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COVID-19 and Quality of Life: The Role of Cognitive, Affective, and Behavioral Factors

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Abstract

The impact of COVID-19 pandemic on quality of life is widely underscored. This study aimed to investigate the role of cognitive, affective, and behavioral factors on quality of life, as well as their mediating effect in the relationship of perceived risk of infection and control beliefs with quality of life. The sample consisted of 1730 adults. A battery of established and self-devised scales was administered online. It was found that higher levels of perceived risk of infection and negative emotionality predicted worse quality of life, while reflective functioning independently contributed to better well-being. Furthermore, a greater sense of personal control predicted better quality of life, but this effect was partially mediated by positive reappraisal, wishful thinking, avoidance, and trust. Specifically, higher level of control beliefs predicted better quality of life through higher levels of positive reappraisal and trust along with less use of wishful thinking and avoidance. Adherence to preventive measures was unrelated to quality of life. It is concluded that psychological factors and adaptive coping strategies should be prioritized in designing interventions and policies against COVID-19 pandemic.

1. Introduction

The heavy toll of the COVID-19 pandemic on mental health, physical and social well-being has been underscored by a multitude of studies to date (Weir, 2020).

The existing literature indicates that COVID-19-related restrictions have significantly impacted on the quality of life (QoL) of the general population (Van Ballegooijen et al., 2021). QoL refers to individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (World Health Organization, 1997). A number of psychosocial factors are considered to mediate the relationship between the pandemic and QoL, including age, gender, education level, employment status, health care accessibility concerns, chronic medical conditions, exercise, professional and educational changes, and extent of social interaction (Alqahtani et al., 2021; Epifanio et al., 2021; Horesh et al., 2020; Pieh et al., 2020; Sarli et al., 2021; White & Van Der Boor, 2020). In addition, emotional factors, particularly negative emotions such as anxiety, have been linked to QoL during the pandemic (Ferreira et al., 2021).

Perceived risk is perhaps the most widely investigated factor with respect to its association with QoL during crises, such as the COVID-19 pandemic (Li et al., 2020). Risk perception is defined as intuitive evaluation of hazards that one is or might be exposed to (Rohrmann, 2008) comprising both cognitive and emotional dimensions (Rundmo & Iversen, 2004). Conflicting findings have been obtained regarding QoL and risk perception in the context of the COVID-19 pandemic. Kharshiing et al. (2021) reported that low levels of perceived risk had no effect on QoL, while Krok and Zarzycka (2020) concluded that risk perception was associated with poorer psychological outcomes. Moreover, studies to date indicate that the association of risk perception with QoL is moderated or mediated by a number of variables. According to Girardi et al. (2021), negative affectivity amplifies the relationship between perceived risk and psychophysical well-being. This relationship was also found to be mediated by problem-focused and meaning-focused coping strategies (Krok & Zarzycka, 2020). Given a certain level of risk perception, the ability to engage in problem- and meaning-focused coping increased QoL.

Perceptions of risk are influenced by the amount of control an individual believes that s/he can exert over that risk (Nordgren et al., 2007). Regarding the current pandemic, less sense of control was related to higher risk perception (Šrol et al., 2020). On the other hand, perceptions of increased control have been linked to better QoL (Lee et al., 2021). Furthermore, perceived control is associated with better mental health, a major component of QoL, by buffering the adverse impact of the pandemic and the restriction measures (Brailovskaia & Margraf, 2020). As Groth et al. (2019) point out, higher perceptions of control increase adaptive coping strategies that promote better psychological well-being. In turn, lack of perceived control is also related to lower trust in institutions and their effective response to the pandemic (Šrol et al., 2020).

Trust is defined as the propensity to allow oneself to be vulnerable in the interest of some future greater good (Bluhm, 1987). It is a complex factor involving not only institutions but interpersonal and community parameters as well.

To some extent, the world is constructed by individual beliefs and levels of trust. These aspects of experience seem to be necessary dimensions of a better QoL, especially in crises such as the COVID-19 pandemic, although the relevant literature is limited to date (e.g., Helliwell et al., 2021). On the other hand, trust has been linked to adherence to COVID-19 preventive measures (Pavlopoulos et al., 2021).

Adherence to governments' measures against the spreading of COVID-19 seems to have a complex relationship with QoL, as indicated by contradictory research findings to date. Adherence to measures has been linked to concerns about one's health, but not to physical well-being (Coroiu et al., 2020; Reinders Folmer et al., 2020). With respect to psychological aspects of QoL, Solomou and Constantinidou (2020) found that adherence to measures was related to lower levels of depression but to higher levels of anxiety. However, Ebrahimi et al. (2020) observed that participants who systematically implemented social distancing were more depressed and anxious than those who did not. Wright et al. (2021) identified adherence duration as a key factor regarding psychological well-being, with prolonged adherence being related to worse psychological outcomes. Regarding social QoL, people with satisfactory relationships and a decreased sense of loneliness were more willing to adhere to protective measures (Lamarche, 2020). However, there are indications that strong desire for social contact may motivate non-adherence, especially among younger people (Blake et al., 2021). Finally, Wright et al. (2021) suggested extreme caution when interpreting the relationship between adherence to protective measures and well-being, due to the multiple, interrelated and context-specific effects of both variables, which make clear associations impossible to determine as yet.

Such complex relationships could be better understood by taking into consideration the fact that perceptions and behavioral responses to the pandemic are determined by psychological processes which provide meaning for interpretation of social and environmental clues (Christopoulos et al., 2021). One such process is reflective functioning, also referred to as mentalization, i.e., the mental capacity to understand oneself and others' internal mental states (Luyten et al., 2020). Increasing evidence links good reflective functioning to better QoL (Esposito et al., 2020). Good mentalization capacity seems to promote psychological well-being (Borelli et al., 2019; Mikulincer & Shaver, 2007) and, reversely, poorer mentalization capacity has been associated with various forms of psychopathology (Luyten & Fonagy, 2018; Luyten et al., 2020; Nolte et al., 2011; Robinson et al., 2019). Schwarzer et al. (2021) suggest that mentalization may compensate for the adverse effects of stress by mediating as an internal capacity in promoting mental health and can additionally act as a protective factor for well-being under high levels of generalized distress. Although according to these findings, reflective functioning may have implications on the effect of the COVID-19 on QoL, to the best of our knowledge there is little research investigating such a hypothesis to date. In a recent study of Christopoulos et al. (2021), higher levels of ref-

lective functioning were linked to a tendency to view the pandemic as less threatening, whereas lower levels of reflective functioning were related to higher levels of pandemic-related negative emotionality. On the other hand, in another study, alexithymia, which involves difficulty in identifying emotions and is closely related to poor mentalization, was found to predict better QoL (Panayiotou et al., 2021). The above findings indicate that the relationship between mentalization and QoL in the context of the pandemic deserves further investigation.

Even though there is little research concerning the role of mentalization on the impact of the pandemic, emotionality, which is associated with reflective functioning, has been investigated to a greater extent. A variety of emotions such as frustration, boredom, fear, anger, and sadness have been reported by some as a result of the pandemic and the related restrictions, while other researchers have found that many individuals report feeling calmer and more relaxed during the lockdown than before (Martinelli et al., 2021). Negative emotional impact of the pandemic was found to be related to poor mental health outcomes and worse QoL (Ballou et al., 2020; Rossi et al., 2020). These emotions were associated with factors such as duration of the quarantine, concerns about health of self and others, and restriction of important activities, while dealing effectively with such feelings predicted better QoL (Panayiotou et al., 2021).

In an effort to deal with distress or negative emotions, people employ coping strategies which, according to Lazarus and Folkman (1984), refer to an individual's cognitive and behavioral effort to manage internal and external stressors. Coping strategies are classified as two general types, namely emotion-focused and problem-focused. In the former, the person tries to reduce or manage the emotional distress arising from the crisis, while in the latter the person turns to problem solving or actions in order to change the source of stress. Examples of emotion-focused coping strategies are wishful thinking, avoidance, positive reappraisal, whereas seeking social support is a problem-focused coping strategy (Carr & Pudrovska, 2012). Successful coping with negative emotions and distress was found to promote QoL (McCabe, 2006; Shamloo et al., 2020). In the context of the current pandemic, active coping and help seeking were associated with better QoL (McFadden et al., 2021). Qualitative research indicated that positive reappraisal of education, as well as adjustment to various factors such as new means of social interaction, is linked to a better QoL (Sarli et al., 2021). These findings highlight the importance of adaptive coping. Gurvich et al. (2020) also concluded that positive emotion-focused coping strategies, such as positive reframing, are associated with better mental health. On the other hand, coping strategies such as avoidance and wishful thinking, were linked with poorer QoL and psychological well-being (Garbóczy et al., 2021; McFadden et al., 2021; Shamblaw et al., 2021).

2. The Present Study

As indicated in the preceding introduction, the QoL of the general population during the COVID-19 pandemic should be prioritized by researchers, health

care professionals and governments. Various factors related to the pandemic, such as beliefs regarding risk or control over the infection, adherence to the restriction measures and trust in agencies that deal with the pandemic, seem to be associated with the QoL of the population. However there are contradictory empirical findings regarding the precise relationships of these variables at the present time. Additionally, other psychological variables, such as reflective functioning, emotionality and coping strategies, have not yet been extensively investigated, despite the fact that they may be factors that affect the QoL during COVID-19. Moreover, there are indications that these psychological variables may also mediate the relationship between QoL and factors such as beliefs regarding risk or control over the infection, adherence to the restriction measures or trust.

This study was conducted at the beginning of pandemic crisis in Greece, during the first lockdown imposed by the Greek government, in April of 2020. Despite the fact that there were not many COVID-19 cases in the country at that time, the fear of the SARS-COV-2 virus was widespread as issues such as transmission were unknown and there was no vaccines as yet available. Additionally, the imposed lockdown was very strict, permitting people to go out of their homes only to purchase necessary food and medicine, professional and educational activities were limited as much as possible to the home environment. Both the fear of infection, and these dramatic changes in daily life appeared to impact significantly the QoL. Thus the goal of this study was to empirically investigate the effect of the aforementioned factors on QoL in order to understand their role more precisely. Therefore, our goal was to provide further understanding of the current pandemic as well as to further the knowledge regarding important factors that affect the QoL during crises in general.

To the best of our knowledge, this is the first study to investigate the effect of COVID-19 perceived risk and control beliefs regarding one's sense of control on QoL among the Greek population. Furthermore, we investigated the impact of psychological and behavioral factors, namely adherence to lockdown measures, coping strategies, reflective functioning, and emotionality on QoL. In addition, we examined the mediating role of the aforementioned factors in the relationship of COVID-19 perceived risk and control beliefs with QoL. We also investigated the relationship between adherence to lockdown measures and QoL in view of the conflicting results from studies to date (Ebrahimi et al., 2020; Solomou & Constantinidou, 2020; Wright et al., 2021).

Specifically, we expected that greater sense of control and lower perceived risk of infection would predict better QoL (Lee et al., 2021; Li et al., 2020). Better QoL was also expected for participants with higher levels of reflective functioning and coping strategies involving positive reappraisal and seeking social support, while poorer QoL was expected for those using avoidance coping and demonstrating higher negative emotionality (Christopoulos et al., 2021; McFadden et al., 2021; Shamblaw et al., 2021).

Lastly, we hypothesized that the effect of perceived risk and control beliefs on QoL will be mediated by higher levels of reflective functioning that enable better

mental processing of the pandemic situation, more frequent use of adaptive coping, less negative emotionality, and stronger adherence to lockdown measures.

3. Method

3.1. Participants

A total of 1730 participants provided informed consent and valid answers to an online questionnaire. Most (n = 1225, 70.9%) identified themselves as women, 502 (29.1%) as men, and three (0.2%) as non-binary or gender fluid. Mean age was 34.6 years (SD = 13.3), ranging from 18 to 80 years. Non-Greek (n = 21, 1.2%) or mixed ethnicity (n = 45, 2.6%) were under-represented. Although most (n = 1222, 66.4%) lived in the wider Athens metropolitan area, other regions of varying population density were included as well: 161 (9.4%) lived in a city with more than 100,000 inhabitants, 151 (10.3%) lived in urban areas with a population of up to 100,000, 85 (7.0%) lived in small towns (up to 10,000 inhabitants), and 69 (6.4%) lived in rural areas (up to 2000 inhabitants). Regarding family status, 574 (33.2%) were single, 480 (27.7%) were married, 446 (25.8%) were in a relationship, and 229 (13.3%) had a different living arrangement. Of them, 1230 (71.1%) did not have children, 180 (10.4%) had one child, 278 (16.1%) had two children, and 41 (2.4%) had three or more children. Regarding educational status, 395 (23.3%) had completed secondary education, 99 (5.7%) had technical education, 794 (45.9%) were university graduates, 286 (22.3%) had a master's diploma, and 54 (3.1%) had a PhD.

3.2. Measures

3.2.1. Quality of Life

Subjective evaluation of quality of life was assessed with the World Health Organization Quality of Life Scale (World Health Organization, 1997) adapted in Greek by Ginieri-Coccossis et al. (2012). It consists of 30 items that investigate four domains: physical health (9 items, e.g., "To what extent do you feel that physical pain prevents you from doing what you need to do?"), psychological health (6 items, e.g., "To what extent do you feel your life to be meaningful?"), social relationships (5 items, e.g., "How satisfied are you with your personal relationships?"), and environment (8 items, e.g., "How healthy is your physical environment?"). For the purposes of the present study we included the physical, psychological, and social aspects of QoL. We excluded the environmental domain as it concerns factors that extend beyond individual control, while our study focused on psychological processes. All items were assessed on a 5-point Likert scale with higher scores indicating better QoL.

3.2.2. Reflective Functioning

Reflective functioning was assessed with the Reflective Functioning Questionnaire (RFQ; Fonagy et al., 2016) validated for the Greek population by Griva et al. (2020). RFQ consists of eight items, six of which are used (with reversed cod-

ing) in both scales assessing the levels of certainty and uncertainty about self and others' mental states, respectively. Example items are "Sometimes I do things without really knowing why" (certainty, reversed) and "Strong feelings often cloud my thinking" (uncertainty). A 7-point Likert scale was used, ranging from 1 = *fully disagree* to 7 = *fully agree.* Items were then recoded following the authors guidelines, in order to make the measurement more sensitive to extreme states of hyper- or hypo-mentalizing, which comprise dysfunctional states of mind.

3.2.3. Ways of Coping

Coping strategies were assessed with the revised Ways of Coping Checklist (Folkman et al., 1986), adapted in Greek by Karademas (2007). Participants rated the frequency of use of 38 items, each of which refers to a way of dealing with the difficulties that came up during the past two weeks. The Greek version of WoC includes five coping strategies, namely positive approach, that reflects positive reappraisal and problem-solving efforts (11 items, e.g., "I came up with a couple of different solutions to the problem") seeking social support (6 items, e.g., "I asked a relative or friend I respect for advice") wishful thinking (8 items, e.g., "I hoped a miracle would happen") avoidance/escape (9 items, e.g., "I tried to forget the whole thing") and assertive coping (4 items, e.g., "I dared to do something risky"). All items were assessed on a 4-point Likert scale ranging from 0 = *does not apply/not used* to 3 = *used a great deal.*

3.2.4. Responses to COVID-19 Risk

1) **COVID-19 Infection Control Beliefs.** Inspired by the study of Prati et al. (2011) regarding the H1N1 pandemic influenza in 2009, we asked participants to rate on a 5-point Likert scale (from 1 = *totally disagree* to 5 = *totally agree*) their belief of infection control ("I think that if I am careful, I can reduce my risk of catching coronavirus").

2) **COVID-19 Perceived Personal Risk.** Perceptions of personal risk posed by the pandemic were assessed with another item from the study of Prati et al. (2011), namely "I believe I am at risk of being infected by the coronavirus", which was rated on the same 5-point Likert scale (from 1 = *totally disagree* to 5 = *totally agree*).

3) **Adherence to Measures Against COVID-19.** Participants were asked to report their adherence to the indicated health measures during the first lockdown in Greece (March-June 2020) noting the extent to which they were sheltering at home, minimizing social contact, keeping at least a two-meter distance from others, washing their hands thoroughly, and informing people whom they had contacted if they developed symptoms. These items were extracted from a large-scale survey given in more than 170 countries (Fetzer et al., 2020) and were measured on a continuous scale of responses ranging from 0 to 10. Adherence to measures was estimated by the mean of the five aforementioned items.

4) **Lockdown Noncompliance.** Intentions to be noncompliant, that is to

leave the house, were assessed for the following eight reasons, namely, work, visiting a pharmacy or doctor, going to the bank, buying food, helping a person in need, being present at an official ceremony (e.g., wedding), physical exercise, or for other reasons. A continuous rating scale ranging between 0 - 10 was used for each item. Noncompliance was indicated by the mean of responses to the above eight items.

3.2.5. Pandemic Related Emotionality

Participants were asked to report their feelings concerning the COVID-19 pandemic using eight items measured with a 7-point Likert scale from 1 = *fully disagree* to 7 = *fully agree*. Negative emotionality was measured as the mean of the extent to which the participants reported that they felt anger, sadness, fear, anxiety, and surprise because of the pandemic, whereas positive emotionality was measured as the mean of happiness, indifference, and calmness.

3.2.6. Trust

An aggregate of trust in various institutions dealing with the COVID-19 crisis was assessed through 10 items, including government (i.e., "I trust the government"), scientists (i.e., "I trust the scientific community"), and others (i.e., "I trust my family"). A 7-point scale was used from 1 = *not at all* to 7 = *very much*.

3.3. Procedure

The study was conducted online utilizing the Google Forms platform for data collection. Social media groups and announcements posted on the university website were used to recruit participants. In the introductory part of the questionnaire, participants were informed of the purpose of the study and of ethical issues, such as anonymity and the right to depart from the study at any time. Their informed consent was required to proceed to the main part of the questionnaire. Data was collected from April 27 to May 3, 2020. The study was conducted in accordance with the Helsinki declaration regarding ethical principles for medical research involving human subjects and was approved by the departmental research ethics committee.

4. Results

Table 1 presents the descriptive statistics and alpha reliability coefficients of the variables under study. Overall, participants reported moderate levels of QoL and perceived personal risk from the pandemic and relatively high COVID-19 infection control beliefs. Nonetheless, their emotions triggered by the pandemic were clearly more negative than positive. They also tended to adhere to lockdown measures rather than not, and exhibited certainty in reflective functioning rather than uncertainty. They made more frequent use of proactive coping strategies, such as positive reappraisal and seeking social support, and less frequent use of passive strategies, such as wishful thinking or avoidance/escape. Their reported level of general trust was moderate to high. The distributions of most variables

Table 1. Descriptive statistics of COVID-19 perceived risk and control beliefs, reflective functioning, ways of coping, lockdown adherence and noncompliance, pandemic related emotionality, trust, and quality of life (N = 1730).

	# items	Min	Max	M	95% CI		Alpha
					LL	UL	
COVID-19 perceived risk and control							
Infection control beliefs	1	1.00	5.00	4.29	4.35	4.33	-
Perceived personal risk	1	1.00	5.00	3.00	2.95	3.05	-
Reflective Functioning							
Certainty	6	.00	3.00	1.01	.98	1.05	.74
Uncertainty	6	.00	3.00	.51	.48	.53	.68
Ways of Coping							
Positive reappraisal	11	.36	3.00	1.93	1.91	1.05	.70
Seeking social support	6	.00	3.00	1.73	1.70	1.76	.74
Wishful thinking	8	.00	3.00	1.38	1.35	1.41	.75
Avoidance/Escape	9	.22	3.00	1.58	1.56	1.61	.63
Assertive problem solving	4	.00	3.00	1.10	1.08	1.13	.50
Emotionality							
Positive	3	1.00	6.33	1.92	1.87	1.97	.62
Negative	5	1.00	7.00	4.08	4.01	4.15	.78
Trust	10	1.00	7.00	3.78	3.73	3.83	.84
COVID-19 lockdown measures							
Adherence	5	.50	10.00	8.46	8.39	8.53	.62
Noncompliance	8	.00	10.00	4.50	4.40	4.59	.66
WHO Quality of Life							
Physical Health	9	1.56	5.00	3.73	3.71	3.76	.74
Psychological Health	6	1.00	5.00	3.46	3.43	3.49	.81
Social Relationships	5	1.00	5.00	3.39	3.36	3.43	.70

did not deviate substantially from normality, with the exception of infection control beliefs and adherence to lockdown measures, which were negatively skewed, and of positive emotions and reflective functioning, which were positively skewed. The internal consistency of all scales but one (assertive problem solving) ranged from acceptable to high.

Table 2 shows Pearson correlation coefficients between the variables under study. For the most part, the direction of the associations depicted in this table was as expected. QoL was positively related to infection control beliefs, certainty in reflective functioning, proactive coping strategies, positive emotionality, and general trust. QoL was negatively related to perceived personal risk from the pandemic, uncertainty in reflective functioning, passive coping, and negative emotionality. The strength of these associations ranged from low to moderate.

Table 2. Pearson correlation coefficients between COVID-19 perceived risk and control beliefs, reflective functioning, ways of coping, lockdown adherence and noncompliance, pandemic related emotionality, trust, and quality of life (N = 1730).

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1) COVID-19 infection control beliefs	1.00																
2) COVID-19 perceived personal risk	−.09***	1.00															
3) Certainty^{RF}	.01	.01	1.00														
4) Uncertainty^{RF}	.03	.08**	−.60***	1.00													
5) Positive reappraisal^{WoC}	.08**	.06*	.17***	−.12***	1.00												
6) Seeking social support^{WoC}	.03	.09***	−.11***	.14***	.30***	1.00											
7) Wishful thinking^{WoC}	.05*	.03	−.19***	.20***	.17***	.30***	1.00										
8) Avoidance/Escape^{WoC}	.10***	−.02	−.17***	.18***	.12***	−.01	.32***	1.00									
9) Assertive problem solving^{WoC}	−.06**	.04	−.15***	.16***	.29***	.45***	.17***	.00	1.00								
10) Positive Emotionality	−.04	−.07**	.00	.03	.05*	−.02	−.15***	.06*	.07**	1.00							
11) Negative Emotionality	.00	.16***	−.19***	.19***	−.05*	.18***	.32***	.10***	.07**	−.24***	1.00						
12) Trust	.22***	.02	.03	−.05*	.20***	.08**	.11***	.07**	−.05*	.02	.16***	1.00					
13) Lockdown adherence to measures	.20***	.10***	.08**	−.03	.14***	.01	.08**	.01	−.10***	−.17***	.15***	.15***	1.00				
14) Lockdown noncompliance	−.07**	.02	.01	−.04	.09***	.03	.01	−.01	.09***	−.04	.02	−.07**	−.12***	1.00			
15) Physical health^{WHOQOL}	.12***	−.07**	.23***	−.23***	.31***	.03	−.10***	−.04	.01	.09***	−.23***	.19***	−.02	.05*	1.00		
16) Psychological health^{WHOQOL}	.10***	−.05*	.30***	−.32***	.43***	.03	−.12***	−.12***	.03	.08**	−.25***	.18***	.04	.08**	.66***	1.00	
17) Social relationships^{WHOQOL}	.07**	−.06*	.24***	−.25***	.28***	.09***	−.11***	−.11***	−.02	.05*	−.19***	.15***	.02	.04	.57***	.65***	1.00

Note. $^*p < .05$. $^{**}p < .01$. $^{***}p < .001$. RF: Reflective Functioning. WoC: Ways of Coping. WHOQOL: WHO Quality of Life.

Seeking social support was related only to the social relationships subscale of QoL. Assertive problem solving was the only coping strategy not related to any domain of QoL, probably because of its low reliability. Moreover, adherence to lockdown was unrelated to QoL while noncompliance showed only weak positive associations with physical and psychological subscales.

Informed by the above descriptive analyses, we applied a linear regression model to predict QoL from the psychological and behavioral variables under study, controlling for demographics. In these analyses, each domain of QoL served as a criterion variable. Predictors were entered in the regression equation as follows: sociodemographic variables (gender, age, income) at block 1; COVID-19 infection control beliefs and perceived personal risk at block 2; and psychological (reflective functioning, coping strategies, emotionality, trust) and behavioral (lockdown noncompliance) factors at block 3. Assertive problem solving and lockdown adherence were not included due to their nonsignificant correlation coefficients with QoL. Confidence level for bias-corrected intervals was set at 95%.

The results revealed that at block 1, sociodemographic factors predicted a sig-

nificant amount of variance ranging from 2.6% [1.1, 4.1] for social relationships to 6.5% [4.3, 8.7] for psychological health. This was mainly due to annual income, which was positively associated with QoL. Also, male (vs. female) gender and older age predicted better psychological health.

At block 2, the COVID-19-related perceived risk and control beliefs significantly contributed to the prediction of QoL over and above demographics, though with a small proportion: 1.9% [0.6, 3.2] for physical health, 1.2% [0.2, 2.2] for psychological health, and 0.1% [0.0, 0.2] for social relationships.

At block 3, the psychological variables further increased the amount of explained variance of QoL by 16.8% [13.6, 19.9] for physical health, 26% [22.5, 29.5] for psychological health, and 16.2% [13.0, 19.4] for social relationships. As shown in Table 3, in the final step of the analysis income and, to a lesser extent, age continued to be significant predictors of QoL. Also, infection control beliefs positively predicted physical and psychological health, while perceived personal

Table 3. Statistical prediction (standardized regression coefficients and % of explained variance) of quality of life from demographics, COVID-19 perceived risk and control beliefs, reflective functioning, ways of coping, pandemic related emotionality, trust, and lockdown noncompliance (N = 1730).

	WHOQOL-BREF								
	Physical			Psychological			Social		
	B	95% CI for B		B	95% CI for B		B	95% CI for B	
		LL	UL		LL	UL		LL	UL
Gender	.03	−.03	.09	.06	−.01	.12	−.01	−.08	.07
Age	−.00*	−.01	.00	.00	.00	.00	−.01**	−.01	.00
Income	.07***	.03	.08	.04**	.01	.07	.08***	.04	.11
COVID-19 infection control beliefs	.05**	.02	.07	.04**	.01	.07	.03	−.01	.06
COVID-19 perceived personal risk	−.03*	−.05	.00	−.02	−.05	.00	−.04*	−.07	−.01
Certainty[RF]	.07**	.02	.11	.08**	.03	.13	.08**	.02	.14
Uncertainty[RF]	−.09**	−.15	−.03	−.19***	−.26	−.12	−.19***	−.27	−.11
Positive reappraisal[WoC]	.30***	.24	.36	.52***	.46	.59	.35***	.27	.43
Seeking social support[WoC]	.02	−.02	.07	.01	−.04	.06	.12***	.06	.18
Wishful thinking[WoC]	−.05*	−.10	.00	−.06*	−.11	.00	−.10**	−.16	−.03
Avoidance/Escape[WoC]	−.02	−.08	.03	−.14***	−.20	−.07	−.11**	−.19	−.03
Positive emotionality	.01	−.01	.04	.02	−.01	.05	−.00	−.04	.03
Negative emotionality	−.07***	−.09	−.05	−.08***	−.10	−.05	−.08***	−.10	−.05
Trust	.08***	.05	.10	.07***	.05	.10	.08***	.05	.12
Lockdown noncompliance	.00	.00	.00	.00	.00	.00	.00	.00	.00
Total R^2 (% expl. var.)	22.6***	19.2	26.0	33.6***	30.0	37.2	19.8***	16.5	23.1

Note. *$p < .05$. **$p < .01$. ***$p < .001$. RF: Reflective Functioning. WoC: Ways of Coping.

risk from the pandemic negatively predicted physical health and social relationships. From the psychological variables, high certainty and low uncertainty in reflective functioning, as well as more positive reappraisal, higher levels of trust and lower levels of negative emotionality were related to better QoL in all three domains. Wishful thinking and avoidance/escape were negative predictors of psychological health and social relationships. On the other hand, seeking social support was a positive predictor of social relationships. Positive emotionality and noncompliance with the lockdown measures failed to contribute to the prediction of any domain of QoL.

In order to further explore the mediation effects of psychological factors in the relationship of COVID-19-related perceived risk and control beliefs with QoL, we tested a path model using AMOS v. 21. In this analysis, QoL served as a dependent latent variable consisting of three indicators, namely the three measured domains of physical health, psychological health, and social relationships. Infection control beliefs and perceived personal risk from the pandemic were independent factors, whereas the psychological variables were inserted as potential mediators. Annual income and age were used as covariates, on the basis of the results of the preceding regression analyses. Confidence level for bias-corrected intervals was set at 95%. The data provided sufficient support for this model as the fit indices reached acceptable levels: $\chi^2(24) = 73.18$, $p < .001$, $\chi^2/df = 3.05$, CFI = .99, NFI = .98, RMSEA = .034 [.026, .044], SRMR = .013. The standardized path coefficients of the model are displayed in Figure 1. As shown in this figure, perceived infection control and perceived risk were negatively related to each other and they conversely predicted QoL. Furthermore, all psychological factors—except seeking social support—significantly predicted QoL. The total amount of variance of the dependent latent factor was 39.2% [35.0, 42.5] (51.6% [47.3, 55.9] for physical health, 84.1%, [79.8, 88.8] for psychological health, and 49.2% [45.4, 53.4] for social relationships). The two independent variables were differentially related to the mediators, i.e., perceived infection control was positively associated with positive reappraisal, wishful thinking, avoidance/escape, and trust, while perceived personal risk from the pandemic was positively associated with uncertain reflective functioning, positive reappraisal, seeking social support, and negative emotionality.

The bootstrapping procedure with 2.000 samples was applied to estimate indirect effects. Confidence level for bias-corrected intervals was set at 95%. The standardized coefficient for the indirect effect of perceived infection control on QoL was .041 [.018, .068]. Considering the direct effects presented earlier, this finding suggests that four mediators, namely positive reappraisal, wishful thinking, avoidance/escape, and trust, partially explain the relationship between perceived infection control and QoL. The standardized coefficient for the indirect effect of perceived personal risk on QoL was −.014 [−.041, .011], thus suggesting a nonsignificant mediation. No mediation effect was established for reflective functioning and negative emotionality, which seem independently contribute to
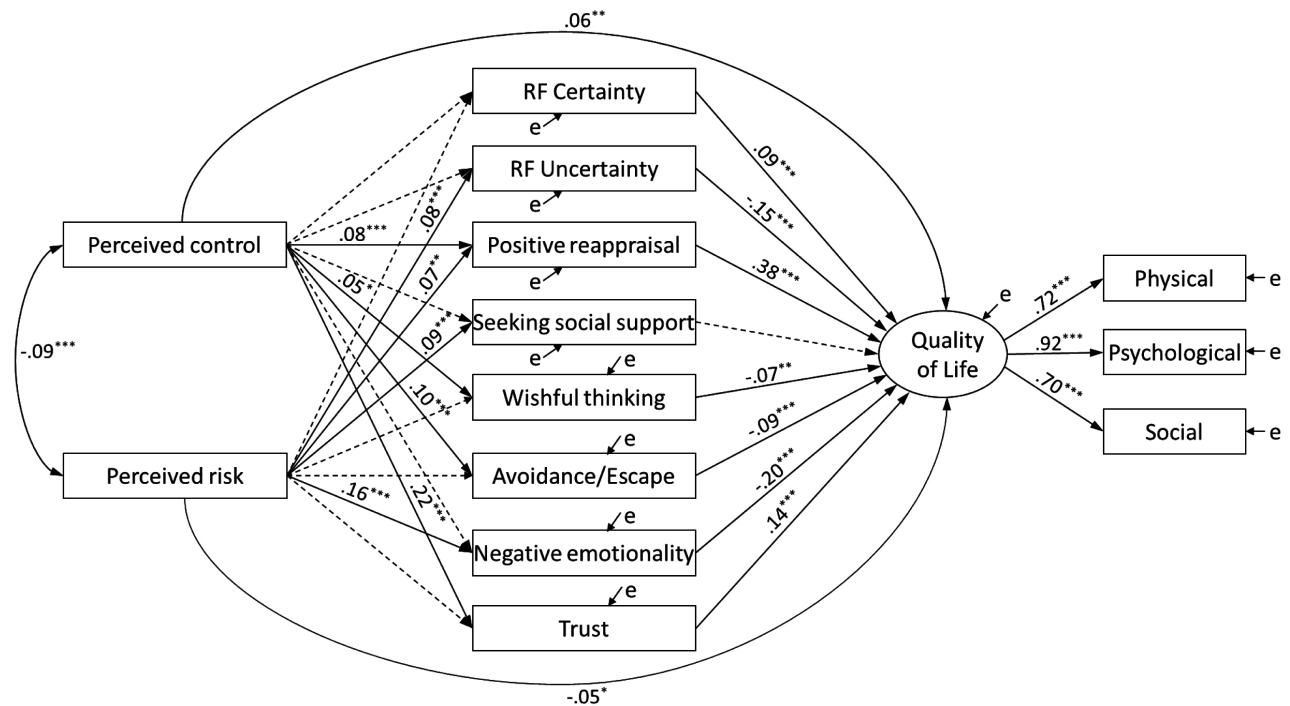
Figure 1. Direct and indirect effects of COVID-19 perceived risk and control beliefs on quality of life through reflective functioning, ways of coping, pandemic related emotionality, trust, and lockdown noncompliance. *Note.* *p < .05. **p < .01. ***p < .001. Numbers are standardized path coefficients. Dotted lines indicate non-significant effects. Control variables (not appearing in the figure): age and income.

statistically predicting QoL.

5. Discussion

This study is one of the few to investigate QoL during the COVID-19 lockdown from a perspective that takes into consideration the complexity of relationships between the pandemic and its effects on psychological and physical health as well as on social relationships. Our results contribute in clarifying existing inconclusive findings concerning the role of risk perception and in confirming previous studies regarding the role of control beliefs on QoL. Furthermore, we investigated the mediating effect of cognitive, affective, and behavioral factors in the above relationship.

We found that believing that one has control over the possibility of getting infected is related to better physical and psychological health, whereas perceiving oneself as being at high risk of infection by the virus is related to worse physical health and social relationships. Interestingly, adherence to preventive measures was not associated with QoL in this study. On the other hand, better mentalization capability contributed to better physical and psychological health as well as to a more favorable appraisal of social relations. Higher trust in state, scientific and community agencies to handle the coronavirus crisis was also linked to better QoL. Negative emotionality induced by the pandemic was associated with worse physical, psychological and social well-being.

The role of coping was also found to be important. The impact of coping is determined by the preferred coping strategy. For example, positive reappraisal and wishful thinking yielded opposing—negative and positive, respectively—outcomes on QoL. Additionally, seeking social support was associated with better social relationships, while avoidance and escape coping strategies were linked to worse psychological health and social relations. Mediation analysis revealed that stronger belief of personal control over the possibility of being infected contributed to better QoL through increased levels of trust and positive reappraisal and a lower tendency to endorse wishful thinking or avoidance coping strategies. On the other hand, perceived risk of infection was found to have a direct association with QoL, which was not mediated by any of the psychological and behavioral factors that we examined.

5.1. Cognitive and Behavioral Responses to COVID-19

With regards to cognitive responses to COVID-19, our findings support the results according which higher risk perception has a negative impact on physical health (e.g., Girardi et al., 2021; Krok & Zarzycka, 2020). Of course, this does not overrule the possibility that poor physical health makes risk perception even worse, thus maintaining a vicious circle of bidirectional causality. Higher levels of perceived risk from the virus may promote social isolation or even, according to Pavlopoulos et al. (2021), fuel conspiracy mentality, which could lead to poorer perception of social relations.

In contrast with Krok and Zarzycka (2020), we did not find a direct association between perceived risk and psychological well-being. Instead, other psychological factors, such as control beliefs, mentalization capacity, effective coping, negative emotionality, and trust, proved to be stronger correlates of psychological QoL than perceptions of risk. The unique effect of infection control beliefs, in particular, indicated that perceived ability of monitoring self-infection leads to better physical and psychological well-being. This finding is consistent with previous studies suggesting that a higher sense of internal locus of control fosters higher wellness by buffering the physical and mental health consequences of the quarantine measures (Brailovskaia & Margraf, 2020; Groth et al., 2019; Lee et al., 2021).

Surprisingly, with regards to behavioral responses to COVID-19, adherence to preventive measures did not seem to have a significant impact on QoL. This finding underlines the complex nature of the relationship between adherence to measures and QoL. According to Wright et al. (2021), adherence duration is the key to understanding its effect on well-being. Our study took place at the beginning of the pandemic outbreak in Greece, when adherence to measures may have not yet affected QoL. Alternatively, the contrasting motives for adherence to COVID-19 mitigation measures, such as safety vs. freedom, may cascade its unique effect on QoL (Costantini et al., 2021).

5.2. Psychological Factors and Their Association to QoL

On the contrary, all psychological factors that we measured in this study were

found to relate to QoL. Higher trust in institutions and agencies responsible for handling the pandemic contributed to better QoL in all its aspects, in line with findings from recent studies (Helliwell et al., 2021). It seems that during the lockdown, trusting the government, the scientific community, and fellow citizens creates an environment of stability and safety that leads to more positive perceptions of individual physical, psychological and social well-being.

Our findings regarding reflective functioning confirm our hypothesis that well-being is linked to mentalizing capacity, in accordance with the existing literature regarding these variables (Borelli et al., 2019; Esposito et al., 2020; Mikulincer & Shaver, 2007). Although the majority of studies have focused mainly on the relationship of reflective functioning with psychological well-being, our study additionally verified that its bolstering effect also includes physical and social QoL. These results suggest that mentalizing capacity, which is an internal, non-situational process, plays an important role for overall well-being and satisfaction in life. Although not found to mediate the effect of cognitive appraisals on QoL, it continued to have an independent positive impact on QoL in a challenging and adverse situation, such as the current pandemic, even after the role of other psychological variables was accounted for.

Negative emotionality predicted poorer QoL in all its aspects as well. This is in line with previous studies indicating that negative emotionality and poor emotion regulation can lead to poor psychological well-being (Ballou et al., 2020; Panayiotou et al., 2021). Individual attempts to cope with distress during stressful situations such as the pandemic and lockdown measures, may result in more negative emotionality and consequently decreased levels of fulfillment from life (Rossi et al., 2020). A number of factors can trigger negative emotions during the pandemic, including quarantine restrictions, separation from loved ones, concerns about the health of self and others, the disruption of important activities, and misinformation through the social media (Martinelli et al., 2021; Panayiotou et al., 2021).

The negative impact of the pandemic can be mitigated through adaptive coping. Indeed, in line with previous research, dealing with stressful situations by reappraising them in a positive manner was found to be related to better physical and psychological health as well as more positive social relationships (Gurvich et al., 2020; Sarli et al., 2021). On the other hand, although a previous study reported that seeking social support was associated with better overall QoL (McFadden et al., 2021), we found that seeking social support is only partially linked to QoL, with regards to its social domain. This suggests that in the face of COVID-19-related risk, active seeking of social support could foster a positive social QoL. According to Sarli et al. (2021) this could be also achieved, by using internet-based platforms for educational as well as socializing purposes. On the other hand, wishful thinking, namely wishing and imagining what things could be different, seems to be maladaptive in the pandemic crisis, as it was associated with poorer psychological and social well-being. This is in line with Garbóczy et

al. (2021) who found that wishful thinking was related to poorer psychological well-being. We obtained the same negative outcomes apply for avoidance, which is consistent with findings from previous research (McFadden et al., 2021; Shamblaw et al., 2021). In conclusion, the denial of a generalized crisis, such as the COVID-19 pandemic, by avoidance of the recognition of the dangers it imposes or by wishing that the pandemic was non-existent, is not beneficial for QoL. On the contrary, reframing the situation in positive terms and enhancing one's social relationships can contribute to better well-being.

5.3. Mediation of Perceived Risk and Infection Control Beliefs Impact

In the model that we tested, the effect of perceived risk on QoL was not significantly mediated by any of the behavioral and psychological factors that we measured. In contrast to our assumptions, better reflective functioning, adaptive coping strategies, emotionality and trust did not buffer the adverse effect of high risk perception on QoL, rather, they contributed to QoL independently of perceived risk. This finding contrasts with the results of a recent study of Krok and Zarzycka (2020), in which coping mechanisms and negative affectivity mediated the impact of risk perception on psychological well-being. As our data were collected at the early days of the pandemic outbreak and lockdown measures in Greece, when information was still fluid and the future was unpredictable, it is possible that fear of COVID-19 infection had a direct heavy impact on QoL regardless of the presence of other factors. Possibly at the beginning of the pandemic in Greece, the very perception of being at risk was a burden on the QoL of the population by imposing life restrictions and, what was at the time, unprecedented social distancing measures.

On the other hand, coping and trust mediated the relationship between infection control beliefs and QoL. Infection control beliefs catalyzed use of adaptive coping strategies, ensuring a functional adjustment that led to better QoL, a finding that corresponds to those of Groth et al. (2019). We can assume that perceptions of being able to control the possibility of getting infected lead to constructive cognitive reappraisal and less defensive and maladaptive approaches to the situation, such as passively wishing that things were different or even avoiding acknowledgment of the pandemic. Additionally, a greater sense of personal control makes it possible to trust institutions and the community with respect to their handling of the pandemic. In turn, more positive reappraisal, less wishful thinking and higher trust may result in a more favorable appraisal of QoL, thus explaining its associations with control beliefs of being infected. The mediation of psychological factors in the relationship of QoL with control beliefs, but not with perceived risk, could be attributed to the fact that, unlike control beliefs, risk perception involves a priori an affective dimension aside from the cognitive one (Rundmo & Iversen, 2004) leaving less room for psychological mediators to emerge.

5.4. Limitations and Implications for Further Research

This study has a number of limitations which should be taken into consideration. Despite its large sample size, certain groups (e.g., the elderly, people living in rural areas, individuals with low socioeconomic status or those belonging to minority groups) were underrepresented, limiting the generalizability of our results. Additionally, the cross-sectional design of this study does not permit causality assumptions. Mutual relationships and inverse paths of causality are quite probable and deserve to be studied. Furthermore, it should be noted that the data collected at the outbreak of the pandemic in Greece and during its first lockdown. Future research regarding the effect of COVID-19 on QoL should take into consideration factors such as vaccination, losses suffered due the pandemic or the burden of the extended lockdown periods.

6. Conclusion

Given the global impact of COVID-19 and the multifaceted consequences of restriction measures on a wide array of everyday activities, intrapsychic factors, subjective perceptions and coping strategies appear to play an important role in well-being. They can act as catalysts, buffering the adverse effect of other stressful factors, but they also seem to suffice in themselves in enhancing well-being, regardless of environmental conditions. With the possibility of lockdown measures becoming a recurring necessity, but also as a lesson learned for any other global crisis should occur, taking into consideration psychological factors and adaptive coping strategies should be prioritized in designing social policy prevention strategies as well as in designing frontline and long-term community interventions. Social policy strategies should include data presentations as well as the indicated necessary health measures in ways that promote the personal sense of control regarding contracting the disease, rather than in ways that create fear of becoming infected and/or dying. In addition, the significance of mental health for individual well-being in the context of the pandemic, as well as with respect to lessening the burden caused by COVID-19, clearly indicated the importance of including mental health professionals in committees that deal with the pandemic at national as well as global level. Within community settings such as schools, universities and health centers, interventions promoting the enhancement of mentalization and adaptive coping are highly recommended. Finally health care professionals such as doctors and nurses should be encouraged to keep the significance of these psychological factors in mind in their interactions with the population.

Availability of Data and Transparency

The anonymized dataset on which the findings of this study were drawn is openly

available through OSF at https://osf.io/qchbt/.

Ethics Approval

The study was conducted in accordance with the Helsinki declaration regarding ethical principles for medical research involving human subjects and was approved by the Research Ethics Committee of the Departmental of Psychology, National and Kapodistrian University of Athens.

Consent to Participate

All participants gave informed consent to participate in the study.

Consent for Publication

All authors gave consent to submit this manuscript for publication.

Conflicts of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

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