RECONNECT: increasing student well-being after two years of COVID-19 disruption

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Abstract

The COVID-19 pandemic and ensuing lockdown measures caused young people aged 14-25 to suffer particularly from loneliness and disconnect. We developed and tested a simple, cost-effective intervention called RECONNECT to increase student well-being. RECONNECT took place at a Dutch university in May-June 2022, and it consisted of three plenary meetings and a series of selforganized, small-group events. We perform a multivariate analysis of data from 150 students, including RECONNECT participants and non-participants. In parallel, we analyze qualitative data from six in-depth interviews as well as open feedback provided by participants. Our findings show the effectiveness of this simple intervention, which gave the students the possibility to reconnect socially with their academic peers. Prior to the intervention, participants who self-selected into RECONNECT reported heightened loneliness (1.13 points compared to the control group, p-value=0.017) and decreased well-being (5 points compared to the control group, p-value<0.001). The intervention improved self-reported well-being, with Satisfaction With Life increasing by 1.89 points (pvalue<0.01). Though our study was conducted against the backdrop of the COVID-19 pandemic, it offers a broader insight: improving student well-being within a self-selected group is achievable in a relatively short time and with a low budget. The present study serves as a proof-of-concept for similar future efforts.

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1. Introduction

Experts issued early warnings about the potential adverse impact of the COVID-19 pandemic on loneliness and the loss of social contact (Holmes et al., 2020). Students were seen as a group particularly vulnerable to experiencing loneliness (Bu et al., 2020), a prediction confirmed by follow-up studies (Bimonte et al., 2022). Across various countries and contexts, studies revealed that students suffered immense loneliness and disconnect due to lockdown measures and the subsequent closure of schools, universities, and workplaces (Sampogna et al., 2021; Weissbourd et al., 2021). Even before these events, university students reported handling mental health issues independently rather than seeking help (Ebert et al., 2019), and this tendency was only exacerbated by the loss of social connection with teachers and peers during the pandemic. Meanwhile, the accessibility of support programs has been hindered by visible and invisible barriers (Broglia et al., 2018; Mowbray et al., 2006; Storrie et al., 2010). Against this backdrop, it is not surprising that the pandemic caused student well-being to plummet.

While loneliness and depression among students have been extensively documented, evidence of targeted post-COVID interventions to counteract the situation is still lacking. To bridge this gap, we have developed and evaluated a simple, on-campus intervention aimed at restoring lost opportunities for social connection among students. Our goal was a preventive, low-cost intervention that could reach students before they come to require professional psychological support. Our study addresses the following question: 'Can we improve student well-being and increase connection with university peers through a simple, low-threshold intervention?'

Low well-being and poor mental health affect not only students' private lives, but also their longterm study outcomes (Lipson & Eisenberg, 2018; Mokgele & Rothmann, 2014). Efforts to improve mental well-being thus deserve the explicit attention of universities. Our study serves as a proof of concept that such efforts are both feasible and desirable. We designed the intervention such that it is easily replicable, with minimal access barriers for students. In addition, we incorporated intensive data collection throughout to evaluate its effectiveness. As a result, this study provides a departure point for systematically improving student well-being.

The intervention design was inspired by existing research showing that well-being responds to interventions focusing on group interaction (Heintzelman et al., 2019; Krekel et al., 2021). On that basis, our intervention focused on two major themes: inspiration and social connection. In service of the 'inspiration' theme, we invited participants to attend informal lectures where there was also space for them to share personal stories of overcoming adversity. In service of the 'social connection' theme, we facilitated opportunities for participants to socialize, have fun together, and form bonds. This design was influenced by well-being courses, such as the online course by Yale University¹, courses provided by lay leaders in local communities (Krekel et al., 2021), and courses provided by professionals (Heintzelman et al., 2019).

Once COVID-related restrictions were lifted in the Netherlands in the spring of 2022, we began promoting RECONNECT as a means for students wo were feeling disconnected and lonely to connect with their peers at the university campus. The five-week program took place between May-June 2022. It consisted of three plenary meetings, each with a different speaker sharing their experience with overcoming adversity. These sessions were flavored with theoretical insights and enriched through informal discussions with the participants. Following each plenary session, participants could

¹ Online Course "The Science of Well-Being". Details can be found here: <u>https://www.coursera.org/learn/the-science-of-well-being</u> [Last accessed: March 16, 2023].

attend a social event at the university bar sponsored by RECONNECT where they could have a drink and chat with one another. Next to these supervised interactions, we also randomly allocated participants in smaller groups of four to five people, connected them through social media (WhatsApp), and motivated them to organize three small-group events (e.g., cooking together).

We gathered initial data from 127 students who registered for RECONNECT, with nearly 60% of them being female students. Both local (46.5%) and international (53.5%) students registered, and the majority of registrations (70.1%) came from students pursuing a Bachelor's degree. Following registration, 77 students completed the baseline survey, and 36 students also completed the endline survey. We also collected data from a random sample of 35 students who did not join RECONNECT during an open day at the university, and this random sample served as our control group.

The intervention targeted students who desired to revitalize their social life, and survey data shows that our promotional strategy succeeded in reaching this target group. We attracted participants who reported higher loneliness (1.13 points higher on the Loneliness scale compared to the control group, *p*-value=0.017) and a greater deficit in social well-being (5 points lower on the Satisfaction With Life scale compared to the control group, *p*-value<0.001), which indicates that these students were able to act on their demand for social connection once support was offered. Most importantly, our qualitative analyses show that students who chose to join RECONNECT were very much aware of their isolation and need for reconnection. This finding opens the door to a non-paternalistic, student-driven approach to supporting students facing transient loneliness and reduced well-being.

Our impact evaluation shows that RECONNECT participants had higher well-being after the program than immediately before its start. Effects are positive on all three outcomes but only statistically significant for Satisfaction With Life. The treatment impact on Satisfaction With Life derived from multivariate regression analysis is 1.89 points (*p*-value<0.01). These results very promising as they could be identified despite the short intervention period and despite limitations stemming from the small sample and the timing of RECONNECT. We implemented RECONNECT at the hectic end of the academic year, where students face considerable study demands from exams, retake exams, term papers, and thesis deadlines. We also see some evidence indicating lower loneliness after the program, though this result is weaker due to the small sample; the reduction in the Loneliness scale is 0.31 (*p*-value=0.411). Our qualitative analysis further reinforces the quantitative findings: participants reported that RECONNECT acted as a low-barrier environment where they could reach out to peers experiencing similar feelings of social isolation, making them feel comfortable to share and connect.

The remainder of this paper is structured as follows: Section 2 briefly introduces the theoretical concepts we employ related to loneliness and well-being. Section 3 presents the study design, the measures used, and the sample. The approach to the quantitative and qualitative analysis of our data and the resulting findings are presented in Section 4. Section 5 concludes with a discussion of the findings.

2. Theoretical background of the studied concepts

2.1 Study setting

During the COVID-19 pandemic, university students experienced lockdowns that suspended oncampus education for an uncertain period, while their usual mode of study was replaced by an unfamiliar online context. The social distance measures effectively put students' social life on hold. Teachers and students searched for creative ways to stay connected, but virtual classrooms were often a poor or unreliable substitute for the daily social interactions of pre-pandemic times.

In the Netherlands (the country of our study), multiple study interruptions took place between March 2020 - May 2021. At Radboud University (where our study took place), this implied a total lockdown, forcing all teaching to move online. Even when the lockdown measures were partially lifted, hybrid education was often combined with only one in-person meeting per week within fixed groups, which particularly affected the large-scale, first-year courses. Thus, in-person interactions with study peers during this period became *de facto* restricted to the small circle of co-habiting students. For those students living with parents or alone, even this contact was absent. Nonetheless, students were expected to continue their studies and perform as usual.

As a first step, we assessed how students were affected by the COVID-19 pandemic by using validated scales of a) loneliness, b) satisfaction with life, c) social well-being, and d) belonging. In the subsequent multivariate analysis, we also included variables that might serve as protective factors in the event of adverse life events: the presence of a romantic relationship, social support from family and friends, and perseverance of effort (a subcomponent of the Grit scale). In a second step, we assessed whether our RECONNECT intervention affected belonging with study peers, social wellbeing, and satisfaction with life. In this analysis we treated loneliness as a stressor, as the previous literature has established that loneliness is negatively associated with social well-being and satisfaction with life (Ben-Zur, 2012; Diener & Ryan, 2008; Vanderweele et al., 2012; Walton & Cohen, 2011).

2.2 Loneliness

Loneliness is widely defined as a negative subjective experience of a lack of social connection, and is the opposite of the feeling of belonging (Cacioppo & Cacioppo, 2014; Dutcher et al., 2022; Hawkley & Cacioppo, 2010; Teater et al., 2021). It has been established that loneliness harms subjective wellbeing (Walton & Cohen, 2011) and is associated with higher rates of depression in young adults (Cacioppo et al., 2006, 2010; Matthews et al., 2016).

The existing research has identified three dimensions of loneliness: (i) *intimate loneliness*, which occurs when the presence of a nurturing relationship with another person is lacking, usually proxied in empirical studies through marital status or a long-term intimate relationship (Hawkley et al., 2005); (ii) *relational loneliness*, which is the perceived or actual absence of a broader friendship network, usually predicted by the frequency of contact with friends and family (Hawkley et al., 2005), and (iii) *collective loneliness*, which is the perceived absence of a meaningful connection with a group or social entity beyond the level of individuals, e.g., a school, team, or nation (Cacioppo et al., 2014). Collective loneliness tends to be operationalized with questions about general feelings of being left out, such as 'How often do you feel left out?' or 'How often do you feel isolated from others?' (Hughes et al., 2004).

The social contact disruptions experienced by the student population during the COVID-19 pandemic are likely to have extended across all three loneliness domains. Still, this study focuses on collective loneliness as experienced by students in the academic context. During the pandemic, students experienced an interruption of in-person contact with study peers and teachers. While intimate and relational loneliness could be somewhat salvaged in the private sphere, collective meetings in the academic context—which are so crucial for preventing collective loneliness—became impossible.

Evolutionary perspectives on loneliness suggest that the feeling associated with an unmet demand for social contact can serve as an adaptive mechanism, stimulating the development of strategies to re-establish disrupted social connections (Cacioppo et al., 2006). People experiencing transient loneliness can therefore benefit from contexts that increase the likelihood of meeting peers, as they will be motivated to overcome that temporary loss of connection. Based on this, we argue that interventions offering opportunities to establish social contact, such as RECONNECT, are likely to succeed in targeting loneliness.

2.3 Belonging

The opposite of loneliness is the perceived sense of belonging, which is seen as a fundamental human need (Baumeister & Leary, 1995). Failing to feel part of some community or group translates into negative affect (Twenge et al., 2021), lower mental health (Gopalan & Brady, 2020), and depressive symptoms in student populations (Dutcher et al., 2022). Like loneliness, belonging arises in multiple social contexts, which can involve family, friendships, or professional settings (such as with study peers in the case of university students).

Previous research found that social engagement via university peers or communities is one of the primary ways students define belonging to their university (Ahn & Davis, 2020). Student belonging diminished during the COVID-19 pandemic, especially with respect to peer relationships (Mulrooney & Kelly, 2020; Potts, 2021). Yet, those feelings seemed unaffected with respect to the university as an institution (Gopalan et al., 2022), suggesting that identification with one's study program did not vanish entirely during the pandemic. In fact, prior research shows that even a short-run intervention to increase the sense of belonging can have a persistent impact in the long-run (Brady et al., 2020; Walton & Cohen, 2011), which is precisely the motivation that fueled RECONNECT.

2.4 Subjective well-being: social well-being and Satisfaction With Life

Next to the specific concepts of loneliness and its flipside, belonging, we were also interested in broader concepts of social well-being. Subjective well-being is a multi-faceted concept expanding upon the medical concept of mental health, and it stands for overall positive functioning in life. Subjective well-being is conceptualized as a combination of (i) hedonistic elements capturing positive and negative affect and satisfaction with life (Diener, 1984; Pavot et al., 1991), and (ii) eudemonic elements capturing positive psychological functioning, human development, and meaningful social relationships (Magyar & Keyes, 2019; Ryan & Deci, 2001; Waterman, 1993; Waterman et al., 2008).

In pre-pandemic research, higher loneliness was linked to lower social well-being (Ben-Zur, 2012; Diener & Ryan, 2008; Vanderweele et al., 2012; Walton & Cohen, 2011). During the COVID-19 pandemic, studies using general public and student populations reported decreased well-being and satisfaction with life (Rogowska et al., 2020, 2021). We therefore choose these as our primary outcome measures to capture the impact of RECONNECT on the well-being of students.

2.5 Protective factors

Narrowly zooming in on loneliness does not do justice to the complex interplay of feelings and perceptions that ultimately feed into social well-being and satisfaction with life. Since we study the impacts of a disruptive, collective life event and possible ways to mitigate them, we also account for two types of protective factors that help people when confronted with hardship. These factors may play a role in moderating the negative impact of the pandemic.

First, we examine one's social resources: romantic relationships, family, and friendships. Social relationships are a protective factor in distressing situations, effectively safeguarding a person from mental health difficulties (Bauer et al., 2021; Sehmi et al., 2020). Crucially, Woon et al. (2021) show that anxiety and stress after lockdowns were moderated by the degree of support one experienced from family and friends. We therefore expect that students who were more embedded in their social relationships outside of the academic context would be less severely affected by the social well-being consequences of the pandemic due to their greater perceived sense of belonging with family and friends.

Second, we examine one component of grit, namely the perseverance of effort despite obstacles and failure (henceforth: 'perseverance'). Grit has been identified as an resilience factor among adolescents and is associated with lower loneliness (Tang et al., 2021). The Grit scale was originally defined as a two-component scale composed of a) perseverance and b) enjoyment of long-term goals (Duckworth et al., 2007; Duckworth & Quinn, 2009a), and it has been shown to be effective in identifying students at risk of burnout (Salles et al., 2014). We opted for zooming in only on the perseverance subscale of grit since, in an extensive meta-analysis by Disabato et al. (2019), only this facet was found to be related to subjective well-being. Following the suggestions of this and other analyses, we focus on the perseverance of effort as a separate protective factor (Credé et al., 2017; Datu, 2021).

In the context of the COVID-19 pandemic, higher grit was again associated with higher levels of resilience, but also of subjective well-being and satisfaction with life (Bono et al., 2020). More gritty students even reported *increased* well-being during the COVID-19 pandemic (Branje & Morris, 2021). Finally, grit also links to the need for belonging, though there might be cultural differences between individualistic versus more collectivist countries (Datu & Fincham, 2022).

Taken together, our conceptual model is summarized in Figure 1 with the COVID-10 pandemic formking the backdrop of the study, the protective factors we have identified being a) social resources and b) perseverance of effort and loneliness serving as stressor. All these factors affect our studied outcomes that are a) belonging with peers, b) social well-being, and c) satisfaction with life.



Figure 1: Conceptual model

3. Study design, implemented measures, and sample

3.1 Study design

We advertised the RECONNECT program with the slogan 'RECONNECT with your peers' and invited students to join if they felt lonely or disconnected from their study peers after the COVID-19 pandemic. We advertised across campus via online channels, weekly newsletters, flyers. We also personally reached out to all course leaders registered on the central education system for the teaching term when RECONNECT was rolled out, inviting them to share the initiative with their students. A sample flyer and the email invite are provided in Appendix 1. We had initially planned for a large-scale, randomized, experimental set-up in two waves, one at the end of the academic year and a second at the beginning of the new academic year, to allow the original control group to participate. Yet, our outreach and marketing activities were not as widely supported as we had counted on. Despite providing all marketing material to our colleagues across the university, the different university entities were reluctant to share the material widely, partly because they were still struggling with their own COVID-19 backlog and partly because we operated under too tight a timeline to give everyone the necessary time to establish trust in our initiative. Time constraints, in particular, worked against our original plan of implementing a large-scale intervention. We did not manage to reach out to all students who are registered with the university with a personal e-mail message, as we had planned. More importantly, most information dissemination happened on a deserted campus, implying that those students who did not happen to come for an in-person course were very likely not to hear or read about the initiative.

Those students we reached with our invitation could register by completing an online form. Registration was open from April 25, 2022, to May 17, 2022. The online registration form also included informed consent for contacting the registered individuals via email and WhatsApp. In addition, we used the registration form to collect socio-economic background data. Due to the limited success of our outreach activities, we have a low response rate. Only 127 students registered for RECONNECT, so we abandoned our planned randomized implementation. We invited all registered students to participate in the program. Six days before the first RECONNECT activity, we asked the registered participants to complete our 30-minute online survey about coping with COVID-19, loneliness, and perceived well-being. 77 out of the 127 registered students filled out this baseline questionnaire.

The RECONNECT program was a five-week program that took place between May and June 2022 and consisted of three plenary meetings in Weeks 1, 3, and 5 of the five-week period. Each plenary meeting had a designated speaker and a 30-minute talk followed by a discussion of about the same length. One of the speakers was a university leader of the Teaching and Learning Centre, one was from the organizing team (a hiccup introduced by the fact that the initial speaker from the university board had contracted COVID-19), and one was a distinguished master student who wrote her thesis during the COVID-19 pandemic. We invited the speakers to share their personal stories associated with the pandemic and the adversities they faced. In the group discussions, we encouraged open sharing of student experiences, loss of contact with campus and peers, and the complexity of studying during the pandemic. We facilitated theoretical insights and academic findings to be discussed in light of personal experiences. We motivated the participants to not only dwell on challenges but also to share what motivates them. Lastly, we provided a concrete list of engagement actions that the participants developed during one of the sessions to the university board. The plenary meetings were followed by informal social events in the university bar that were organized and sponsored by RECONNECT. There, participants could continue the exchange with the speakers and each other and, most importantly, meet peers who were equally looking for possibilities to reconnect. In addition, we randomly allocated the participants into subgroups of 4-5 individuals, connected them through WhatsApp, and motivated them to organize three small-group events. As themes for the sub-group meetings, we suggested sports, cooking, and a social event such as a museum visit. Krekel et al. (2021) and Heintzelman et al. (2019) similarly encouraged individuals to interact in subgroups and engage prosocially, motivating the small group intervention design.

Directly after the five-week program, we invited participants to complete the endline survey, which was accessible for two weeks. Eventually, 36 out of 77 students that filled in the baseline survey also filled in the endline survey. Two additional students only responded to the endline, resulting in 38 endline respondents. We also used two university events as opportunities to establish a control group. We distributed fliers at two university events (one study fair and one social event) taking place at the faculties that yielded the highest share of RECONNECT registrations (66%). The flyers invited students to participate in our 30-minute survey through a QR code. Responses were obtained within two weeks before the end of the program.

3.2 Implemented measures

The impact of the COVID-19 pandemic on students' lives was assessed by measures of subjective well-being, in particular belonging with study peers, social well-being, and satisfaction with life. We included a measure of loneliness as a stressor variable. We elaborate on each measure below. The complete survey materials can be found in Appendix 2.

To measure loneliness, we implemented the short, three-Item Loneliness Scale, developed to facilitate simple and reliable information (Hughes et al., 2004). This scale is derived from the Revised UCLA Loneliness Scale (Russell et al., 1980). Respondents had to rate three loneliness items on a 3-point scale, asking them how often they experience a given context. For example, one question asked, 'How often do you feel left out?' and responses ranged from 'Hardly ever' to 'Sometimes' to 'Often.' The three items were aggregated by summation into the Loneliness Scale, with higher scores indicating a higher perceived level of loneliness. Given the vast literature that has established increased loneliness among students due to the pandemic (Bimonte et al., 2022; Bu et al., 2020; Holmes et al., 2020; Sampogna et al., 2021; Weissbourd et al., 2021), we use loneliness as a *de facto* measure of the impact of the COVID-19 pandemic. Therefore, we find it essential to treat loneliness as a mitigating factor impacting other well-being measures, rather than as an outcome in itself.

To capture the flipside of loneliness and assess it as an outcome, we measure belonging. The feeling of belonging with study peers was assessed by the pictorial scale 'Inclusion of Others in the Self' (Aron et al., 1992). Participants had to choose one of seven pictures that best described their relationship with their study peers. Each of the pictures depicted two circles gradually more and more overlapping. Existing research supports that the overlap of the circles is reliably understood as closeness of relationship (Gächter et al., 2015). The degree of overlap resulted in a numerical scale ranging from 1 to 7, with higher numbers reflecting a higher degree of belonging.

As a second outcome, we measure social well-being. Social well-being evaluates the interpersonal and social integration of an individual, going beyond the individual's psychological state. To assess social well-being, we implemented the short version of the 'Social Well-being Scale' (Keyes, 1998). The scale captures social contributions to well-being from five aspects of an individual's existence in a community and society. The five subscales are: (i) social integration, (ii) social acceptance, (iii) social contribution, (iv) social actualization, and (v) social cohesion. Each subs-scale consists of three statements. These statements were rated on a 7-point Likert scale ranging from 1 ('Strongly

Disagree') to 7 ('Strongly Agree'). Social actualization measures the belief about a positive social future, using statements such as 'The world is becoming a better place for everyone.' Social coherence measures whether individuals can make sense of the world around them, with statements such as 'I find it easy to predict what will happen next in society.' Social integration captures feelings of belonging to a community, and is represented by statements such as 'My community is a source of comfort.' Social acceptance captures beliefs about others' pro-sociality, as expressed with the statement, 'I believe that people are kind.' Finally, social contribution captures the belief about one's own contribution to society, with statements such as 'I have something valuable to give to the world.' The 15 items were aggregated by summation into one composite indicator, with higher scores indicating higher social well-being.

We study Satisfaction With Life (SWL) as a third outcome. SWL measures global judgments of satisfaction with life (Deiner et al., 1985). The scale has high internal consistency and correlates with other measures of subjective well-being (Deiner et al., 1985; William Pavot & Diener, 1993). It consists of five items, with statements such as 'In most ways, my life is close to my ideal.' All statements are rated on a 7-point Likert scale ranging from 1 ('Strongly Disagree') to 7 ('Strongly Agree'). The five items were aggregated by summation into one composite indicator with higher scores indicating higher satisfaction with life.

We account for the presence of a romantic relationship, the sense of belonging with family and friends, and perseverance of effort as protective factors, which are used as independent variables in the regression analysis. The presence of a romantic relationship was assessed simply as a binary ('yes/no'), explicitly avoiding more detailed questions to protect the participants. Belonging with family and friends were both assessed using the pictorial 'Inclusion of Others in the Self' Scale (Aron et al., 1992). Assessment was identical to that of belonging with study peers: we first replace 'study peers' with 'family' and then with 'friends', resulting in two separate measurements of belonging.

We assess perseverance using the perseverance subscale of the short Grit scale (Duckworth & Quinn, 2009b). Participants had to evaluate four statements, such as 'Setbacks don't discourage me.' All responses were rated on a 5-point Likert scale ranging from 1 ('Not like me at all') to 5 ('Very much like me'). The four items were aggregated by summation into one composite indicator, with higher scores indicating higher perseverance of effort.

We further asked direct questions about the experienced impact of the pandemic on participants' lives, to detect possible self-selection into the program. This allows us to control for multiple channels through which students may have suffered from the changes brought on by COVID-19. For example, we asked about their financial situation, with questions such as 'How was your financial/study situation affected by COVID-19?'. Possible answers ranged from 1 ('Much worse (than before)') to 5 ('Much better (than before)'). We addressed selection in the social domain, with questions such as 'How important is it for you to meet new people and make friends?'. Possible answers ranged from 1 ('Not important') to 3 ('Very important'). We also asked 'How satisfied are you with your personal relationships?', where responses ranged from 1 ('Very dissatisfied') to 5 ('Very satisfied'). The loss of social contact due to COVID-19 was derived from a binary, 'yes/no' response to the question, 'Did you lose contact with friends because of the COVID-19 crisis?'.

Cronbach's α for all multi-item scales can be found in Table 1. The internal validity was satisfactory in all instances, exceeding the value of 0.6 for all studied subgroups. In the baseline and endline surveys, we have a Cronbach's α of above 0.8 in three instances and close to 0.8 for one concept (social well-being in the baseline survey and loneliness in the endline survey). The control group

comprising 35 respondents also has a Cronbach's α of above 0.8 in three instances, yet one is below 0.7.

	Baseline (N=77)	Control (N=35)	Endline (N=38)
Loneliness	0.841	0.928	0.795
Social well-being	0.797	0.819	0.813
Satisfaction With Life	0.836	0.805	0.861
Perseverance	0.709	0.671	0.787

Table 1: Cronbach alpha for all scales

3.3 Sample

We obtained 127 registrations from all seven university faculties of 24,104 registered students, corresponding to <0.5% of the total student population. We present the basic background characteristics of the individuals that registered for RECONNECT in Table 2. Almost 60% of the registered students were female students (75 female and 47 male), and the registered students were nearly equally divided among local (46.5%) and international students (53.5%). About half of the registered students lived in a student housing facility, and about three-quarters were directly based in the city of the university campus. This suggests that the demand for reconnection with the campus was not only present in students that lived further away, but also those who lived close by. We also note that we did not manage to address students of all faculties equally; the highest number of registrations came from the Faculty of Social Sciences, the Faculty of Science, and the Faculty of Management, representing 43.3%, 25.2%, and 22.8% of all registrations, respectively. We have no reason to believe that the demand for reconnection varied across faculties; rather, our outreach efforts in four out of the seven faculties was less effective. We attribute this to the fact that the global advertising that took place mainly on campus did not reach students well in the post-COVID context, where many of them were absent from campus. Among those registered, 70.1% were Bachelor's students. They were the ones likely to have suffered most from the pandemic as, for most of them, the start of their studies was online.

After the registration, 77 students filled in the voluntary baseline survey, while after the completion of the RECONNECT program, 38 students participated in the endline survey. In total, 36 completed both the baseline and the endline survey. In our analysis we will briefly comment on attrition, which appears random and not systematically linked to the measures assessed at baseline. We also know from WhatsApp, email correspondence, and comments at the end of the endline survey that several students withdrew due to study obligations or other agenda clashes.

In addition, during two open days at the university we collected data from a random sample of 35 students who did not register for RECONNECT. These students filled in the same questionnaire as the RECONNECT participants before the intervention started (with the exception of personal information, to preserve anonymity). Therefore, the characteristics of these students are not represented in Table 2.

	Male	Female	Total
	(N=47)	(N=75)	(N=127)
Age			
Mean (SD)	22.2 (3.06)	23.3 (4.66)	22.8 (4.09)
Median [Min, Max]	21.0 [19.0, 34.0]	22.0 [18.0, 48.0]	22.0 [18.0, 48.0]
Nationality (#,%)			
Dutch	26 (55.3%)	33 (44.0%)	59 (46.5%)
Non-Dutch	21 (44.7%)	42 (56.0%)	68 (53.5%)
Dutch spoken at home (#,%)			
Yes	24 (51.1%)	27 (36.0%)	51 (40.2%)
No	23 (48.9%)	48 (64.0%)	76 (59.8%)
Housing (#,%)			
Parents	10 (21.3%)	8 (10.7%)	18 (14.2%)
Student housing	25 (53.2%)	40 (53.3%)	66 (52.0%)
Private housing	6 (12.8%)	23 (30.7%)	31 (24.4%)
Other	6 (12.8%)	4 (5.3%)	12 (9.4%)
Lives in the city of campus (#,%)			
Yes	35 (74.5%)	53 (70.7%)	93 (73.2%)
No	12 (25.5%)	22 (29.3%)	34 (26.8%)
Degree (#,%)			
Bachelor	34 (72.3%)	51 (68.0%)	89 (70.1%)
Master	11 (23.4%)	22 (29.3%)	34 (26.8%)
PhD	0 (0%)	0 (0%)	0 (0%)
Other	2 (4.3%)	2 (2.7%)	4 (3.1%)
Faculty (#,%)			
Faculty of Arts	1 (2.1%)	4 (5.3%)	6 (4.7%)
Faculty of Law	0 (0%)	1 (1.3%)	1 (0.8%)
Medical Sciences	2 (4.3%)	1 (1.3%)	3 (2.4%)
Faculty of Management	14 (29.8%)	15 (20.0%)	29 (22.8%)
Faculty of Phil, Theo & Relig.Studies	0 (0%)	1 (1.3%)	1 (0.8%)
Faculty of Science	11 (23.4%)	18 (24.0%)	32 (25.2%)
Faculty of Social Sciences	19 (40.4%)	35 (46.7%)	55 (43.3%)

Table 2. Summary table of students that self-registered for RECONNECT

3.4 Qualitative data: interviews and feedback survey

Next to our quantitative approach, we conducted semi-structured interviews with six participants of the RECONNECT project after its completion. The interviews aimed to extract more in-depth insights into participants' experiences with COVID-19, its impact on their life and well-being, and their expectations of how the university can support them moving forward. Since these interviews were likely to touch on sensitive topics, we aimed to conduct them face-to-face. In sensitive interview settings, human interaction often makes participants more comfortable with sharing information which might not be provided through other data collection methods (Elmir et al., 2011; Knox & Burkard, 2009). When the interviewees had other obligations and could not join us face-to-face, we conducted the interviews via Zoom.

All semi-structured interviews touched on specific themes while allowing for a flexible and open conversation (Dempsey et al., 2016). Each interview began with general questions about the participant's background before moving on to the first thematic area: their experience during the pandemic. Here, the focus was on the pandemic's impact on the interviewees' living situation, studies, social relationships, and overall well-being. Interviewees were duly informed that they could skip any sensitive question they were uncomfortable responding to. This first stage of the interview was also the most flexible, diving deeper into each interviewee's experienced struggles. The second stage of the interview focused on the interviewees' expectations. Here, interviewees shared what motivates them to come to campus, what coping mechanisms help them in their life and education, and what they believe the university should do to support the student population. All interviewees provided explicit consent to being recorded.

An additional source of qualitative insights was provided by the open questions in the endline survey (N=38). The open questions in this survey focused on participants' experience with the initiative, its positive and negative aspects, and how its effectiveness could be improved in the future.

4 Empirical Analysis and Results

4.1 Quantitative and qualitative analysis

To investigate the differences between the RECONNECT participants at baseline on the one hand and the control group on the other, we first performed the non-parametric generalized Wilcoxon test (Brunner-Munzel test), accounting for the non-normality of variables based on Likert scales (Karch, 2021; Neuhäuser & Ruxton, 2009). We report the statistical significance based on two-tailed tests. For binary variables, we report the *p*-value of the Chi-square test.

Secondly, we present linear regression models to explain the baseline differences between the study participants and the control group. The OLS model we estimate has the following general structure:

$$Y_i = \beta_0 + \beta_1 X_i + \beta_2 Z_i + \beta_2 T_i + \varepsilon_i,$$

where the dependent variable Y_i is a measure of student well-being, namely: belonging with study peers, social well-being, or satisfaction with life. The vector of protective factors, X_i , contains perseverance as well as supportive social relationships from outside the academic context: the presence of a romantic relationship and perceived belonging with friends and family. Z_i stands for the impact of the corona context stressor of loneliness. The dummy T_i stands for the treatment variable and is equal to 1 if an individual self-selected into participation in RECONNECT and equal to 0 otherwise. Finally, ε_i captures noise. We implement robust standard errors to account for unobserved heterogeneity. We used the Akaike information criterion to distinguish among possible models.

Third, we investigated the impact of the RECONNECT intervention. Similar to the approach at baseline, we used a non-parametric matched-pair generalized Wilcoxon test, accounting for the non-normality of the data. For the pre-post measurement, we report the statistical significance based on two-tailed tests for loneliness and our three outcome variables.

Finally, we present regression analysis using pooled data from (i) self-selected subjects at baseline (N=115), (ii) treated subjects at endline (N=38), and (iii) the untreated control group (N=35). Self-selected subjects were students that registered for the RECONNECT program, and the treatment group consisted of a subset of these students. The untreated control group is comprised of students

that did not register for the program. Some students provided data both at baseline and endline (N=36). We report robust standard errors correcting for clustering at the student level. All statistical analyses were performed using R version 4.1.1 (R Core Team, 2021).

Concerning the qualitative data analysis, interview recordings were first uploaded to the automatic transcription software *Otter.ai* to obtain a rough transcript. The resulting transcripts were edited for grammatical clarity and then fed into the qualitative analysis software Atlas.ti, which we used to code the data and extract the main findings. An exhaustive list of codes generated in Atlas.ti, accompanied by example quotes, can be found in Appendix 3.

4.2 Self-selection into RECONNECT

When inviting students to the RECONNECT program, we communicated our understanding that the COVID-19 pandemic has negatively affected their social connectedness with study peers. We invited students to join the program to reconnect with their peers. Did we manage to address the group of students in demand of reconnection? Table 3 compares the RECONNECT participants at baseline (i.e., before the intervention) with the control group. The comparisons suggest that the RECONNECT participants who self-selected for participation were more negatively affected by the context and circumstances surrounding COVID-19 than the control group.

Four observations stand out. First, at baseline, RECONNECT participants were significantly more lonely compared to the control group (6.82 vs. 5.69, *p*-value< 0.017; with higher values indicating higher loneliness), and were less satisfied with their personal relationships with 27% of the RECONNECT participants reporting being dissatisfied but only about 8% of the control group (*p*-value< 0.001). Moreover, RECONNECT participants indicated a substantially higher loss of friendships due to COVID-19 than the control group (51% vs. 14%, *p*-value< 0.016). The identified differences stem from non-parametric two-sided Brunner-Munzel generalized Wilcoxon tests accounting for the fact that our data are not normally distributed. This quantitative self-selection finding is mirrored in the qualitative data: 80% of open-ended responses to the question 'Why did you decide to join the RECONNECT initiative?' used the words 'to meet new people'.

Second, and contrary to their perceived situation, students who self-selected into RECONNECT did not seem to have a different financial or study situation due to COVID-19 compared to the control group. Both *p*-values for the non-parametric comparisons are above 0.45, indicating that the two groups of students are comparable regarding their socio-economic situation.

Third, RECONNECT participants did not significantly differ from non-participants in terms of preferences. Both groups found friendships equally important. The share of individuals reporting that they are in a romantic relationship is lower for the control group (18%) compared to the RECONNECT participants (29%), but this difference is not statistically significant at conventional levels (*p*-value=0.245). Also, RECONNECT participants did not differ from the control group in their perseverance of effort (*p*-value=0.817), and they reported similar levels of belonging with friends and family (*p*-value=0.385 and 0.502, respectively). Thus, RECONNECT participants and the control group do not differ systematically in their preferences for relating to others and their protective factors. This suggests that the group of RECONNECT participants was mainly experiencing a transient negative loneliness shock imposed by the context generated by the pandemic. It also suggests that students who self-selected to participate in RECONNECT did so in response to this transient situation because of their demand for rebuilding social relationships.

	Baseline	Control	n-value
	(N=77)	(N=35)	p-value
Loneliness			
Mean (SD)	6.82 (1.78)	5.69 (2.29)	0.017**
Median [Min, Max]	7.00 [3.00, 9.00]	5.00 [3.00, 9.00]	
Satisfaction with personal relations (#,	%)		
Very satisfied	2 (2.6%)	10 (28.6%)	<0.001***
Satisfied	29 (37.7%)	13 (37.1%)	
Neither satisfied nor dissatisfied	23 (29.9%)	7 (20.0%)	
Dissatisfied	21 (27.3%)	3 (8.6%)	
Very dissatisfied	2 (2.6%)	2 (5.7%)	
Lost social contacts because of C	OVID19	- (,	
(# %)			
Ves	51 (66 2%)	14 (40 0%)	0.016**
No	26 (33 8%)	21 (60.0%)	0.010
Einancial cituation due to COVID 19 (#	20 (33.876) •/)	21 (00.070)	
Financial situation due to COVID-19 (#,	,70)	0 (00/)	1 000
Much better	3 (3.9%)	0 (0%)	1.000
Somewnat better	9 (11.7%)	6 (17.1%)	
About the same	41 (53.2%)	17 (48.6%)	
Somewnat worse	17 (22.1%)	11 (31.4%)	
Muchworse	7 (9.1%)	1 (2.9%)	
Study situation due to COVID-19 (#,%)			
Much better	1 (1.3%)	1 (2.9%)	0.489
Somewhat better	7 (9.1%)	2 (5.7%)	
About the same	14 (18.2%)	9 (25.7%)	
Somewhat worse	30 (39.0%)	14 (40.0%)	
Much worse	25 (32.5%)	9 (25.7%)	
Friends importance (#,%)			
Very important	49 (63.6%)	21 (60.0%)	0.587
Somewhat important	24 (31.2%)	10 (28.6%)	
Not important	4 (5.2%)	4 (11.4%)	
Romantic relationships (#,%)			
Yes	29 (37.7%)	18 (51.4%)	0.245
No	48 (62.3%)	17 (48.6%)	
Perseverance			
Mean (SD)	13.8 (2.63)	13.6 (2.84)	0.817
Median [Min, Max]	14.0 [8.00, 19.0]	14.0 [7.00, 18.0]	
IOS friends			
Mean (SD)	3.99 (1.34)	4.23 (1.31)	0.385
Median [Min, Max]	4.00 [1.00, 7.00]	4.00 [1.00, 6.00]	
IOS family		• / •	
Mean (SD)	4.36 (1.35)	4.14 (1.59)	0.502
Median [Min, Max]	4.00 [1.00, 7.00]	4.00 [1.00, 7.00]	
IOS peers			
Mean (SD)	2.42 (1.23)	3.23 (1.44)	0.005***
Median [Min. Max]	2.00 [1.00, 5.00]	3.00 [1.00, 6.00]	
Satisfaction With Life	[,]	[, 0.00]	
Mean (SD)	20.1 (5.81)	25.1 (5.41)	<0.001***
Median [Min. Max]	21.0 [6.00. 30.0]	27.0 [11.0. 32.0]	0.001
Social well-being	[0.00] 00.0]		
Mean (SD)	65.1 (11.0)	67.9 (12.5)	0.160
Median [Min_Max]	66.0 [41.0, 95.0]	69.0 [39.0. 89.0]	

Table 3. Comparison of RECONNECT participants before the study and non-participants

Note: Standard deviations in parentheses () and min-max in brackets []. The *p*-values reported in column 4 are for two-sided Brunner-Munzel generalized Wilcoxon tests (compare section 4.1). *p<0.1; **p<0.05; ***p<0.01

Fourth, RECONNECT participants report a considerably lower level of belonging with their study peers (2.42 vs. 3.23 respectively, *p*-value< 0.005). This is interesting in light of the fact that their level of belonging with friends and family is the same compared to those in the control group. In addition, the participants' initial satisfaction with life (pre-RECONNECT) is also markedly lower, namely 5 points below the control group on the SWL Scale (*p*-value<0.001). No significant group differences were observed with respect to social well-being (*p*-value=0.160), with RECONNECT participants reporting an average value of 65.1 and non-participants a value of 67.9. Thus, at baseline, we find significantly lower values for the RECONNECT participants in two out of three outcome measures, namely belonging with their study and satisfaction with life. These descriptive baseline statistics supported that the RECONNECT participants self-selecting into the program responded to their need to re-establish social connection.

4.3 Multivariate analysis of differences in belonging with peers, satisfaction with life and social wellbeing between RECONNECT participants and the control group

Next, we turn to the multivariate analysis of belonging with peers, satisfaction with life, and social well-being. Table 4 contains the OLS estimates. The analysis sample consists of a treatment-control comparison between the 77 students that filled in the baseline survey and the 35 students that serve as the control group resulting in a total sample of 112 students. We assess the determinants of well-being and to what extent the two groups differ.

As identified in previous research, we expected that well-being would decrease with loneliness and increase with perseverance. Therefore, we included these two variables across specifications. In addition, we used the Akaike information criterion to distinguish between possible models. The best-fit model, carrying the maximum of the cumulative model weight, always included perseverance and, most importantly, the treatment dummy variable. Thus, even after accounting for the observable differences between the students self-selecting into RECONNECT and the control group, RECONNECT participants had lower initial well-being.

In addition, we identify the following: belonging with peers, satisfaction with life, and social wellbeing are all negatively affected by loneliness. A one standard deviation increase in control group loneliness (2.29, compare Table 2) decreases belonging with peers by 0.550 (-0.240*2.29). This corresponds to a 9.7% decrease in the baseline mean of the control group in belonging with peers. The effect of a one standard deviation increase in control group loneliness on satisfaction with life corresponds to a 23% decrease in the baseline mean of the control group of satisfaction with life. For social well-being, the decrease is equal to 43%. Thus, the practical link between loneliness and wellbeing is non-negligible. In addition, all coefficient estimates are statistically significant at the 1% level implementing robust standard errors.

Second, while perseverance is unrelated to belonging with peers, it is highly connected with satisfaction with life and social well-being. A one standard deviation increase in the control group's perseverance (2.84, compare Table 2) increases satisfaction with life by 1.49, corresponding to 11% of the baseline mean of the control group in satisfaction with life. The presence of a romantic relationship is not associated with any of the three outcomes. Interestingly, belonging with friends and family has a significant and positive relation to belonging with the university. Yet, only belonging with family is strongly linked to satisfaction with life. In turn, it is not associated with social wellbeing. Belonging with friends is neither linked to satisfaction with life or to well-being. Thus, it is worth noting that perceived loneliness is a more potent stressor of satisfaction with life and wellbeing compared to self-assessed relational aspects.

	Belonging with study peers	Satisfaction With Life	Social well- being
	(1)	(2)	(3)
Loneliness	-0.240***	-1.084***	-2.332***
	(0.067)	(0.267)	(0.529)
Perseverance	-0.052	0.526***	1.088***
	(0.044)	(0.198)	(0.348)
Romantic relationship (1=yes,0=no)	-0.194	0.278	-0.252
	(0.225)	(0.889)	(1.819)
IOS family	0.140*	0.879**	0.104
	(0.081)	(0.357)	(0.700)
IOS friends	0.237***	0.244	0.969
	(0.083)	(0.387)	(0.750)
RECONNECT Sign up (=1, 0 for control)	-0.531**	-4.036***	-0.174
	(0.238)	(0.941)	(2.131)
Constant	3.285***	15.294***	61.777***
	(1.056)	(4.086)	(7.705)
F Statistic (df = 6; 105)	16.401****	18.595****	10.852****
Observations	112	112	112
R ²	0.364	0.466	0.355
Adjusted R ²	0.327	0.435	0.318
Residual Std. Error (df = 105)	1.103	4.61	9.522

Table 4. OLS explaining belonging with study peers, Satisfaction With Life and social well-being and in baseline and control sample, with robust standard errors

Note: OLS results with robust standard errors; *p<0.1; **p<0.05; ***p<0.01, ****p<0.001.

Last but not least, we study the self-selection mechanism in the RECONNECT program and its link with our three outcome measures. As already identified in the descriptive statistics, we see that RECONNECT sign-ups have a practically much lower perceived belonging with university peers. Sign-up for RECONNECT explains 16.4% of the baseline mean of the control group in belonging. Similarly, sign-up for RECONNECT explains 16.1% of the baseline mean of the control group in satisfaction with life. Yet, sign-up for RECONNECT is unrelated to baseline social well-being. In sum, the multivariate analysis further reinforces not only that loneliness is a stressor of well-being and perseverance a moderator, but also that those most in need of improving their well-being in the dimensions 'belonging with peers' and 'satisfaction with life' self-selected into RECONNECT. These findings reinforce that such self-identification can work when targeting young individuals in the university context who struggle with belonging and well-being under transient circumstances.

To gauge the validity of these quantitative observations that stem from a relatively small sample, we now turn to the qualitative analysis of our six in-depth interviews and the insights they deliver about COVID-19's impacts on student well-being.

4.4 Qualitative data analysis about COVID impacts on student well-being

The six in-depth interviews provide a clearer picture of the lower well-being emerging from the multivariate analysis. Interviewees reported various negative ways in which the pandemic has affected them. The first broad category refers to study consequences relating to the interviewees' place in life, which impacted them in their i) learning environment and ii) professional development. The second broad category refers to personal consequences relating to the interviewees' mental and emotional status. These impacted interviewees in their i) interpersonal relationships, ii) physical, and iii) mental well-being.

Interviewees shared multiple ways in which the pandemic impacted their study context. Interviewee #5 notes how hard it was to follow classes online: 'Many courses didn't have good recordings. The teacher would turn around and show something on the board, but you couldn't see it. Or halfway through the lecture, the mic would stop working. He was talking, and you couldn't hear anything.' This setup limited students' ability to participate actively in the lectures and to ask questions: 'It was hard because we have very big groups, and it's not the same as raising your hand [in person]' (Interviewee #2). Learning was even more challenging because it was hard to meet and collaborate with fellow students: 'It was more difficult to connect with people within my studies, people with whom I could do projects.' (Interviewee #3).

These challenges introduced by the new learning environment also negatively impacted most interviewees' professional development. Interviewee #1 says: 'Corona came in February, and then I didn't have any direct contact with researchers anymore. That made it really hard to find a potential internship. Also, one of my lab rotations stopped because of Corona. There was just no way to be practically involved in any research group anymore.' Interviewee #6 had a similar experience: 'My bachelor internship [...] was completely online. I only saw my supervisor once in real life at the end of my internship. I didn't go to the lab. I did data analysis; that was my internship. That impacted my studies because I have zero lab experience, and in my field, it's quite important. Now I'm a first-year Master's student, and I barely know how to do anything in the lab.' These setbacks eventually caused delays in obtaining qualifications and in achieving essential milestones: 'We needed to finish a practical part in order to get our course certificates. But that wasn't possible, so it had to be postponed.' (Interviewee #1). Interviewee #6 had to postpone an internship and a semester abroad.

Interviewees simultaneously experienced strain in their interpersonal relationships: 'It was quite hard to live at home with my parents and my sister because we were not used to spending so much time together.' (Interviewee #5). Others experienced the stress of not seeing their loved ones: 'It was hard to visit my parents or to stay there for some time because they also didn't want to get infected.' (Interviewee #1). This sentiment was also echoed by Interviewee #6.

The experience of studying online also took a toll on some interviewees' physical health: 'Because you're basically all on your own and just sitting in front of the computer all the time, it's more exhausting than listening in a lecture hall. I think this complicated and isolated my studies a bit more.' (Interviewee #5). Interviewee #3 shared how the students' concentration benefits from physical lectures: 'I really think it was a little harder to concentrate on [online] lectures. I still notice it when I'm going to class; listening to a physical person in front of me is way easier than concentrating on the screen.'

Finally, all interviewees touched on the pandemic's negative impact on their experienced well-being. Interviewees #4 and #5 discussed loneliness: 'We were forced to stay at home [and] that was not good for my mental health. I was alone at home a lot.' (Interviewee #5). Interviewee #2 talked about missing friends: 'I really missed my friends, going to a big party, meeting a lot of school friends you

don't see every week.' For some interviewees, it caused irreparable damage to their social lives: 'I think some friends I have only seen once or twice since the beginning of COVID in real life, so it kind of fell apart. When everything opened back up this year, I realized they had moved on. They've all made new friends.' (Interviewee #6).

Most interviewees expressed a lack of knowledge regarding the available support resources and what those resources could do for them. In discussing the study advisors and their role, Interviewee #1 said: 'There's only so much they can do, right? If I think about it, I wouldn't know what they could have done to help.' Interviewee #3 said: 'I didn't know exactly how to describe the reason to go. So I postponed it. It's easier to find a reason not to do it than to do it.'

Overall, the interviews support the result already seen from the quantitative data that the COVID-19 pandemic compounded adversity in students' professional and study lives, as well as in their personal and social lives. Students were lonely, felt excluded from the way studies and university typically operate, and were unsure about what support was available to them to deal with the consequences of the adversities they faced. All this negatively impacted their experienced well-being.

Next, we turn to whether RECONNECT could do something to improve the COVID-induced challenges.

4.5 Impact of the RECONNECT program

To analyze the impact of RECONNECT, we first present descriptive comparisons of the outcome variables and protective factors for four subgroups of survey respondents: (i) control group of 35 respondents, (ii) baseline self-selected respondents with 36 observations, (iii) only baseline self-selected respondents with 36 observations. This results in an overall sample of 150 observations (Column 5). Notably, the non-parametric Brunner-Munzel test does not allow us to reject the null hypothesis that there is no difference between the self-selected RECONNECT participants at baseline that also conducted the endline survey (Column 2) and those that only completed the baseline survey (Column 3). The relevant *p*-values for loneliness, satisfaction with life, social well-being, and inclusion with study peers are *p*-value=0.9481, *p*-value =0.4732, *p*-value = 0.741, and *p*-value = 0.3451, respectively. We, therefore, conclude that there is no evidence of selective feedback at endline that drives the impacts we assess in the multivariate analysis.

Next, we turn to the responses of the 36 students that participated in RECONNECT and completed both the baseline and the endline survey. *P*-values from a simple pre-post comparison using the Brunner-Munzel generalized Wilcoxon matched pair test suggest that in terms of loneliness, no change was observed (*p*-value=0.411) despite a decline in reported loneliness by 0.31 points. Yet, this decline is likely too small to be identified with our small sample. Similarly, we see no change over time for the protective factors of perseverance, belonging with family, and belonging with friends (*p*-value=0.594, *p*-value=0.663, *p*-value=0.417, respectively). Actual changes are small, and we observe a decline in perseverance and belonging with family and an increase of 0.22 in belonging with friends. We find that the subjective well-being across all three outcome variables increased for the study participants that completed both the baseline and the endline survey. However, the increase is only precisely measured for satisfaction with life (*p*-value=0.072), suggesting that along this dimension, RECONNECT is likely to have had a measurable impact on the participants.

		Baseline self-	Only baseline	En allin a	
	Control	selected	self-selected	Endline	Overall sample
	(N=35)	respondents	respondents	(N=2C)	(N=150)
		(N=36)	(N=43)	(11-50)	
	(1)	(2)	(3)	(4)	(5)
Loneliness					
Mean (SD)	5.69 (2.29)	6.81 (1.74)	6.77 (1.81)	6.50 (1.73)	6.46 (1.93)
Median [Min, Max]	5.00 [3.00, 9.00]	6.50 [3.00, 9.00]	6.00 [3.00, 9.00]	6.00 [3.00, 9.00]	6.00 [3.00, 9.00]
Satisfaction With Life					
Mean (SD)	25.1 (5.41)	19.9 (5.61)	20.5 (6.05)	22.1* (5.85)	21.8 (6.04)
Median [Min, Max]	27.0 [11.0, 32.0]	21.0 [8.00, 30.0]	22.0 [6.00, 29.0]	23.0 [8.00, 31.0]	23.0 [6.00, 32.0]
Social well-being					
Mean (SD)	67.9 (12.5)	64.8 (10.1)	65.8 (12.4)	66.1 (10.8)	66.1 (11.5)
Median [Min, Max]	69.0 [39.0, 89.0]	64.0 [41.0, 85.0]	66.0 [42.0, 95.0]	67.5 [47.0, 89.0]	66.0 [39.0, 95.0]
IOS peers					
Mean (SD)	3.23 (1.44)	2.28 (1.16)	2.56 (1.28)	2.61 (1.05)	2.66 (1.27)
Median [Min, Max]	3.00 [1.00, 6.00]	2.00 [1.00, 5.00]	2.00 [1.00, 5.00]	3.00 [1.00, 4.00]	3.00 [1.00, 6.00]
IOS friends					
Mean (SD)	4.23 (1.31)	3.97 (1.38)	4.02 (1.30)	4.19 (1.33)	4.10 (1.32)
Median [Min, Max]	4.00 [1.00, 6.00]	4.00 [1.00, 6.00]	4.00 [1.00, 7.00]	5.00 [1.00, 6.00]	4.00 [1.00, 7.00]
IOS family					
Mean (SD)	4.14 (1.59)	4.28 (1.32)	4.42 (1.35)	4.14 (1.31)	4.25 (1.39)
Median [Min, Max]	4.00 [1.00, 7.00]	4.00 [2.00, 7.00]	4.00 [1.00, 7.00]	4.00 [2.00, 7.00]	4.00 [1.00, 7.00]
Perseverance					
Mean (SD)	13.6 (2.84)	14.2 (2.91)	13.6 (2.45)	13.8 (2.65)	13.8 (2.69)
Median [Min, Max]	14.0 [7.00, 18.0]	14.5 [8.00, 19.0]	13.0 [8.00, 19.0]	14.5 [8.00, 18.0]	14.0 [7.00, 19.0]
Committed relationship					
Yes	18 (51.4%)	16 (44.4%)	13 (30.2%)	15 (41.7%)	62 (41.3%)
No	17 (48.6%)	20 (55.6%)	30 (69.8%)	21 (58.3%)	88 (58.7%)
Satisfaction with pers. rela.					
Very satisfied	10 (28.6%)	1 (2.8%)	1 (2.3%)	0 (0%)	12 (8.0%)
Satisfied	13 (37.1%)	15 (41.7%)	16 (37.2%)	19 (52.8%)	63 (42.0%)
Not satisfied nor dissatisfied	7 (20.0%)	11 (30.6%)	12 (27.9%)	11 (30.6%)	41 (27.3%)
Dissatisfied	3 (8.6%)	8 (22.2%)	13 (30.2%)	6 (16.7%)	30 (20.0%)
Very dissatisfied	2 (5.7%)	1 (2.8%)	1 (2.3%)	0 (0%)	4 (2.7%)
Friends importance					
Very important	21 (60.0%)	25 (69.4%)	26 (60.5%)	23 (63.9%)	95 (63.3%)
Somewhat important	10 (28.6%)	10 (27.8%)	14 (32.6%)	13 (36.1%)	47 (31.3%)
Not important	4 (11.4%)	1 (2.8%)	3 (7.0%)	0 (0%)	8 (5.3%)

Table 6. Summary for subgroup level outcomes, stressors and protective factors

Note: The Brunner-Munzel generalized Wilcoxon matched pair test is applied for the pair-wise comparison of the temporal comparison between the baseline and endline respondents, i.e., Columns (2) and (4); *p<0.1; **p<0.05; ***p<0.01.

To offer the overall perspective in a multivariate analysis, we run a pooled OLS regression comparing the self-selected RECONNECT participants at baseline (N=115) with the endline respondents (N=36) and the untreated control group (N=35). The main variables of interest are self-selection (which is equal to 1 for those who filled in the baseline questionnaire and equal to 0 for the control group), and receipt of treatment (which is equal to 1 for those who participated in RECONNECT and completed the endline questionnaire and equal to 0 otherwise). Detailed results are provided in Table 7.

	Dependent variable:					
	Belonging with study peers Satisfactio With Life		Social well-being			
	(1)	(2)	(3)			
Self-selected into RECONNECT	-0.538**	-4.080***	-0.232			
	(0.236)	(0.952)	(2.122)			
Treated by RECONNECT	0.127	1.886***	0.164			
	(0.162)	(0.701)	(1.369)			
Loneliness	-0.231***	-1.009***	-2.167***			
	(0.064)	(0.269)	(0.508)			
Perseverance	-0.025	0.619**	1.310***			
	(0.034)	(0.231)	(0.399)			
Romantic relationship (1=yes,0=no)	-0.038	0.529	-0.052			
	(0.206)	(0.793)	(1.670)			
IOS family	0.156**	0.892***	-0.133			
	(0.076)	(0.318)	(0.657)			
IOS friends	0.197**	0.355	1.345^{*}			
	(0.082)	(0.365)	(0.689)			
Constant	3.423***	16.995***	57.287***			
	(0.866)	(4.167)	(7.825)			
Observations	150	150	150			
R ²	0.344	0.459	0.372			
Adjusted R ²	0.312	0.432	0.341			
Residual Std. Error (df = 142)	1.056	4.551	9.303			

Table 7. OLS explaining belonging with study peers, Satisfaction With Life and social well-bein	ig and
in pooled data, with robust standard errors clustered at student level	

Note: Pooled OLS results with clustered standard errors; *p<0.1; **p<0.05; ***p<0.01.

We reinforce the above-established findings that self-selection was deliberate. This is shown by the negative coefficient associated with self-selection into RECONNECT that is sizeable and statistically significant for belonging with study peers and satisfaction with life. It is insignificant for social wellbeing. Again, we see the negative and statistically significant impact of loneliness on all three outcomes and the positive impact of perseverance on satisfaction with life and social well-being. But most importantly, the pooled analysis further reinforces the findings on RECONNECT treatment impacts from the pair-wise tests: across all three outcomes, the treatment impact is positive. It ranges between 0.127 for belonging with study peers and 1.886 for Satisfaction With Life. While the impact is imprecisely measured for belonging with study peers and social well-being, it is statistically significant for satisfaction with life (*p*-value<0.01). What is most important and convincing about the finding is that it is robust to controlling for loneliness, perseverance, romantic relationships, and inclusion with family and friends, highlighting that self-selection was successful and the program had the desired impact.

4.6 Qualitative insights about RECONNECT's impact on student well-being

Open-ended feedback given through the endline survey provide insights into the mechanisms through which RECONNECT has impacted participants. The most consistent point of positive

feedback RECONNECT received was that it created a low-barrier social environment for people who shared a common feeling of social isolation. One respondent said: 'I think the nice thing about this specific project is that you know that the other people are open to making new friends, otherwise they wouldn't be there, and that makes it easier! Also, I think RECONNECT created a really nice, open, and safe atmosphere to try and open up.' Another respondent echoed the same point of feeling at ease in the RECONNECT environment: 'It was always a perfect atmosphere to feel comfortable in reaching out to new people, and everyone seems to feel the same. So it was really easy getting to know each other.' This finding fits well with the recent literature on wider community groups as a means to alleviate the stigma of loneliness (Mann et al., 2017). Efforts to reduce loneliness are more likely to achieve positive results if they consider the individual's context and target their sense of connectedness with their broader community (Berra et al., 2017). Research on the effectiveness of such interventions is currently underdeveloped, a gap this study has tried to address.

Subjective well-being of students is closely tied with study success. Our interviewees suggest that sense-making and feelings of belonging play a role in well-being. When discussing what interviewees expect from their university, multiple insights emerged. Interviewee #1 emphasized the university's role in personal development outside of academic learning: *'Students are looking for questions of identity or meaning, like 'What's my role in society?' I think the university might help facilitate those discussions.'*

Respondents further emphasized direct contact with peers, professors, and supervisors to track one's development within a course and continued mentorship throughout one's studies. Interviewee #4 echoed this suggestion, requesting more contact hours with professors. Interviewee #3 focused on feeling welcomed at the university: 'Feeling welcomed, being included in a community of students from your bachelor. Creating more opportunities for students, for people to meet and spend time together before starting classes. Kind of forcing them to work together during work projects. I think we are working together quite a bit in the AI bachelor.'

Respondents also valued knowledge and accessibility of support resources: 'I think people don't know about these facilities, or they feel like the option to not go is always easier. Make that step of saying yes to facilities (student support, advisors, counselors, psychologists) smaller. Make it very clear and easy.' Interviewee #6 emphasized the need for more in-person events where students can meet people outside their program: 'I'd like to meet more people outside my study program, not just be in the Faculty of Science bubble. That is why I liked RECONNECT.'

Interviewee #2 focused on setting up smart schedules to motivate students to come to university: 'You need to compensate them a bit for the traveling time. If they have to go to campus for one hour, they'll skip it, but if there is a whole afternoon program, they have more reason to go.' The respondents also suggested working together with study associations to create fun events surrounding lectures. Furthermore, our interviews point to giving students the option to sign up and agree to compulsory working groups, which makes them responsible for showing up. Such a commitment mechanism is considered to increase attendance.

Overall, the student feedback emphasizes that the university is not just a place for knowledge creation and exchange. Universities can also do much to facilitate the well-being of the students. RECONNECT was just one attempt. We deduce from the responses we received that further attempts to improve student well-being and to learn how to do this most effectively are necessary for the university context.

Lastly, RECONNECT's holistic approach elicited some critical feedback, which can help inform similar future interventions. Our intervention had a semi-structured character, with talks and social events

planned by the RECONNECT team while encouraging participants to independently plan social smallgroup events. Many survey respondents found the latter element less helpful: 'I thought the university would organize the social activities instead of having to organize something ourselves.' For some, the effort to organize such events was fruitless due to the lack of motivation by other group members: 'I did my best to arrange something that everyone could join. But things never went anywhere as nobody else committed to anything.' This intervention component would have likely benefitted from some more structure and may be partly responsible for RECONNECT's limited impact.

5 Discussion and Conclusion

During the COVID-19 pandemic, university students struggled with social isolation, having to forego direct contact with friends and family members and their study peers, university teachers, and the campus environment. To remedy student well-being and disconnect with the university, we designed an intervention to rebuild connections with university peers. Referring to our initiative as RECONNECT, we invited students university-wide to a series of inspirational talks, social events, and get-togethers with peers. We expected such an intervention would help students make new links with peers, decrease loneliness and increase participants' well-being. We accompanied the initiative with an evidence-based research approach, collecting information on students' socio-demographic backgrounds and protective factors that could explain their well-being. We also conducted detailed qualitative interviews to better understand missing links.

Our program had the foreseen impact. Students that self-selected to participate in RECONNECT were more lonely (1.13 points higher loneliness scale, p-value=0.017) and had lower satisfaction with life (5 points lower, p-value<0.001) compared to a random sample of non-participants. They also reported an increase in well-being after participating in RECONNECT. In particular, we observed higher satisfaction with life (1.89 points, p-value<0.01) after the RECONNECT program compared to the initial measurement.

Yet, we cannot conclude without pointing to the limitations of the study. As already discussed, we were under a tight timeline. Implementing the intervention at the end of the academic year may have dampened its effect, and thus, similar future efforts should identify the best moment for such types of interventions. Second, we could not implement the originally envisioned randomized controlled trial (RCT). While findings from an RCT would have been more rigorous, we experienced that proof of concept, field interventions are seen critically, even in a university context. Since real life happens in intertwined contexts and not in clean lab environments, we deduce that the discussion of the contribution of field interventions should be revived.

Third, we can only identify immediate program impacts but not long-run effects. Yet, previous successful interventions that deal with adverse situations increased the well-being of students in the short-run as well as in the long-run (Brady et al., 2020; Walton & Cohen, 2011). These researchers proposed that '[s]ocial belonging may ... constitute a psychological lever where targeted intervention could yield broad benefits.' (Walton & Cohen, 2011, p. 1447). Existing evidence from RCTs also supports the conclusion that structured exchange in small, self-selected groups, even without professional mentoring, can substantially increase well-being and social behavior (Krekel et al., 2021).

The overall evidence on interventions improving student well-being from a recent meta-study (Upsher et al., 2022) suggests that many studies suffer from low N. Our study also shares this feature,

which constitutes the fourth limitation. As a result of the identified challenges, we have a relatively small sample. The small N study at hand, nevertheless, allowed us to provide a proof of concept and serves as a starting point for future research about evidence-based impact in education. Further replications of our study with a larger participant population are a crucial next step needed to nuance our findings. In short, all limitations can be readily addressed with future research.

We note that previous studies have not consistently reported the negative impacts of COVID-19 on student well-being. A study in the Netherlands that followed students at the start of the pandemic for three months focused on Master's students and did not find adverse impacts on well-being (van Zyl, 2021). This student population, however, was more mature than Bachelor students, who comprise about three-quarters of our group of participants. More importantly, in our study, we interacted with students after two years of repeatedly occurring COVID-19 disruptions to their study and social lives. Therefore, differences in findings are expected.

It is essential to highlight that the focus of this study was on transient loneliness and that we aimed to address mechanisms which could positively impact well-being in the short-run. The adaptive explanation of loneliness suggests that transient experiences of loneliness stimulate activities to reconnect, and therefore, students confronted with increasing loneliness during the COVID-19 pandemic might be more in demand for contexts that remedy their disconnect. In contrast, chronically lonely individuals might be less motivated by positive social stimuli and less searching for help, with a resulting downward spiral (Cacioppo et al., 2014). A meta-analysis of existing interventions for decreasing loneliness in youth showed moderate effects (Eccles & Qualter, 2021) but also stressed the need to treat transient and chronic cases of loneliness as distinct challenges. By communicating about the opportunity to reconnect in the RECONNECT program, we have reached out to individuals experiencing transient loneliness who were strongly motivated to mitigate its impact. Yet, we acknowledge that merely offering an opportunity to re-establish contact to individuals suffering from chronic loneliness would be insufficient (Masi et al., 2011). To support well-being at the university, a mix of activities is therefore more likely to support the heterogenous student population and their demands rather than relying on one type of support.

Ethics board approval

Before the study implementation and data collection, we obtained positive advice from the Ethics Board of the Faculty of Management and Law Faculty of the Radboud University (April 20, 2022).

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Appendix 1: Marketing material Flier distributed online and offline

> Reconnect with your peers

Do you feel lonely or disconnected from your social life at university?

REconnect

Join **REconnect** and listen to inspiring **talks**, get free social **drinks**, and meet people across Radboud!



E-Mail sent to students

Dear xxx,

do you feel lonely? Are you frustrated about spending too much time beyond your screen in your room? Would you like to RECONNECT with your peers?

We know that young adults your age are severely hit by loneliness as a consequence of Corona. Despite this being known, we observe hardly any initiative reaching out to young adults and helping them to overcome the negative impacts of Corona.

Your University sets out to make a difference. We want to give you the opportunity to share about your situation in the context of the RECONNECT study that we initiated to give you voice and visibility.

How can you participate? You can register here to join the study.

What does participation mean?

All participants are asked to share about their situation in two online surveys each taking you 20 minutes. The first survey takes place in week XXX. The second survey takes place in week XXX. We also offer a possibility to RECONNECT at the campus with peers and professors through a series of inspirational talks including meet and greet sessions and social events. Participation in this part of the study is subject to capacity constraints. At the end of the registration period (DATE) you will receive more information about your participation in the RECONNECT activities. Your registration at this stage is important because those who cannot participate in this first round will be invited for a follow up in XXX.

If you participate and complete both survey rounds, you are eligible for our lottery of VVV vouchers of 100 (which can be used almost everywhere). We have 10 vouchers of EUR 100 in the pot.

Why is your participation important?

We want to understand better what your struggles are, in order to provide meaningful support for you. For the last two years, your generation has protected older generations by abstaining from many fun activities. Now, it is payback time. We want to do something for you. By participating in the study you help identifying what type of support you and your peers need and want

We look forward to RECONNECT with you.

In case you have questions, you can reach us here: XXX.

Cheers,

The RECONNECT team

E-mail sent to registered participants

Dear xxx ,

Welcome again to the RECONNECT initiative. With this e-mail we would like to share more information with you about the content of RECONNECT. RECONNECT offers you four weeks of activities starting from Wednesday, May 18 and lasting until Wednesday, June 8. During this period we offer you three inspirational lectures and invite your for three group activities:

- Wednesday, May 18 at 19h: Grand opening with Prof. Jan Bransen from the behavioral science institute
- Monday, May 23 Friday, May 27: Social activity
- Wednesday, June 1st at 19h: Meet and discuss with the head of the Executive Board Prof.
 Daniel Wigboldus
- Monday, May 30 Friday, June 3rd: Social activity
- Wednesday, June 8 at 19h: Closing and discussion with a fellow student Marie Therese Rezko
- Monday, June 6 Friday, June 10: Social activity

The three speakers will share with us their personal story about how they made it through the challenging last two years. You can find out more about the speakers at the bottom of the e-mail. After their talk you are invited to meet and greet our speaker, your peers and to RECONNECT among each other and with us. Snacks and drinks will be provided for free. These events take place in the Leon Wecke lecture hall (1st floor) of the Elinor Ostrom Building (left part of the Radboud Sportcentrum, Heyendaalseweg 141) and the drinks are served at The Yard (same building, same floor O). Please put the three Wednesday events in your agenda: May 18, June 1st, June 8.

For the social activities we will set up WhatsApp groups. You will receive more information and a WhatsApp invite from us at the beginning of next week. Throughout the next four weeks we will get in touch with you mainly by WhatsApp and you can also reach out to us this way.

Before starting with the RECONNECT activities, we have one request: Please fill out the following questionnaire: [Link]. You might wonder why. Your answers in the questionnaire help us to learn about your concerns and your needs and to build educational programs and a university that is people centered. We ask you to fill in a questionnaire at the beginning and the end of the program, i.e. twice. We promise that this is all. It roughly takes you 30 minutes. Among all those who answer both questionnaires we conduct a lottery worth five times 100 \in . We very much appreciate your input.

If you have any questions or want to reach out to us in the meantime, please contact us at <u>reconnect@ru.nl</u>.

For now, welcome again to RECONNECT and we look forward to meeting you on Wednesday next week.

Have a great day. Kind regards,

The RECONNECT Team

Appendix 2: Study materials

Introduction + Informed consent

Welcome to REconnect!

During the pandemic, you and your peers went through a lot: struggles with loneliness, anxiety, and depression, but also remarkable moments of resilience and success. This is why we designed the REconnect initiative for you: to provide you with a space to share your personal situation after the pandemic and help you REconnect with one another.

Why?

Because for the last two years, your generation has protected older generations by abstaining from many fun activities. Now, it's time to catch up! We want to do something for you. By participating in the initiative, you get to experience a series of events designed to inspire you, while at the same time helping us identify what type of support you and your peers want and need.

What?

The initiative will take place for seven weeks (the exact dates will be communicated as soon as possible). We are organizing a series of inspirational talks, social events, and meet-ups with peer groups for this period. Participants will have the chance to pick the most interesting sessions, listen to compelling stories, and attend free social drinks with peers from across our university.

Participation in this part of the initiative is subject to capacity constraints. This is done to offer the best experience to participants while respecting COVID-19 guidelines. After registration has closed, you will receive more information about your participation. Those who cannot participate in this round of REconnect activities will be invited for later editions.

Research

As part of a research study, we will ask you to complete a questionnaire before and after the program. In these questionnaires, you will be asked to answer some questions regarding your wellbeing, social network, and how you have experienced the past two years. The data we collect with these questionnaires will be used to investigate the strengths, merits, and limitations of the initiative. If you participate in both survey rounds, you will be entered into a lottery to receive one of ten VVV vouchers worth €100 each. VVV vouchers can be redeemed in numerous physical and online stores in the Netherlands (for more information, please click <u>here</u>).

Additionally, we would like to ask your permission to link our research data to information about your study progress from the administrative systems of Radboud University (e.g. number of courses followed, number of study points obtained, average grade). We do this to look for relationships between the well-being measures from our research, the impact of the COVID-19 measures, and your study progress. If you <u>do not wish to participate</u> in this part of the research study, you can indicate this on the next page, and still participate in the rest of the initiative.

Confidentiality

To be able to contact you and link your background information to your responses to our questionnaires, we must collect your student number, e-mail, and phone number. Any information you share through REconnect will be kept entirely confidential to the full extent of the law. Any information that could possibly lead to identifying individuals will be stored in an encrypted file,

separate from the other data, and will only be accessible to the principal investigators of this study.

Contact

If you have any questions about this study, please contact the principal investigators: Dr. Jana Vyrastekova - <u>jana.vyrastekova@ru.nl</u> ([phone-number]) Prof. Dr. Natascha Wagner - <u>natascha.wagner@ru.nl</u> ([phone-number])

The research part of this study is funded by the Teaching and Learning Center at Radboud University.

----- Page break ------

Informed Consent

I hereby confirm:

- That I have been sufficiently informed about the initiative and research study.
- That I have read and understand the information.
- That I had the possibility to reach out to the researchers with any questions.
- That I gave my participation in the initiative and research study sufficient thought.

I understand that:

- To participate in this initiative, I must be a registered student at Radboud University.
- Participation is completely voluntary. And that I can decide to stop my participation at any point without having to give a reason or consequences to this decision.
- I have the right to withdraw my personal information from (further) processing and that my personal information will be handled according to the European privacy laws, as well as the <u>privacy statement</u> from Radboud University.
- The researchers will not perform any analysis, draw any diagnostic conclusions, or share information on responses, at the individual level.
- I can skip any questions in the questionnaire that I am not comfortable with answering.

I consent with that:

- I will be contacted via e-mail and WhatsApp for the duration of the initiative. We will only reach out with information regarding the REconnect initiative.
- My phone number is shared with the assigned peer group. Your phone number will not be shared with people outside your peer group.
- The anonymized data collected with the questionnaires will be used for academic purposes and will be saved for at least 10 years for control, re-use, and replications.
- The informed consent will be stored for 10 years.
- The personal information used for the administrative purposes of the REconnect initiative will be saved for 1 year after the start of the data collection (provided the data collection is finished within this time). The administrative purposes entail the linking of the data from different questionnaires, and if applicable the data on the study progress.
- Anonymized data will be shared with other researchers for academic purposes.

Yes, I agree with the above and want to participate in the REconnect initiative and research study.No, I do not agree.

----- Page break -----

Additionally, I consent to the researchers of this study obtaining data on my study progress from the administrative systems of Radboud University. If you do not agree with this, you can still participate in the initiative and the rest of the research study!

o Yes

o No

Registration questionnaire

Name:
Email:
Phone number (for WhatsApp):
Student number:
Study program:
Degree:
 Bachelor Master PhD Other
Faculty:
Study year (ie. 1 – 4 for bachelor; 1 – 2 for master):
Do you live with your parents or in student housing?
 Parents Room in student housing Own (studio) appartment Other
Do you live in Nijmegen?
YesNo
If No: How long is your commute to campus?
What is your nationality?
What language do you speak at home with your parents?
What is your gender?
 Male Female Other Prefer not to say
What is your age?

Baseline/control/endline questionnaire

----- Page break – Baseline and endline questionnaire only ------

This survey is part of the REconnect initiative. By participating in the survey you agree with the conditions that were described when you signed up for the REconnect initiative. If you would like to review this information, you can do so by clicking <u>here</u> (opens in a new window).

In this survey, you will be asked about your personal opinions, feelings, and preferences. There are no right or wrong answers, so please answer openly and honestly. This survey is part one of the research project linked to the initiative. After the REconnect initiative has finished, you will be invited for the second survey. If you complete both surveys, you will be entered into a lottery to receive one of ten VVV vouchers worth €100 each.

The survey will take approximately 30 minutes to complete. Please take your time to think about your answers.

[Baseline questionnaire only:

Before we start the survey, we would like to ask where you learned about the REconnect initiative:

- Screens at the university
- Flyers/posters at the university
- Brightspace
- Social media
- Through friends/study peers
- Other:_____]

----- Page break – Baseline and endline questionnaire only ------

Please enter your student number: _____

Please enter the phone number you submitted when you registered for the REconnect initiative:

Note: This information will only be used to link the data we collect. We will not use the information to connect the answers you give in this questionnaire to you personally. After data collection any personal information will be removed.

----- Page break – Control questionnaire only -----

Welcome! And thank you for taking the time to respond to our questionnaire.

As part of a research study on student well-being after the COVID-19 crisis, we will ask you to complete a questionnaire regarding your well-being, social network, and how you have experienced the past two years. The data we collect with these questionnaires will be used to investigate the strengths, merits, and limitations of the different initiatives that have been implemented to help students after the COVID-19 crisis.

After completing the questionnaire, you will be entered into a lottery to receive one of 10 VVV vouchers worth €50 each. VVV vouchers can be redeemed in numerous physical and online stores in the Netherlands.

Contact

If you have any questions about this study, please contact the principal investigators: Dr. Jana Vyrastekova - jana.vyrastekova@ru.nl (06 55 863 483) Prof. Dr. Natascha Wagner - natascha.wagner@ru.nl (06 31 132 483) This research is part of a study funded by the Teaching and Learning Center at Radboud University.

----- Page break – Control questionnaire only -----

Informed Consent

I hereby confirm:

- That I have been sufficiently informed about the initiative and research study.
- That I have read and understand the information.
- That I had the possibility to reach out to the researchers with any questions.
- That I gave my participation in the initiative and research study sufficient thought.

I understand that:

- Participation is completely voluntary. And that I can decide to stop my participation at any point without having to give a reason or consequences to this decision.
- I have the right to withdraw my personal information from (further) processing and that my personal information will be handled according to the European privacy laws, as well as the <u>privacy statement</u> from Radboud University.
- The researchers will not perform any analysis, draw any diagnostic conclusions, or share information on responses, at the individual level.
- I can skip any questions in the questionnaire that I am not comfortable with answering.

I consent with that:

- The anonymized data collected with the questionnaires will be used for academic purposes and will be saved for at least 10 years for control, re-use, and replications.
- The informed consent will be stored for 10 years.
- Anonymized data will be shared with other researchers for academic purposes.

• Yes, I agree with the above and want to participate in the research study.

• No, I do not agree.

----- Page break ------

Below are five statements that you may agree or disagree with. Indicate your agreement with each item by selecting the appropriate box. Please be open and honest in your responding.

	Neither						
	Strongly		Somewhat	agree nor	Somewhat		Strongly
	agree	Agree	agree	disagree	agree	Disagree	disagree
In most ways my life is	0	0	0	0	0	0	0
close to my ideal.	0	0	0	0	0	0	0
The conditions of my	0	0	0	0	0	0	0
life are excellent.	0	0	0	0	0	0	0
I am satisfied with my	0	0	0	0	0	0	0
life.	Ũ	Ŭ	0	0	U	Ũ	0
So far, I have gotten	0	0	0	0	0	0	0

the important things I							
want in life.							
If I could live my life							
over, I would change	0	0	0	0	0	0	0
almost nothing.							

----- Page break -----

Below are three statements that you may agree or disagree with. Indicate your agreement with each item by selecting the appropriate box. Please be open and honest in your responding.

		Neither							
	Strongly		Somewhat	agree nor	Somewhat		Strongly		
	agree	Agree	agree	disagree	agree	Disagree	disagree		
I don't feel like I									
belong to anything I'd	0	0	0	0	0	0	0		
call a community.									
I feel close to other									
people in my	0	0	0	0	0	0	0		
community.									
My community is a	0	0	0	0	0	0	0		
course of comfort.	0	0	0	0	0	0	0		

----- Page break -----

Below are three statements that you may agree or disagree with. Indicate your agreement with each item by selecting the appropriate box. Please be open and honest in your responding.

	Very much	Mostly like	Somewhat	Not much	Not like me
	like me	me	like me	like me	at all
I finish whatever I begin.	0	0	0	0	0
Setbacks don't discourage me.	0	0	0	0	0
I am diligent.	0	0	0	0	0
I am a hard worker.	0	0	0	0	0

----- Page break ------

Below are three statements that you may agree or disagree with. Indicate your agreement with each item by selecting the appropriate box. Please be open and honest in your responding.

				Neither			
	Strongly		Somewhat	agree nor	Somewhat		Strongly
	agree	Agree	agree	disagree	agree	Disagree	disagree
People who do a favor							
expect nothing in	0	0	0	0	0	0	0
return.							
People do not care							
about other people's	0	0	0	0	0	0	0
problems.							
I believe that people	0	0	0	0	0	0	0
are kind.	0	0	0	0	0	0	0

----- Page break ------

The next questions are about how you feel about different aspects of your life. For each one, tell us how often you feel that way.

	Hardly ever	Some of the time	Often
How often do you feel that you lack companionship?	0	0	0
How often do you feel left out?	0	0	0
How often do you feel isolated from others?	0	0	0

----- Page break ------

.

Below are three statements that you may agree or disagree with. Indicate your agreement with each item by selecting the appropriate box. Please be open and honest in your responding.

				Neither			
	Strongly		Somewhat	agree nor	Somewhat		Strongly
	agree	Agree	agree	disagree	agree	Disagree	disagree
The world is becoming							
a better place for	0	0	0	0	0	0	0
everyone.							
Society has stopped	0	0	0	0	0	0	0
making progress.	0	0	0	0	0	0	0
Society isn't improving	0	0	0	0	0	0	0
for people like me.	-	2	2	2	2	2	2

----- Page break ------

Please choose the picture that best describes your relationship with your family:



Please indicate to what extent you agree with the following statement:

		Neither					
	Strongly		Somewhat	agree nor	Somewhat		Strongly
	agree	Agree	agree	disagree	agree	Disagree	disagree
I am satisfied with the							
support I get from my	0	0	0	0	0	0	0
family.							

----- Page break ------

Please choose the picture that best describes your relationship with your **friends**:



Please indicate to what extent you agree with the following statement:

		Neither					
	Strongly		Somewhat	agree nor	Somewhat		Strongly
	agree	Agree	agree	disagree	agree	Disagree	disagree
I am satisfied with the	0	0	0	0	0	0	0
friends.	Ũ	Ũ	Ũ	Ũ	Ũ	Ũ	Ũ

----- Page break ------

-

Please choose the picture that best describes your relationship with your **study peers**:



Please indicate to what extent you agree with the following statement:

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat agree	Disagree	Strongly disagree
I am satisfied with the support I get from my study peers.	0	0	0	0	0	0	0

----- Page break ------

Please choose the picture that best describes your relationship with your **Radboud University**:





Please indicate to what extent you agree with the following statement:

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat agree	Disagree	Strongly disagree
I am satisfied with the support I get from my Radboud University.	0	0	0	0	0	0	0

----- Page break ------

Below are three statements that you may agree or disagree with. Indicate your agreement with each item by selecting the appropriate box. Please be open and honest in your responding.

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat agree	Disagree	Strongly disagree
I have something valuable to give to the world.	0	ο	0	0	ο	0	0
My daily activities do not produce anything worthwhile for my community.	o	0	0	o	o	0	0
I have nothing important to contribute to society.	ο	0	0	0	0	ο	ο

----- Page break ------

How satisfied are you with your personal relationships?

- Very satisfied
- o Satisfied
- o Neither satisfied nor dissatisfied
- o Dissatisfied

• Very dissatisfied

How many close friends do you have right now?

Did you lose contact with friends because of the COVID-19 crisis?

- o Yes
- o No

How important is is for you to meet new people and make friends?

- Very important
- Somewhat important
- o Not important

Are you in a committed relationship?

- o Yes
- o No

Under the current circumstances, what are good reasons for you to come to the university campus? (You can select multiple answers)

- $\hfill\square$ For lectures
- □ For work groups
- □ To study (e.g. at the library)
- $\hfill\square$ To play sports / go to the gym
- To meet your friends or study peers
- □ Events organized by study / student associations
- Evenst organized by Radboud University
- Other: ______

----- Page break ------

How much money do you have at you disposal every month (including rent)?

- Less than €500
- €500 to €750
- €750 to €1000
- €1000 to €1500
- €1500 to €2000
- €2000 or more
- Prefer not to say

For the two statements below, please indicate to what extend you agree with them:

				Neither			
	Strongly		Somewhat	agree nor	Somewhat		Strongly
	agree	Agree	agree	disagree	agree	Disagree	disagree
I struggle to pay all my bills.	0	0	0	0	0	0	0
I am satisfied with my financial situation.	0	0	0	0	0	0	0

How has the COVID-19 crisis affected the following situations for you?

		Somewhat	About the	Somewhat	
	Much better	better	same	worse	Much worse
How was your financial					
situation affected by the	0	0	0	0	0
COVID-19 crisis?					
How was your study situation					
affected by the COVID-19	0	0	0	0	0
crisis?					

----- Page break ------

Below are three statements that you may agree or disagree with. Indicate your agreement with each item by selecting the appropriate box. Please be open and honest in your responding.

				Neither			
	Strongly		Somewhat	agree nor	Somewhat		Strongly
	agree	Agree	agree	disagree	agree	Disagree	disagree
The world is too complex for me.	ο	0	0	0	0	0	0
I cannot make sense of what's going on in the world.	o	o	0	0	0	0	0
I find it easy to predict what will happen next in society.	0	0	0	0	0	0	0

----- Page break -----

Social Value Orientation task

The six primary items, implemented following: <u>http://ryanomurphy.com/styled-</u> 2/downloads/files/Implementing%20the%20Murphy%20et%20al%20(2011)%20SVO%20Slider%20Ite ms%20in%20Qualtrics.pdf

----- Page break – Baseline questionnaire only -----

Thank you for completing the survey. We are looking forward to seeing you at the REconnect events. If you have any question regarding the research or the initative, feel free to contact us via: reconnect@ru.nl.

----- Page break – Endline questionnaire only -----

Thank you for completing the survey! We would like to ask you some follow up questions about your experiences of the REconnect events and the initiative as a whole:

Why did you decide to join the REconnect initiative?

Did the REconnect initiative meet your expectations?

- o Not at all
- \circ Somehwat
- \circ Completely yes

Why / why not? _____

Which of the REconnect talks did you join? (You can select multiple)

- May 18: Jan Bransen
- □ June 1: Daniël Wigboldus
- June 8: Marie Therese Rezko

How active were you in the social group you were assigned to?

- Very active
- Somewhat active
- Neither active nor inactive
- o Somewhat inactive
- Very inactive

Could you elaborate a bit on your previous answer?

Were there any external reasons that prevented you from participating in the REconnect initiative as much as you would have liked? (e.g. studying, job, other obligations) ______

Which part of the REconnect initiative did you enjoy the most? (You can select 2 max.)

- \Box The events
- □ The social drinks after the events
- □ The interaction with you social group via WhatsApp
- □ The challenges with you social group
- □ Meeting with your social group offline
- Other, namely: ______

What could be improved in the REconnect initiative in your opinion?

What else could REconnect / Radboud University do to help you (re)connect to your fellow students and the university as a whole?

Do you have any other comments? _____

----- Page break – Endline questionnaire only ------

Thanks again for joining the REconnect initiative!

We would like to organize a final get-together to discuss your experience and ideas about the REconnect initiative. This will be in an informal setting with some drinks and snacks. Would you be interested in such a meeting? If so, leave your email address below and we will get in touch?

----- Page break – Control questionnaire only -----

Thank you for completing the survey. If you have any question regarding the research, feel free to contact us via: reconnect@ru.nl.

Appendix 3

Interview coding structure

External negative consequences	ENC1: Learning environment	"it was more difficult to connect with people within my studies. I think outside of it, it was much easier for me personally, with associations in Nijmegen. But you have to connect with people inside the bachelor programme. It was a bit more difficult. I think I would have gone way earlier to activities of the study association and maybe meet people there with whom I could do projects with."
	ENC2: Professional development	"My bachelor internship [] was completely online. I only saw my supervisor once in real life at the end of my internship. I didn't go to the lab. I did data analysis, that was my internship. That impacted my studies, because I have zero lab experience, and in my field, it's quite important. Now I'm a first year master student and I barely know how to do anything in the lab."
Personal negative consequences	PNC1: Interpersonal relationships	<i>"It was quite hard to live at home with both my parents and my sister, because we were not used to spend so much time together. We were used to spending a few hours a day, but not every single hour of the day."</i>
	PNC2: Physical well-being	<i>"You're basically all on your own and just sitting in front of the computer all the time. It's more exhausting than listening actually, in a lecture hall."</i>
	PNC3: Mental well-being	<i>"it was honestly hard to be on my own, to not have so many people around me."</i>
Experience with support resources		<i>"I contacted the study advisor once. But it's really difficult to get an appointment that's not like in two months. So I just didn't look further."</i>
Expectations from the university		"I think that they really should work together with students organisations. Because you will see that they usually have close contact with the members. If you, for example, do a little on campus activity, with study association, right before and after a lecture there will be enough reason for people to go."

Appendix 4: Additional results

Table A1. Correlations among loneliness, Satisfaction With Life (SWL), social well-being (SWB) and belonging with study peers (IOS) for the RECONNECT participants at baseline

Variable	Mean	Standard Deviation	1	2	3
1. Loneliness	6.82	1.78			
2. SWL	20.08	5.81	-0.52** [-0.66, -0.33]		
3. SWB	65.10	11.04	-0.47** [-0.63, -0.28]	0.61** [0.45, 0.74]	
4. IOS study peers	2.42	1.23	-0.39** [-0.56, -0.18]	0.20 [-0.02, 0.41]	0.25* [0.03, 0.45]

Note: Mean and standard deviation are represented followed by the correlations with confidence intervals. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates p < .05. ** indicates p < .01.

Table A2. Correlations among loneliness, Satisfaction With Life (SWL), social well-being (SWB) and belonging with study peers (IOS) for the CONTROL group

Variable	Mean	Standard Deviation	1	2	3
1. Loneliness	5.69	2.29			
2. SWL	25.14	5.41	-0.46** [-0.69, -0.15]		
3. SWB	67.89	12.50	-0.61** [-0.78, -0.34]	0.60** [0.34, 0.78]	
4. IOS study peers	3.23	1.44	-0.58** [-0.76 <i>,</i> -0.30]	0.35* [0.02, 0.62]	0.46** [0.15, 0.69]

Note: Mean and standard deviation are represented followed by the correlations with confidence intervals. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates p < .05. ** indicates p < .01.