'Reach Out, Rise Up': The efficacy of text messaging in an intervention package for anxiety and depression severity in young people

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ABSTRACT

Background: Depression and anxiety are among the most commonly experienced mental health issues faced by young people in Aotearoa, New Zealand. Considerable barriers exist that prevent young people from engaging with face-to-face mental health services. Young people's preference for technology-based counselling mediums such as text messaging opens up new pathways for intervention.
Objective: A pilot text message-based intervention package was trialled for use by young people to evaluate the potential efficacy of the text package as an intervention for depression and anxiety symptoms.
Method: The text package was piloted using a 10-week longitudinal cohort pilot with 21 young participants (12–24 years) who demonstrated mild to moderate anxiety and/or depression symptoms.
Results: Participants' post-package scores were significantly lower than their pre-package scores for both anxiety ($Z = -2.83$, $p = .005$, $r = -0.65$) and depression ($Z = -2.49$, $p = .013$, $r = -.056$). 'Feeling encouraged and supported' increased as a result of receiving support from a trained supporter ($Z = -2.06$, $p = .039$, $r = -0.45$), but not from friends/family ($Z = -1.72$, $p = .130$, $r = -0.37$). Anxiety and depression scores did not change as a result of support from either trained supporters or friends/family.
Conclusions: Findings support the potential efficacy of the text package, justify wider trials of the text package, and support the use of text message-based interventions as potentially effective therapies for young people.

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1. Introduction

Depression and anxiety are among the most commonly experienced mental health issues faced by young people in New Zealand (Oakley Browne, Wells, & Scott, 2006). National survey estimates place recognised lifetime prevalence of anxiety for 16–24 year olds at 24%, and 15% for major depressive disorder, with 50% of adult cases having experienced the onset of a mood disorder before the age of 18 (Oakley Browne et al., 2006). Client data from Youthline—the host community agency who specialises in working with young people—reflects this trend, with anxiety and depression holding the top two positions for clients' reason for entry into face-to-face counselling services (Youthline, 2015). Despite being common experiences for young people (Oakley Browne et al., 2006; Mariu, Merry, Robinson, & Watson, 2012), many do not receive help for symptoms of anxiety and depression. While the under-recognition of mental health symptoms by primary health care providers has been acknowledged (Lowe et al., 2003), many young people do not seek help from health services despite experiencing serious mental health issues (Mariu et al., 2012). Barriers to their

help-seeking include the avoidance and inhibition associated with depression and anxiety (Rapee, Schierring, & Hudson, 2009), hoping that the problem will go away by itself or get better with time, not wanting to make a fuss, being too embarrassed, not having the motivation to seek help, not knowing how to seek help, the cost of healthcare, not having access to transport (Adolescent Health Research Group, 2013), and limited independent access to services. These barriers highlight the need for easily accessible solutions that are youth friendly and can be conveniently accessed through platforms readily utilised by young people, such as mobile phones.

Mobile phones have become an increasingly important way young people experience community and connection, with text messaging providing a particularly low cost and convenient way of staying in touch (Reid & Reid, 2007). Text messaging provides a connected presence for young people despite distances created by space or time (Licoppe, 2004), and offers young people a sense of control, privacy, and anonymity which young people value when they do access help services (Gibson & Cartwright, 2014). Young people's preference for technology-aided counselling media, particularly text messaging, is apparent (King et al., 2006; Gibson & Cartwright, 2014). As such, text messaging presents organisations working with young people with a platform to communicate and offer support to young people on young people's own terms (Gibson & Cartwright, 2014). This also highlights the need for community agencies to adapt to new technologies in

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offering youth-friendly, effective, and appropriate vehicles of support (Evans, 2014).

Given evidence supporting computerised therapies in the self-management of diabetes (Dobson et al., 2015; Franklin, Waller, Pagliari, & Greene, 2006), smoking cessation (Whittaker et al., 2009), weight loss (Patrick et al., 2009), depression and anxiety (Broom, Ladley, Rhyne, & Halloran, 2015; Fleming, 2012; Aguilera & Munoz, 2011; Aguilera & Berridge, 2014), combining text messaging with standardised computerised therapies offers an evidence-based opportunity for community agencies to continue to support young people. However, few studies have evaluated text-messaging as an acceptable and effective intervention for depression or anxiety in young people.

At the same time that young people may value technological media that allow the absence of a counsellor's presence (King et al., 2006; Evans, 2014), a genuine relational connection is important for some young people in counselling services (Gibson & Cartwright, 2014). Interpersonal relationships and therapeutic alliances have been acknowledged to have a strong impact on treatment efficacy, sometimes as much as treatment itself (Watanabe, Hunot, Omori, Churchill, & Furukawa, 2007; Merry et al., 2011; Norcross & Lambert, 2010). Indeed, Mohr and colleagues have suggested that human support may improve the effectiveness of computer-mediated therapies (Mohr, Cuijpers, & Lehman, 2011).

This research tested the potential efficacy of a module-based text package, called 'Reach Out, Rise Up', through a prospective cohort pilot study using a sample of young people. Of particular interest was the testing of the text package as an effective intervention for depression and anxiety symptomology in young people, and whether human support would contribute to positive outcomes.

2. Method

2.1. Participants and procedure

Ethical Review for the study was sought from the New Zealand Northern X Region Ethics Committee prior to study commencement. Young people (12–24 years) who contacted Youthline's Helpline or Support Centre, and who also presented with mild to moderate anxiety and/or depression, were offered the option of signing up for the text package. Young people were also recruited through Youthline's Facebook page and Youth Service (a Youth Worker led service providing practical one-to-one support). Involvement in the study was voluntary and other standard intervention options were offered, i.e. face-to-face and helpline counselling, and mentoring. Information was not collected about participants' interactions with other services. Forty-three young people responded to the recruitment campaign and were screened for anxiety and depression severity, using the General Anxiety Disorder scale (GAD-7) and Patient Health Questionnaire (PHQ-9) respectively. Forty met inclusion criteria (presenting with mild to moderate anxiety and/or depression symptoms (i.e. scores greater than 4 and less than 15) (Spitzer, Kroenke, Williams, & Lowe, 2006; Kroenke & Spritzer, 2002), owning a personal mobile phone, and reporting English literacy) and were included in the study. One was excluded from the study and referred to face-to-face counselling due to responses exceeding moderate severity. Two young people were excluded from the study due to responses indicating below mild severity.

Half of the participants were randomly selected to receive a follow-up phone call each week to support them with the text package. Follow-up phone calls were made to selected participants by a team of trained volunteer helpline counsellors. The helpline counsellors received additional 'Reach Out, Rise Up' training to the traditional Youthline counsellor training to answer questions and offer assistance and motivation. Training included CBT introduction and supporter training, and a supporter manual. The remaining half of the participants received only the text messages.

Two participants explicitly opted out of the text package after commencing: one cited that they no longer needed the text package, and one found the abbreviated text language patronising and was dissatisfied about the volume of weekly text messages. The remaining 38 participants were sent text messages for the full ten weeks of the package. On completion of the text package, participants were rescreened for anxiety and depression symptom severity, and completed an evaluation form. Participants were given the option of returning printed copies or completing evaluations with a trained supporter over the phone. Sixteen participants did not complete the evaluation: seven participants explicitly declined the evaluation, and nine were unable to be contacted. Of these nine, trained supporters had been unable to make contact with two participants over the course of the text package.

Twenty-two of 40 participants completed the full text package, rescreening, and evaluation. However, one participant's data was removed from the analysis due to responding which indicated a change from mild to severe symptomology. Follow-up by a trained supporter revealed that the participant in question experienced additional psychiatric symptoms related to a previously diagnosed personality disorder. In response, the researchers considered the participant's scores inappropriate for the analysis and removed the data. There were no significant differences between those who completed the text package and evaluation, and those who did not. Participant demographic and clinical profiles are shown in Table 1.

Twelve (63%) of the 19 participants who received support from a trained supporter completed the text package and evaluation. Nine (45%) of the 20 participants who did not receive support from a trained supporter, also completed the text package and evaluation. Of the 21 participants who completed the text package and evaluation, 16 (76%) reported having received support from family/friends.

2.2. Text package

The text package comprised three, weekly text messages (a psycho-educational message, a weekly challenge relating to the week's psycho-educational message, and an inspirational message) that were sent to each participant for 10 weeks. Two exceptions were weeks 5 and 10 in which there were no weekly challenges. The rationale for omitting challenges from these weeks was to provide participants with opportunities to reflect on, and practise, the previous weeks' modules. In week 7, there were two aspects to the weekly challenge. The weekly themes and challenges are outlined in Table 2. The texts were scripted to be youth-friendly, and framed with participant choice and empowerment in mind, using encouraging wording (e.g. 'Dont b nervous, its all bout findin ways tht wrk 4 u', 'Dont worry if u havnt done evrythin just

Table 1
Demographic characteristics of text package participants.

	Completed text package and evaluation (n = 21[a])	Did not complete text package and evaluation (n = 18)
Mean age (years)[b]	19.3 (2.8)	18.0 (2.4)
Gender		
Female	14	14
Male	7	4
Ethnicity		
Maori	0	3
Maori/NZ European	1	1
NZ European	16	9
Pacific Island	1	3
Other	3	2
Mean anxiety (GAD-7) score[b]	8.1 (3.2)	9.2 (3.9)
Mean depression (PHQ-9) score[b]	7.8 (3.6)	9.8 (3.0)

[a] Table excludes the data of one participant whose data was removed from the analysis altogether.
[b] Means (followed by standard deviation in parenthesis) are reported for continuous variables.

Table 2
Weekly psycho-education themes and challenges.

Week	Theme	Challenge
Week one	Getting to know your moods	Mood journal
Week two	Self-care basics	Breathing exercise practise
Week three	How thoughts impact and focussing on small victories	Small victories
Week four	Balancing thoughts	Thought record
Week five	Avoidance and suppression	–
Week six	Building resilience: living life and expression	Trying new activities
Week seven	Coping strategies: self-care and mindfulness	Self-care Mindfulness
Week eight	Envisioning the future: goal setting and locus of control	Things inside and outside of your control list
Week nine	Envisioning the future: breaking down goals	Goal break down
Week ten	Celebration, personal strength and options for further support	–

– indicates no weekly challenge.

keep givin things a go.') and presenting exercises in an open-ended manner (e.g. 'This weeks challenge is 2 try some new activities. Experiment til u find some things that make u feel gud'). The same text messages were sent to each participant. Each participant commenced receiving text messages the week following their inclusion in the study, so not all participants received text package messages simultaneously.

2.3. Measures

2.3.1. Anxiety

Anxiety severity was assessed using the 7-item GAD-7, a brief self-report scale used for assessing generalised anxiety disorder. The GAD-7 has demonstrated good reliability and internal consistency as well as criterion, construct, factorial, and procedural validity (Spitzer et al., 2006; Lowe et al., 2008). Higher scores on the GAD-7 are associated with functional impairment, and good agreement between self-reports and interviewer-administered versions of the GAD-7 have been shown (Spitzer et al., 2006). The GAD-7 has also been found to distinguish between generalised anxiety disorder and depression (Spitzer et al., 2006), and is used in primary care settings and in the general population (Lowe et al., 2008). Scores indicating mild or moderate anxiety are those that fall between 4 and 15 (Spitzer et al., 2006).

2.3.2. Depression

Depression severity was assessed using the 9-item PHQ-9, a subscale of the larger Primary Care Evaluation of Mental Disorders screening questionnaire. The PHQ-9 is based on Diagnostic and Statistical Manual of Mental Disorders IV criteria for depression. Self-administration of the tool has demonstrated diagnostic validity comparable to clinician administration as well as validity and reliability in measuring depression severity (Kroenke & Spritzer, 2002). Scores indicating mild or moderate anxiety are those that fall between 4 and 15 (Kroenke & Spritzer, 2002).

2.3.3. Text package evaluation

To evaluate the effect of interpersonal encouragement and support, participants were asked to respond to the following on a 5-point Likert Scale: "Reach Out Rise Up' was encouraging and I felt supported as a result of being part of it'. Other items measuring customer satisfaction were included in the evaluation but are not discussed in this paper. Participants were asked to provide an overall rating for the text package out of 5 and were asked to respond to the following questions in the form of a yes/no response with space for extra narrative: *did you notice changes in yourself from doing Reach Out Rise Up? Do you think other young people would benefit from Reach Out Rise Up? Did you have a support person (family member or trusted friend) who knew you were doing Reach Out Rise Up?* Participants were also asked which of the weekly challenges

they participated in (yes/no response), and their experience of each challenge. Young people supported by a trained supporter were asked what they liked about having contact with their trained supporter.

2.4. Analysis

Tests for normality indicated that the data were not normally distributed, thus non-parametric tests were used in the analysis. A Wilcoxon matched-pairs signed-ranks test was used to compare participants' pre and post-package anxiety and depression scores. Due to difficulties in finding an appropriate non-parametric test able to examine interactions of variables within matched-pairs, the effect of participating in weekly challenges on symptom severity was explored using individual Mann–Whitney tests on post-package GAD-7 and PHQ-9 scores. Subsequent Mann–Whitney tests were used to examine the effect of support provision on the post-package anxiety and depression scores.

3. Results

Overall, the young people participating in the study rated the text package highly, with an average rating of 3.9 (out of 5). Of the 21 participants completing the text package and evaluation, 17 (81%) reported that they noticed changes in themselves in response to their participation, and 21 (100%) reported that they thought other young people would benefit from taking part in the text package.

Participants' post-package scores were significantly lower than their pre-package scores for both anxiety ($Z = -2.83$, $p = .005$, $r = -0.65$) and depression ($Z = -2.49$, $p = .013$, $r = -.056$). A summary of mean scores, pre and post text package, is presented in Table 3.

Anxiety ($Z = -3.13$, $p = .002$, $r = -0.68$) and depression ($Z = -2.86$, $p = .004$, $r = -0.62$) scores differed only as a function of participation in the 'trying new activities' challenge. Participants' evaluation narratives pointed to specific aspects of the 'trying new activities' challenge that lifted their mood. Of the 11 participants who completed the challenge, five reported trying new activities to be more fun than they had anticipated and felt better in response. Three participants reported feeling better having increased their socialising with other people in response to the challenge.

The effect of support provision was examined using the evaluation item "'Reach Out Rise Up' was encouraging and I felt supported as a result of being part of it". 'Feeling encouraged and supported' scores differed as a function of receiving support from a trained supporter ($Z = -2.06$, $p = .039$, $r = -0.45$), but not from friends/family ($Z = -1.72$, $p = .130$, $r = -0.37$). Evaluation narratives pointed to specific aspects of the trained supporters that participants found useful. Of the 12 participants that received calls from a trained supporter, five reported that they found it helpful to have someone guide them through the process and offer practical advice on the weekly challenges. Four participants reported that they liked having someone to talk to, three participants reported that they liked talking to someone who was friendly, and three reported appreciation in having support from someone who was encouraging and affirmative. Anxiety and depression scores did not differ significantly as a function of support from either trained supporters or friends/family.

While an initial power analysis suggested that a sample size of 40 participants would afford the detection of mean changes of 1.7 and 1.8 (for the PHQ-9 and GAD-7 respectively) with 80% power, the ability to

Table 3
Participants' mean anxiety and depression scores pre and post-participation in the text package.

	Mean pre-package score	Mean post-package score
Anxiety	8.1 (3.2)	4.9 (3.7)[*]
Depression	7.8 (3.6)	4.8 (4.2)[*]

[*] p < 0.05.

make definitive conclusions about the effect of support received and the effect of completed challenges, is compromised when splitting the sample in so many ways. The findings should thus be interpreted with caution.

4. Discussion

4.1. Principal results

The 'Reach Out, Rise Up' text package appeared to contribute significantly to participants' change in anxiety and depression severity, though it is impossible to say for certain that participants' scores did not naturally decrease, given the absence of a control group. Using Cohen's benchmarks of effect size (Cohen, 1988), the magnitude of potential treatment effectiveness (0.65 and 0.56 for anxiety and depression, respectively) fell between medium (i.e. 0.50) and large (i.e. 0.80). If changes were in fact due to the intervention, this suggests comparatively higher intervention effectiveness than could be expected from psychotherapy for children and adolescents in general, which have demonstrated a small to medium average effect size of 0.34 (Weisz, McCarty, & Valeri, 2006).

Receiving support from trained supporters, while appreciated by the young people, appeared to have no bearing on the overall reduction of symptom severity. However, human support, particularly from friends and family, may have contributed somewhat to the slightly higher proportions of supported young people completing the text package and evaluation. It is difficult to be certain, given the small sample size.

'Trying new activities' appeared to be the active component of the intervention. Again, due to the absence of a control group, this finding should be interpreted with caution. Despite evidence supporting interventions such as mindfulness-based therapies (Hofman, Sawyer, Witt, & Oh, 2010; Mendelson et al., 2010), these components were not significantly associated with reductions in anxiety or depression severity. While the influence of trying new activities on symptom severity may reflect the focus of cognitive-based interventions over the bio-psycho and self-awareness emphasis of the other activities (e.g. mood journaling, breathing), previous research suggests little difference between cognitive and non-cognitive interventions for adolescents (Weisz et al., 2006). Trying new activities may simply present an uncomplicated and practical way of alleviating immediate symptom severity, rather than modifying longstanding behavioural habits. Considering the already relatively short term effects of psychotherapy in children and adolescents (Weisz et al., 2006), the enduring benefits of trying new activities as a long term coping strategy could be questioned.

The flexibility for young people to choose their own new activities is consistent with findings that young people may respond well to control and autonomy in counselling approaches (Gibson & Cartwright, 2014). Young people may benefit from greater flexibility, control, and autonomy, which has implications for integrating computerised therapies into practise. The findings also add to the literature supporting the efficacy of interventions that are brief and incorporate 'homework' assignments (Stice, Shaw, Bohon, & Marti, 2009).

Previous research has demonstrated the effectiveness of individualised text messages based on algorithms matching participant characteristics to databases of text messages (Bramley et al., 2005). However, the results of this text package suggest the efficacy of standardising a small selection of text messages without the need for a large database of text messages.

4.2. Limitations

A clear limitation of this research is the small sample size from which it is difficult to draw definitive conclusions or generalisations. This appears to be a recurring trend in research into computerised therapies (Fleming, 2012) and warrants larger scale trials. Another limitation is the self-selection of participants into the text package. By participating in the text package, participants signalled that they were already open

to trying something new, perhaps leading to increased chances of benefiting from the 'trying new activities' challenge. The absence of control around the use of the text package as an adjunct to other therapies or in isolation was also apparent. Finally, there was little time for participants to benefit from techniques that may take a long time to adopt and master to the point of symptom reduction (e.g. mindfulness) and so potentially effective components of the intervention may have been underutilised or overlooked by participants. It should also be acknowledged that the participants completing the package were predominantly New Zealand European. In the multicultural context of New Zealand, it is important to examine the effect of culture in closer detail. While text messaging interventions for diabetes in New Zealand have been found to be as effective in Maori as non-Maori (Bramley et al., 2005), cultural differences can impact the effect of supportive mobile health interventions (Aguilera & Berridge, 2014) and should be considered.

4.3. Future considerations

The results support future research into text packages for anxiety and depression, with room for improvement through more rigorous methodological approaches incorporating control methods, larger samples, a focus on fewer weekly challenges, and comparing participant empowerment with specific practitioner-prescribed activities. Given the absence of long-term follow-up, it is unclear whether the effects of the text package were enduring. It is also unclear whether participants may have adopted trying new activities as a long term coping strategy or whether intermittent reminders to do so may be beneficial for future iterations of the text package. Lastly, it is unclear whether the same text package would demonstrate equivalent efficacy for young people with increased symptom severity. Stice and colleagues theorised that high-risk populations may be more motivated to engage more effectively with interventions (Stice et al., 2009). It may be informative to test this theorisation in the face of barriers that advanced anxiety and depression present to trying new activities (American Psychiatric Association, 2013).

5. Conclusions

The use of standardised text messaging packages offers opportunities for community organisations to support young people in circumventing commonplace barriers to service provision and managing mental health issues. Text messaging presents an effective way of communicating evidence-based intervention content to young people, while preserving young people's control, privacy and anonymity. In particular, text messaging may be an effective way of encouraging young people to benefit from trying new things.

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