The contribution of distress factors and Coping Resources to the motivation to use ICT among adults with intellectual disability during COVID-19

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Abstract
The current study focused on people with intellectual disability (ID), who have unique disadvantages that place them at greater risk for negative outcomes due to COVID-19. The study goals are three-fold: (a) To examine whether differences in distress factors (loneliness and stress) would be found between adults with ID who used the Zoom application, and those who did not use Zoom during the pandemic; (b) To examine whether differences in psychological and coping resources (psychological capital), and practical-technological resources (attitudes and motivation to use information communication technology) would be found between the groups; (c) To examine the contribution of background variables (gender, type of residence, Zoom use), distress factors and psychological and practical technological coping resources on the motivation to use technology. The sample included 35 adults with ID (MCA=40.06, SD=11.02). Of these, 57% learned to use the Zoom application during the COVID-19 pandemic (N=20), and 47% did not (N=15). Participants answered seven questionnaires examining distress factors and psychological and technological resources. Both groups exhibited distress factors. However, the Zoom users demonstrated higher scores in hope and motivation to use technology. Regression analysis indicated that the resilience and attitudes toward technology among the Zoom users contributed to the explained variance of motivation to use technology. In light of the higher coping resources among Zoom users, we may carefully say that using Zoom might increase the independence of individuals with ID in learning, develop their communications possibilities, and help them to cope better in distress situations.

Keywords Intellectual disability (ID) · Psychological capital · Motivation to use ICT · Stress · Loneliness · COVID-19
1 Introduction

The COVID-19 pandemic has created an unprecedented worldwide crisis, necessitating drastic changes in living conditions, social life, personal freedom, and economic activity. The pandemic did not only cause physical health concerns, but also affected the psychological outcomes of people in different communities (Shevlin et al., 2020). One of these groups is people with intellectual disability (ID), who have a range of vulnerabilities that include health problems, mental disorders, and social disadvantage (Carr et al., 2016). Thus, it was essential to examine the distress factors and coping resources during the COVID-19 pandemic among adults with ID, in order to seek new ways to preserve their mental health as well as that of other vulnerable groups in challenging situations such the COVID-19 pandemic. During the first wave lockdown, several residences and families decided to teach their clients/offspring with ID to use the Zoom application in order to relieve loneliness and stress and enable contact with friends and relatives. This study’s goals were three-fold: (a) To examine whether differences in distress factors (loneliness and stress) would be found between adults with ID who used the Zoom application, and those who did not use Zoom during the pandemic; (b) To examine whether differences in psychological and coping resources (psychological capital), and practical-technological resources (attitudes and motivation to use information communication technology – ICT) would be found between the groups; (c) To examine the contribution of background variables (gender, type of residence, Zoom use), distress factors and psychological and practical technological coping resources on the motivation to use technology.

1.1 COVID-19 and people with intellectual disability

Extensive research on infectious disease outbreaks (e.g., SARS, H1N1) and mental health outcomes has established that affected populations are likely to experience increased distress and decreased quality of life (Fong et al., 2020; Pfefferbaum & North, 2020). Indeed, evidence accumulated to date confirms that the ongoing pandemic is having a major deleterious psychological impact on people (Colizzi et al., 2020; Talevi et al., 2020). Salari and colleagues (2020) observed a wide range of psychological outcomes during the pandemic in the population with typical development (TD), such as emotional distress, depression, stress, mood swings, irritability, insomnia, attention deficit, posttraumatic stress, and anger.

During the course of the pandemic, the vulnerabilities of certain groups of people have been highlighted. These include the elderly, pregnant women, and the homeless (Kirby, 2020; Qiao, 2020). People with disabilities are considered to be particularly vulnerable (World Health Organization, WHO, 2020). The unforeseen changes in everyday life resulting from the COVID-19 pandemic, along with regulations requiring self-isolation and social distancing, have been especially challenging for people with disabilities and have had an unprecedented impact on their families as well (Rose et al., 2020; Toseeb et al., 2020).

The current study focused on a specific vulnerable group, people with ID. According to the American Association on Intellectual and Developmental Disabilities, ID is characterized by significant limitations in both intellectual functioning and adap-
tive behavior, as expressed in conceptual, social, and practical skills. People with ID experience limitations in cognitive capacity, such as learning, reasoning, problem solving, etc., and difficulties in adaptive behavior that refers to independent function of conceptual, social, and practical skills (APA, 2013; Schalock et al., 2021). A meta-analysis showed that the prevalence of ID across the world is about 1% (Maulik et al., 2011). People with ID have unique disadvantages that place them at greater risk for negative outcomes due to COVID-19.

Gleason et al. (2021) found that people with ID were at the highest risk for COVID-19. A reduction in access to routine healthcare and rehabilitation services, and the negative social impacts caused by the lockdowns, led to an increase in morbidity. In England, it was found that the risk for death as a result of COVID-19 was three-fold higher among men and women with ID compared to the regular population. This effect was found mainly among persons living in a shared residence, but also among those living at home (Shakespeare et al., 2021).

1.2 Distress factors among persons with ID

Social distancing and quarantines were essential for preventing mass infection during the COVID-19 pandemic. However, there is concern that these measures could lead to an increase in feelings of loneliness, particularly among vulnerable groups. Studies show high rates of loneliness during the quarantines of the pandemic, which may increase the prevalence of mood disorders, self-harm, and suicide, and exacerbate pre-existing mental health conditions (Groarke et al., 2020; Holmes et al., 2020).

Loneliness is considered to be a distress factor. It is a universal unpleasant human experience that occurs when a person’s network of social relationships is deficient, either qualitatively or quantitatively (Bekhet et al., 2008). It has a negative effect on multiple distinct health outcomes, such as depression, anxiety, suicidal tendencies, mental health, general health, well-being, physical health, sleep, and cognition (Erzen & Çikrikci, 2018; Park et al., 2021).

People with ID are highly vulnerable to loneliness. According to Gilmore and Cuskelly (2014), up to half of the persons with ID are chronically lonely, compared to around 15–30% of people in the general population. Young people with ID who experience high levels of loneliness reported low quality of life and increased sadness and depression (Al-Yagon et al., 2020). In addition, mental health problems are already associated with ID, and are likely to be compounded by experiences of chronic loneliness (Gilmore & Cuskelly, 2014). Another distress factor is stress. Restrictions on usual activities as in the COVID-19 pandemic are likely to induce mental stress, especially among those who have challenging behaviors or other special needs (Courtenay & Perera, 2020).

1.3 Coping resources in stress situations

Coping is the process of attempting to manage the demands created by stressful events that are appraised as disturbing or exceeding a person’s resources (Lazarus, 1993; Lazarus & Folkman 1984). This process is designed to respond to external and internal challenges, helping to tolerate, minimize, and deal with stressful situations.
in life. Managing stress well improves the individual’s well-being, quality of life, self-esteem, resilience and acceptance of disability (Folkman & Moskowitz, 2004).

Coping resources or strategies can be classified into two main types (Lazarus, 1993): Practical or problem-focused coping is activated when the situation is evaluated as changeable and controllable and the aim is to focus on the problem solution. Emotion-focused coping, in which the individual is not able to deal directly with the problem, but by using different (conscious or unconscious) strategies tries to eliminate the psychological pressure. This includes emotional mechanisms such as self-efficacy, resilience and others.

1.4 Coping resources during the COVID-19 pandemic

As the risks of COVID-19 can affect vulnerable populations disproportionately (for example elderly people, people with chronic disease, and those with disabilities), there is a consensus that these populations should be provided with adequate coping resources in order to cope with general life situations, but especially in crisis situations like the COVID-19 pandemic (Berger et al., 2020; World Health Organization, 2020). Coping resources strategies that were used among vulnerable populations during the COVID-19 pandemic, were classified by us into psychological-emotional ones and practical problem-focused resources. The psychological-emotional resources includes therapeutic interventions. For example, Sauces et al. (2020) used an emotional intervention based on the mindfulness principles among adults with intellectual and developmental disabilities. Other psychological resources used during the COVID-19 pandemic include positive reframing, planning receiving emotional support or social support, humor, and reliance on religion (Szuces, 2020; Umucu & Lee, 2020).

Umucu and Lee (2020) tested the level of perceived stress, the above coping resources and mental well-being during the COVID-19 period among people with chronic disease and disabilities. The findings presented a positive relation between perceived stress and and the above coping strategies. The higher the use of the positive resources, the less stress was demonstrated. On the other hand, negative strategies, such as denial, substance use, behavioral detachment, venting, and self-blaming were correlated with stress. The higher the use of negative resources, the more stress was demonstrated. The participants of this study (Umucu & Lee, 2020) were people with chronic disease and disabilities, but not with ID.

The practical-problem solving strategies that were used during COVID-19 were drama therapy or psychodrama, painting and other creative tools (Szuces, 2020; Umucu & Lee, 2020). These strategies aimed to fill the leisure time of persons with disability as well as relieve their stress and loneliness. Most of the studies focused on persons with various types of disabilities (Umucu & Lee, 2020). Only few examined coping resources among persons with ID during the COVID-19 pandemic (Szuces, 2020). However, the impact of these strategies was not examined empirically. The current study fills this void.
1.5 Psychological and practical Technological Resources for coping with distress situations

In the current study, we tested two types of coping resources with stress situations among people with ID: Psychological resources (including three sub-concepts of psychological capital: hope, optimism and resilience), and practical technological resources for the immediate and the far future situations (attitudes and motivation to use ICT).

**Psychological Capital resources among persons with ID:** Psychological capital (Luthans et al., 2015; Luthans & Youssef-Morgan, 2017) is a sub-concept under the umbrella of positive psychology (Seligman, 2002), and refers to resilience, positive aspects of human behavior, and resources that play a central role in individuals’ success. It includes four traits (three of which were examined in the current study): Hope is a positive motivational state comprised of two interactive dimensions. It is derived from the sense of successful goal-directed energy and from plans to actually meet those goals (Snyder et al., 1991); Optimism is a psychological intention, expectation and openness for the best positive outcome in the future (Luthans et al., 2007). It is an explanatory or attributional style for interpreting positive and negative events (Seligman, 2002). It contributes to motivation and goal-oriented performance in a collective manner that goes beyond the individual component (Luthans et al., 2015; Luthans & Youssef-Morgan, 2017). Resilience is defined as “positive adaptation” after a stressful or adverse situation (Hopf, 2010). It is a coherent sense of self that is able to maintain normative developmental tasks that occur at various stages of life (Richardson, 2002). It allows a person to rebound from adversity as a strengthened and more resourceful person.

Lifshitz (2020) found that students with TD exhibited significantly higher hope scores than people with ID. Al-Yagon et al. (2020) found that the sense of hope of young people with ID explains their quality of life indices. Regarding optimism, it has been shown that people with ID are able to achieve a high level of vital fulfillment and optimism (Gavín-Chocano & Molero, 2019). Among college students with disabilities, including those with ID, optimism, along with adaptation to disability, predicted quality of life (Freeman, 2013).

Practical-technological resource. In the current study we focused on ICT use as a practical coping resource. Using ICT aimed to solve the problem of loneliness and distancing from family, or friends during the COVID-19 especially in the lockdown periods as well as a tool that will enable adults with ID to participate in various leisure activities through the Zoom. Distance learning can be facilitated by different platforms, and there are several popular interactive multimedia tools and video-conferencing software, such as Zoom, Google meet, and WebEx. During the COVID-19 pandemic lockdowns, distance online learning occurred through virtual classrooms, and in Israel the Zoom software was most commonly used (Soleman, 2020). The current study therefore focused on using Zoom as a coping resource.

**Attitudes and motivation toward ICT.** As mentioned, there was intensive use of ICT for different purposes during the COVID-19 pandemic. It is important for teachers, staff in facilities of persons with ID, students, and adults with ID who use ICT to be aware of how technology can be used to build a supportive learning environment
that encourages learning and use (Murphy et al., 2019), mainly in stressful times such as the COVID-19 pandemic (Alfredsson et al., 2021). Therefore, research is needed in order to identify how to promote the digital participation of people with ID, learn what is effective and what they prefer to use and how (Courtenay & Perera, 2020). Attitudes toward ICT use are important in this context. When teachers or other staff who work with population with ID have a positive attitude toward the use of technology, they will adapt and integrate it into their lives (Ozdamli, 2017). Eden et al. (2019) found a positive correlation between teachers’ attitudes toward iPad use and the teachers’ use of the iPad. Yang and Kwok (2017) and Meerza and Beauchamp (2017) found that a positive attitude toward ICT is a necessary condition for the use of ICT in teaching students to be effective learners online.

In addition to attitudes toward ICT use, motivation to use technology is a crucial factor in its use. Ryan and Deci (2000, p.56) define motivation as people’s actions resulting from excitement or enjoyment. Motivation is a drive that pushes an individual to act and perform specific tasks and actions. Intrinsic motivation in doing something can achieve high quality of learning and boost their creativity (Pinder, 2014; Lussier-Desrochers, 2017). Without sufficient motivation, it is unlikely that people, particularly those with ID, will put forth effort to use ICT in their lives.

Werner and Shpigelman (2019) highlighted the importance of finding an assessment of factors that may strengthen motivation and attitudes toward ICT among persons with ID. Self-determined use of mobile technology and apps was associated with improvement of social inclusion of adults (mean age 42) with ID (Martin et al., 2021). Internet was used for chatting with friends, reading or writing on social networks, and for social and romantic contacts in special educations schools. Those who used technology reported significantly better social contacts (Murphy et al., 2019). Using technology, such as the Internet, was found to be more frequent among youth and young adults with ID (ages 13–25) than among older (25+) adults (Alfredsson Ågren et al., 2020). Ramsten et al. (2019) found that staff in residential homes for young adults with ID perceived ICT, and specifically the Internet, as being supportive for both the daily lives and the social relationships of these young adults. However, they also viewed ICT as posing social risks such as exposure to immoral material. The authors concluded that staff perception is based on their subjective moral judgment, and not primarily on the wishes or interests of the adults. All the above mentioned studies, which were conducted before COVID-19, highlight the importance of attitudes and motivation to use ICT in a population with ID.

1.6 The impact of ICT use during COVID-19 in typical/IDD populations

Technology became the only way for people with TD, as well as people with disabilities isolated at home during the COVID-19 pandemic, to stay in contact with their families, friends, and communities. Several researches examined the impact of technology use during COVID-19 in the typical population. Studies during the COVID-19 pandemic found that technology helps maintain social relationships, performing work-related tasks, and social and emotional well-being of children and adults (Goldschmidt, 2020; Varshney, 2021). Subakthiasih and Putri (2020) found that university
students demonstrated higher intrinsic motivation compared to extrinsic motivation, in learning English through technology during the pandemic.

Only few studies examined the impact of technology use among the population with ID during the COVID-19 pandemic. In Ireland, McCausland and colleagues (2021) found that a greater number of adults with ID used technology during the COVID-19 pandemic than before the pandemic, mainly among adults who live in community residence than among those who live with their families. Furthermore, after the first lockdown, the adults who use technology stayed in contact with their home. However, those researchers examined technology use, contact with families, and social activities based on qualitative interviews. Our study is the first to empirically examine the coping resources and distress factors as well as the motivation to use technology during the COVID-19 pandemic among adults with ID using reliable scales. In addition, McCausland et al. did not ask specific questions about using the Zoom application (or Skype) to make video calls. The current study fills this void by examining the contribution of using Zoom on coping resources and distress factors of adults with ID during the COVID-19 pandemic.

2 Rationale and research questions

The COVID-19 pandemic has undoubtedly affected the psychological outcomes of people all over the world, particularly vulnerable groups. People with ID are considered to be among those groups, as they experience health problems, mental disorders, and social disadvantage (Carr et al., 2016). The current research focused on two main aspects of people with ID — distress factors and coping resources. As for the distress factors, studies show high rates of loneliness during the COVID-19 pandemic (Groarke et al., 2020; Holmes et al., 2020), as well as mental stress, especially among those who have challenging behaviors or other special needs (Courtenay & Perera, 2020). People with ID are highly vulnerable to loneliness and stress (Gilmore & Cuskelly, 2014; Tipton et al., 2013). We examined two types of coping resources: psychology resources (including three subscales of psychological capital—hope, optimism, and resilience; Luthans & Youssef-Morgan, 2017), and practical technological resources (attitudes toward ICT use, and the motivation to use ICT), which have great potential for coping in distress situations such as the COVID-19 pandemic, and distress situations that might occur in the future, and to contribute to health, functioning, and quality of life of adults with ID (Durocher et al., 2019).

It is therefore essential to examine the distress factors and coping resources during the COVID-19 pandemic among adults with ID, in order to seek new ways to preserve the mental health and quality of life of these individuals.

The operative goals of the current study were: (a) To examine whether differences in distress factors (loneliness and stress) would be found between adults with ID who used the Zoom application, and those who did not use Zoom during the pandemic; (b) To examine whether differences in psychological and coping resources (psychological capital), and practical-technological resources (attitudes and motivation to use ICT) would be found between adults with ID who used the Zoom application and those who did not use Zoom during the pandemic; (c) To examine the contribution
of background variables (gender, type of residence, Zoom use), distress factors and psychological (psychological capital) and practical technological (attitudes toward ICT use) coping resources on the motivation to use technology.

3 Method

3.1 Participants

The present study was conducted in Israel during and after the lockdown of the third wave of the COVID-19 pandemic. The sample included 35 adults with ID (15 men and 20 women) whose ages ranged from 24 to 68 ($MCA=40.06$, $SD=11.02$) divided into two groups: (a) adults with ID who learned how to use Zoom ($N=20$; 4 men and 11 women); (b) adults with ID who did not learn how to use Zoom ($N=15$; 11 men and 9 women). There was no significant difference in the chronological age between the groups ($t=1.03$, $p=.31$) as well as in gender distribution ($\chi^2(1)=2.81$, $p=.094$).

Mental age and basic cognitive level The mean mental age of the participants was $7.76$ ($SD=1.56$) and $7.91$ ($SD=2.14$) for participants who used Zoom and those who did not, respectively, with no significant difference between the groups ($t=0.23$, $p=.82$). However, there was a significant difference ($t=4.7$, $p=.001$) in the Raven Matrices test between participants who used Zoom ($M=19.7$; $SD=3.67$) and those who did not ($M=26.30$; $SD=4.86$).

Residence Of the participants who used Zoom, 85% live in community residences such as hostels and apartments, versus 73% who did not use Zoom, with no significant difference in type of residence between the groups, $\chi^2(1)=0.73$, $p=.393$. The rest of the participants live at home with their families, usually with their parents.

Using technological devices Both groups use the same amount of technological devices, such as computers, cell phones, tablets or iPads, with no significant difference between the groups, $t=2.46$, $p=.127$, $\eta^2_p=0.08$.

All participants with ID work in vocational workshops and participate in leisure activities in the afternoon. During the first, second and third waves of the COVID-19 pandemic, they continued to work under restrictions, in improvised vocational workshops built for them within the community residence during the first wave of the pandemic. They also participated in leisure activities offered by the residence. During the first wave lockdown, several residences and several families decided to teach their clients/offspring with ID to use the Zoom application in order to relieve loneliness and stress and enable contact with friends and relatives. Table 1 presents the background characteristics of participants who learned to use Zoom and those who did not.
3.2 Assessment tools

The tests battery included two tests for examining mental age and basic cognitive level, five tests for examining coping resources, and two tests for examining distress factors.

Peabody Picture Vocabulary Test (PPVT-IV; Dunn & Dunn, 2007): The PPVT-IV was used to match the two groups of participants with ID: those who used the Zoom application and those who did not, and to measure their vocabulary knowledge. This test has been correlated with general intelligence and is commonly used in populations with ID (Dunn & Dunn, 2007) ($\alpha=0.93$ in our study).

The Colored Progressive Matrices CPM (Raven et al., 1986) assesses the ability to form comparisons, deduce relationships, correlates, and reason by analogy. It refers to fluid intelligence and is considered a measure of general intelligence $g$. Participants solved sets A, AB and B. A correct answer afforded one point. Scores were the sum of the raw scores. This test is commonly used in populations with ID (Facon, 1999); ($\alpha=0.90$ in our study).

The Short-Form UCLA Loneliness Scale (Hays & DiMatteo, 1987; 8 items). Examines participants’ subjective feelings of loneliness and social isolation, e.g., “I feel isolated from others”, “I feel completely alone” on 4 points scale. Range of scores 8–32). The scale was used in a population with ID (Edenburg, 2019). Internal consistency in our study was $\alpha=0.57$, removal of items no. 2 and 3 yielded a higher consistency of $\alpha=0.70$.

The Perceived Stress Scale (Cohen et al., 1983; 10 items) examines “the degree to which individuals appraise situations in their lives as stressful” (p. 385). Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives (Lee, 2012). i.e. “In the last month, to what extent were you upset because of something that happened unexpectedly?” “In the last month, to what extent were you nervous and ‘stressed’?” on 4 points scale. Score range 10–40. The scale was used in population with ASD (Bishop-Fitzpatrick et al., 2018) ($\alpha=0.89$ in our study).

Psychological capital questionnaires: The Adult Hope Scale (AHS; Snyder et al., 1996; 12-items) examines Snyder’s cognitive model of hope. The scale is divided into two subscales: (1) Agency – goal-directed energy; For example: In general I fulfill my goals) and (2) Pathways that relates to the planning of the individual to accomplish his goals, i.e. “When there is a problem I have many ways to solve it”, on
a 4-point scale. Scores range 12–48. Lifshitz (2020) used this scale in a population with ID (α=0.75 in our study).

Optimism (Scheier & Carver 1985; 9 items) examines the ability to cope with life challenges and positive thinking and expectations: “Even when I have a problem I feel that it is easy for me to relax”; “I always think that things will be well” on 4-point scale. Scores range 9–27. Lifshitz (2020) used this scale in a population with ID (α=0.72 in our study).

The Resilience Scale (Wagnild & Young, 1993; 16 items) examines the capacity to withstand life stressors, and to thrive and make meaning from challenges. It is a widely used scale with adequate psychometric properties (Wagnild, 2009), i.e.: “I can get through difficult times because I’ve experienced difficulty before”, “When I am in a difficult situation, I can usually find my way out of it” on 4-point scale. Scores range 16–64. Scheffers et al. (2021) used this scale in a population with ID (α=0.72 in our study).

Attitudes toward ICT Scale (Albirini, 2006; 15 items) examines the attitudes toward ICT use, i.e.: “Using technology makes everything more interesting” “Using technology helps in organize everyday tasks” on a 4-point scale. Scores range 15–60. As far as we know, the questionnaire was not used in a population with ID (α=0.85 in our study).

Motivations for Technology Use (Silva, 2012; 10 items) examines the students’ motivation to use technology, i.e. “I use technology in order to try new things” “Technology challenges me to perform complicated tasks” on a 4-point scale. Scores range 10–20. As far as we know, the questionnaire was not used among the population with ID (α=.72 in our study).

Technology Use Questionnaire (Shpigelman & Gill, 2014; 20 items) examines use of information and communication technologies in general and on social network sites in particular, among people with ID. Spigelman and Gill (2014) used it in a population with ID (α=0.70 in our study).

3.3 Procedure

The study was conducted during the COVID-19 pandemic, after lifting of the third lockdown. Authorizations were obtained from the University Ethics Committee and the Division Disability in the Ministry of Welfare and Social Affairs. Consent for participation was obtained from parents/guardians. The study’s aims and procedure were explained to all participants. They signed an informed consent form for participation in scientific research (adapted to populations with ID). They were told that they could withdraw in mid-study. The tests battery was administered by an MA student in ID in a private room in the vocational centers, with strict adherence to COVID-19 regulations. The PPVT and Raven test were administered first, followed by the coping resources and distress scales in three-hour sessions, with a half-hour break in the middle.
4 Results

Prior to examining the current research questions and hypotheses, Shapiro-Wilk tests were conducted in order to examine whether the various research variables (psychological coping resources, distress and ICT measures) have a normal distribution in each study group. The results indicated that the various research variables did not deviate significantly from a normal distribution ($p = 0.070-0.962$). The research questions were therefore examined using parametric analyses.

Three one-way MANCOVAs were conducted, with the Raven score as covariate (due to the difference between the groups in the Raven Matrix), in order to examine whether significant differences would be found in the psychological coping resources (hope, optimism and resilience), and in the distress (loneliness and stress) and ICT measures (attitude toward technology use and motivation to use technology), between the participants with ID who learned how to use Zoom and those who did not use Zoom.

4.1 Group differences in the distress factors

The results of the MANCOVA indicated that there was no significant difference between the two study groups in the distress factors, distress and loneliness, $F(2, 31) = 0.73, p = 0.488, \eta_{p}^2 = 0.05$ (see Table 2). The scores of both groups in the two measures ranged between $M = 2.17–2.65$ out of 4, which reflect a medium level of loneliness and distress.

4.2 Group Difference in Psychological Coping Resources

The results of the MANCOVA indicated that there was no significant difference between the two study groups in the coping resources, $F(3, 29) = 2.36, p = 0.092, \eta_{p}^2 = 0.20$ (see Table 2).

An examination of the difference between the two study groups while controlling for the scores on the Raven test in each of the coping resources measures indicated that the two groups differed significantly in their level of hope,

| Table 2 Mean, SD, ME and F values of the psychological capital measures |
|---------------------------------------------------------------|
| Did not use Zoom ($n = 15$) | Zoom users ($n = 20$) |
|-------------------------------|----------------------|
| **Psychological coping resources** | **Psychological coping resources** |
| Hope | Optimism | Resilience | Distress | Hope | Optimism | Resilience | Distress |
| 2.86 | 0.48 | 2.90 | 3.39 | 0.45 | 3.36 | 4.81* | 0.036 | 0.13 |
| 3.31 | 0.21 | 3.36 | 3.53 | 0.47 | 3.49 | 0.59 | 0.447 | 0.02 |
| 3.03 | 0.33 | 3.11 | 3.14 | 0.48 | 3.07 | 0.06 | 0.814 | 0.00 |
| Loneliness | Stress | *p < 0.05, **p < 0.001 |
| 2.44 | 0.29 | 2.36 | 2.29 | 0.43 | 2.36 | 0.00 | 0.997 | 0.00 |
| 2.17 | 0.64 | 2.25 | 2.65 | 0.62 | 2.58 | 1.41 | 0.245 | 0.04 |

* $p < 0.05, ** p < 0.001$
The scores of participants with ID who did not use Zoom was 2.86 out of 4 (between do not agree and agree), whereas the scores of participants who used Zoom was 3.39 out of 4 (between agree to agree to a great extent). There were no differences between the groups in the levels of optimism and resilience \[ F(1, 31) = 0.59, p = .447, \eta_p^2 = 0.02 \] and \[ F(1, 31) = 0.06, p = .814, \eta_p^2 = 0.00 \], respectively, which in both groups ranged between 3.03 and 3.53 (between agree to agree to a great extent).

### 4.3 Group Difference in practical – Technological Coping Resources

The results of the MANCOVA with the Raven scores as a covariate showed a significant difference between the two study groups in the practical-technological resources, \[ F(3, 28) = 3.73, p = .022, \eta_p^2 = 0.29 \] (see Table 3), between the two study groups in each ICT measure. The results indicated that the two groups differed significantly in their level of motivation to use ICT \[ F(1, 30) = 10.56, p = .003, \eta_p^2 = 0.26 \], which was significantly higher among adults with ID who learned to use Zoom compared to those who did not. The mean score of participants who did not use Zoom was \( M = 2.42 \) out of 4 points (between do not agree to agree), whereas the mean scores of participants with ID who used Zoom was \( M = 3.03 \) out of 4 (between agree to agree to a great extent).

The scores of attitude toward ICT ranged between \( M = 3.08 \)–3.47 (agree to agree to a great extent), without a significant difference between Zoom users and participants who do not use Zoom, \( F(1, 30) = 0.75, p = .395, \eta_p^2 = 0.02 \).

**Table 3 Mean, SD, ME and F values of the ICT use measures**

|                        | Did not use Zoom \( (n=15) \) | Zoom users \( (n=20) \) |
|------------------------|-------------------------------|-------------------------|
|                        | \( M \)       | \( SD \)   | \( M.E \) | \( M \)       | \( SD \)   | \( M.E \) | \( F \)  | \( p \)  | \( \eta_p^2 \) |
| Psychological coping resources |          |             |          |          |             |          |      |       |       |             |
| Attitude toward ICT    | 3.08         | 0.34        | 3.19     | 3.47     | 0.45        | 3.39     | 1.25  | 0.271 | 0.04  |
| ICT use                | 1.90         | 0.63        | 1.93     | 2.34     | 0.40        | 2.32     | 2.46  | 0.127 | 0.08  |
| Motivation to use ICT  | 2.42         | 0.30        | 2.49     | 3.02     | 0.28        | 2.97     | 14.63*** | 0.001 | 0.31  |

\*p < .05, ***p < .001
measures (loneliness and stress). These measures were entered into the regression model in the second step in order to examine their unique contribution to the EPV of the level of motivation to use ICT beyond the participants’ background characteristics. Finally, the participants’ ICT use level and their attitude toward ICT were entered in the third step, in order to examine their unique contribution to the EPV of the motivation to use ICT beyond their background characteristics, coping resources and distress level. We performed the regression analyses in a stepwise manner so that only variables that make a significant contribution to the EPV of the level of motivation to use ICT were entered into the model. The order of the variables was according to the order of their significance. Only variables that make a significant unique contribution to the EPV of motivation to use ICT beyond the last step were entered into the regression model in the next step. This is intended to decrease the probability of multi-collinearity (see Table 3).

As shown in Table 3, the grouping variable significantly contributed 51.2% to the EPV of the level of motivation to use ICT. The positive β coefficient indicated

Table 4 Hierarchical regression results: motivation to use ICT by the participants’ background variables, psychological capital level, use and attitude toward ICT

| Steps | Variables which contribute to the EPV | B    | SE.B | β    | R^2   | ΔR^2   |
|-------|-------------------------------------|------|------|------|-------|--------|
| **Model 1** | Study group | 0.60 | 0.10 | 0.72*** | 0.512*** | 0.512*** |
|       | Study group | 0.51 | 0.11 | 0.61*** |          |        |
|       | Psychological coping resources | 0.31 | 0.14 | 0.29* | 0.583*** | 0.071* |
|       | Study group | 0.41 | 0.10 | 0.48*** |          |        |
|       | Psychological coping resources | 0.17 | 0.12 | 0.16 |          |        |
|       | Attitude toward ICT | 0.38 | 0.11 | 0.41** | 0.705*** | 0.122** |
|       | Study group | 0.35 | 0.09 | 0.41*** |          |        |
|       | Psychological coping resources | 0.14 | 0.11 | 0.13 |          |        |
|       | Attitude toward ICT | 0.31 | 0.10 | 0.33** |          |        |
|       | ICT use | 0.21 | 0.08 | 0.27* | 0.762*** | 0.056* |
| **Model 2** | Study group | 0.60 | 0.11 | 0.71*** | 0.508*** | 0.508*** |
|       | Study group | 0.58 | 0.10 | 0.68*** |          |        |
|       | Resilience | 0.27 | 0.12 | 0.27* | 0.580*** | 0.072* |
|       | Study group | 0.43 | 0.10 | 0.51*** |          |        |
|       | Resilience | 0.12 | 0.11 | 0.12 |          |        |
|       | Attitude toward ICT | 0.39 | 0.12 | 0.42** | 0.702*** | 0.122** |
|       | Study group | 0.38 | 0.09 | 0.45*** |          |        |
|       | Resilience | 0.11 | 0.10 | 0.11 |          |        |
|       | Attitude toward ICT | 0.30 | 0.11 | 0.32* |          |        |
|       | ICT use | 0.22 | 0.09 | 0.28* | 0.758*** | 0.056* |

*p < .05, **p < .01, ***p < .001; Step 1: gender, type of residence, age, PPVT scores, Raven scores, study group (0- Did not use Zoom, 1- Used Zoom); Step 2: Psychological coping resources (Hope, Optimism, Resilience); Step 3: ICT: attitude and use
that the level of motivation to use ICT among adults with ID who learned how to use the Zoom application was significantly higher compared to those who did not learn how to use Zoom. A significant unique contribution of 7.1% to the EPV of the level of motivation to use ICT was found for the composite score of the coping resources beyond the background characteristics. The positive β coefficient indicated that as the level of coping resources increased, the level of motivation to use ICT also increased. Finally, both the participants’ ICT use level and their attitude toward ICT were entered in the third step and contributed 17.9% to the EPV of the level of motivation to use ICT beyond their background characteristics and coping resources and distress level. The positive β coefficients indicated that as the participants’ ICT use level and positive attitude toward ICT increased, the level of motivation to use ICT increased.

An additional hierarchical regression analysis was conducted in order to examine which of the three coping resources make a significant unique contribution to the EPV of the level of motivation to use ICT. The participants’ background characteristics were entered into the regression model in the first step. The scores on the three coping resources were entered in the second step, and the ICT use level and attitude toward ICT were entered in the third step of the regression model (see Table 3).

As shown in Table 4, the grouping variable significantly contributed 50.8% to the EPV of the level of motivation to use ICT, with a positive β coefficient. A significant unique contribution of 7.2% to the EPV of the level of motivation to use ICT was found for the participants’ resilience scale, beyond their background characteristics. The positive β coefficient indicated that as the level of resilience increases, the level of motivation to use ICT also increases. Both the ICT use level and the attitude toward ICT were entered in the third step and contributed 17.8% to the EPV of the level of motivation to use ICT beyond the background characteristics, psychological capital and distress level with positive β coefficients.

5 Discussion

Three issues will be at the core of the discussion: (a) Distress factors (loneliness and stress) among adults with ID during the COVID-19 pandemic; (b) Differences in psychological coping resources (hope, resilience) and ICT resources (attitudes toward and motivation to use ICT), between adults with ID who learned to use the Zoom application and those who did not; (c) The contribution of background variables (gender, type of residence, using the Zoom application), distress factors, and coping resources to the motivation to use ICT.

5.1 Distress factors among adults with ID during the pandemic

No difference was found in loneliness and stress between adults with ID who learned to use the Zoom application, and those who did not. However, both groups revealed some amount of loneliness ($M=2.17–2.65$ out of 4) and stress ($M=2.36–2.44$ out of 4) during the COVID-10 pandemic. It is worth noting that the research was conducted during the second wave of the pandemic, when the Israeli population was under lock-
downs. At that time, even adults with TD exhibited a sense of loneliness and stress as a result of lack of physical contact with the extended family, such as parents, brothers, or others (Salari et al., 2020). Our findings correlate with others studies (Groarke et al., 2020; Holmes et al., 2020) which indicate that COVID-19 exposed vulnerable populations such as the elderly and persons with disabilities to feeling of distress and loneliness (Kirby, 2020). It is therefore not surprising that adults with ID feel some distress, such as loneliness and stress, even though most of them live in community residences with other persons with ID. The fact that they could not meet their parents or other relatives caused feelings of loneliness. For example, on the Jewish holidays, most adults with ID who live in community residences return home to spend the time with their families. In 2020, during the first wave of the COVID-10 pandemic when Israel was under lockdown, adults with ID stayed in their residence (Nissim, 2020), and the fact that they could not meet their families caused frustration and longing. In addition, the fact that they remained with other dwellers in the residence 24/7 caused tensions and fights with them, and this increased their sense of stress (Nissim. 2020). Adults with ID who live at home experienced the same feelings due to the fact that the family and friends circle shrank during the lockdowns. In this respect there was no difference between adults with ID who learned to use Zoom and those who did not. However, there was a significant difference between the Zoom users and those who did not use Zoom in the coping resources to handle distress situations.

5.2 Coping resources among adults with ID during the pandemic

In this study we examined two types of coping resources: psychological coping resources (feeling of hope, optimism, and resilience), and practical technological resources - problem-focused coping (attitudes toward and motivation to use ICT). Regarding the psychological coping resources, no significant difference was found in optimism and resilience between the Zoom users and those who do not use Zoom. However, the score of hope was significantly higher among participants who used Zoom. Thus, psychological capital, especially hope, mitigate the feelings of loneliness and stress. The current study supports those of Avey et al. (2011) and Rabenu (2017), who found that psychological capital correlated negatively with negative emotions such as stress, anxiety, turnover from work, etc. Hope is a positive motivational state, which has two interactive dimensions – agency and pathways. It is derived from a sense of successful goal-directed energy (agency), and from plans (pathways) to actually meet those goals (Snyder et al., 1991). Agency is a determination that directs the goals, while the pathway is described as a plan to achieve desired goals. Thus, this component of psychological capital is a motivational state that supports one’s desired positive emotional outcomes, such as dreams, and can be assumed to waken people to motivation, which in turn can lead to better performance according to one’s abilities. It should be noted that using the Zoom application is a complicated process. It requires recognizing the Zoom system and the operative steps that must be taken to open the application, click on the correct link, confirm the user name and operate the speaker video buttons. It also requires handling technical problems.

When the adults with ID learned how to use the Zoom, they became aware of its advantages. Not only were they determined to use it as a communication tool
with the world outside their residence or home, they started to develop other goals beyond communication, such as participating in leisure activities that were broadcast through the Zoom. They looked for lectures, stories of cities in Israel, music, sports and cooking programs. The fact that adults with ID learned to use the Zoom application increased their level of hope, which serves not only as an agent, but also as a pathway to fulfill their wishes. Using the Zoom increased their curiosity, their motivation to be busy and to fill the time in the lockdown with meaningful contents. Zoom use could thus serve as a good psychological mechanism to handle stress situations such as the COVID-19 pandemic.

Concerning the practical-technological resources, both research groups (Zoom users/non-Zoom users) exhibited high attitude scores toward ICT use ($M=3.08–3.47$ out of 4), with no significant difference between the groups. That is, the participants understood the importance of ICT use, and exhibited positive attitudes toward its use. They stated that they are willing to use ICT, and are not afraid of barriers. However, the motivation to use ICT was significantly higher among the group that learned to use Zoom. Theories of motivation can serve as an explanation for this finding.

Motivation is a process that initiates, guides and maintains goal-oriented behaviors or activates, directs, and sustains, even though the task involves barriers and obstacles (Deci & Ryan, 2000). Motivation emphasizes the universal will toward growth and development (Ryan & Deci, 2017), and is associated with energy, direction, persistence, intention and activation. It involves biological, social and cognitive forces of the behavior. Maehr and Zusho (2009) relate to three components of motivation in learning: Activation which involves the decision to initiate (or to maintain) a behavior and continued effort toward a goal, despite the potential existence of obstacles; Persistence which is the amount of time, energy and resources that are invested (behavior); Intensity (also known as quality) which relates to the thought (cognition) and emotion put toward the goal (there are other interpretations for this concept).

As a consequence of the higher hope level of participants who used Zoom, the Zoom users are characterized by higher motivation and self-determination to use ICT. They invested time and energy to use ICT, and declared that they use ICT since it arouses interest and excitement. Moreover, they used Zoom as a learning tool in order to acquire new knowledge, and to be more involved in their surroundings. In addition to communication, they use Zoom for enrichment of their leisure activities, in particular during the lockdowns.

Our findings are in line with previous findings (McCausland et al., 2021) that adults with ID who used technology during the COVID-19 pandemic remained connected with their families and participated in leisure activities. However, McCausland et al. did not relate to Zoom use, as the current study found higher levels of hope and motivation to use ICT among Zoom users based on reliable questionnaires.

We were eager to examine which factors contributed to the explained variance of the motivation to use ICT. We therefore examined the participants’ background characteristics (gender, type of residence, grouping variable), distress factors, psychological coping resources use, and attitude toward ICT. Hierarchal regressions indicated that the group (including gender, type of residence and Zoom use) contributed 51.2% to the EPV of the level of motivation to use ICT. Thus, using Zoom predicted the level of motivation to use ICT beyond gender and type of residence. The psychological
coping resources as a whole (hope, optimism, and resilience) contributed 7.1% to the EPV of the level of motivation to use ICT. As the level of coping resources increased, the level of motivation to use ICT increased. The participants’ ICT use level and their attitude toward ICT contributed 17.9% to the EPV of the level of motivation to use ICT. As the ICT use level and the positive attitude toward ICT increased, the level of motivation to use ICT also increased. In addition, the second regression indicated that the resilience scale contributed 7.2% to the level of motivation to use ICT. As the level of resilience increases, the level of motivation to use ICT increases.

Resilience is related to the ability to manage with changes, handle challenging situations, succeed in coping with a challenging task, fulfill resilience in distress situations (Richardson, 2002). Antonovsky (1979) stated that “When an event is appraised as comprehensible (predictable), manageable (controllable), and somehow meaningful (explainable) a resilient response is more likely”. Using the Zoom gave our participants a sense of control, confidence and self-efficacy in their achievements. It is therefore not surprising that resilience contributed to the EPV of the motivation to use ICT. Our findings add to other findings according to which using Zoom could serve as a practical problem-focused source of resilience that enables individuals with ID to solve the problem of stress and loneliness, broaden their social network, participate in leisure activities in adverse times, such as during lockdown or other situations.

Limitations and Implications.
Generalization from this study should be performed with caution, due to the small sample size. This was the largest sample that could be found during the COVID-19 pandemic, when Israel experienced several lockdowns and entrance to the community residences or houses was forbidden. Nevertheless, many studies on persons with disabilities are conducted with a relatively small sample (Lledó et al., 2021). The current study focused on psychological and technological coping resources among adults with ID. It is recommended to examine the same measures in adults with a lower level of cognitive ability and in younger persons with ID, in order to identify foci of weakness and resilience so as to help them cope with situations of crisis from a young age. It is also recommended to use other formal measures and qualitative interviews to examine additional coping resources, such as curiosity, self-efficacy, and quality of life, as well as other domains, such as cognitive and learning abilities.

In light of the higher coping resources (hope and motivation to use ICT) among Zoom users, teaching individuals with ID, whether younger ages or adults, to use the Zoom application is of the utmost importance. This will increase the independence of individuals with ID in learning, will develop their communications possibilities and will help them to cope better in distress situations.

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