (with resilience scores measured on a scale from 25 to 175). The fact that the 95% confidence interval for the interaction term excludes zero again indicates that there is sufficient evidence to reject a null hypothesis of no difference in rate of change between the groups.

Table 3

Multilevel Model for Resilience

	95% CI lower	Estimate	95% CI upper	Standardised estimate
Fixed effects				
Intercept	126.34	132.78	139.23	-
Group (Project K)	-20.02	-11.94	-3.87	-0.08
Rate of change (per month, controls)	-1.33	-0.63	0.08	-0.04
Group*Rate of change	0.51	1.32	2.13	0.07
Random effects (SDs)				
Intercept | Participant	10.82	13.62	17.13	0.11
Rate of change | Participant	0.33	0.71	1.52	0.04
Correlation (intercept, rate of change)	-0.41	-0.02	0.37	-0.02

Notes. N = 369 observations across 80 participants. Possible scale range of dependent variable: 25–175.

Connectedness

At the beginning of the programme, Project K participants had a mean score of 195 on the connectedness scale (*SD* = 28), improving to a mean of 217 (*SD* = 21) at the end of the programme (a difference of *d* = 0.77). Control group participants' scores at the start of the programme were similar to those in the Project K group (*M* = 196, *SD* = 24) and also increased over time (time 6 *M* = 200, *SD* = 26, *d* for change = 0.17). Changes in connectedness scores over the course of the programme are displayed in the bottom left panel of Figure 1. The coefficients for a multilevel model of connectedness are displayed in Table 4.

Table 4

Multilevel Model for Connectedness

	95% CI lower	Estimate	95% CI upper	Standardised estimate
Fixed effects				
Intercept	187.09	195.92	204.74	-
Group (Project K)	-8.26	2.97	14.19	0.01
Rate of change (per month, controls)	-0.44	0.33	1.09	0.01
Group*Rate of change	-0.20	0.69	1.58	0.02
Random effects (SDs)				
Intercept | Participant	17.93	21.77	26.44	0.11
Rate of change | Participant	0.69	1.06	1.62	0.04
Correlation (intercept, rate of change)	-0.68	-0.39	-0.00	-0.39

Notes. N = 369 observations across 80 participants. Possible scale range of dependent variable: 57–285.

In Table 4, the rate of change of 0.33 means that control participants showed slight improvements in connectedness over time. The positive Group*Rate of change interaction term suggests that Project K participants' connectedness scores improved more than did those of control participants within the sample, but the confidence interval for the interaction term spans zero meaning that this effect was not statistically significant.

Wellbeing

At the beginning of the programme, Project K participants had a mean score of 70 on the Affectometer 2 (*SD* = 10), improving very slightly to a mean of 71 (*SD* = 12) at the end of the programme (a difference of *d* = 0.07). The control group's mean wellbeing scores were higher at the start of the programme (*M* = 73, *SD* = 9), but had declined quite substantially by the end of the programme (time 6 *M* = 67, *SD* = 12, *d* for change = -0.74). Changes in wellbeing scores over the course of the programme are displayed in the bottom right panel of Figure 1. The coefficients for a multilevel model of connectedness are displayed in Table 5.

In Table 5, the rate of change of -0.62 means that control participants showed reductions in wellbeing over time, as indeed is visible in the bottom left panel of Figure 4. The Group*Rate of change interaction term of 0.67 suggests that in this sample, Project K participants showed virtually no change (-0.62 + 0.67 = 0.05) in wellbeing scores over time (with wellbeing measured on a scale ranging from 20 to 100). However, the confidence interval for the interaction term excludes zero, meaning that there was some evidence of a difference in rate of change between the two groups (with the control group declining in wellbeing, and the Project K group remaining relatively stable).

Table 5
Multilevel Model for Wellbeing (Affectometer 2)

	95% CI lower	Estimate	95% CI upper	Standardised estimate
Fixed effects				
Intercept	69.50	73.03	76.56	-
Group (Project K)	-7.05	-2.53	1.99	-0.03
Rate of change (per month, controls)	-1.03	-0.62	-0.21	-0.08
Group*Rate of change	0.18	0.67	1.16	0.06
Random effects (SDs)				
Intercept | Participant	2.28	5.80	14.73	0.07
Rate of change | Participant	0.05	0.42	3.75	0.04
Correlation (intercept, rate of change)	-0.99	0.31	1.00	0.78

Notes. $N = 152$ observations across 80 participants. Possible scale range of dependent variable: 20–100.

Supplementary Analysis: Controlling for School Term of Observation

A peer reviewer raised the concern that the control and intervention groups experienced data collection points at different times, meaning the effect of Project K could be confounded by the effect of time of school year (e.g., students perhaps being happier near the end of the school year, and less so in the middle of it, perhaps producing spurious trajectories of change). To deal with this potential confound, we conducted supplementary analyses controlling for the school term of each observation (1, 2, 3, 4 or holidays) as a nominal variable. This control strategy resulted in no change to the direction or statistical significance of the key interaction between condition (Project K vs. control) and time, with the size of the effect on each of the four main dependent variables remaining very similar. Further details are available upon request.

Discussion

This study provided evidence suggesting positive effects of Project K on the self-efficacy, resilience, and wellbeing of adolescents. The magnitude of these effects was relatively large for self-efficacy and resilience, with an improvement over the course of the programme of Cohen's $d = 0.93$ for self-efficacy, and $d = 0.70$ for resilience. It was less clear whether the programme had a positive effect on adolescent connectedness; this effect was not statistically significant.

These findings replicate the finding of Deane et al. (2016) that Project K has a positive effect on self-efficacy. Indeed, although Project K participants started with substantially lower mean self-efficacy levels than control group participants in the current study, their mean self-efficacy levels had overtaken those of the control group by the end of the programme. A strength of this study is the use of multilevel modelling to demonstrate that this change was not simply due to regression to the mean. The current study also extends Deane et al.'s findings by showing positive effects of Project K on resilience and wellbeing.

The findings of this study fit well with previous research showing positive effects of the components that form part of the Project K package. For example, adventure education programmes have demonstrated their ability to build resilience (Neill & Dias, 2001), while mentoring programmes have been shown to be effective positive youth development tools (Jekielek, Moore, Hair, et al., 2002), and engagement in service activities (like those in the community challenge) is associated with positive academic, behavioural and civic outcomes (Schmidt, Shumow, & Kackar, 2007).

With respect to wellbeing, an interesting finding was that control participants displayed *decreases* in wellbeing over time, while Project K participants displayed essentially stable wellbeing over time. It is possible that the stresses of adolescence result in a temporary reduction in wellbeing over this developmental stage, as reflected in the control group's decline in wellbeing scores. Indeed, a survey of 9,107 secondary school students in New Zealand found that older students tended to report lower levels of wellbeing (Adolescent Health Group, 2008). It could be the case that Project K provides a protective effect against a decline in wellbeing during adolescence. This would make sense given Project K's primary focus on self-efficacy, as self-efficacy is a good predictor of overall life satisfaction (Vecchio, Gerbino, Pastorelli, Del Bove, & Caprara, 2007). However, it is also possible that the apparent decline in wellbeing in the control group was due to a time-of-year effect (given the fact that the first and last data collection points took place at slightly different times of the school year), or even simply due to chance variation in scores. Given the limited number of time points for the wellbeing data (just two), the evidence of a protective effect on Project K on this variable should be considered tentative.

The effects seen in this study appear to be large enough to have practical significance: For example, the Project K participants started with much lower mean levels of self-efficacy and resilience, yet by the end of the programme had *higher* mean scores on these two variables than did the control group.

Mechanism of action

The results presented here provide evidence of a positive effect of Project K on self-efficacy and resilience (and, more tentatively, wellbeing). There is a number of ways in which Project K might improve self-efficacy and resilience. For example, the wilderness adventure provides students with an opportunity to experience competence and mastery when faced with challenging tasks such as abseiling and team leadership, and such experiences of mastery are considered essential to developing self-efficacy (Bandura, 1977; Pajares, 2002). Similarly, Project K emphasises several skills that are important to developing resilience, such as goal setting, effective problem solving, effective communication and social skills which could explain its apparent positive effect on resilience. Nevertheless, our study was not designed to determine the mechanism of action of Project K and this question could be addressed in future research.

Limitations

While a control group was used, the present study used a quasi-experimental design with non-random allocation of participants to conditions. The use of a control group helps rule out single-group threats to internal validity such as maturation, history, or testing, but the lack of random assignment means that more complex threats to internal validity are possible. Of these, perhaps the most troublesome is the possibility of a selection-regression threat: Project K participants were selected in large part on the basis of having low self-efficacy scores, and started the programme with lower levels of self-efficacy than did the control group. The Project K group's levels of self-efficacy might therefore have improved at a faster rate than the control participants due simply to a faster rate of regression to the mean. However, our multilevel models provided an indirect control for this threat to internal validity. The models specifically included a correlation term modelling the relationship between initial status and rate of change, statistically controlling for a selection-regression threat. For example, for self-efficacy, there was a correlation of -.36 between initial status and rate of change. Participants with lower levels of self-efficacy at the start of the programme tended to improve more, and this was explicitly controlled for in the statistical analysis.

A limitation with respect to the breadth of applicability of our findings is that we were unable to specifically study the efficacy of Project K for Māori adolescents. It could have been useful to study whether the efficacy of Project K differed for Māori versus non-Māori, but the moderate overall sample size meant that there simply were not enough Māori participants to produce a robust and valid comparison (12 Māori participants in the Project K group, and just 8 in the control group). This said, a qualitative study with a group of Māori Project K participants found that these participants generally found Project K to be a supporting and challenging environment to which they attributed positive changes in their lives (Hollis, Deane, Moore, & Harré, 2011). Furthermore, the effect of Project K on self-efficacy amongst Māori adolescents has been studied in the past: Deane (2012) had 264 Māori participants in her randomised controlled trial (when including Māori participants identifying with multiple ethnicities). She found no significant difference in the efficacy of Project K in Māori versus non-Māori for academic or social efficacy when outcomes were measured just after the programme, albeit that a one year follow-up did suggest that the effect of the programme on social (but not academic) self-efficacy was smaller for Māori. Future studies with larger samples than ours could further research the efficacy of Project K amongst Māori, and attempt to determine whether the program does indeed have a smaller effect on social self-efficacy for Māori youth.

Other limitations of the study included the fact that the control group started their waves of measurement slightly later in time than the Project K group, raising the possibility of a selection-history threat. The Project K group could have been exposed to slightly different historical or calendar events over the course of the study period than the control group, thus resulting in a different change trajectory unrelated to the actual effects of Project K. This seems a relatively unlikely explanation for the differences in rates of change across Project K and control participants given that controlling for the school term of each observation resulted in no substantial change to our primary findings.

Implications for Practice and Future Directions

Project K targets youth who are moderately at risk. DuBois et al. (2011) noted that youth who are moderately at risk tend to experience increased benefits from mentoring programmes when compared to youth in the low and high risk ranges. As Project K includes a significant mentoring component, its targeting of moderate risk youth appears to be filling an important gap in order to meet the needs of youth who are most likely to benefit from this type of intervention. The results of this study, along with the randomised controlled trial by Deane et al. (2016), provide some justification for organisations who undertake programmes like Project K to advocate for and obtain increased funding to invest in this important area. This said, we have not evaluated the cost-effectiveness of Project K in comparison to competing alternatives for youth development.

On a broader scale, this study demonstrates the importance of building strengths in young people. Not every adolescent can attend Project K, but activities similar to some of the individual components of Project K (adventure education, service learning, and mentoring) could be available more broadly. For example, young people can attend outdoor adventure education courses via programmes such as Outward Bound, engage in local community projects, or make use of one of the several mentoring programmes in New Zealand; see Farruggia et al. (2011) and Dunphy et al. (2008) for reviews.

Conclusion

Positive youth development programmes such as Project K aim to help young people reach their full potential through building self-confidence, teaching essential life skills such as goal setting and team work, and promoting good health and a positive attitude. This study provides evidence that Project K meets these goals by producing a positive effect on self-efficacy, resilience, and wellbeing in moderately at-risk young people.

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The Multidimensional Model of Māori Identity and Cultural Engagement: Measurement Equivalence across Diverse Māori Groups

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The Multidimensional Model of Māori Identity and Cultural Engagement (or MMM-ICE2) is a self-report questionnaire that measures seven distinct dimensions of one's subjective identity as Māori. Prior research indicates that the scale performs well psychometrically and predicts a wide range of outcomes for Māori peoples. However, the measurement equivalence of the MMM-ICE2 is yet to be assessed. That is, the extent to which the scale provides comparable measurement of the same aspects of identity for all Māori, for instance, across different age groups, for Māori men and women, and for Māori living in different urban or rural regions. Here, we address this gap in the validation of the MMM-ICE2 using Multigroup Confirmatory Factor Analysis to assess the configural, metric, and scalar equivalence of the scale across different demographic groups. We test our models using data from Māori participants who completed the MMM-ICE2 as part of the broader New Zealand Attitudes and Values Study (N = 696). Results indicate that the scale has reasonable measurement equivalence over metric, configural, and scalar assessments across most demographic comparisons. In sum, the results indicate that the MMM-ICE2 provides a valid assessment tool for Māori across a range of contexts, but nevertheless points to ways in which the scale could be improved in future.

Keywords: Māori; Identity; Indigenous; Measurement Equivalence

The field of quantitative identity research has undergone somewhat of an *emic* (by the people of the culture, for the people; Berry, 1989) revolution in recent years. The addition of the Pacific Identity and Wellbeing Scale (the PIWBS; Manuela & Sibley, 2013; 2015a), and the Multidimensional Model of Māori Identity and Cultural Engagement - Revised (the MMM-ICE2; Houkamau & Sibley, 2010, 2015a), have allowed researchers to assess identity in a culturally-specific and nuanced way. The MMM-ICE2 is a seven dimension, public domain, quantitative, Likert-style, self-report measure created *for* Māori *by* Māori (Houkamau & Sibley, 2010, 2015a). The purpose of the scale is to measure one's subjective identification as Māori (Houkamau & Sibley, 2010, 2015a). The MMM-ICE2 has shown utility in predicting a wide range of outcomes including: home-ownership (Houkamau & Sibley, 2015b), *Marae* visits and fluency in *Te Reo* Māori (Houkamau & Sibley, 2010), perceptions of National and Personal well-being (Houkamau & Sibley, 2011), self-esteem (Matika, Manuela, Muriwai, Houkamau, & Sibley, 2017), environmental attitudes and values (Cowie, Greaves, Milfont, Houkamau, & Sibley, 2016), and mental health (Muriwai, Houkamau & Sibley, 2015). Here, we aim to test the measurement equivalence of the MMM-ICE2 across urban/rural Māori, gender, "age and" sole-identified versus mixed Māori, to provide evidence that the scale is measuring subjective identification equally across groups.

Development of the MMM-ICE

Initially, Houkamau and Sibley (2010) aimed to create a scale of Māori identity, where identity is defined as: "constituting those aspects of the self-concept (including beliefs/values/attitudes) that pertain to 'who' a person is as Māori, how they 'fit in' with others in the social world and what that means in terms of behaviour" (Houkamau & Sibley, 2010, p.12). The original items were from a broad and detailed review of the literature on Māori identity and the international literature on ethnic identity. The initial item pool included items based on: identity centrality (Sellers, Smith, Shelton, Rowley, & Chavous, 1998; Luhtanen & Crocker, 1992), collective self-esteem (Luhtanen & Crocker, 1992), cultural efficacy (see Durie, 1995), active identity engagement (based on qualitative research by Houkamau, 2006), spirituality (i.e., Durie, 1994), interdependency/collectivism (Kashima & Hardie, 2000), and essentialist/authenticity based beliefs (based on discussions on the legitimising myth of real "Māoriness" by Borrell, 2005; Chadwick, 1998).

Houkamau and Sibley (2010) then used Exploratory Factor Analysis (EFA) on responses to a pool of 92 items by 270 participants recruited on the internet. EFA is a method used to explore how items cluster together to form a number of latent dimensions. A six-factor solution emerged from the analysis, meaning there were six reliable dimensions which underlie Māori identity over 47 items drawn from the data. Descriptions of the different dimensions can be found in Table 1. The first dimension was called Group Membership Evaluation (GME), which relates to having positive feelings about one's membership in the group 'Māori'. A second aspect of this dimension is how central and important to the self one's identity as a 'Māori' is. Another dimension was named Socio-Political Consciousness (SPC). This dimensions indexes beliefs in the continued importance of colonial history and the injustices experienced by

Māori. This dimension also assess the degree to which the participant feels they actively engage in the political process and 'stand up' for Māori political rights. The dimension of Cultural Efficacy and Active Identity Engagement (CEAIE) measures the extent to which one believes they have the personal resources to engage with other Māori in traditional cultural contexts.

The fourth dimension of the scale was named Spirituality, which measures engagement with traditional Māori concepts of spirituality like recognising *tīpuna* (ancestors) and that which is *tapu* (sacred). The fifth dimension was called Interdependent Self-Concept; this assesses the degree to which the participant believes that being Māori is interdependent or independent from their relationships with other Māori. Put more simply, it assesses whether one feels they need to actively engage with other Māori in order to truly be Māori. The final dimension was named Authenticity Beliefs. This dimension assess the degree to which someone believes that Māori have to do certain cultural things or look/act certain ways to be an authentic Māori.

In a later paper, Sibley and Houkamau (2013) examined the scale properties of the MMM-ICE, and assessed the stability of the scale across genders, and across the lifespan. They extended the initial analyses by using item response theory to look at the scale's internal reliability. That is, to check if there were scale reliability differences between people and at different levels of the dimensions. The MMM-ICE tended to be most precise at the mean level range of each dimension, but each dimension showed an acceptable level of reliability across the scale. Examining the dimensions across age cohorts and genders provided interesting comparisons and insights into how identity may change with age (although longitudinal research is needed). Older people tended to have a higher level of identification with the MMM-ICE dimensions and across genders the results were reasonably similar.

Finally, due to feedback from the community and further examination of the literature, Houkamau and Sibley (2015a) updated the original MMM-ICE by adding a seventh factor, Perceived Appearance. Perceived Appearance assesses the extent to which someone believes that they looking prototypically Māori to others. Houkamau and Sibley (2015a) also showed that this new factor, when controlling for the other six dimensions of the MMM-ICE2, predicted unique variation in reported perceived discrimination and that people lower in this dimension were more likely to be of mixed Māori-Pākehā (New Zealand European) descent. However, despite the growing body of research developing the scale, some important questions remain: for example, does the MMM-ICE2 measure identity as '*well*' for urban Māori as it does for rural Māori? What about for men versus women? Or across age groups? And, finally, for those who solely identify as Māori versus those who also identify with other ethnicities?

The aim of this paper is to test the measurement equivalence of the MMM-ICE2 across all of these groups using Multigroup Confirmatory Factor Analysis (MCFA).

Māori Identity: Key Influential Variables

MCFA is a tool that allows us to test the factorial equivalence of the MMM-ICE2 subscales across groups. However, the researchers must still choose suitable groups for comparison. For example, Manuela and Sibley (2015b) chose to compare the Pacific Identity and Wellbeing Scale across the major Pacific Island groups (Samoan, Cook Island, Tongan, and Nuiean). For the study of Māori identity this decision is less clear cut (especially since there are numerous *iwi*). However, several key variables have been identified in past literature as having a role in shaping one's identity as Māori.

Urban and Rural Māori

The distinction between urban and rural Māori has been influential in past research on identity. This distinction has been largely shaped by historical forces (Durie, 1994, Houkamau, 2006, 2010). A

Table 1

Construct definitions for the seven factors indexed by the MMM-ICE2. Adapted from Houkamau and Sibley (2015a).

Group Membership Evaluation (GME) The extent to which the individual positively evaluates their membership in the social category Māori and views their membership as Māori as a personally important or central aspect of their self-concept versus the extent to which the individual negatively evaluates their membership in the social category Māori and views their membership as Māori as peripheral or irrelevant to their self-concept
Cultural Efficacy and Active Identity Engagement (CEAIE) The extent to which the individual perceives that they have the personal resources required (i.e., the personal efficacy) to engage appropriately with other Māori in Māori social and cultural contexts versus the extent to which the individual perceives that they lack the personal resources and ability to engage appropriately with other Māori in Māori social and cultural contexts
Interdependent Self-Concept (ISC) The extent to which the concept of the self-as-Māori is defined by virtue of relationships with other Māori people versus the extent to which the concept of the self-as-Māori is viewed as being defined as solely unique and independent to the individual rather than as part of the social group.
Spirituality (S) The extent to which the individual is engaged with, and has a belief in, certain Māori concepts of spirituality, including a strong connection with ancestors, Māori traditions, the sensation and experience of *waahi tapu* (sacred places), and a strong spiritual attachment and feeling of connectedness with the land versus the extent to which the individual is disengaged from or does not believe in Māori concepts of spirituality.
Socio-Political Consciousness (SPC) The extent to which the individual perceives historical factors as being of continued importance for understanding contemporary intergroup relations between Māori and other ethnic groups in New Zealand; and how actively engaged the individual is in promoting and defending Māori rights given the context of the Treaty of Waitangi versus the extent to which the individual perceives historical factors and injustices experienced by Māori as being irrelevant in contemporary society.
Authenticity Beliefs (AB) The extent to which the individual believes that to be a 'real' or 'authentic' member of the social category Māori one must display specific (stereotypical) features, knowledge and behaviour versus the extent to which the individual believes that Māori identity is fluid rather than fixed, and produced through lived experience.
Perceived Appearance (PA) The extent to which people subjectively evaluate their appearance as having clear and visible features that signalling their ethnicity and ancestry as Māori (or high Māori prototypicality) versus the extent to which people evaluate their appearance as less indicative of having Māori ancestry (low Māori prototypicality).

key time period in the shaping of modern Māori identity is said to have occurred in the middle of the 20th century, where there was a mass migration away from (rural) ancestral lands to urban areas for economic opportunities (Taonui, 2012). This transition meant that assimilation of Māori into Pākehā culture became a reality of Māori life for some. For example, it was official policy to 'pepper pot' state housing (meaning dispersing Māori families throughout Pākehā ones). Additionally, speaking *te reo* Māori in schools became a punishable offense and the amount of land owned by Māori shrunk to the point that the remaining Māori-owned lands could only support one quarter of the Māori population (Belgrave, 2005; Walker, 1990). The distinction between rural and urban Māori was pronounced through this time in history as many who resided in urban areas adapted to Pākehā culture as they had reduced access to Māori cultural resources. Whereas rural Māori were said to still be engaged in *Te Ao Māori,* or the traditional Māori world/way of life (Houkamau, 2006, 2010).

However, these events led to 'the Māori Renaissance', a phrase used to refer to a period in New Zealand history from approximately the late 1960s through until the 1990s where Māori fought back against the forces of assimilation (Derby, 2014; Taonui, 2012). As a consequence, the Government responded with policies promoting Māori culture and biculturalism, and established the Waitangi Tribunal to address Treaty violations (Belgrave, 2005; Derby, 2014). The urbanization that contributed to a weakening of traditional Māori identity (Durie, 1994; Houkamau, 2006, 2010) also aided in the creation of this movement, as over the years, Māori became more concentrated in urban centers (Taonui, 2012).

Although, through this period Māori culture became more easily accessible to urban Māori than it had in the past, there still remains the possibility that Māori from rural areas have different conceptualizations of Māori identity than urban Māori. That being said, recent research with the MMM-ICE2 has found no differences between the urban/rural divide across common patterns of Māori identity (Greaves, Houkamau, & Sibley, 2015). In contrast, Chapple (2000) argues that the urban/rural divide exists and now may be more of a class distinction comprising an urban, educated, working class of Māori, versus rural Māori that have few employment prospects. Other research has found that there are differences in health risk factors across rural and urban Māori (Hodgkin, Hamlin, Ross, & Peters, 2010; Robson, Cormack, & Purdie, 2010), including that urban Māori youth are at a higher risk of developing depression (Clarke, & Jensen, 1997). Therefore, due to the possible different experiences that rural and urban Māori may have, it is beneficial to test the measurement equivalence of the MMM-ICE2 over this divide.

Gender

Life experiences and how people perceive one another typically differ depending on one's gender; of course this is no different for the experiences of Māori. Although, research using the MMM-ICE2 rarely finds gender differences across the scale. The most thorough investigation of gender differences being Sibley and Houkamau's (2013) examination of the stability of the scale across the lifespan by gender. They used item response theory to check if there were scale reliability differences between people, and at different levels of the dimensions. The MMM-ICE2 tended to be most precise at the mean level range of each dimension, but each dimension showed an acceptable level of reliability across the scale. Importantly, across genders the results were reasonably similar.

While there is little quantitative work focusing on Māori women's identity, a body of qualitative work recognises that Māori women's experience and identity have been greatly shaped by their gender. Work completed under the mana wahine framework of kaupapa Māori research challenges the idea that women have held, or hold, a lower status position in Māori society (Pihama, 2001). Mana wahine provides a framework for research that acknowledges issues that impact specifically on Māori women and girls (Pihama, 2001; Simmonds, 2011). For example, experiences of reproduction alone are inherently life- and identity- shaping for Māori women (Le Grice, 2014). Thus, although there is little quantitative research on Māori identity and gender, extant research, combined with the qualitative and theoretical literature suggest that gender is an important category to assess the MMM-ICE2 across.

Age

Historical events have been found to be very influential in shaping Māori identity. Houkamau (2006, 2010) showed that identity is linked to socio-historical contexts in that cultural, social, political and historical processes shape identity over time and across generations. As such, age cohort groups may have had very different experiences relating to their identities. Houkamau (2006, 2010) interviewed 35 Māori women, and found that three key periods of events in New Zealand history were salient in their descriptions of identity. These three key periods of events influenced the identity development for these three distinct age cohort groups. Firstly, there was an older group who felt positive about their Māori Identity and engaged in the traditional Māori world. Secondly, there was a middle-aged group who grew up in a time when Māori Identity was devalued, who struggled to form a sense of identity, and felt removed from their culture. This group were the least likely to feel that they could confidently rebut racism and negative views of Māori. Thirdly, there was a younger group who grew up during the Māori Renaissance, and so were able to learn how to act competently as Māori and were also able to navigate a colonised or 'Pākehā' world.

Quantitative research has also shown age differences in Māori identity, although it is as yet unclear whether these were cohort effects or if identity changes as one ages. Sibley and Houkamau (2013) investigated the stability of the MMM-ICE2 across the lifespan and found that older people tended to have higher scores across MMM-ICE2 dimensions. Greaves and colleagues (2015) also found that those with an enculturated (higher scoring) identity profile tended to be older. Thus, keeping in mind the historical influences on identity and the higher level of identification that past research has found with older people, age may have an influence on MMM-ICE2 scale scores. Therefore, we aim to test the measurement equivalence of the MMM-ICE2 across three age cohorts

based on Houkamau (2006, 2010): those aged under 40 (post-Māori Renaissance and may have benefitted from policies for increased biculturalism), 41-54 (formative years during the Māori Renaissance) and over 55 (pre-Māori Renaissance).

Sole and Mixed Māori

Another key variable that influences ethnic identity is whether one identifies solely as Māori or also identifies with another ethnicity (typically Pākehā). In 1974, being officially 'Māori' first legally moved beyond a Western blood-quantum based framework, which assumes that Māori identity and culture have a strict biological basis, to one of identification and affiliation (Cormack & Robson, 2010; Durie, 1994; Kukutai, 2004). A blood-quantum based system meant that one had to have a minimum level of Māori ancestry to identify as Māori. For example, one had to be at least half Māori (i.e. have one Māori parent) to identify their ethnicity as Māori. However, post-1974 anyone with *whakapapa* (with a Māori ancestor) could be counted officially as Māori on birth certificates and documentation, on the electoral roll (from 1975), and on the census if they wished (from 1986). Even though, in reality, Māori had been doing this for years (Durie, 1994). The 1991 national census even allowed people to identify with their *iwi* and distinguished between a) having a Māori ancestor and b) choosing to identify as Māori under ethnicity (including mixed- and sole-Māori). These changes to the official conception of ethnicity in New Zealand meant that being Māori moved from being about the Western and outdated concept of 'race' and toward ethnic identity or affiliation.

In the present day one in seven New Zealanders (14.9%) identify as Māori (although a further 100,000 New Zealanders report Māori ancestry but do not identify as Māori), with almost half (46.5%) of these individuals identifying solely as Māori (Statistics New Zealand, 2013). The experiences of mixed and sole identified Māori may differ as those who identify with another ethnicity may be able to draw upon the 'cultural resources' of the other ethnicity (Houkamau & Sibley, 2014). This effect is particularly pronounced for those who also identify as Pākehā, who are the majority of the population in New Zealand. These individuals may have a broader repertoire of psychosocial resources that can help them interact effectively with Pākehā and Māori (Houkamau & Sibley, 2014; Kukutai, 2007, 2013; Kukutai & Callister, 2009; Kukutai & Zealand, 2008; Muriwai et al., 2015).

As a result, research has found differences between sole-identifying and mixed- identifying Māori. It may be due to higher levels of racism that sole-identified Māori are more likely to experience exclusion (Houkamau & Sibley, 2015a; Nairn & McCreanor, 1991; Pihama, 2001; Thomas & Nikora, 1996) which can lead to a range of negative psychological outcomes (Houkamau & Sibley, 2014; Muriwai et al., 2015). Houkamau and Sibley (2014) have also shown that mixed and sole identifying Māori differ in some political attitudes: sole identifying Māori showed higher support for the Māori party, more warmth towards Māori and more support for policies benefitting Māori (Houkamau & Sibley, 2014). Due to these consistent findings of differences between sole- and mixed-identifying Māori over a range of outcomes, it is important to test the measurement equivalence of the MMM-ICE2 across these groups.

Testing Measurement Equivalence

A key goal in the development of the MMM-ICE was to create a scale to assess one's subjective Māori identity. Māori, however, are a diverse and changing group. In earlier Māori identity research, Durie (1995) recognized this as a key assumption when creating a Māori identity scale for the Te Hoe Nuku Roa study of Māori households. Furthermore, research with the MMM-ICE2 has also shown that Māori identity can be expressed in a number of diverse patterns (Greaves et al., 2015). This previous research highlights the need to test the factor equivalence of the MMM-ICE2 over a diverse number of groups within Māoridom to ensure that the scale can serve each sector of the Māori community equally. For example, if Māori residing in rural areas interpret items from the MMM-ICE2 differently to those who reside in cities/urban areas then the sub-scales are referring to different concepts. Meaning, that the whole point of the scale – to measure certain factors within, and specific to, Māori ethnic identity – is compromised. Manuela and Sibley (2015b) liken this to the problems researchers have using Western scales, like self-esteem, across different cultural contexts and languages. That is, the scale could potentially lose its meaning when items do not 'translate' across contexts and therefore the scale may not actually measure the construct that researchers had intended to measure.

A Multigroup Confirmatory Factor Analysis (MCFA) extends typical Confirmatory Factor Analysis (CFA) and tests factorial equivalence by estimating a CFA model for separate groups at the same time. This allows the researcher to test measurement equivalence (sometimes called measurement invariance) or whether the scale assesses the same constructs across the different groups (for more on MCFA see Cheung & Rensvold, 2002; Steenkamp & Baumgartner, 1998; for a review of measurement invariance see Vandenberg & Lance, 2000). In our case, one model we aim to test is the MMM-ICE2 across age cohort groups. Thus, we would estimate fit across the three theoretically different *a priori* specified age categories (40 and under, 41-54, and 55 plus), the goal being that the model fits equally well across groups. There are three levels at which this can be assessed: configural, metric, and scalar equivalence (see Milfont & Fischer, 2015).

Configural equivalence is the least conservative measure of factor equivalence. A key purpose of configural equivalence is to establish a baseline model for more stringent tests of measurement equivalence (Vandenberg & Lance, 2000). Good configural equivalence would indicate that different groups are interpreting the construct the researcher is testing for in the same way, or that the items are measuring the same underlying concepts across groups. If researchers do not find configural equivalence, then the measure represents different constructs in different groups, and so it becomes pointless to assess metric or scalar equivalence (Vandenberg & Lance, 2000). In MCFA, the test of metric equivalence examines the extent to which the factor loadings are the same across the groups. Metric

equivalence assesses whether the strength of the relationship between the indicators (Likert items, in our case) and the underlying latent construct are the same across different groups. If the tests of metric equivalence are satisfied then the groups can be compared with the confidence that the measurement units (in our case, the intervals of the Likert scale) are comparable across groups.

The third and most demanding test of factorial equivalence is that of scalar equivalence. Scalar equivalence extends the other model by estimating the extent to which the intercepts for the indicators are similar across groups. To return to our example of testing the scale across age cohorts, scalar equivalence would tell us if the mean scores (intercepts) of the different survey items are comparable across everyone regardless of age. For example, two people from different age groups (e.g., one under 40 and one aged 55 plus) have conceptually the same level of belief in the continued importance of the Treaty of Waitangi and both actively stand up for Māori political rights (indexed as part of the MMM-ICE2 by the subscale/construct of Socio-Political Consciousness). These two individuals should have a similar mean score on any given question in the Socio-Political Consciousness subscale. In other words, we would hope that the average construction of Māori identity for one group is not dramatically different from another when using the MMM-ICE2 scale, except when there are real mean differences between groups.

Overview

In this paper we aim to test the measurement equivalence of the MMM-ICE2 with four Multigroup Confirmatory Factor Analyses looking across the urban/rural divide, gender (male or female), three age cohort groups (under 40, 41-54, and 55+) based largely on work by Houkamau (2006, 2010), and sole-Māori or mixed-Māori ethnic identification. Additionally, this paper presents the first Confirmatory Factor Analysis of the MMM-ICE2 (revised) scale. The MMM-ICE2 is a scale of Māori identity that was created based on the recognition that Māori are a broad and diverse group (Houkamau & Sibley, 2010). As such, we hypothesise that the MMM-ICE2 will display fairly good measurement equivalence across all groups.

Method

Participant Details

Participants were 436 women, 260 men with a mean age of 44.01 (*SD*=13.03; note that sample sizes varied across analyses due to missing data). We sampled participants that identified as Māori, however, 55% also identified as Pākehā (NZ European; *n*=383), 5.6% as Pasifika (*n*=39), 1.3% as Asian (*n*=9), and 1.4% as another ethnicity (*n*=10). Participants were asked if they identified with a religion or spiritual group, 44.4% of the sample identified as religious (*n*=309). In regards to education, 25.1% did not report their highest level of education or reported no education (*n*=175), 33.3% reported at least some high school (*n*=232), 18.0% reported having studied towards a diploma or certificate (*n*=125), 17.1% reported having studied at the undergraduate level (*n*=119), and 6.5% reported having pursued post-graduate study (*n*=45).

Participants' postal addresses were used to identify the levels of material deprivation for each participant's immediate neighbourhood area based on census data (Atkinson, Salmond, & Crampton, 2014). The sample had a mean NZ Deprivation 2013 score of 6.77 (*SD*=2.78). The index is decile ranked (each unit represents 10% of the population) from 1 to 10 (low-high), therefore a mean score of 6.77 indicates a moderate level of deprivation relative to others in New Zealand. We also used participant addresses to determine whether each participant lived in either a rural or urban unit as defined by the Local Government Act 2002 (Statistics New Zealand, 2014). People living in urban areas constituted 52.8% of the sample (*n*=366), and those in rural areas were 47.2% of the sample (*n*=327).

Sampling Procedure

As part of the Time 4 New Zealand Attitudes and Values Study (NZAVS) sampling design, we included a booster sample aimed specifically at recruiting Māori participants (Frame 5 of the Time 4 NZAVS). This sample frame consisted of 9,000 people randomly selected from those who indicated on the 2012 Electoral Roll that they were of Māori descent. A total of 690 participants responded to this booster sample.

Adjusting for the overall address accuracy of the electoral roll as a whole, this represents a response rate of 7.78%. It should be noted that this response rate is lower than that observed for the main (full random probability) sample frames used in the NZAVS, which give responses rates of up to approximately 16%. The low response rate for this sample likely indicates many factors, among the most influential being the overall reduced likelihood of Māori participants to respond to postal surveys in general, combined with the possibility that contact details for Māori in the electoral roll may, on average, have a lower level of accuracy. It is likely that this relatively low response rate was also partially affected by the fact that people were opting into a 15-year longitudinal study. Thus, providing their contact details indicated that they were willing to be contacted by us to complete similar questionnaires for the next 15 years.

The questionnaire administered to the NZAVS Māori booster sample was similar in format and content to the standard NZAVS questionnaire, except it included questions specifically designed for Māori, and the cover letter introduced the survey as a "The NZAVS – Māori Identity Focus Questionnaire." The lead researcher and point of contact for this sample frame was of Māori descent, and was introduced to participants in the cover letter by listing *iwi* affiliations. Participants were informed that they had been randomly sampled for this study from among those who indicated that they were of Māori descent on the electoral roll.

Questionnaire Measures

Participants completed the full 54 item MMM-ICE-Revised including reverse-scored items and subscales for all seven subscales (Houkamau & Sibley, 2015a). A full copy of the scale is presented in the Appendix. Group Membership Evaluation (GME) was assessed by eight items (α=.843), example items include "I love the fact I am Māori" and "Being Māori is NOT important to who I am as a person" (reverse coded). The Cultural Efficacy and Active Identity Engagement (CEAIE)

subscale also used eight items (α=.858), including "I can't do Māori cultural stuff properly" (reverse coded). The subscale for Interdependent Self-Concept used seven items (α=.810) including "My Māori identity is fundamentally about my relationships with other Māori" and "My relationships with other Māori people (friends and family) are what make me Māori". Spirituality was assessed using eight items (α=.810), for example "I feel a strong spiritual association with the land" and "I don't believe in that Māori spiritual stuff" (reverse coded). We looked at Socio-Political Consciousness by using eight items (α=.882) including the items "I stand up for Māori rights" and "Māori would be heaps better off if they just forgot about the past and moved on" (reverse coded). Authenticity Beliefs were assessed by using the eight item scale (α=.603) including items like "You can tell a true Māori just by looking at them" and "Real Māori put their whānau first". The final dimension, Perceived Appearance was assessed with seven items (α=.918), examples include: "You only need to look at me to see that I am Māori".

Analytic Approach

We conducted four separate Multigroup Confirmatory Factor Analyses (MCFA), assessing the configural, metric, and scalar equivalence of the MMM-ICE2 for Māori across different demographic factors. The four demographic factors we examined were:

(a) Urban Māori versus rural Māori.

(b) Women and men.

(c) Broad age cohorts (40 years and under, 41-54 years, and 55 years and over).

(d) Sole-identified Māori versus Māori who identify with a least one other ethnic group.

We estimated these models using Maximum Likelihood with Robust error estimation (MLR) using *MPlus* 7.3. MLR is a maximum likelihood estimator that means the standard errors and chi-square test statistic are robust to non-normality and non-independence of observations (Muthén & Muthén, 2012). For each demographic, we first conducted standard CFAs separately for each subgroup (e.g., separate CFAs of the MMM-ICE2 for Māori men, and another for Māori women), and then a MCFA assessing the configural, metric and scalar equivalent of the MMM-ICE2 in a model directly comparing these groups (e.g., a MCFA comparing the solution for Māori men and women).

Results

Table 2 presents fit indices for CFAs assessing each group within each model is examined independently (e.g., a model for men, a model for women), and also the configural, metric, and scalar tests for each model directly comparing groups (e.g., comparing men and women). We present the results for both the independent CFAs and MCFA for the purposes of completeness, so that interested readers have information that can inform their use of the scale both in a specific population of Māori (e.g., Māori men, or Māori of a certain age), as well as the equivalence of the scale access different demographic groups.

For interpretation of model fit we present measures of exact fit: model χ^2, and indicators of relative fit: the Tucker-Lewis Index (TLI), the Comparative Fit Index (CFI), the Root Mean Squared Error of Approximation (RMSEA), and the Standardised Root Mean Square Residual (SRMR). We present a variety of indices of relative fit as model χ^2 alone is not an appropriate assessment of model fit, and recommendations advocate the presentation of a range of fit indices (Bentler, 2007). This is because χ^2 is an indicator of *exact fit*: one's test is either significant (the model does not fit) or not (the model does fit) and because we have sample sizes over 200 χ^2 will always be significant (Barrett, 2007). Due to this limitation we additionally present indicators of relative fit: the TLI, CFI, RMSEA, and SRMR. Relative fit measures tell the researcher not whether the model fits exactly, but whether the level of fit in a model is acceptable.

Table 2
Fit indices for Standard and Multigroup CFAs assessing the equivalence of the MMM-ICE2 across different groups.

	N	x^2	*df*	TLI	CFI	RMSEA	SRMR
Standard CFAs							
Overall model	678	5004.69	1356	.795	.806	.063	.074
Regional Models							
Urban	315	3543.51	1356	.744	.757	.072	.087
Rural	360	3365.38	1356	.791	.802	.064	.074
Gender Models							
Women	428	2920.27	1356	.765	.777	.066	.083
Men	250	2772.51	1356	.807	.818	.065	.072
Age Models							
40 and under	271	2908.74	1356	.807	.817	.065	.075
41-54	186	2670.49	1356	.739	.753	.072	.088
55+	221	2695.81	1356	.714	.729	.073	.095
Ethnicity Models							
Sole	305	3453.95	1356	.672	.689	.071	.104
Mixed	373	3166.15	1356	.823	.832	.060	.067
Multigroup CFA							
Regional Model							
Configural model	675	6307.43	2712	.770	.782	.063	.080
Metric model		6328.04	2759	.776	.784	.062	.081
Scalar model		6383.69	2806	.779	.784	.061	.081
Gender Model							
Configural model	678	6110.77	2712	.784	.796	.061	.079
Metric model		6167.88	2759	.787	.795	.060	.081
Scalar model		6304.97	2806	.786	.790	.061	.082
Age Model							
Configural model	677	8067.16	4068	.760	.772	.066	.085
Metric model		8179.29	4162	.764	.771	.065	.087
Scalar model		8438.86	4256	.760	.762	.066	.088
Ethnicity Model							
Configural model	678	6045.70	2712	.767	.779	.060	.086
Metric model		6208.25	2759	.763	.771	.061	.088
Scalar model		6366.07	2806	.759	.764	.061	.090

However, finding an exact cut-off value for relative model fit is difficult (as it depends on a number of factors; Hu & Bentler, 1998; Marsh, Hau, & Wen, 2004) and well-contested (and perhaps in contrast to the point of "relative" fit; Barrett, 2007; Bentler, 2007; Hayduk, Cummings, Boadu, Pazderka-Robinson, & Boulianne, 2007; Marsh et al., 2004). Standard guidelines or 'rules-of-thumb' generally recommend that an RMSEA of less than .08 indicates acceptable model fit and an RMSEA of less than .05 indicates excellent fit (Marsh et al., 2004). For SRMR, Hu and Bentler (1999) have reported a standard 'rule-of-thumb' of less than .08 is generally desirable. They also propose that CFI and TLI should be greater than .95, but a CFI and TLI greater than .90 may also indicate a reasonable model.

As can be seen in Table 2, the overall CFA model provided reasonable fit across the whole sample (χ^2(1356, N=678)=5004.69, p<.001, TLI=.795, CFI=.806, RMSEA=.063, SRMR =.074). Additionally, the independent CFAs for each group across each test also indicated that the MMM-ICE2 fits reasonably well when examining each group independently. The configural models for the MCFAs for region (χ^2(2712, N=675)=6307.43, p<.001, TLI=.770, CFI=.782, RMSEA=.063, SRMR =.080), gender (χ^2(2712, N=678)=6110.77, p<.001, TLI=.784, CFI=.796, RMSEA=.061, SRMR =.079), age groups (χ^2(4068, N=677)=8067.16, p<.001, TLI=.760, CFI=.772, RMSEA=.066, SRMR =.085), and sole versus mixed Māori (χ^2(2712, N=678)=6045.70, p<.001, TLI=.767, CFI=.779, RMSEA=.060, SRMR =.086) performed reasonably well. Although, the SRMR for both the age groups and ethnicity models was above the .08 generally recommended for acceptable fit. The TLI and CFI were also below the recommended .90 cut-off.

Additionally presented in Table 2 are the results for the metric models. Metric equivalence is attained if the factor loadings are the same across groups. The results for the metric models are as follows: for region (χ^2(2759, N=675)=6328.04, p<.001, TLI=.776, CFI=784, RMSEA=.062, SRMR =.081), gender (χ^2(2759, N=678)=6167.88, p<.001, TLI=.787, CFI=.795, RMSEA=.060, SRMR =.081), age groups (χ^2(4162, N=677)=8179.29, p<.001, TLI=.764, CFI=.771, RMSEA=.065, SRMR =.087), and sole versus mixed Māori (χ^2(2759, N=678)=6208.25, p<.001, TLI=.763, CFI=.771, RMSEA=.061, SRMR =.088). Again, no models had a TLI or CFI higher than the .90 cut-off value. Additionally, the SRMR for the age and ethnicity models were again well above .08.

The results for our third and most stringent test of the measurement equivalence of the MMM-ICE2 are also presented in Table 2. Recall that scalar equivalence assesses the similarity of the intercepts for each item across groups. The results for the scalar models are as follows: for region (χ^2(2806, N=675)=6383.69, p<.001, TLI=.779, CFI=.784, RMSEA=.061, SRMR=.081), gender (χ^2(2806, N=678)=6304.97, p<.001, TLI=.786, CFI=.790, RMSEA=.061, SRMR =.082), age groups (χ^2(4256, N=677)=8438.86, p<.001, TLI=.760, CFI=.762, RMSEA=.066, SRMR =.088), and sole versus mixed Māori (χ^2(2806, N=678)=6366.07, p<.001, TLI=.759, CFI=.764, RMSEA=.061, SRMR=.090). As with the configural and metric models, the scalar models for ethnicity and age had SRMR values higher than the desired .08. Again, the TLI and CFI values for each model were lower than the desired .90.

We then tested for differences in model fit for each group comparison using chi-square difference tests and change in CFI. When assessing model fit we assessed the metric against the configural model, then the scalar against the configural model. We conducted chi-square difference tests. In these tests if the more restrictive model (e.g. scalar), is significantly different from the less restrictive one (e.g. metric), then the model does not fit as well. Additionally, Cheung and Rensvold (2002) propose that fit can be assessed incrementally with change in CFI across these models: if ΔCFI is less than .01 the more restrictive model can be accepted.

For region, the metric against configural model ($\Delta\chi^2$(47)=28.17, p=.987; ΔCFI=.002), the scalar against configural model ($\Delta\chi^2$(94)=76.43, p=.907; ΔCFI=.002), and the scalar against metric model ($\Delta\chi^2$(47)=50.33, p=.343; ΔCFI=.000) did not significantly differ in fit and ΔCFI was below the <.01 threshold. For gender, the metric and configural model did not significantly differ in fit ($\Delta\chi^2$(47)=59.37, p=.106; ΔCFI=.001). The scalar and configural model ($\Delta\chi^2$(94)= 193.77, p<.001; ΔCFI=.006), and the scalar against the metric model ($\Delta\chi^2$(47)=140.60, p<.001; ΔCFI=.005) results indicated that the more restrictive measurement equivalence models did not fit as well as the metric model. However, when assessing ΔCFI, the differences were below .01, indicating that the more restrictive models can be accepted in both cases.

We found when testing both age cohort and sole versus mixed Māori, the more restrictive models significantly differed from the fit of the less restrictive metric models. For the age cohorts there were significant differences for the metric against configural ($\Delta\chi^2$(94)=120.32, p=.035; ΔCFI=.001), scalar and configural ($\Delta\chi^2$(188)= 371.73, p<.001; ΔCFI=.010), and the scalar against metric models ($\Delta\chi^2$(94)=264.28, p<.001; ΔCFI=.009). However, the ΔCFI for each comparison came in equal to or below the <.01 guideline indicating that the more restrictive models can be accepted in this case, although ΔCFI for the configural versus scalar comparison was .01.

The results were similar for sole versus mixed Māori. There were significant differences for the metric against configural models ($\Delta\chi^2$(47)=155.07, p<.001; ΔCFI=.008), the scalar and configural models ($\Delta\chi^2$(94)= 316.10, p<.001; ΔCFI=.015), and the scalar against metric models ($\Delta\chi^2$(47)=161.76, p<.001; ΔCFI=.008). However, when using ΔCFI as an indicator of model fit, the metric versus configural and configural versus scalar models were under the <.01 guideline. The threshold of ΔCFI <.01 was not met when comparing the configural model to the most restrictive scalar model, with the change being .015.

Discussion

The MMM-ICE2 is a scale that purports to measure subjective Māori ethnic identity in a scale specific to Māori. However, Māori are a diverse group, which may present problems for any scale wishing to capture the

multiplicity of Māori identity (Durie, 1994; Greaves et al., 2015). Thus, we aimed to answer the questions: does the MMM-ICE2 measure the same concepts across all Māori? Even across such diverse groups as urban Māori, rural Māori, Māori men, Māori women, young Māori, older Māori, those solely-identified as Māori, and bi-/multi-ethnic identifying Māori? As such, we conducted several Multigroup Confirmatory Factor Analyses to test measurement equivalence across these groups.

Our results showed that the scale performed well across region (urban or rural) and gender (female or male), the only exception being that the region and gender models did not reach the .90 guideline for TLI or CFI at any point. However, it bears keeping in mind that TLI and CFI may have been sensitive to the large number of items on the scale (Cheung & Rensvold, 2002). The ethnicity (sole or mixed identifying Māori) and age (40 and under, 41-54, and 55 plus) models again did not meet the .90 recommended for TLI or CFI, and had an SRMR higher than the recommended .80. Additionally, when comparing the configural (base) model and the most conservative scalar models, the results were just over the guideline for ethnicity and right on the rule-of-thumb value for age. This indicates two areas where the scale could have performed better. Our results suggest that the intercepts for the indicators are not similar across these groups. When examining the CFA results, the key weaker areas for the MMM-ICE2 was the comparison between older Māori and sole identifying Māori, and the comparison between age groups.

To put this in practical terms, those who are older (when compared to the younger age groups), or those who vary across ethnic affiliation, may have conceptually the same level of identification with a MMM-ICE2 domain, but a different mean score on an item across groups. For example, across age groups people may conceptually, equally agree with the item "Being Māori is cool" however, they may have a different mean score on this item due to a variety of possible reasons. The result is that any mean differences found across groups, across items, may not be related to there being a real difference in scores. Therefore, if someone were to conduct research exploring age differences or differences between sole- and mixed-Māori in a domain of the MMM-ICE2, there is a possibility some of the differences found could be attributed to measurement invariance. However, in both cases these comparisons fell barely short of the guideline we used for model fit (change in CFI). Additionally, in future, those working with the MMM-ICE2 should also try to replicate our results in an independent sample of Māori as intercepts, and therefore scalar invariance, may be sample-specific (Vandenberg & Lance, 2000). Generally, the results of our analyses should provide confidence to researchers that the MMM-ICE2 can continue to be used as a scale to measure Māori identity across broad and diverse samples of Māori.

It is also important to keep in mind that the Māori population is youthful compared to the non-Māori population (Statistics New Zealand, 2013). As such representative samples of Māori tend to have lower rates of people over 55 (or older: only around 5% of the Māori population is over 65; Statistics New Zealand, 2013) compared to samples of the general population. Further, younger people may be more familiar with the format and goals of surveys. It could be interesting to test measurement equivalence with a sample of Māori over time (Vandenberg & Lance, 2000) to explore whether the slight measurement invariance we found here is a cohort effect, i.e. whether it is due to a feature of this cohort of older Māori, or whether these effects for equivalence change as people age. Additionally, future studies examining the scale properties of the MMM-ICE2 could explore the particular items that were invariant (Byrne, Shavelson, & Muthén, 1989).

There remains the possibility that a couple of key things are missing from this examination of the MMM-ICE2 scale, and this sample used to test the MMM-ICE2 more generally. While the MMM-ICE2 purports to be a scale of Māori identity, there is the possibility that some unexamined part of Māori identity is not measured in the scale. This would mean that the scale is not a complete picture of Māori identity and can be remedied with improvements and feedback over time (like the addition of the Perceived Appearance dimension in the MMM-ICE2; Houkamau & Sibley, 2015a). Another limitation is the relatively low response rate to the survey (7.78% when electoral roll address accuracy adjusted). Participants were opting into a 16 year longitudinal survey and this may have been off-putting. However, survey response rates have been dropping over time and the effect is particularly pronounced for Māori (see Fink, Paine, Gander, Harris, & Purdie, 2011; Sibley 2014). This low response rate may mean that the sample tested here was biased in some way.

One problem is that we cannot know if our sample differs in views or identity to non-respondents, although, the sample look reasonably representative compared with census data on the Māori population (notwithstanding gender; Sibley, Muriwai, & Greaves, 2014). However, it may be that there is a group of Māori who are resistant to surveys, a Western concept that they may view as being linked to the Government. Additionally the survey was only sent in English and not *te reo* Māori. This may be the case, considering that the model did not fit as well for sole-identifying and older Māori, groups who may speak *te reo*. Alternatively, there may have been problems with address accuracy – it may be that some aspect of Māori identity predicts moving house more often and we have missed an important group – or we may have missed a group of more economically deprived Māori. However, these are all speculative, and we hope to follow up on these ideas with future analyses.

A key future research direction for the MMM-ICE2, however, is to collect longitudinal data. There are plans for a follow up Māori focus questionnaire in the next couple of years. This means that more complex, longitudinal models can be created to help us better understand how Māori identity may change over time. There is currently a need for research to discover how Māori identity may change with age, although extant research suggests that Māori may become more enculturated as they get older (Sibley & Houkamau, 2013; Greaves et al., 2015). Furthermore, collecting data from adolescent Māori, to both compare age groups and to examine scores as they age, are potential future research

directions. Here, we have found that the intercepts of the scale may vary by age, meaning that future research examining age and Māori identity will need to examine, and control for, measurement invariance. We hope that the groundwork laid in this paper allows for future longitudinal research to be conducted with relative confidence that the MMM-ICE2 is an efficacious measure of the broad, diverse group that are 'Māori'.

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Appendix

Table A1.
Item content for the MMM-ICE2 by dimension.

Group Membership Evaluation (GME)
1. I reckon being Māori is awesome.
2. I love the fact I am Māori.
3. Being Māori is cool.
4. I don't really care about following Māori culture.
5. I wish I could hide the fact that I am Māori from other people.
6. My Māori ancestry is important to me.
7. Being Māori is NOT important to who I am as a person.
8. Being Māori is NOT important to my sense of what kind of person I am.
Cultural Efficacy and Active Identity Engagement (CEAIE)
9. I don't know how to act like a real Māori on a marae.
10. I can't do Māori cultural stuff properly.
11. I can't do Māori culture or speak Māori.
12. I know how to act the right way when I am on a marae.
13. I'm comfortable doing Māori cultural stuff when I need to.
14. I have a clear sense of my Māori heritage and what it means for me.
15. I try to korero (speak) Māori whenever I can.
16. I sometimes feel that I don't fit in with other Māori.
Interdependent Self-Concept (ISC)
17. My relationships with other Māori people (friends and family) are what make me Māori.
18. I consider myself Māori because I am interconnected with other Māori people, including friends and family.
19. My Māori identity is fundamentally about my relationships with other Māori.
20. For me, a big part of being Māori is my relationships with other Māori people.
21. How I see myself is totally tied up with my relationships with my Māori friends and family.
22. My Māori identity belongs to me personally. It has nothing to do with my relationships with other Māori.
23. Reciprocity (give-and-take) is at the heart of what it means to be Māori for me.
Spirituality (S)
24. I believe that Tupuna (ancient ancestors) can communicate with you if they want to.
25. I don't believe in that Māori spiritual stuff.
26. I believe that my Taha Wairua (my spiritual side) is an important part of my Māori identity.
27. I can sense it when I am in a Tapu place.
28. I can sometimes feel my Māori ancestors watching over me.
29. I have never felt a spiritual connection with my ancestors.
30. I think Tapu is just a made up thing. It can't actually affect you.
31. I feel a strong spiritual association with the land.

Table A1 (continued).

Socio-Political Consciousness (SPC)	
1.	Māori would be heaps better off if they just forgot about the past and moved on.
2.	All of us, both Māori and Pākehā, did bad things in the past—we should all just forget about it.
3.	I'm sick of hearing about the Treaty of Waitangi and how Māori had their land stolen.
4.	I think we should all just be New Zealanders and forget about differences between Māori and Pākehā.
5.	I think that Māori have been wronged in the past, and that we should stand up for what is ours.
6.	What the European settlers did to Māori in the past has nothing to do with me personally. I wasn't there and I don't think it affects me at all.
7.	I stand up for Māori rights.
8.	It's important for Māori to stand together and be strong if we want to claim back the lands that were taken from us.
Authenticity Beliefs (AB)	
9.	You can always tell true Māori from other Māori. They're real different.
10.	I reckon that true Māori hang out at their marae all the time.
11.	True Māori always do karakia (prayer) before important events.
12.	You can tell a true Māori just by looking at them.
13.	Real Māori put their whānau first.
14.	To be truly Māori you need to understand your whakapapa and the history of your people.
15.	You can be a real Māori even if you don't know your Iwi.
16.	You can be a true Māori without ever speaking Māori.
Perceived Appearance (PA)	
17.	I think it is easy to tell that I am Māori just by looking at me.
18.	You only need to look at me to see that I am Māori.
19.	When people meet me, they often do not realize that I am Māori.
20.	I think it is hard to tell that I am Māori just by looking at me.
21.	I think it is clear to other people when they look at me that I am of Māori descent.
22.	People would never know that I am of Māori descent just by looking at me.
23.	People who don't know me often assume that I am from another (non-Māori) ethnic group.

The Function of Reward Sensitivity and Temporal Discounting in the Relationship between Risk and ADHD in Adults

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Objective: To explore risk behaviors in adults with ADHD, testing the possible mediating role of reward sensitivity and temporal discounting. Method: 66 adults (43 men, 23 women; 18-65 years) completed clinical interviews and self-report measures of ADHD symptoms, risk-taking behaviours/risky experiences and experimental measures of temporal discounting and reward sensitivity. Results: ADHD symptom severity in adults was significantly associated with self-reported life-time histories of risk-taking behaviours, including alcohol abuse, nicotine abuse, illicit drug abuse, and perpetration of violence; as well as experience of risky sexual situations and violence victimisation (all p values <0.05). The relationships between violence, nicotine use and ADHD symptom severity were significantly and differentially mediated by motivational variances (p values < .05), including temporal discounting and reward sensitivity. Conclusions: The results of this study suggest that motivational variances (reward sensitivity; temporal discounting) may provide a mechanism for understanding the greater risk of harm to adults with ADHD.

Keywords: ADHD; risk-taking; violence; motivation; reward, temporal discounting

Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is a developmental disorder that often persists into adulthood (Biederman et al, 2006), and is associated with a range of neurobehavioural difficulties including response inhibition and poor executive functioning (Nigg, 2005; Barkley et al., 2001; Sergeant et al., 2002). One focus of research in this area has been on adverse outcomes associated with ADHD, in particular high-risk behaviour. Research suggests that children and adolescents with ADHD engage in more high-risk behaviours such as dangerous alcohol and drug use (Biederman et al., 1998) and that they are at an increased risk of accidental injuries, such as burn injuries and traumatic brain injuries (Mangus et al., 2004; Merrill et al., 2009). However, significant research gaps exist regarding the extent to which individuals with ADHD are exposed to greater risk of injury or harm in adulthood. A limited number of studies have indicated that adults with ADHD may engage in a higher frequency of substance abuse, smoking (Pomerleau et al., 2003; Biederman et al., 2006), sexual risk taking (Barkley and Gordon, 2002) dangerous driving (Barkley et al., 2005) and suicide and self-harm (James et al., 2004; Taylor, Boden, & Rucklidge, 2014). A key question arising from the literature is the extent to which neurobehavioural features of ADHD may contribute to increasing levels of risky behaviour.

A Neurobehavioural Model of ADHD

Sonuga-Barke et al (2003) present a theoretical model of neurobehavioural factors in ADHD. In this model, there are two pathways by which neuroanatomical differences amongst persons with ADHD result in ADHD typical behaviour; executive dysfunction; and motivational variance (failure of response inhibition). The implications of this model is that while there may be two different pathways, these pathways result in similar behaviour

In terms of empirical support for the executive dysfunction pathway, significant associations between ADHD and executive functioning domains have been repeatedly found (Sergeant et al., 2002) and are often implicated as playing a role in the formation and maintenance of ADHD-typical behaviours. In this way executive dysfunction is one neurobehavioural factor that serves as an etiological pathway between genetic, environmental, neurochemical and neuroanatomical factors and the behavioural phenotypes of ADHD (Tripp & Wickens, 2009). Sonuga-Barke and colleagues (2003) argue that executive dysfunction amongst individuals with ADHD leads to behavioural disinhibition, which in turn leads to ADHD-typical behaviours.

Failure of response inhibition is a second area of neurobehavioural functioning (parallel to executive functioning) thought to affect individuals with ADHD (Nigg, 2005). Sonuga-Barke et al (2003) have hypothesized that as a result of functional differences in the reward circuits of the amygdala and the ventral striatum, individuals with ADHD tend to have steepened delay of reinforcement gradient. The behavioural effects of this steepened gradient may include: a) a higher preference for immediate gratification; and/ or b) a tendency towards temporal discounting. The authors also suggested that these

reward circuits may have a differential effect on those with ADHD resulting in two related but distinct subtypes: one in which there is a greater difficulty with behavioural disinhibition and another subtype characterised by difficulty with temporal discounting.

Reward Sensitivity

A consistent research finding is that individuals with ADHD tend to show a greater preference for immediate gratification than controls (Tripp & Wickens, 2009). For example, Tripp and Alsop (2001), in a study comparing children with ADHD with controls, found that children with ADHD demonstrated a bias toward an immediate reward rather than a delayed reward, whereas this pattern was not observed in controls. Luman et al (2012), in a questionnaire validation study, reported similar findings, with children with ADHD preferring immediate to delayed rewards.

On the basis of these findings, it could be argued that individuals who tend towards immediate gratification may be more likely to engage in behaviours that have an immediate, tangible reward (such as drug use) but higher levels of negative consequences over time. Unsurprisingly, behaviours that are associated with preference for immediate gratification or behavioural disinhibition, such as gambling and drug use, are also more likely to occur among individuals with ADHD (Breyer et al., 2009; Barkley et al., 2001; Dai et al., in press).

Temporal Discounting

A related consequence of the association between ADHD and a shortened delay gradient is a greater tendency towards temporal discounting (Sonuga-Barke et al, 2003), defined as a tendency to disregard distal rewards and overvalue more immediate rewards (Barkley et al, 2001). For example, an individual may discount the larger long-term rewards associated with investing money, preferring instead to focus on the lesser but immediate reward of spending the money in the present. It has been suggested that individuals with ADHD may correspondingly exhibit a kind of 'temporal blindness' regarding the significance of negative consequences (de Wit, 2009), which may unrealistically seem as though they will occur a very long time in the future, if at all.

Preference for immediate gratification and temporal discounting are often referred to as functionally equivalent to behavioural impulsivity (Sonuga-Barke et al., 2003; Barkley et al., 2001), a core characteristic of ADHD. Impulsivity has in turn been repeatedly suggested as an underlying mechanism of risk-taking behaviours such as drug abuse (e.g. de Wit, 2009), problematic drinking (e.g. Vuchinich & Simpson, 1998), violence and aggression (DeWall et al, 2007) and sexual risk-taking (Tapert et al., 2001).

The present study

A largely unexamined question in the literature relates to the possible neurobehavioural mechanisms of the relationship between ADHD symptomatology and risk. For example, it could be argued that the associations between ADHD and risk may be due to intervening variables such as level of impulsivity. A model of a deficit in response inhibition, comprised of executive and motivational dysfunction, may serve to explain some of the behavioural characteristics of ADHD (in particular, impulsivity, inattention and reward seeking). These behaviours may result in a higher rate of risk-taking behaviours among individuals with ADHD.

Against this background, the aims of the present exploratory study were to examine linkages between ADHD symptomatology and exposure to increased harm, using data from a case-control study of ADHD and outcomes in a sample of adults. It was hypothesized that higher levels of ADHD symptomatology would predict increased risk-taking behaviour and victimisation. We hypothesized that there would be both direct and indirect relationships from ADHD to risky behaviour/outcomes, via motivational variances including temporal discounting and reward sensitivity tendencies.

Method

Sample and Procedure

Sixty-six participants were recruited as part of a wide-ranging study of adult ADHD via a participant pool from existing studies at the University of Canterbury (New Zealand); advertisements on campus, in local media; and referral from community mental health treatment services. Exclusion criteria for the study were (a) IQ under 70; (b) a history of psychotic illness; (c) a history of significant traumatic brain injury; (d) diagnoses of pervasive developmental disorder; or (e) being unable to provide corroborating information for the ADHD assessment (e.g. parent or partner completed measures and/or recent clinical diagnosis of ADHD by a trained mental health professional).

Initial telephone interviews were used as a preliminary screen for inclusion/ exclusion criteria followed by a mailed participant pack, containing an information sheet, consent form and self-report screening tools. Those who met inclusion criteria were then invited to take part in face-to-face assessment interviews at the University of Canterbury. All participant interviews were conducted by senior postgraduate students or registered clinical psychologists in a postgraduate research block at the University Of Canterbury Department of Psychology. All participants received grocery or petrol vouchers as reimbursement for their time ($30). Interviewers completed the measures described below in two face-to-face interviews, lasting approximately roughly 2.5 hours per session. All participants (ADHD and control group) who completed the research received a complete psychological assessment report. The purpose of this report was for the outcome of the psychological assessment to be communicated to the participants' general practitioners and other health care providers, if so desired.

Of the participants, 26% were university students. Participants' mean age was 31.9 years (SD = 1.6). The research methods used in this study were approved by both the host university and regional Health and Disability ethics boards. Written consent was obtained from participants and parents/partners prior to interview, and reviewed to ensure that participants were fully informed. Parent/partner responses were obtained either by face-to-face interview, or were completed at home and mailed to the researchers.

Although the study consisted of two groups (those meeting criteria for adult

ADHD [n = 35; 23 males, 12 females] and those not meeting criteria [n = 31; 20 males, 11 females]), for the purposes of the present investigation the two groups were combined to form a single sample. Tests of group membership (ADHD/no ADHD) x covariate interactions were performed to ensure that the strength of association between covariates and outcomes did not differ across the two groups. In no case was a statistically significant interaction observed (all p values > .05).

Measures

ADHD Symptomatology

All participants were administered structured interviews using Conners' Adult ADHD Diagnostic Interview for DSM-IV (CAADID: Epstein et al. 2001) in order to assess ADHD symptomatology, as well as inclusion/exclusion criteria (via assessment of prior mental and physical health history). In addition, the Conners Adult ADHD Rating Scales (CAARS: Conners et al. 1999) was administered to both participants and an independent observer (usually a partner or friend) and used to screen for the presence of attentional difficulties as well as to assess severity (α = .86 to .92). In this study, a continuous predictor variable of ADHD symptomatology was derived from the severity scores of the CAARS Index G T-scores (ADHD DSM-IV Symptom Total). The average of the self-report and observer report scores was obtained to form an overall continuous measure of ADHD symptoms. As expected, this continuous variable is consistent with our dichotomous group variable as demonstrated by the high point biserial correlation between group membership and ADHD severity scores on the CAARS (r_(pb(64))=.85, p<.001). Participants were then grouped into a four-group independent variable (ADHD Severity) based on quartile ranking of the above score of ADHD symptomatology severity (<25%, 26-50%, 51-75%, 76%>). These quartiles were used as the independent variable in the analyses reported below for the purposes of reporting clarity (as noted below, parallel analyses using the continuous measure of ADHD produced analogous results).

Risk-Taking behaviours

The dependent variable of risk-taking comprised of five index scores from the Adult Risk Taking Questionnaire (ART-Q; personal safety, social violence, alcohol use, nicotine use and drug use) and one from the Sexual History Questionnaire (SH-Q: Cupitt, 1998). The ART-Q is a novel self-report questionnaire developed by the author that includes questions from the Youth Risk Behaviour Survey (YRBS; CDC, 2007). The YRBS is a questionnaire that is part of the Youth Risk Behaviour Surveillance System undertaken by the Centre for Disease Control and Prevention (U.S.A Government). All questions from the ART-Q used a Likert scale response format. As the YRBS is in the public domain, the CDC give permission for questions in the YRBS to be used and modified without condition. Questions from the YRBS was adapted for this study in two ways: firstly, the questions were expanded and modified to reflect risk-taking behaviours in *adulthood*: for example, the introduction to each question was changed from "During the last 12 months…" as used in the YRBS, to "From the time you turned 18…" in the ARTQ. Secondly, as the YRBS was developed for use with a North American sample, some changes were made to represent risk taking behaviour in a New Zealand context. For example, idiomatic language was removed or modified. The complete modified questionnaire used in this study contained 37 questions and took approximately 15 minutes to complete. The ART-Q results were divided into five Index (mean) scores: Personal Safety (questions address driving behaviour, dating violence, and self-harm; α=.70); Social Violence (α=.70); Alcohol use (α= .70); Nicotine use (α= .63); and Drug Use (α=.80). The overall internal consistency reliability of the ART-Q was found to be high (α= .89).

The Sexual History Questionnaire (Cupitt, 1998) is a self-administered 20-item questionnaire that assesses the degree to which an individual has engaged in recent sexual activity that increases the risk of contracting a sexually transmitted infection (STI), answered in a response format of "Yes", "No", or "N/A". The questionnaire includes questions regarding; the number of sexual partners within the past 6 months, the proportion of times that participants had unprotected sex, and whether participants had engaged in sexual activity with a partner that they believed may have been infected with an STI. Scores were calculated based on a sum of "Yes" responses. Cupitt (1998) measured the test-retest reliability of the test at 0.80 indicating a high level of reliability.

While Cupitt's (1998) original questionnaire referred to a time-frame of sexual activity within "the previous month" it was felt that this time frame was too short for this study, given the older average age of participants and the potentially lower frequency of sexual activity in general (Seidman & Rieder, 1994). For the purposes of the present investigation the time frame for the questionnaire was altered to "the past six months".

Potential Confounding Factors

Demographic Information

Demographic variables including age, gender, ethnicity, educational achievement, household income level and occupation were assessed. The occupational responses from all participants were converted into SES scores using the New Zealand Socio-Economic Index(NZSEI; Davis, McLeod, Ransom, & Ongley, 1997); a measure which involves the assignation of a score based on one of 97 coded occupational groups, which range from 10 to 90 (10 being the lowest and 90 representing the highest occupational group).

Intellectual Functioning

The Wechsler Abbreviated Scales of Intelligence (WASI: Wechsler, 1999) were administered to gauge general levels of intellectual functioning, in addition to highlighting any fundamental learning or cognitive deficits. The WASI includes the administration of the Vocabulary, Similarities, Matrix Reasoning and Block Design subtests of the WAIS-III and takes approximately 30 minutes to administer. The WASI has been found to have good levels of reliability and validity, and at the time, was found to correlate highly with full scale IQ scores on the comprehensive Wechsler scales (Sparrow & Davis, 2000).

History of Child Abuse

The Childhood Trauma Questionnaire (CTQ: Bernstein and Fink 1998), a 70-item measure using a Likert scale response format, was administered to all participants, covering the period of childhood and adolescence. The CTQ assesses the occurrence of childhood trauma, differentiating between emotional, physical and sexual abuse while excluding experiences of non-abuse related traumatic events such as death of a parent. For the purposes of reducing the number of variables in the present investigation, the measures of emotional, physical and sexual abuse were combined (as directed by the test manual) to form a composite measure of abuse exposure ranging from 0 to 5 (m = 1.71; sd = 1.51).

History of Conduct Problems

A history of conduct problems from childhood to early adulthood was assessed using questions from the CAADID to assess delinquent and conduct-disordered behavior. On the basis of this questioning, 25.8% of the sample reported a history of conduct problems (indicating at least one conduct problem).

Potential Mediating Factors

Temporal Discounting

Temporal discounting was measured by a computer-generated task, derived from the Reward Discounting Task (RDT; Barkley et al., 2001; Green et al., 1994). In this experiment, participants were choose one of two options (Option A or Option B) based on fictional amounts of money presented to them on the screen. The assumption was that individuals with greater difficulty with delaying gratification in their lives were more likely to prefer the option of more immediate gains (option A) versus the delayed option (option B).

The task was presented visually on the computer screen ("please choose between option A and option B. Press the 'A' key for option A or the 'B' key for option B"). The program presented a series of screens (96 in total) with various conditions to the choice task (employing different amounts of money and different time delays). The speed of the rotation through conditions was controlled by the response time of each participant (a new screen emerged once either the A or B key was pressed).

In the first condition, participants were presented with a choice between a static option A: ($100 *in one month*) versus option B: *ascending* amounts of money that were immediately available (ranging from *$1 now* to *$100 now*). This condition was then presented in reverse order (the option B values *descended* from $100 to $1 whilst paired with the same option A: *$100 in one month*). In the second condition, Option A was set at *$100 in one year* and was paired with the same ascending immediate rewards and then descending rewards as in the first condition. In the third condition, the time delay of option B was set at 5 years; and in the fourth condition, the delay was 10 years. This was followed by a second trial which used larger amounts of money for option A (*$1000 in one month*) and option B: (ranging from *$10 now* to *$1000 now*). These larger amounts were similarly followed by the same conditions in reverse, descending order. In total, there were 8 conditions measured, with an associated total of 12 responses per condition. The participants' scores were the immediate reward values at which the participant switched from a preference for the delayed sum of money (option A) for the immediate sum (option B) and the same in reverse for the descending trials (score at which they switched from option B to option A).

Reward Sensitivity

Reward sensitivity was measured through the use of a computer generated passive avoidance learning (PAL) experiment (Farmer and Rucklidge, 2006). The PAL task involves trial and error learning of a go/no-go task with contingent reinforcement; participants received positive visual feedback ("*correct*") and a small reward (ten cent coin) for each correct response and negative feedback ("*wrong*") and a withdrawal of a reward (ten cent coin) for each incorrect response. All participants were introduced to the task by a pre-treatment trial in which a series of six target numbers appears on the computer screen, interspersed with non-target numbers. In the pre-treatment trial, target numbers and non-target numbers were set at a ratio of presentation of 1:3; in order to increase learning success. Participants learned via reinforcement (visual feedback "*correct*" or "*wrong*") which of the numbers presented were target numbers, and which were not. This was followed by the treatment trials in which 32 numbers were presented, including the 6 target numbers which were presented at a 1:1 ratio with random non-target numbers. Participant responses (pressing the space bar) were recorded, in addition to response time. Learning performance on this task was measured by the rate of *passive avoidance errors* (PAE); specifically, errors of commission (responding incorrectly or failing to abstain) or omission (failing to respond).

Statistical Analyses

The data were analysed over several steps. In the first step of the analyses, the bivariate associations between the predictor (the quartile measure of ADHD) and the outcomes (risk-taking behaviours: personal safety; violence risk; alcohol use; nicotine use; drug use; and sexual risk taking) were modelled using ordinary least squares (OLS) regression. In order to examine the extent to which these associations could be explained by potential confounding factors, these variables (demographic factors, measures of IQ and conduct disorder symptomatology, and exposure to child abuse) were entered into each of the models individually.

In the second step of the analyses, the associations between the two potential mediating factors (reward sensitivity; temporal discounting) and the outcome measures that were found to have a statistically significant ($p < .05$) bivariate association with the quartile measure of ADHD in the first step of the analysis (violence risk; alcohol use; nicotine use; drug use; and sexual risk taking) were also modelled using OLS regression.

In the third step of the analyses, potential mediating pathways between ADHD and risk-taking behaviours was tested using bootstrapping of indirect effects via ordinary least squares (OLS) regression (Preacher & Hayes, 2008). An issue arising from many common meditational approaches (such as the Sobel test: Sobel, 1982) is that these approaches assume a normal distribution amongst both predictors and outcomes (see Hayes, 2009, for a discussion of these issues), whereas bootstrapping of indirect effects via latent variable

structural equation modelling or OLS regression (e.g. Muthen & Muthen, 2007; Preacher & Hayes, 2008) does not make assumptions of normality. In these approaches, bootstrapping is used to estimate bias-corrected confidence intervals for each direct and indirect effect in the model, thereby reducing the risk of Type II error and increasing the power of the model to detect effects. Furthermore, these approaches allow the specification of more complex models with multiple mediating pathways (see below). The bootstrapping approach is particularly appropriate for the present analyses as they employ a mixture of variable scales, including continuous outcomes and ordinal and continuous predictors, and the models employ two intervening variables simultaneously.

In the current models, both the ordinal reward sensitivity and temporal discounting variables were employed as potential mediating variables in the association between ADHD and each of the three risk-taking outcomes (violence risk; nicotine use; drug use) that had been found to have a statistically significant ($p < .05$) association with the mediating factors in the second step of the analyses (above). Bootstrapping latent variable models were fitted using the mediation macro developed for SPSS Statistics 19 (Preacher & Hayes, 2008). In this model, effects were estimated for the direct pathway between ADHD and each outcome, as well as the indirect pathways via mediators/moderators, using or Ordinary Least Squares (Preacher & Hayes, 2008). The model also provided tests of statistical significance for each direct and indirect pathway in the model. Final path models were restricted to no more than four variables due to small sample size.

Finally, to ensure the robustness of the conclusions, the analyses above were repeated using the continuous measure of ADHD symptomatology in place of the quartile measure.

Results

Sample Characteristics

Table 1 shows the sample classified into four ADHD severity score quartiles. For each quartile, the mean ADHD severity score, the number of participants meeting criteria for ADHD, and the number of participants in the quartile is provided. The data clearly show that the ADHD quartile scores represent increasing levels of ADHD.

Table 1: Characteristics of sample

	ADHD Score Quartiles			
Characteristics	1-25%	26-50%	51-75%	76-100%
Mean (SD) ADHD severity score[1]	40.68 (3.71)	52.41 (3.33)	66.26 (5.33)	81.50 (3.61)
% met criteria for ADHD	0.0	18.8	94.1	100.0
n	17	16	17	16

[1] "ADHD severity score" indicates an average of ADHD symptom scores derived from self-report and observer report. Scores ranged from 34.5 to 88.5

Associations Between ADHD and Outcomes

Table 2 also shows the sample divided into quartiles on ADHD severity score. For each quartile, the Table displays the mean scores and standard deviations for each outcome measure. The Table also displays tests of significance for linear trend derived from the OLS regression models for the associations between ADHD quartile and outcomes. The Table shows that increasing levels of ADHD symptoms were significantly ($p < .05$) associated with increased scores on the measures of: violence risk; alcohol use; nicotine use; drug use and sexual risk taking (there was no evidence of statistically significant non-linear trend for any outcome; all p values > .05). However, increasing levels of ADHD symptoms were not significantly associated ($p > .20$) with the measure of personal safety, which was dropped from subsequent analyses.

Table 2. Bivariate Associations between ADHD and Risk-Taking Behaviors

	ADHD Score Quartiles					
	1-25%	26-50%	51-75%	76-100%	Total sample	p
Personal Safety						
Mean (sd)	48.27 (8.50)	50.11 (9.35)	48.00 (10.90)	53.69 (10.73)	50.02 (9.97)	.22
Violence risk						
Mean (sd)	45.93 (9.04)	46.56 (7.53)	51.00 (7.11)	57.06 (14.35)	50.14 (10.58)	.001
Alcohol Use						
Mean (sd)	47.27 (8.17)	51.06 (9.30)	46.18 (8.90)	55.56 (11.37)	50.02 (9.99)	.048
Nicotine Use						
Mean (sd)	46.00 (7.66)	48.50 (9.05)	49.82 (9.79)	56.00 (10.88)	50.08 (9.91)	.002
Drug Use						
Mean (sd)	49.00 (11.77)	47.17 (5.18)	48.88 (11.89)	54.69 (9.93)	49.98 (10.12)	.030
Sexual Risk Taking						
Mean (sd)	46.87 (7.50)	47.83 (11.82)	49.35 (6.72)	55.81 (10.70)	49.94 (9.91)	.001

Testing for Potential Confounding (Gender; Ethnicity; IQ; Socioeconomic Status; History of Child Abuse; Conduct Disorder) in the Associations Between ADHD and Outcome Measures

In order to examine the possibility that the associations between ADHD and outcomes could be explained by confounding factors, the models described above were extended to include the following variables gender, ethnicity, IQ, socioeconomic status, history of child abuse, and conduct disorder symptomatology. In no case was a potentially confounding factor statistically significant (all p values > .05).

Associations Between Potential Mediating Factors (Reward Sensitivity; Temporal Discounting) and Outcomes

As noted in Methods, two variables were chosen as potential mediating factors in the analyses (temporal discounting; reward sensitivity). The Pearson product moment correlations for each of these with the quartile measure of ADHD were 0.33 ($p < .05$) and -0.32 ($p < .01$), respectively, while the two mediating factors had a Pearson product moment correlation of 0.09 (*ns*). Table 3 shows the sample divided into quartiles on the measures of temporal discounting and reward sensitivity, and displays the associations between these two mediating factors and the outcomes. The Tables shows that:

1. Total error scores on the RDT (temporal discounting) task was significantly ($p < .05$) negatively associated with three outcome measures: violence risk; nicotine use; and drug

use, suggesting that higher levels of performance on the measure were associated with lower scores on the outcome measure. However, the measure of reward sensitivity was not significantly associated with: alcohol use; and sexual risk (both p values > .05).

2. Participant scores on the PAL task (the measure of reward sensitivity) were significantly ($p < .05$) negatively associated with the measure of violence risk, again suggesting that higher levels of performance on the measure were associated with lower scores on the outcome measure. However, the measure of temporal discounting was not significantly associated with alcohol use; nicotine use; drug use; and sexual risk.

On the basis of these results, the two outcomes that were not associated with the mediating factors, alcohol use and sexual risk taking, were dropped from further analyses.

Testing Mediation for ADHD and Violence Risk

As noted above, the extent to which temporal discounting (RDT task) and reward sensitivity (PAL task) mediated the associations between ADHD and violence risk was examined using bootstrapping of indirect effects via an SPSS macro developed by Preacher & Hayes (2008). In this procedure, the data were modelled with a single direct pathway between ADHD and violence risk, and two indirect pathways between ADHD and violence risk, the first via the temporal discounting variable, and the second via the reward sensitivity variable (see Figure 1). The results of these meditational analyses showed that there was evidence of a statistically significant direct pathway from ADHD to violence risk (path *a*; β = .20, SE = .08, p = .02). Tests of the total mediating pathways via temporal discounting and via reward sensitivity was found to be statistically significant (path *d*: β = .26, SE = .08, p = .001). A test of the specific indirect effects of each mediator was found to be significant for reward sensitivity (path *c*: point estimate = .06, p <.05, 95% CI [.01, .04]) but not temporal discounting (path *b*: point estimate = .21, p = *n.s*).

Figure 1. Mediation model showing the single direct pathway between ADHD and violence risk (a), and two indirect pathways between ADHD and violence risk, the first via the temporal discounting variable (b), the second via the reward sensitivity variable (c). The total indirect effect via both mediating factors is also shown (d).

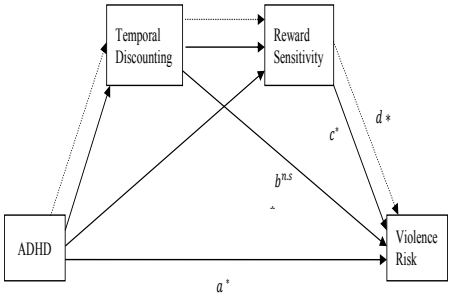


Table 3. Bivariate Associations between Mediating Variables and Risk-taking Behaviors

		Mediating Variables						
		Temporal Discounting (RDT Task) quartiles						
		1-25%	26-50%	51-75%	76-100%	n	Total	*p*
Personal Safety								
	Mean (sd)	51.50 (10.66)	50.93 (10.55)	49.00 (9.53)	49.53 (10.04)	63	50.24 (10.02)	.36
Violence risk								
	Mean (sd)	55.33 (14.82)	50.43 (8.46)	47.00 (7.76)	47.27 (7.87)	63	50.01 (10.78)	.01
Alcohol Use								
	Mean (sd)	52.28 (9.29)	51.64 (11.69)	47.00 (8.48)	50.53 (10.98)	63	50.36 (10.06)	.16
Nicotine Use								
	Mean (sd)	56.11 (9.73)	49.36 (8.63)	44.50 (8.27)	49.13 (9.30)	63	49.78 (9.83)	.002
Drug Use								
	Mean (sd)	54.28 (11.68)	47.57 (5.57)	45.50 (3.74)	51.73 (13.83)	63	49.77 (10.15)	.035
Sexual Risk Taking								
	Mean (sd)	50.06 (7.15)	52.47 (15.24)	48.88 (7.71)	47.13 (7.87)	63	49.63 (9.88)	.257

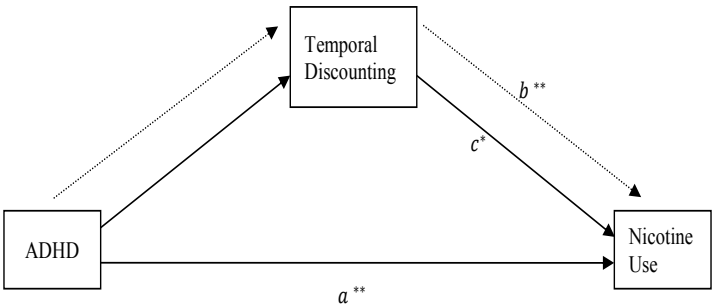
		Reward Sensitivity (PAL Task) quartiles						
		1-25%	26-50%	51-75%	76-100%	n	Total	*p*
Personal Safety								
	Mean (sd)	51.55 (9.69)	49.31 (11.73)	50.80 (10.20)	48.17 (9.21)	66	49.96 (9.97)	.284
Violence risk								
	Mean (sd)	46.95 (8.34)	51.15 (11.66)	51.47 (10.66)	51.72 (12.00)	66	50.32 (10.58)	.020
Alcohol Use								
	Mean (sd)	51.75 (10.85)	49.08 (8.80)	51.07 (11.14)	47.94 (9.12)	66	49.96 (9.99)	.345
Nicotine Use								
	Mean (sd)	49.90 (10.00)	48.62 (9.61)	48.93 (9.28)	52.33 (10.91)	66	49.95 (9.91)	.157
Drug Use								
	Mean (sd)	50.05 (11.45)	50.31 (8.17)	52.27 (13.40)	47.44 (6.24)	66	50.02 (10.12)	.438
Sexual Risk Taking								
	Mean (sd)	47.60 (8.06)	53.69 (12.65)	47.93 (6.71)	51.50 (11.39)	66	50.18 (9.91)	.162

The results of these analyses suggest that the linkages between ADHD and violence risk were mediated by reward sensitivity, but not by temporal discounting. Those individuals with higher ADHD scores were at greater risk of violence (perpetration or victimisation), and this risk could be largely explained by a greater sensitivity to reward, and a lower sensitivity to punishment amongst those with higher ADHD scores.

Testing Mediation for ADHD and Nicotine Use

The extent to which temporal discounting (RDT task) mediated the association between ADHD and nicotine use was also examined using bootstrapping of indirect effects via an SPSS macro (Preacher & Hayes, 2008). In this procedure, the data were modelled with a single direct pathway between ADHD and nicotine use, and a single indirect pathway between ADHD and nicotine use, via the temporal discounting variable (see Figure 2). The results of these meditational analyses showed that there was evidence of a statistically significant direct pathway from ADHD to Nicotine use (path *a*: β = .20, SE = .07, *p* = .008). A test of the total mediating pathways via temporal discounting was found to be statistically significant (path *b*: β = .23, SE = .07, *p* = .002). A test of the total indirect effect via the mediating factor was also found to be statistically significant (path c: point estimate = .04, *p* < .05, 95% CI [.006, .09]).

Figure 2. Mediation model showing the single direct pathway between ADHD and nicotine use (a), the total pathway between ADHD and nicotine use, and a single indirect pathway between ADHD and nicotine use, via the temporal discounting variable (c).



Notes: p-values use a modified Michelin scale by adding marginal significance: * =significant (p<.05), **= highly significant (p<.01), m= marginally significant

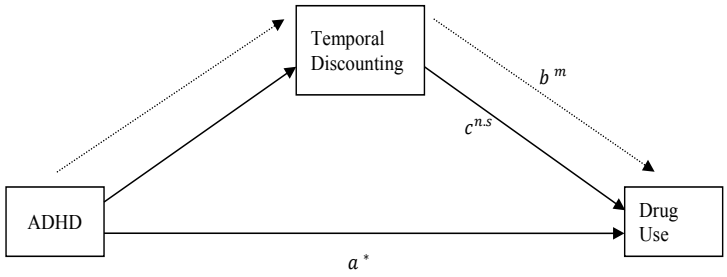
Testing Mediation for ADHD and Drug Use

The extent to which temporal discounting (RDT task) mediated the association between ADHD and drug use was also examined using bootstrapping of indirect effects via an SPSS macro (Preacher & Hayes, 2008). In this procedure, the data were modelled with a single direct pathway between ADHD and drug use, and a single indirect pathway between ADHD and drug use, via the temporal discounting variable (see Figure 3).

The results of these meditational analyses showed:

There was evidence of a statistically significant direct pathway from ADHD to Drug use (path *a*: β = .15, SE = .07, *p* = .04). Testing the total mediating pathways via temporal discounting (path *b*) was not found to be statistically significant. However, a test of the total indirect effect via the mediating factor was found to be marginally statistically significant (path *c*: point estimate =.168, *p* =.05, 95% CI [.016, .335]).

Figure 3. Mediation model showing the single direct pathway between ADHD and drug use (a), the total pathway between ADHD and drug use, and a single indirect pathway between ADHD and drug use, via the temporal discounting variable (c).



Notes: p-values use a modified Michelin scale by adding marginal significance: * =significant (p<.05), **= highly significant (p<.01), m= marginally significant

In summary, the meditational models above demonstrate that adults with higher levels of ADHD symptomatology are at a greater risk of a range of risk-taking behaviours, including violence perpetration and also victimisation; nicotine, alcohol and drug use, and sexual risk taking. Furthermore, for at least two behaviours (violence risk and nicotine use) a significant amount of this increased risk may be differentially explained by either a higher rate of temporal discounting or variances in reward and punishment sensitivity.

Supplementary analyses

As noted in Methods, the analyses reported above were repeated using the continuous ADHD symptom score in place of the quartile measure. The results of these analyses were congruent with those reported above, suggesting that the findings were robust

to the operationalization of the ADHD measure.

Discussion

In this study, ADHD in adulthood was found to be significantly associated with risk variables including violence risk (both perpetration and victimisation); alcohol abuse, nicotine abuse, illicit drug abuse and sexual risk-taking (including number of partners, casual sex encounters, sexually transmitted diseases). Risk-taking measures associated with personal safety indicators (such as seatbelt use, safety helmet use, dangerous driving) were not found to be significantly associated with ADHD in adulthood, although it should be noted that, as this study was exploratory in nature, it may have been underpowered to detect some differences. Understanding the behavioural drivers of these associations may assist in reducing the risk of disability and mortality in this population. Furthermore, a seemingly overlooked area of risk in ADHD (risk of violence) has not been extensively explored in non-offending populations with ADHD, despite indicators that both perpetration and victimization of violence may be associated with childhood ADHD (Goodman et al., 2008) and impulsivity in adults with ADHD (Dowson and Blackwell, 2010).

The findings of the current study concerning substance abuse were consistent with a number of studies that repeatedly found an association between ADHD in adulthood and drug and alcohol abuse (e.g. Biederman et al., 2006; Barkley, 2008). The significant association between ADHD and sexual risk taking was also consistent with previous findings (e.g. Woodward & Fergusson, 1999; Barkley, 2002). The findings regarding risk of violence perpetration (adults with ADHD were more likely to self-report more frequent engagement in physical fights and carrying a weapon to social encounters) were also consistent with previous findings, such as the association between ADHD-consistent traits such as impulsivity and fighting (Stanford et al.; 1996), and linkages between ADHD and impulsive aggressive behaviours (Dowson and Blackwell, 2009).

A key question in the present study was to examine possible pathways (motivational variances) that may explain the linkages between ADHD and risky behaviour. Specifically, this study explored two such potential mechanisms; reward sensitivity and temporal discounting. Both factors in this study were found to be significantly associated with ADHD severity in adulthood, results that were comparable with a number of findings regarding an association between ADHD and motivational differences (e.g. Tripp & Wickens, 2009; Sonuga-Barke et al., 2003). Given the likely functional overlap between reward/punishment sensitivity and temporal discounting, these variables were explored both as single direct mediators as well as combined mediators of the risk-taking outcomes mentioned above. The findings from this study suggest that reward sensitivity and temporal discounting may have a differential effect on risk-taking behaviours. Whilst reward sensitivity significantly mediated the relationship between ADHD and violence risk, temporal discounting was found to significantly mediate the relationship between ADHD and nicotine use. This differential effect of the two motivational variables is logical. One of the key differences between the reward sensitivity and temporal discounting paradigms is the tangibility of the contingent reward. While the positive and negative reinforcement involved in the reward sensitivity variable were real and tangible (as measured by the Passive Avoidance Learning task, [PAL; Farmer and Rucklidge, 2006]), the reinforcement was hypothetical in the temporal discounting variable (as measured by the Reward Discounting task [RDT; Barkley et al., 2001]). These differences in tangibility seem to be consistent with any 'real-life' reinforcement involved with violence risk (more immediate/ tangible) versus nicotine use (more hypothetical/ delayed risk). This is supported by the findings of Scheres and Sumiya (2007) regarding the differential effect of tangibility on reinforcement.

Alternatively, the differential findings regarding the impact of reward sensitivity/temporal discounting mechanisms, may have highlighted a potential difference between two neurocognitive 'subtypes' of ADHD, one that is characterised by a greater tendency to discount delayed rewards and another subtype that is less sensitive to punishment and more sensitive to reward. This hypothesis relating to the findings in this study are consistent with the subtypes of ADHD posited by Sonuga-Barke et al., (2002) and Winstanley et al., (2006): in which ADHD symptoms are influenced by two related but distinct behavioural pathways, delay aversion and behavioural disinhibition. Such a distinction between the differential effects of delay aversion and disinhibition/ insensitivity to punishment, may be important in understanding the effects of different neural variances on ADHD (Sonuga-Barke, 2002) and in turn, the effect of ADHD on adult risk-taking outcomes. For example, DeWall et al. (2007) provide evidence to suggest that the inability to delay gratification (such as that displayed with the reward sensitivity task in the present study) is related to impulsivity (low self-control), which is in turn associated with increased tendencies to violence and aggression.

In this study, the nonsignificant association between ADHD and personal safety measures (e.g. such as seatbelt and helmet use) were not consistent with research of Barkley (2008) or Jonah et al. (2001). As there is a dearth of research that explores such behaviours in adults ADHD, it may be that such an association between adult ADHD and such behaviours does not exist. Conversely, the nonsignificant association between ADHD and safety behaviours may be due to a possible limitation of this study, such as the smaller sample size. Conversely, the majority of the studies that have found an association between ADHD and lower rates of self-protective behaviours have been completed with younger samples (Jonah et al., 2001), whereas the average age of this study was 35 years of age (compared with an average of 25 [Jonah et al., 2001]). Given the association between age and risk-taking behaviours in general (Laurence, 2008), the older age range of this study may have negated any potential association between ADHD and these risk outcomes.

Limitations

A possible limitation of this study is the measure on which the dependent risk-taking variables are based, the

ART-Q. As this is a new measure with only preliminary demonstrated levels of reliability and validity, the measure may not have been sensitive enough to gauge all possible effects of associations between ADHD and risk-taking outcomes. The reliance on such a new measure demonstrates the lack of a selection of reliable measures of adult risk-taking that were available at the time that this study was conducted. Since this study was completed, a number of promising measures have been found which specifically assess susceptibility to risk taking, such as the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ; Torrubia et al., 2001), which was validated for use with children with ADHD by Luman and colleagues (2012). In hindsight, such measures would have been helpful additions to the measurement of risk taking in this study.

A further limitation of this study is the reliance on the grouped variable of 'violence risk'. This grouping (of perpetration and victimisation) was employed for greater statistical power (too many intervening variables would have resulted in a significant loss of power) and also for logical reasons (almost all of the participants involved in relationship violence were both perpetrators and victims). However, such a grouping of 'victims' and 'perpetrators' of violence while methodologically sound, was ethically more difficult to rationalize. In future research (ideally with ideally larger sample sizes) it is hoped that clearer distinctions would be made between victimisation and perpetration of violence.

In addition, although discussion of possible neurocognitive subtypes is of interest, a limitation of this study is the small number of experimental tasks that were used to represent delay aversion and behavioural inhibition. Further exploration of the responses of adults with ADHD to a number of such tasks (such as the stop signal, Go/no-go tasks) may provide more in-depth findings regarding any possible neurocognitive subtype differentiation.

General limitations of this study may largely be related to the small sample size. As a result, whilst power levels were adequate for two-step mediation models in each of the studies reported, more in-depth exploration was not possible without increasing type II error levels significantly. Importantly, a lack of power may have led to a failure to detect associations between ADHD and some of the outcomes shown in Table 2. In addition, a further limitation of this study was the retrospective design of the data that was utilized to assess both ADHD symptomatology and the dependent variables of self-destructive behaviours. An ideal research design would involve the longitudinal follow-up of individuals with ADHD. An additional limitation of this reported study is the reliance on self-reported data. Whilst ADHD diagnosis was conditional on corroborated information, many of the risk-taking outcomes were based on self-report in this study. Although this retrospective design was a necessity as a result of the time-limited and scope-limited nature of single-investigator research, these methodological limitations warrant caution regarding the reliability of this data.

Conclusions

In conclusion, this exploratory research project into the association between ADHD symptomatology in adulthood and risk outcomes in a New Zealand sample found significant associations between adult ADHD and risk-taking outcomes that measured risk of both the perpetration and victimisation of violent behaviours. These findings illustrate that ADHD symptomatology may contribute an additional element of risk in adulthood that has received very little attention to-date, as rates of domestic or sexual violence among this population have not been extensively explored. Considering the worryingly high self-reported rate of intimate violence among participants with ADHD in this current study (46% compared with 23% among controls), this research highlights the importance of considering the many domains in which the safety of adults with ADHD may be compromised, including the risk of harm from intimate partners.

In addition, this research helped to highlight the possible fundamental influence of ADHD on a range of other risk-taking behaviours in adulthood, including drug and alcohol abuse, nicotine use and sexual risk taking. The fact that some of these behaviours were differentially mediated by two motivational variances; reward sensitivity and temporal discounting; supports the hypothesis that individuals with ADHD may differentially respond to reinforcement (based on factors such as the tangibility of the reinforcement or the delay of the reward). This evidence of differential mediators is consistent with a dual neural pathway model of ADHD which may result in two phenotypes; characterised by either behavioural disinhibition (higher reward sensitivity, lower punishment sensitivity) or delay aversion (greater temporal discounting) (Sonuga-Barke et al., 2002).

The clinical implications of a dual pathway/ differential reward response, model of ADHD are manifold. Primarily, if clinicians have a better understanding of a more specific reinforcement model for subtypes of ADHD, then treatment can be better tailored for each individual. Similarly, this research has helped to elucidate the hypothesis that specific reinforcement models may operate for different behaviours. For example, whilst there appears to be an on-going assumption that sensation seeking is characteristic of ADHD due to a generalized increased sensitivity to reward, it may be more accurate to suggest that a subset of individuals with ADHD are likely to engage in sensation seeking such as smoking, more because they have a greater difficulty with seeing the negative consequences of their actions through a kind of 'temporal near-sightedness' associated with temporal discounting (Barkley, 1998). The current research certainly supports this heterogeneous reinforcement model. Therefore, within a clinical setting, to develop a behavioural treatment plan without catering for this differential response to reinforcement would likely lead to ineffective treatment.

Finally, this research study has highlighted a potentially high degree of risk associated with adult ADHD. As this is a relatively new finding, few clinicians may be aware of the importance of a very thorough risk assessment with all individuals, but especially those with ADHD. There are a number of 'hidden' risk behaviours such as low seatbelt use or unprotected sex which occur at a greater frequency among this population.

Clinicians need to be thorough in our assessment of the myriad of ways in which this pervasive neurobehavioural disorder may influence an individual's life.

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Conflicts of Interest

The authors declare no conflicts of interest.

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Call for papers for a Special Section of the New Zealand Psychology Journal
Indigenous Psychologies: Research and practice from Aotearoa New Zealand and the Pacific
Full paper deadline: 31st July 2017
Target publication date: December 2017

Guest Editors: Dr Bridgette Masters-Awatere, Dr Waikaremoana Waitoki, Dr Julie Wharewera-Mika & Dr Christine Fa'alogo-Lilo

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Abstract

E ngā mana, e ngā karanga maha, nau mai te ao, nau mai te po. Last year the first Indigenous Psychology's book was launched. It was a long overdue book that brought our attention to the unique combination of Indigenous practitioners, academics and researcher experiences that exist in our everyday work. This call for papers reflects our growing need to consider the role of Indigenous psychologies in Aotearoa and to create an alternative space for working with Māori and Pasifika peoples.

Focus of the Special Issue

This special section explores the breadth of approaches that we as psychologists use in our work with, or as, Maori, and Pasifika Peoples. Contributors are asked to present their theories and, or experiences of working as an Indigenous psychology in the form of a case studies, case analysis, research report, or as a paper based on a thesis.

The primary aims of the issue is:

- To add to the growing Indigenous psychology knowledge base from Aotearoa and the Pacific
- To transform psychology
- To develop an Indigenous workforce
- To contribute to Indigenous psychology globally
- To bring together our contributions and to meet our collective vision.

Preference will be given to submissions that demonstrate engagement in work that is fundamentally action orientated and focused on indigenous psychology.

Deadlines and submission process

You can discuss a potential contribution by contacting one of the Guest Editors directly. The deadline for full paper submission is 31st July 2017. The aim to have the Special Section published in December 2017. Guidelines for authors and submission details are available at https://nzjp.scholasticahq.com/for-authors .