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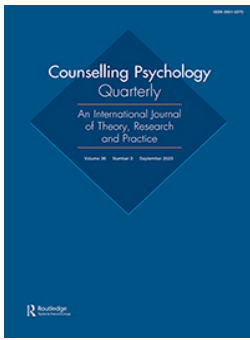
Examining the effectiveness and acceptability of a group-based ACT intervention delivered by videoconference to international university students during the COVID-19 pandemic

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Examining the effectiveness and acceptability of a group-based ACT intervention delivered by videoconference to international university students during the COVID-19 pandemic

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ABSTRACT

Studies have shown that international students are at increased risk of experiencing poor mental health. The COVID-19 pandemic has had further negative impacts on the psychological well-being of students. In this quasi-experimental study, we examined the impact of a brief acceptance and commitment therapy (ACT) -based group intervention delivered by videoconference (ACT videoconference; n = 48). We used an equivalent in-person group intervention administrated prior to the pandemic as a reference group (ACT face-to-face; n = 53). In addition, we investigated the exposure – response relationship, dropout attrition, acceptability, and user experiences. International university students participated in five online group meetings using a videoconferencing app during the COVID-19 pandemic and were compared with students participating in five face-to-face group meetings prior to the pandemic. Symptoms (stress, anxiety, depression) and process measures (psychological inflexibility, mindfulness, engaged living) indicated similar positive changes in both groups (e.g. PSS-10, ACT videoconference dw = 0.54; ACT face-to face dw = 0.94; AFQ-Y, ACT videoconference dw = 0.55; ACT face-to-face, dw = 0.84), with a slightly larger effect in the ACT face-to-face group. This study suggests that brief ACT-based group workshops can be effective in enhancing the psychological flexibility of international university students, and decreasing symptoms of stress, depression and anxiety whether delivered by videoconference or face-to-face format.

Introduction

The impact of the COVID-19 pandemic on university students

The COVID-19 pandemic placed new and unforeseen stress on individuals, resulting in increased feelings of overwhelm, social isolation, and worry about our own health and that of others. Mental health problems have increased due to the COVID-19 pandemic, prompting numerous disruptions to daily life, unique stressors, increased mental health concerns, and

decreased quality of life (Gallagher, Zvolensky, Long, Rogers, & Garey, 2020; White & Van Der Boor, 2020). Furthermore, university students have been deeply affected by the pandemic, reporting moderate to severe levels of depression and anxiety (e.g. Di Consiglio, Merola, Pascucci, Violani, & Couyoumdjian, 2021; Meda et al., 2021). Similarly, students' mobility and study experiences worldwide have been significantly impacted by the COVID-19 pandemic. Preventive measures, such as closing campuses, canceling classes, and transitions to online teaching have adversely affected students' mental health, particularly that of international students (Lai et al., 2020). Lai et al. (2020) found that international students who stayed in their host country during the pandemic experienced higher stress related to personal health and lack of social support, perceived stress, and more severe symptoms of insomnia than students who returned to their home country. Their survey indicated that more than 80% of the students perceived moderate-to-high stress, with females showing higher stress and lower resilience than males (Lai et al., 2020). Even without the challenges and burden imposed by the global pandemic, the mental health of international students raises considerable concerns (Forbes-Mewett, 2019) as they face many challenges that might negatively affect their psychological well-being and quality of life (Hauschildt, Gwosc, Netz, & Mishra, 2015). International students are considered at an elevated risk for psychological problems (Brown & Brown, 2013; Jung, Hecht, & Wadsworth, 2007; Mori, 2000), including stress, loneliness (e.g. Rosenthal, Russell, & Thomson, 2006; Russell, Rosenthal, & Thomson, 2010; Sawir, Marginson, Deumert, Nyland, & Ramia, 2008), depressive symptoms (e.g. Rice, Choi, Zhang, Morero, & Anderson, 2012), and anxiety (Shadowen, Williamson, Guerra, Ammigan, & Drexler, 2019) and their distress has been found to be even higher than that of domestic students (Forbes-Mewett & Sawyer, 2016).

Coping with the effects of the stressful situation caused by the pandemic has the potential to diminish the ability to successfully respond to or be flexible in the face of adversity (Centers for Disease Control and Prevention, 2021). Skills related to health, adaptation, resilience, and flexibility are considered protective factors in mental health (Biglan, Hayes, & Pistorello, 2008). Indeed, research has demonstrated a strong positive association between COVID-19-related hardship and distress (Pierce et al., 2020). One potential mediating factor of this relation is psychological flexibility, a modifiable trans-diagnostic process (Hernández-López, Cepeda-Benito, Díaz-Pavón, & Rodríguez-Valverde, 2021). There are indications that psychological flexibility and four of its sub-processes (self-as-context, defusion, values, committed action) may mitigate the detrimental impacts of COVID-19 risk factors on mental health such as COVID-19 peritraumatic distress, and symptoms of anxiety and depression (Pakenham et al., 2020). Individuals high in psychological flexibility may be less affected by the adverse consequences of the COVID-19 pandemic (e.g. McCracken, Badinlou, Buhrman, & Brocki, 2021).

Psychological flexibility and the ACT the model

Psychological flexibility can alleviate suffering and clarify how individuals deal with adversity while also being a potential factor in improving well-being (Mallett, Coyle, Kuang, & Gillanders, 2021). In contrast, lower levels of psychological flexibility have been found to be associated with higher levels of depression, anxiety, and COVID-19-related distress (Dawson & Golijani-Moghaddam, 2020; Gloster, Walder, Levin, Twohig, & Karekla, 2020; Mallett, Coyle, Kuang, & Gillanders, 2021). In addition, psychological

flexibility has been proven to be a moderating factor in the relationships between social isolation and depression and anxiety (Smith, Twohy, & Smith, 2020), COVID-19 risk factors and mental health difficulties (Pakenham et al., 2020), and COVID-19 stressors and suicide risk (Crasta, Daks, & Rogge, 2020).

Empirical evidence supports psychological flexibility as the mechanism of action in acceptance and commitment therapy (ACT; Doorley, Goodman, Kelso, & Kashdan, 2020; Hayes, 2016; Mallett, Coyle, Kuang, & Gillanders, 2021; Stockton et al., 2019; Trompetter, Bohlmeijer, Veehof, & Schreurs, 2015). The aim of ACT is to foster psychological flexibility through six related skills: (1) acceptance, (2) defusion, (3) being present, (4) self as context, (5) values, and (6) committed action (Hayes, 2019). Acceptance is about being open to one's own experiences, especially in relation to unpleasant thoughts and emotions. Defusion involves undermining the negative effects of cognitions by teaching skills that enable people to take distance from thoughts. Self as context is a perspective from which an individual can become aware of their experiences without becoming overly attached to them, while contact with the present moment is about flexibly attending to an experience as it is happening in the now. Furthermore, a connection to one's own values is represented by the ability to choose what matters and acting in service of them by performing value-oriented actions. These six components have also been grouped into two main dimensions of psychological flexibility: (1) Mindfulness and acceptance processes (including acceptance, defusion, being present, self as context) and (2) Commitment and behavior change processes (including values and committed actions). ACT has been found to be effective in a variety of conditions (Gloster, Walder, Levin, Twohig, & Karekla, 2020), this review on the empirical status of ACT showed that it is efficacious for all conditions examined, including anxiety (small to medium, Effect Size, ES, g = 0.18–0.57), depression (small to medium ES, g = 0.24–0.76), substance use (small ES, g = 0.40–0.45), pain (small ES, g = 0.44), and trans-diagnostic groups (small to large ES, g = 0.17–0.96). Overall, ACT or its components has more than 1,000 randomized controlled trials up to date.

ACT interventions for national and international students

ACT can provide valuable tools to enhance psychological flexibility and well-being, including college settings (Pistorello, 2013; Viskovich, Pakenham, & Fowler, 2021). A recent systematic review showed that ACT training, implemented in various formats, has a positive, albeit small effect (d = .29) on student well-being (Howell & Passmore, 2019), improving the psychological health and well-being of college students (see also Levin et al., 2014; Muto, Hayes, & Jeffcoat, 2011; Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016; Stafford-Brown & Pakenham, 2012). A recent ACT-based online course enhanced student well-being and decreased stress (Katajavuori, Vehkalahti, & Asikainen, 2021). Similarly, students showed significantly reduced levels of general psychological distress and negative emotional symptoms at follow-up, and these outcomes were mediated by increases in psychological flexibility and mindfulness (Christodoulou, Flaxman, & Lloyd, 2021). A self-help digital intervention conducted during the COVID-19 pandemic improved well-being in students who reported persistent experiences of COVID-related distress but felt better able to cope with general psychological distress, such as anxiety (Shepherd, Golijani-Moghaddam, & Dawson, 2022). In general, ACT interventions with students showed positive outcomes.

ACT has been researched in most continents, a vast majority of the studies is set in the USA (Levin et al., 2014; Muto, Hayes, & Jeffcoat, 2011), but there are many studies also in Europe (Christodoulou, Flaxman, & Lloyd, 2021; Katajavuori, Vehkalahti, & Asikainen, 2021; Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016; Shepherd, Golijani-Moghaddam, & Dawson, 2022), Asia and Australia (Stafford-Brown & Pakenham, 2012; Wang et al., 2017). In the context of international students, however, ACT has been scarcely examined. For example, ACT has been explored among Japanese international students attending college in the United States, with favourable results (Muto, Hayes, & Jeffcoat, 2011), and Chinese students studying abroad in the USA (Xu, O'Brien, & Chen, 2020). In Muto, Hayes, and Jeffcoat (2011), students who received the bibliotherapy self-help intervention showed enhancements in general mental health, stress levels, and psychological flexibility. Similarly, in the ACT-based study by Xu, O'Brien, and Chen (2020), students showed reductions in depression, stress, anxiety, and physical symptoms at post-intervention, with the changes being maintained at one-month follow-up.

Videoconference interventions during the pandemic

The COVID-19 pandemic challenged the education system across the world and forced schools, colleges, and universities to discontinue in-person teaching and shift to online teaching (Dhawan, 2020). In addition, the use of technology became the only way to offer psychological services (Duan & Zhu, 2020; Jiang et al., 2020; Li et al., 2020; McGuire, 2020; Zhou et al., 2020). Indeed, the use of videoconferencing applications was noticeably accelerated during the COVID-19 pandemic (Billingsley, 2020). Meta-analyses suggest that videoconferencing interventions consistently produce treatment effects largely equivalent to those of in-person interventions (Batastini, Paprzycki, Jones, & MacLean, 2021; Varker, Brand, Ward, Terhaag, & Phelps, 2019). Furthermore, online group interventions have grown exponentially with COVID-19 (Marmarosh, Forsyth, Strauss, & Burlingame, 2020), suggesting that they are effective at reducing depression, anxiety, and stress and that they allow group cohesion similar to that in in-person group therapy (Gentry, Lapid, Clark, & Rummans, 2019; López et al., 2020). Group cohesion helps people survive during distressing times (Marmarosh, Forsyth, Strauss, & Burlingame, 2020); therefore, groups can be important when treating people suffering during COVID-19 and can bring benefits critical to mental health and coping with COVID-19 (Marmarosh, Forsyth, Strauss, & Burlingame, 2020). Previous studies suggest that ACT group training could be an effective mental health intervention in educational settings, reducing levels of general psychological distress and negative emotional symptoms and decreasing procrastination (Christodoulou, Flaxman, & Lloyd, 2021; Wang et al., 2017) as well reducing anxiety and depression symptoms as shown in Iranian adolescents in a videoconference group intervention (Zemestani, Hosseini, Petersen, & Twohig, 2022). Dropout, non-completion, and the premature termination of an intervention constitute significant problems that limit the effectiveness of any intervention (Barrett, Chua, Crits-Christoph, Gibbons, & Thompson, 2008). Both very low (Browning, Morena, Gould, & Lloyd-Richardson, 2022; Yuen et al., 2019) and high attrition rates (Shepherd, Golijani-Moghaddam, & Dawson, 2022) have been reported in videoconference interventions. Thus, more knowledge of attrition rates in videoconference interventions is needed, especially among international students.

Aim of the study

Considering the large number of students, including international students, who experience psychological problems, there is a need for more research on various types of interventions and the ways to deliver them. Overall, ACT-based interventions targeting students have been found to be effective in promoting students' overall well-being and psychological flexibility (Howell & Passmore, 2019). However, research investigating ACT in the context of international students remains scarce. Therefore, there is a need for more research on how ACT can be delivered to international students in an effective and acceptable way. In particular, during times of immense difficulty, such as the COVID-19 pandemic, there is a need for effective psychological procedures to enhance mental well-being. We observed earlier that a five-week in-person ACT group workshop was effective at reducing psychological symptoms of stress, depression, and anxiety (Brandolin et al., 2023). Furthermore, we previously observed low dropout rates and linear reduction in symptoms when the students attended more sessions. In the spring of 2020, the pandemic forced us to shift a group-based in-person intervention offered to international university students into a group-based intervention delivered through the Zoom videoconferencing platform.

The aim of the current study was to investigate the impact of variously delivered ACT-based group interventions (videoconference vs. face-to-face) in terms of effectiveness and acceptability. As we were unable to randomize the participants to the two interventions, and the context of the delivery differed (no-pandemic vs. pandemic), the comparison between the procedures was problematic. However, we were interested in whether the distance intervention (ACT videoconference) during a distressing period would be beneficial to a group of vulnerable students (i.e. international university students) during the pandemic. To evaluate the usefulness of the intervention, we used our previous face-to-face intervention as a reference group (ACT face-to-face). The reference group offered us the possibility to control the effect of attention and repeated measurements and increase the validity of the findings. We were particularly interested in studying the effectiveness of the videoconference intervention on symptoms of stress, anxiety, and depression as well as on psychological flexibility skills reflected by the mindfulness and acceptance processes, and commitment and behavior change processes. Based on the earlier studies that have applied the ACT- and psychological flexibility model among students, we expected the intervention to decrease these symptoms and to increase psychological flexibility skills. This expectation was based on the findings suggesting that psychological flexibility and four of its sub-processes (self-as-context, defusion, values, committed action) may mitigate the detrimental impacts of COVID-19 risk factors on mental health such as symptoms of anxiety and depression (Pakenham et al., 2020).

We also wanted to study the adherence to the intervention, that is, the relationship between the number of sessions completed and the magnitude of change in symptoms of stress and psychological flexibility. More specifically, we compared whether the changes in stress and psychological flexibility were larger when the students had completed all five sessions compared to if they had completed three or four sessions. We expected larger changes in stress and psychological flexibility when students had completed more sessions. Moreover, low dropout rate (9%) was observed in our earlier study employing a supported online approach to national university students during a non-

pandemic period (Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016). In the current study completed during the pandemic, we were interested in studying the dropout rates (number of completed workshops), and the acceptability, defined here as satisfaction to the intervention and whether they recommended the intervention to others as well as user experiences, for example, what skills they had learned during the intervention. The findings of this study can be used to promote the mental health of international students and provide insight into whether engagement in an ACT intervention delivered via videoconference could be a feasible alternative.

Method

Procedure

To recruit the participants, flyers were advertised on the campus of the university of Jyväskylä and on social media platforms such as Facebook and Instagram, and ads were posted in university newsletters directed to international university students, inviting them to participate in a group intervention consisting of five weekly meetings. The ad specified that the aim of the workshop was to promote student well-being and that it would cover topics such as how to more effectively adapt and cope with life and study-related stressors, mindfulness, and how to engage in life and studies in a more meaningful way. The inclusion criteria were (a) to be enrolled international students at the University of Jyväskylä, (b) to be at least 18 years old, and (c) to have access to the Internet. Students receiving a simultaneous psychological intervention were excluded from the study. However, the pre-existing mental health diagnoses or psychiatric medication was not asked. Students who indicated via email or registration form that they were willing to participate in the workshop were then contacted via email to schedule the first interview. Between the falls of 2017 and 2019, the workshops were administered through in-person group-based sessions (the reference group), and during the COVID-19 pandemic (i.e. from the spring of 2020 to the fall of 2021), they were organized through zoom videoconference workshops in group format (the ACT videoconference), which was also specified in the ad. Thus, the participants were not randomly divided into the intervention conditions.

Participants

A total of 125 international university students were interested in participating in the workshops (ACT videoconference, $n = 57$; ACT face-to-face, $n = 68$). However, a total of 24 students dropped out before the pre-measurement. Among them, 16 did not reply, and eight reported a busy schedule (Figure 1). Therefore, pre-measurements were collected from 48 students participating in the ACT videoconference and 53 students participating in the ACT face-to-face group, who started the five-week intervention. Post-measurements were collected seven to eight weeks later from 43 participants (90%) in the ACT videoconference workshop and 47 participants (89%) in the ACT face-to-face workshop. A flowchart of the participants is presented in Figure 1.

Most participants were female ($n = 80$; 79%) and had a mean age of 26.09 (SD = 6.49; range 18–46). About half of them were degree students ($n = 55$, 55%), representing 40 nationalities, with nearly 30% of them coming from Asia ($n = 29$; 29%). Over 60% of the
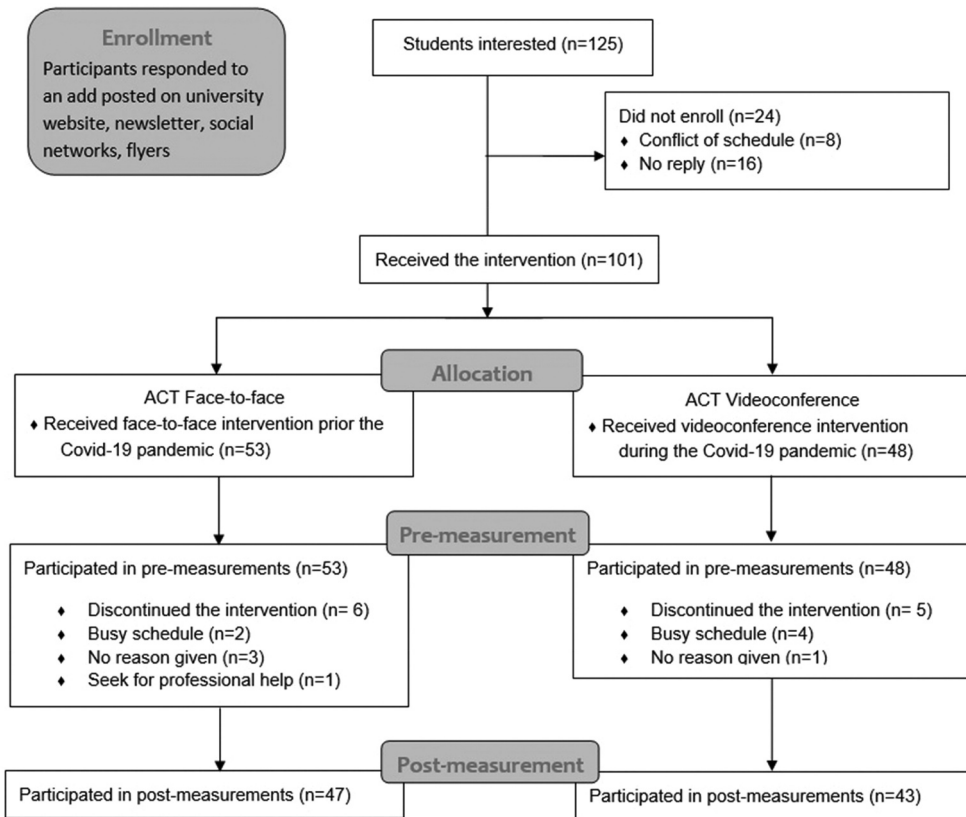
Figure 1. Flow of participants.

students stayed in Finland for less than six months ($n = 62$; 61%). The most common faculties and majors were education and psychology ($n = 35$; 35%), followed by humanities and social sciences ($n = 27$; 27%). The participants' characteristics are shown in Table 1. There were no statistical differences between the two intervention groups in terms of background variables.

The interventions

The ACT intervention conditions differed in terms of delivery format: workshops in group format through the Zoom videoconference application (ACT videoconference) or in-person group workshops (ACT face-to-face). However, both workshops followed a 90-min workshop format, with five group meetings, including a total of 7.5 hours for the workshops and a total of 2–2.5 hours for individual assessment and feedback (2×1–1.5 hours). Prior to the workshops (i.e. one week before the start), both groups of students were invited to participate in an individual semi-structured psychosocial interview (either videoconference or face-to-face) based on the model adapted from Strosahl, Robinson, and Gustavsson (2012). The purpose was to obtain an overview of the students' situation and provide general information about the intervention. During the pre-assessment, they either received a link

Table 1. Participant characteristics.

Baseline characteristics	ACT videoconf. (*n* = 48)	ACT face-to-face (*n* = 53)	All (*n* = 101)
Age			
M (SD)	25.81 (SD = 5.04)	26.09 (SD = 6.49)	25.95 (SD = 5.77)
Gender			
Female	36 (75%)	44 (83%)	80 (79.2%)
Male	12 (25%)	9 (17%)	21 (20.8%)
Educational program			
Degree	26 (54.2%)	29 (52.8%)	55 (54.5%)
Exchange	22 (45.8%)	24 (47.2%)	46 (45.5%)
Educational level			
Bachelor's	19 (39.6%)	15 (28.3%)	34 (33.7%)
Master's	24 (50%)	37 (69.8%)	61 (60.4%)
Doctorate	5 (10.4%)	1 (1.9%)	6 (5.9%)
Faculty			
Education & Psychology	17 (35.4%)	18 (34%)	35 (34.7%)
Humanities & Social Sciences	9 (18.8%)	18 (34%)	27 (26.7%)
Business & Economics	6 (12.5%)	7 (13.2%)	13 (12.9%)
Mathematics & Science	5 (10.4%)	5 (9.4%)	10 (9.9%)
Sport & Health Sciences	4 (8.3%)	3 (5.6%)	7 (6.9%)
Information & Technology	7 (14.6%)	2 (3.8%)	9 (8.9%)
Area of origin			
Asia	12 (25%)	17 (32%)	29 (28.7%)
Central Europe, Baltic, and UK	12 (25%)	9 (17%)	21 (20.8%)
East Europe & Russia	8 (16.6%)	8 (15.1%)	16 (15.8%)
Mediterranean Europe	9 (18.7%)	8 (15.1%)	17 (16.8%)
Middle East	4 (8.3%)	6 (11.3%)	10 (9.9%)
America North & South	3 (6.3%)	5 (9.5%)	8 (7.9%)
Length of stay			
Less than 6 months	32 (66.7%)	30 (56.6%)	62 (61.4%)
6 months to 1 year	9 (18.8%)	9 (17%)	18 (17.8%)
Up to 2 years	3 (6.3%)	6 (11.3%)	9 (8.9%)
More than 2 years	4 (8.4%)	8 (15.1%)	12 (11.9%)

to complete a set of online questionnaires (ACT videoconference) or completed online questionnaires on site (ACT face-to-face). The intervention was completed in groups of five to 12 students, with two group facilitators in each group. The meetings were conducted in English and led by the first and third authors (FB, SG), who were first international trainee psychologists (2017–2019) trained in administering interviews and the application of ACT models, later (2020–2021) becoming licensed psychologist and postgraduate researchers. They were trained and supervised in ACT methods by the researcher who was a licensed psychologist and expert in ACT with 20 years of experience (RL).

The structure and content of the intervention were constructed by the University of Jyväskylä research group specialized in brief ACT interventions (see, e.g. Lappalainen et al., 2014, 2021; Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016). During the intervention, the workshop facilitators were supervised by a psychologist and supervisor with more than 20 years of experience in ACT. All participants provided written informed consent, and the study was approved by the board of Central Finland Healthcare District's Ethics Committee (registration number 14 U/2012).

The videoconference intervention

During the COVID-19 pandemic (i.e. starting from the spring of 2020 to the fall of 2021), we offered the workshops ($n = 5$) remotely through the Zoom videoconferencing tool. A different ACT process was introduced each week (Table 2). Each workshop meeting started with a mindfulness exercise aimed at fostering focus on the contents of the meeting. Second, at the beginning of each session, the past week's theme was summarized, followed by a discussion in pairs. Next, the topic and core message of ACT were introduced, and a variety of experiential exercises and metaphors, including animated videos, were utilized (Table 2). Each group meeting closed with a home assignment to be conducted throughout the week, including ACT skills for application in daily life. Minor adjustments were made due to the delivery format and the COVID-19 lockdown. For example, mindfulness exercises were kept shorter, and the Face Covid protocol (Harris, 2020) was introduced (including for example, a set of practical steps for responding effectively to the Corona crisis using the ACT principles). In addition, in the discussions, the participants were encouraged to talk about the current COVID-19 situation (see Table 2 for details). A website (https://ok.jyu.fi/en) was introduced to provide text and audio exercises on the concepts discussed and the ACT skills to be practiced. Extra material was sent to the students via email the day after each workshop (see Table 2).

The reference group: the face-to-face intervention

Prior to the COVID-19 pandemic, between the falls of 2017 and 2019, the workshops ($n = 7$) were administered through face-to-face group sessions. The protocol of the face-to-face group intervention followed the same structure and content as that of the video-conference group intervention (see Table 2).

Measurements

Symptom measures

The Perceived Stress Scale (PSS-10) was used to measure symptoms of stress (Cohen & Williamson, 1988; Cohen, Kamarck, & Mermelstein, 1983). It includes 10 items on a 5-point Likert scale (0 = never, 4 = very often) prompting the respondents to indicate the level of stress perceived in their daily life in the last month. The PSS-10 score is obtained by reversing the values of four items and then summing up the 10 items (minimum 0, maximum 40). The total score with a minimum of 13 indicates low, 14 to 26 moderate, and 27 to 40 high levels of stress. The PSS has been used in student populations (Tavakoli, Broyles, Reid, Sandoval, & Correa-Fernández, 2019), with an internal consistency ranging from .74 to .91 (Lee, 2012). In this study, the scale demonstrated good reliability (10 items; $\alpha = .81$).

The Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001) is a tool that allows the evaluation of the presence or absence of the nine criteria of major depression according to the DSM-IV (American Psychiatric Association, 2013) on a scale of 0 (not at all) to 3 (nearly every day). A score of 10 or more indicates symptoms typical of major depression. The total score is obtained by the sum of the items ranging from 0 to 27. A total score of less than 4 is indicative of an absence of minimal levels of depressive

Table 2. Structure and content of the intervention (the ACT face-to-face group vs. The ACT video-conference group).

Theme	Module content	Home assignment	Adjustment and additional resources for the Videoconference intervention
Individual Pre-Assessment	Informed consent. Psychosocial interview to get a sense of the participant's current situation, problems, and level of functionality	Pre-measurements: online questionnaires	Informed consent sent via email, signed digitally or printed and scanned. Interviews via the Zoom videoconference app
Group Meeting 1: Introduction and Values	**Find out what is important to you** Introduction, introducing each other, experiences of international students. Discussion: Why are you here as an international student? Defining values. Exercises: Two kids in a car, Value cards, 80th birthday. Video: Values vs goals	Clarifying one's own values – Find out which areas are a priority now. Video: The unwelcome party guest	Introduction of the Face Covid protocol and related discussion. Additional exercises on the website: The Compass; Scary passengers; Clarifying your values
Group Meeting 2: Take action	**Engage with the important things in your life** Value-based actions. SMART goals, FEAR and DARE moves. Obstacles to actions. Discussion: How do you connect your actions to your values? Exercise: Zorg the alien. Videos: The choice point Discussion: Feelings of being an outsider	Defining goals: Immediate, short, semi-long, and long term. Commitment to taking value-based actions. Video: Ted Talk – Becoming a mad scientist with your life	Additional exercises on the website: Trip to the theme park; The dice; Three steps to setting goals
Group Meeting 3: Mindfulness	**Be present in this moment** How to be mindful in the here and now in daily life. Videos: Mindfulness is a superpower; How mindfulness empowers us. Exercises: Body scan; Mindfulness of the hand; Time machine. Discussion: How to be more engaged and focused on this experience here and now.	Being mindful in daily activities: eat, cook, shower. Audio exercise: "Hexaflex" Video: Ted Talk – Want to be happier; stay in the moment	Additional exercises on the website: Mindful breathing; Three senses; Mindful listening; Dropping the anchor
Group Meeting 4: Get out of your mind (Cognitive Defusion)	**Watch your thinking and don't get caught up in it** An observer's perspective on thoughts and feelings. Exercises: Watch your thinking; I'm having the thought that … Mind as storyteller; Say it in another language – Weakening of language control. Videos: Internal struggle; Struggle switch. Discussion: How to take distance from thoughts and negative judgements about studying abroad?	Taking distance from your thoughts: Defusion techniques sheet. Audio exercise "Leaves on the stream" Video: Ted Talk – How to make stress your friend	Additional exercises on the website: Terrier thoughts; Observer; Treat your mind as a separate person; Do the opposite; Label your thoughts; The lecture room

(*Continued*)

Table 2. (Continued).

Theme	Module content	Home assignment	Adjustment and additional resources for the Videoconference intervention
Group Meeting 5: Acceptance and Compassion	**Embrace all your thoughts and feelings** Acceptance of thoughts and feelings Exercises: The sky; The continuous you. Connection to values, value cards. Connection to self-compassion. Videos: Three happiness myths; Sadness Comforts Bing Bong. Summary of psychological flexibility. Discussion: How to reconnect the studying abroad experience with values and a more open attitude.	Write down three things you learned from this workshop. Video: Ted Talk – How love turns pain into purpose	Additional exercises on the website: Exploring emotional strategies; Giving space to your emotions; Two friends; What am I willing to accept?
Individual Post-measurements and feedback	Final interview Evaluating the student's situation.	Post-measurements: online questionnaires and feedback	Interviews via the Zoom video conference app. Questionnaire link was delivered via email.

symptoms, 5 to 9 mild, 10 to 14 moderate, 15 to 19 moderately severe, and over 20 severe depression. The validity and reliability of the PHQ-9 have been found to be good in previous studies, including student samples (Kroenke, Spitzer, & Williams, 2001; Tavakoli, Broyles, Reid, Sandoval, & Correa-Fernández, 2019). In this study, the scale demonstrated good reliability (9 items; α = .80).

The Generalized Anxiety Disorder Assessment (GAD-7) is a self-administered questionnaire that evaluates the level of generalized anxiety (Spitzer, Kroenke, Williams, & Löwe, 2006). The respondent is asked to rate on a scale from 0 (not at all) to 3 (nearly every day) how often they have experienced anxiety symptoms in the last two weeks (minimum 0, maximum 21). Scores below 5 indicate minimum levels of anxiety, scores from 5 to 9 mild, 10 to 14 moderate, and above 15 high levels of anxiety. The internal consistency of the GAD-7 has been found to be excellent (α = .92; Spitzer, Kroenke, Williams, & Löwe, 2006), including in studies of university students (Kim, Maleku, Lemieu, Du, & Chen, 2019). In this study, the reliability of the scale at baseline was excellent (7 items; α = .88).

Process measures

Below the mindfulness and acceptance processes (measured by AFQ-Y and FFMQ) and commitment and behavior change processes (measured by ELS) are described in more detail.

The Avoidance and Fusion Questionnaire for Youth (AFQ-Y) measures psychological inflexibility, a construct that refers to the non-adaptive avoidance of thoughts and emotions, typical of many psychopathologies such as anxiety and mood disorders (Greco, Lambert, & Baer, 2008). The AFQ-Y includes 17 statements on a scale from 0 to 4 (0 = not at all true, 4 = very true). The score is obtained by summing up all 17 items

(minimum 0, maximum 68). Higher scores indicate higher levels of psychological inflexibility (i.e. a higher tendency of cognitive fusion and rumination). The AFQ-Y has shown adequate reliability and validity in child and adolescent (Greco, Lambert, & Baer, 2008) and university student samples (Schmalz & Murrell, 2010) and in predicting psychological symptoms (Fergus et al., 2012). In this study, the reliability of the scale at baseline was excellent (17 items; α = .83).

The Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) was used to measure the participants' mindfulness skills. It consists of 39 statements prompting respondents to indicate their degree of agreement on a scale from 1 to 5 (1 = rarely or never, 5 = often true or always true). The questionnaire is divided into five subscales: observing (FFMQ-Ob); describing (FFMQ-De); non-judging of inner experience (FFMQ-Nj); non-reactivity of inner experience (FFMQ-Nr); and acting with awareness (FFMQ-Aw). The total score of the FFMQ is obtained by reversing the scores of the positive items and summing up the 39 items to obtain scores ranging from 39–195. Higher scores are indicative of higher levels of mindfulness. The FFMQ has an adequate internal consistency (Baer et al., 2008) and is a valid measure of mindfulness among university students (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Carmody, Baer, Lykins, & Olendzki, 2009). In this study, the FFMQ showed high reliability for the total score (39 items; α = .88) and for observing (8 items; α = .81), describing (8 items; α = .89), non-judging (8 items; α = .89), non-reacting (7 items; α = .74), and acting with awareness (8 items; α = .88).

The Engaged Living Scale (ELS) measures the ability to engage in actions in accordance with their values (Trompetter, 2014). It includes 16 items and consists of two subscales: valued living (ELS-VL), which measures the ability to identify one's own values, and life fulfillment (ELS-LF), which evaluates the ability to act in accordance with one's values. All items are rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The total scores are calculated for each subscale and the main scale (minimum 0, maximum 80). Higher scores indicate higher levels of engagement in valued actions. Studies with student samples have shown adequate to good psychometric properties (Grégoire, Doucerain, Morin, & Finkelstein-Fox, 2021). In this study, the ELS showed excellent reliability for the total score (16 items; α = .92), valued living (11 items; α = .90) and life fulfilment (5 items; α = .85).

Participant satisfaction and experiences

The participants' feedback relating to their satisfaction with the intervention was collected using a self-constructed feedback questionnaire with rating scales, yes and no questions, and open-ended questions that reflected how students perceived and responded to the intervention. They rated their satisfaction with the intervention on a 10-point Likert scale, with 0 indicating *very dissatisfied* and 10 *very satisfied, and reported whether they recommended the intervention to others or not (1= would not recommend, 5= would highly recommend)*. Additional feedback from the participants was collected using a 1–5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*), including questions related to the coaches and the workshop, a selection of yes and no questions about the skills learned during the workshop, and open-ended questions focusing on the perceived benefits (e.g. *What did you find most helpful in the workshop?*) and suggestions for improvements (e.g. *If you could change anything about the workshop, what would it be?*).

Statistical analyses

Statistical analyses were conducted using Mplus (version 8.4, Muthén, 1998) and IBM SPSS Statistics 26. The baseline differences between the groups were explored with *t-tests* and *chi-square* tests. Latent change score (*LCS*) models were used to investigate whether changes in the face-to-face and videoconference groups differed from the pre- to post-measurement. They were represented by the *Wald test* score and the associated *p-value, significant p-value reflecting an interaction effect (equivalent to repeated ANOVA)*. All the available information was used in the analyses, and missing data were assumed to be missing at random. Thus, all the participants who completed the pre-measurements were included in the analyses.

Effect sizes (*ESs*) were reported using *Cohen's d*. The corrected between-group *ES* was calculated by dividing the change in the mean difference between the face-to-face and videoconference groups by the mean of the standard deviation of the pre-measurement (Face:MPre – Mpost + Online: Mpost-MPre) divided by ((Face:SDpre + Online: SDpre) divided by 2), the Excel formula: A4-C4+H4-F4)/((B4+G4)/2). To interpret *Cohen's* between- and within-group *d*, an *ES* of 0.20 was considered small, 0.50 moderate, and equal to or above 0.80 large (Cohen & Williamson, 1988). When calculating *Cohen's d* for the within-subjects *ESs*, we used the average standard deviation of both repeated measures as a standardizer, as recommended by Lakens (2013). Because we expected both interventions to have an impact on our outcome variables, we interpreted that the intervention had shown beneficial effects when the within-group 95% confidence interval (*CI*) for the within-group *ESs* did not include or cross through zero indicating significant change (indicated with asterisks in the table).

Results

Dropout rates

As shown in Figure 1, the overall dropout rate was relatively low. Altogether, 89% ($n = 90$) of the 101 international university students completed the workshops and were assessed at post-intervention. Among those who discontinued their participation ($n = 11$, 11%), four provided no specific reason, while six reported a busy schedule. One participant in the face-to-face group interrupted their participation due to a high level of symptoms. The dropout rates were highly similar in both groups (10% videoconference group; 11% face-to-face group). Eighty-nine percent of the participants in the videoconference group and 83% in the face-to-face group attended four to five group meetings. Thus, there were no statistical differences between the groups in the number of sessions attended (videoconference, $M = 4.28$, $SD = 0.67$; face-to-face, $M = 4.34$, $SD = 0.76$).

Severity of symptoms at pre-measurements

At pre-measurement, 91% ($n = 44$) of the students in the videoconference group and 87% ($n = 46$) in the face-to-face group reported moderate to high stress (PSS-10 scores higher than 14). Moderate to high depressive symptom levels (PHQ-9 $\geq$ 10) were reported by 33% ($n = 16$) of the students in the videoconference group and 51% ($n = 27$) in the face-to-face group. Moderate to high anxiety (GAD-7, score of 10 or more) was reported by 35%

($n = 17$) of the students in the videoconference group and 40% ($n = 21$) in the face-to-face group. Based on the total scores of PSS-10, PHQ-9, and GAD-7, there were no statistical differences between the groups in the severity of symptoms reported prior to the interventions ($p > 0.10$).

Changes in symptoms and psychological flexibility

There were no significant interaction effects since both intervention groups showed beneficial changes (Table 3). Although the groups did not change statistically differently

Table 3. Pre – post values for symptoms, psychological inflexibility, mindfulness, and engaged living in the videoconference ($n = 48$) and face-to-face ($n = 53$) groups. Estimated mean values, standard deviations, Wald test, p-values, between- and within-group effect sizes (including 95% confidence intervals).

| | Pre | Post | $W(df = 1)$ | | | |
	M (SD)	M (SD)	p	d_b	d_w	d_w 95% CI
Stress (PSS-10)						
ACT videoconf	2.73 (5.96)	17.50 (5.93)	2.23		0.54	0.13; 0.95*
ACT face-to-face	2.74 (5.32)	15.61 (5.63)	0.135	0.34	0.94	0.53; 1.33*
Anxiety (GAD-7)						
ACT videoconf	8.58 (5.30)	7.23 (3.83)	3.82		0.29	−0.11; 0.69
ACT face-to-face	8.72 (4.52)	5.60 (3.70)	0.051	0.36	0.76	0.36; 1.14*
Depression (PHQ-9)						
ACT videoconf	8.17 (4.79)	6.85 (3.98)	3.16		0.30	−0.11; 0.70
ACT face-to-face	9.47 (5.05)	6.39 (4.81)	0.076	0.36	0.63	0.23; 1.01*
Psych. inflex. AFQ-Y						
ACT videoconf	26.38 (9.66)	2.75 (1.86)	3.12		0.55	0.14; 0.95*
ACT face-to-face	26.45 (11.33)	17.08 (1.88)	0.077	0.36	0.84	0.44; 1.23*
FFMQ Total						
ACT videoconf	121.23 (15.94)	128.55 (16.73)	1.32		0.45	0.04; 0.85*
ACT face-to-face	118.48 (19.61)	129.58 (19.43)	0.251	0.21	0.57	0.18; 0.95*
FFMQ-Obs						
ACT videoconf	26.90 (5.93)	27.78 (5.98)	0.07		0.15	−0.25; 0.55
ACT face-to-face	26.85 (6.44)	27.45 (5.91)	0.789	0.05	0.10	−0.28; 0.48
FFMQ-Desc						
ACT videoconf	27.48 (5.33)	28.31 (5.53)	3.33		0.15	−0.25; 0.55
ACT face-to-face	26.08 (7.58)	28.48 (6.55)	0.068	0.24	0.34	−0.05; 0.72
FFMQ-Awa						
ACT videoconf	25.27 (6.63)	25.93 (6.30)	0.87		0.10	−0.30; 0.50
ACT face-to-face	24.45 (5.99)	26.15 (4.57)	0.352	0.16	0.32	−0.07; 0.70
FFMQ-Nonjudg						
ACT videoconf	24.96 (7.52)	28.74 (7.43)	0.27		0.51	0.10; 0.91*
ACT face-to-face	24.52 (6.99)	29.00 (7.14)	0.604	0.10	0.63	0.24; 1.02*
FFMQ-Nonreact						
ACT videoconf	16.63 (4.23)	17.69 (3.54)	0.80		0.27	−0.13; 0.67
ACT face-to-face	16.59 (4.25)	18.44 (4.21)	0.371	0.19	0.44	0.05; 0.82*
Engaged Living ELS Total						
ACT videoconf	53.98 (11.10)	57.37 (8.60)	1.80		0.34	−0.06; 0.74
ACT face-to-face	54.23 (12.62)	6.02 (1.12)	0.180	0.20	0.51	0.12; 0.89*
Valued Living						
ACT videoconf	38.60 (8.05)	39.86 (5.86)	2.04		0.18	−0.22; 0.58
ACT face-to-face	37.87 (8.72)	4.97 (6.92)	0.153	0.22	0.39	0.01; 0.78*
Life Fulfillment						
ACT videoconf	15.38 (4.17)	17.51 (4.03)	0.65		0.52	0.11; 0.92*
ACT face-to-face	16.36 (4.52)	19.05 (3.87)	0.420	0.13	0.64	0.24; 1.02*

Note: d_b = between-group effect size.
d_w = within-group effect size, * = significant change, $p < 0.05$.

from pre- to post-intervention, the between- (d_b) and within- (d_w) group ESs indicated slightly larger positive changes in the face-to-face intervention group. The between-group *ESs* were either very small ($d = 0.05$ to 0.19) or small ($d = 0.20$ to 0.36) in favor for the face-to-face intervention. Based on the within-group *ESs* (Table 3), and upon interpreting the 95% *CI* that did not include zero as a meaningful change and as an indicator for statistical significance, we observed that both intervention groups showed comparable decreases in symptoms of stress and psychological inflexibility and increases in the mindfulness total scores, the mindfulness non-judgement subscale, and the engaged living subscale life fulfillment. Moreover, there were no differences in how much the symptoms changed in the different cultural groups. For example, between the subgroups of students form Asia and students from Central Europe, UK and Baltics, the t-test showed no differences (PSS: $t = 1.237$ (38), $p = 0.224$; GAD: $t = -0.496$ (38), $p = 0.623$; PHQ-9: $t = 0.415$ (38), $p = 0.681$). When comparing the six cultural groups (Asia, $n = 24$; Central Europe, Baltics & UK, $n = 16$; East Europe & Russia, $n = 16$; Mediterranean Europe, $n = 15$; Middle East, $n = 12$, and America North & South, $n = 7$), the changes did not differ significantly for each other (PSS: $F(5,84) = 0.980$, $p = 0.435$; GAD: $F(5,84) = 1.448$, $p = 0.216$; PHQ-9: $F(5,84) = 0.334$, $p = 0.891$). However, the results must be taken with caution because of the low number of students.

Adherence to the intervention

We further investigated the number of sessions attended and the response to the intervention relationship (Figure 2) regarding stress (PSS-10) and psychological inflexibility (AFQ-Y). Of the 43 students in the videoconference group, 11% completed three sessions, 49% four sessions, and 40% five sessions. The corresponding numbers in the face-to-face group were 17%, 32%, and 51%, respectively. In the videoconference group, we observed that those who completed all five sessions ($n = 17$) did not report larger decrease in stress and psychological inflexibility compared to those who completed three or four sessions ($n = 26$, Figure 2). However, in our reference group (the face-to-face
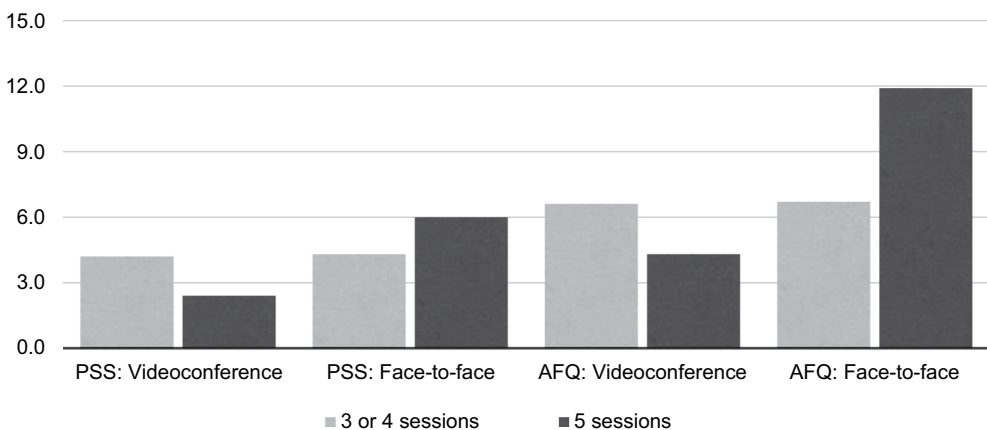

Figure 2. Mean changes of stress (PSS) and psychological inflexibility (AFQ-Y) in the videoconference and face-to-face groups when completing 3 or 4 sessions compared to when completing 5 sessions.

intervention group), those who completed all five sessions ($n = 24$) also reported larger changes compared to those who completed fewer sessions ($n = 23$). The pre-post change in psychological inflexibility (AFQ-Y) when completing 3 to 4 sessions ($M = 6.74$, $SD = 9.82$) was significantly smaller ($t = -2.083$, $df = 45$, $p = 0.043$) compared to when completing 5 sessions ($M = 11.92$, $SD = 7.06$). However, in the videoconference group, the corresponding values were for 3 to 4 sessions ($M = 6.58$, $SD = 11.72$), and for 5 sessions ($M = 4.29$, $SD = 11.43$, $p = 0.532$), were similar.

Participant satisfaction and experiences

The overall satisfaction with the intervention was slightly but significantly higher in the ACT face-to-face intervention ($M = 8.57$, $SD = 1.30$, $n = 47$) compared to the ACT videoconference condition ($M = 7.88$, $SD = 1.76$, $n = 43$; $t (88) = 2.130$, $p = 0.039$). There was no difference between the groups in the number of participants who recommended the intervention to others (videoconference, 86%, $n = 37$; face-to-face, 83%, $n = 39$). The working relationship with the coaches was evaluated equally in both groups (videoconference, 91%, $n = 39$; face-to-face, 87%, $n = 41$). Both groups perceived that learning new skills and strategies was most helpful: skills in general (videoconference, 33%, $n = 14$; face-to-face, 28%, $n = 13$); defusion ($n = 4$ vs. 9, 9% vs. 19%); mindfulness ($n = 11$ vs. 6, 26% vs. 13%); and values ($n = 9$ vs. 4, 20% vs. 9%). In addition, opportunities to share with others were perceived in a quite similar way (videoconference, 35%, $n = 15$; face-to-face, 23%, $n = 11$). The need for improvement included more time for sharing ideas and interactive group activities (videoconference, 30%, $n = 13$ vs. face-to-face, 19%, $n = 9$) and more or longer sessions ($n = 2$ vs. 5, 5% vs. 10%). Among the students in the videoconference group, four expressed the desire for face-to-face group meetings. In sum, the workshops were well accepted by the participants, as illustrated by one of the students in the videoconference group in an open-ended feedback question (e.g. *What did you find most helpful in the workshop?*): "*Through these sessions, I could find the aim and value for my life, and it helps me to work better in my daily life!*"

Discussion

We were interested in exploring whether a psychological intervention delivered by videoconference during the distressing COVID-19 pandemic could decrease psychological symptoms and increase psychological flexibility skills among international university students. The acceptance and commitment therapy (ACT) -based five-week videoconference workshop reduced symptoms of stress, decreased psychological inflexibility, and increased mindfulness skills and valued-based actions. These changes were comparable to the impact of the face-to-face workshop convened prior to the pandemic. These findings were consistent with earlier ACT-based studies reporting positive outcomes in general (e.g. Grégoire, Lachance, Bouffard, & Dionne, 2018; Levin et al., 2014; Levin, Hayes, Pistorello, & Seeley, 2016; Levin, Krafft, Pistorello, & Seeley, 2019; Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016) and international (Muto, Hayes, & Jeffcoat, 2011; Xu, O'Brien, & Chen, 2020) student populations. Multiple studies have shown that ACT training has a positive effect on student well-being (Howell & Passmore, 2019). The current evidence supports the implementation of ACT in various formats for student well-

being. For instance, a self-help ACT-based digital intervention conducted during the COVID-19 pandemic helped improve well-being in students who reported COVID-related distress (Shepherd, Golijani-Moghaddam, & Dawson, 2022). However, studies investigating group-based ACT videoconferencing interventions for international students during the pandemic are hitherto non-existent.

Overall, research on interventions examining the well-being of international students during the pandemic remains limited. Our findings point to encouraging benefits of the ACT intervention delivered during the pandemic. Even though it was delivered during arduous times, the relatively limited support and guidance provided online helped the students reduce their stress and, perhaps most importantly, decrease non-adaptive avoidance of thoughts and emotions and increase the ability to refrain from judging their thoughts, emotions, and sensations and act in accordance with their values. Interestingly, attending all five videoconference sessions did not produce larger changes compared to attending three or four sessions on psychological inflexibility and stress symptoms. This contrasts with the "dose-response effect" observed in the face-to-face intervention and raises the question of whether a three- or four-session videoconference intervention would have been sufficient for the students' needs during the pandemic. Also, the differences in changes in psychological inflexibility after 5 sessions compared to after 3–4 sessions between the groups could be because of the COVID-19 pandemic. The pandemic might have negatively affected the changes in psychological flexibility. In other videoconference studies with students, Yuen and colleagues (Yuen et al., 2019) found that a 12-session ACT group videoconferencing intervention decreased social anxiety symptoms. On the other hand, a brief 5-session ACT videoconference training for university students during the COVID-19 pandemic (Browning, Morena, Gould, & Lloyd-Richardson, 2022) decreased symptoms of stress and anxiety. The sufficient length of videoconference interventions during pandemic remains to be investigated.

We observed a low dropout rate of approximately 10% among the international university students in both intervention groups, indicating that nearly 90% of the participants completed the intervention. A similarly low dropout rate (9%) was reported in an earlier study employing a supported online approach to university students during a non-pandemic period (Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016). Importantly, the videoconference workshop was well received by the students, although delivered by less experienced psychologists. Thus, the dropout rate was not significantly higher for the ACT-based intervention via videoconference compared to the face-to-face delivery. This was also reflected in the studies of Yuen and colleagues (Yuen et al., 2019) and Browning and colleagues (Browning, Morena, Gould, & Lloyd-Richardson, 2022), with both losing one participant in the post-assessment. However, it contrasts with observations in the videoconference study of Shepherd and colleagues (Shepherd, Golijani-Moghaddam, & Dawson, 2022) with only 46% of the participants completing the post-intervention measurements. Thus, the intervention model applied in the current study was well accepted by the international students.

Based on our findings, which included nearly 40 nationalities, it may not be necessary to make interventions or counseling more culturally appropriate for diverse international student populations, as suggested by Forbes-Mewett (2019). Our results, as well as the participants' feedback, show that a process-based ACT workshops, combined with issues that international university students deem relevant, can be effective and well received by

participants regardless of cultural background. We believe that it may be less critical to culturally tailor an intervention to students when applying process-based approaches focused on teaching generic skills, such as in this intervention. Moreover, we found that there were no differences in the impact of the intervention on symptoms between the different cultural groups, for example, between the subgroups of student from Asia and students from Central Europe, UK and Baltics.

Limitations

There were several notable limitations that hinder the generalizability of the results, the most important being the lack of a randomized control group and the small sample size. Moreover, most of the study participants were female (around 80% total), which appears to be an inherent problem in many online and face-to-face interventions, limiting generalizability of our results. Female students may experience higher levels of psychological symptoms, such as anxiety and depression, higher stress, and lower resilience than male students (e.g. Adlaf, Gliksman, Demers, & Newton-Taylor, 2001; Lai et al., 2020), all of which were arguably reflected in our results. The lack of a control group made it impossible to draw firm causal conclusions. Without a control group, key threats to internal validity such as history, maturation, and regression toward the mean cannot be ruled out. According to Yalom and Leszcz (2005), being with others in the group who experience similar feelings is one of the most curative aspects of groups. Thus, we were not able to separate the impact of group involvement in our results. However, our studies suggest among students the changes in stress (PSS) were comparable whether the interventions were delivered individually (within group $d = 0.76$, Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016) or in group ($d = 0.54–0.94$, the current study). Future studies are needed in this area. Furthermore, this study included a diverse and heterogeneous student sample who voluntarily decided to participate in a program to improve well-being and stress, limiting again generalizability, mostly because of personal difficulties or curiosity regarding the applied approach. Limited recruitment time may have influenced participation since the intervention had to be delivered within one semester. These observations need to be taken into consideration when drawing conclusions from the study. Further studies with larger samples are needed to investigate whether our findings can be generalized to the overall international student population. Furthermore, the difficult context related to the COVID-19 pandemic and the adjustments made to the protocol may have impacted the results of the intervention. Interestingly, the effect of the videoconference intervention was no different on psychological flexibility skills whether the participants attended all five sessions or three/four sessions. The within group change was significant and moderate while in the face-to-face intervention it was large. This difference could be because of the last session. Further studies are needed to investigate the change mechanisms in videoconference interventions.

Conclusions

University students have been deeply affected by the pandemic (e.g. Di Consiglio, Merola, Pascucci, Violani, & Couyoumdjian, 2021; Meda et al., 2021) and international students even more so due to their temporary status in their host countries and disruptions to their daily life

(Gomes & Forbes-Mewett, 2021). Preventive measures, such as closing campuses and transitions to online teaching, have adversely affected students' mental health, particularly that of international students (Lai et al., 2020). It is estimated that mental health issues among international students are increasing in both occurrence and severity (Forbes-Mewett, 2019). The current study confirmed this, showing that these students may, indeed, experience significant mental health challenges, which can have adverse impacts on their well-being and delay their studies.

It has been suggested that group treatments engaged people socially while also protecting them from psychological symptoms during the COVID-19 pandemic (Marmarosh, Forsyth, Strauss, & Burlingame, 2020). Against this backdrop, this study showed that it was possible to help students during the pandemic by offering them a brief online workshop with the aim of increasing their psychological flexibility skills. Our sample included nearly 40 nationalities suggesting that the investigated intervention is appropriate for students with diverse backgrounds. Many of the observed changes were equivalent to those obtained in a similar face-to-face workshop prior to the pandemic. Learning acceptance skills and encouraging students to pursue a value-driven study life and acting accordingly should be integrated into both the curriculum and counseling services targeting international students in the future. The possibility of effectively delivering similar services online via videoconferencing applications offers a chance to reach those students coming and/or attending the workshop from overseas, or simply from a different location. It would be interesting to broaden the research to identify the ideal amount of support needed, the intervention length, and the components that may have a stronger impact in terms of delivering effective results.

Disclosure statement

Notes on contributors

Francesca Brandolin, PhD. Licensed clinical psychologist in Italy. Previous studies are bachelor in Psychological Sciences and Techniques and an international master's degree in Clinical Psychology. During the last year of the master and post-graduate internship she got involved in different research projects dealing with brief psychological interventions for student's wellbeing and stress management, and virtual reality (VR) interventions for social anxiety and public speaking at the department of Psychology, University of Jyväskylä. Her ongoing research in the past six years involve the efficacy of a brief low-threshold workshop on the distress of international students, both delivered face-to-face or online through videoconference during the COVID-19 pandemic. Currently, all three articles that formed her doctoral dissertation are published. Brandolin is an active member in the Association for Contextual Behavioural Science.

Päivi Lappalainen, PhD, PostDoctoral Researcher has published over 40 papers in the area of web-based and mobile eHealth interventions based on Acceptance and Commitment Therapy (ACT). She has also been the digital content lead (psychology) for 18 web-based and mobile interventions, including web and mobile applications for preventing stress and promoting well-being of working age individuals, depressive symptoms, insomnia and chronic conditions. Therefore, she is one of the world leading experts in the field of digital ACT interventions. During the last 11 years she has been involved in and managed research projects dealing with web-based and mobile interventions at the department of Psychology, University of Jyväskylä. Her ongoing research projects involve the efficacy of a web-based psychological intervention for parents experiencing stress and burnout, a

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Raimo Lappalainen, in clinical psychology. Professor in clinical psychology and psychotherapy at the Department of Psychology, University of Jyväskylä, Finland. A licensed psychologist and psychotherapist. He has acted as the vice head and the head of the Department of Psychology between years 2008-2013. He has over 25 years' experience of Cognitive Behavioural Therapies (CBT) with expertise especially in the third wave CBT, acceptance and value –based interventions. Author of more than 100 scientific articles and books. He has special expertise in applying and constructing web- and mobile-based psychological interventions. His main research interests are development of brief psychological interventions, including web- and mobile -based interventions for wellbeing and wellness management. Received the Public Information Award (2015) by the Jyväskylä University Foundation for his research group's achievement of developing web and mobile interventions.

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