I giovani e la Pandemia da Covid-19

Uno studio pilota che ha testato un Questionario sulle motivazioni psicologiche a proteggersi contro il Covid-19

Manuela Zambianchi[1]

Sommario

La Pandemia da Covid-19 rappresenta un evento traumatico collettivo improvvisamente diffuso in tutto il mondo nel 2020 e che ha posto la questione di come ridurre il rischio di contagio. Un questionario costruito *ad hoc*, basato sulla *Teoria della Motivazione a Proteggersi*, ha valutato le credenze sulla gravità della Pandemia, la percezione di vulnerabilità, le credenze circa l'efficacia delle protezioni e l'utilizzo delle protezioni. Hanno partecipato allo studio 126 adulti emergenti italiani (29% maschi; 71% femmine, età media = 23.82 anni). L'Analisi Fattoriale Esplorativa, con il metodo di estrazione dell'Asse principale, evidenzia una struttura a quattro fattori che rispecchia in parte il modello previsto. Il primo fattore raccoglie gli item sull'utilizzo delle protezioni; il secondo fattore gli item relativi ai vaccini; il terzo fattore gli item sulla percezione di efficacia delle protezioni; il quarto fattore gli item sulla negazione della gravità della Pandemia. I risultati preliminari di valutazione del questionario confermano le assunzioni della *Teoria sulla Motivazione a Proteggersi* sulla rilevanza delle credenze e la percezione di vulnerabilità per l'adozione di comportamenti protettivi.

Parole-chiave

Questionario Covid-19, Comportamenti protettivi, Giovani, Motivazione a proteggersi, Interventi per la salute.

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The young and the Covid-19 pandemic

A pilot study testing a questionnaire on psychological motivation to protect against Covid-19

Manuela Zambianchi[1]

Abstract

The Covid-19 pandemic represents a collective traumatic event which suddenly spread all over the world in 2020, posing the question of how to reduce the risk of contagion. An ad hoc questionnaire, based on the Theory of Motivation to Protect, assessed beliefs about the severity of the pandemic, perception of vulnerability, beliefs about the effectiveness of protection used and the use of protection. 126 Italian emerging adults (29% males; 71% females, mean age = 23.82 years) participated in the study. Exploratory Factor Analysis, with Principal Axis Factoring as its method of extraction, highlights a four-factor solution that partly reflects the expected model. The first factor comprises items on the use of protection; the second factor items relating to vaccines, the third factor items on the perception of the effectiveness of the protection used, and the fourth factor items on denial of the seriousness of the pandemic. The preliminary evaluation results of the questionnaire confirm the assumptions of the Theory on Motivation to Protect on the relevance of beliefs and the perception of vulnerability for the adoption of protective behaviours.

Keywords

Questionnaire on Covid-19, Protective behaviours, Young people, Motivation to protect, Health interventions.

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Introduction

An event of such magnitude and gravity as the Covid-19 pandemic can be defined as an authentic collective psychological trauma, with important effects on the level of individual and social functioning (Bridgland et al., 2021; Forte et al., 2020; Zambianchi, 2020).

The sudden worldwide spread of Covid-19 led to a drastic change in lifestyle in every person and in every age group, as the extreme contagiousness of the virus demanded a search for strategies for its containment. Among these, the lockdown, and the adoption, by the whole population, of behaviours aimed at reducing the risk of coming into contact with the virus and transmitting it to others. These strategies, and in particular self-protective behaviours, were regulated at a legislative level throughout the year 2020 through specific national and regional Italian legal provisions. At the same time, the scientific world's acquisition of the effectiveness of three strategies: the use of face masks, hand sanitising gel and social distancing to reduce the spread of the virus raised the question of how they were adopted by the whole population.

Health psychology has already highlighted for many years the importance of psychological and social factors with regard to the adoption and maintenance over time of other protective health behaviours (e.g. regular physical exercise) and the reduction of behaviours deemed risky to health (e.g. Ajzen, 1991; Jessor & Jessor, 1977). In addition, health psychology has highlighted how health risks and self-protective strategies are influenced by numerous structural factors, such as age, gender and level of school education.

Some theoretical models that can be traced back to the perspective of social cognition have identified the importance of cognitive variables such as beliefs about health, the perceived severity of the disease and one's susceptibility to it, together with the role of the mass-media for the construction of the beliefs themselves, such as, for example, the Health Belief Model, (HBM, Rosenstock et al., 1988). Among these theories, the Theory of Motivation to Protect (Prentice-Dunn & Rogers, 1986; Rippetoe & Rogers 1987; Rogers, 1975, 1983) seeks to explain, predict and modify protective behaviours for health. This model, which is considered the extension of the Health Belief Model (Gremigni, 2013), introduces the emotional dimension as a relevant factor for the protective response to the threat. It states that the intention to adopt self-protective behaviours for health is the result in sequence of four factors: perception of the severity of the threat, perception of vulnerability to it, perceived effectiveness of the response to this threat (e.g. specific self-protective behaviours that consistently reduce the risk of becoming ill), and, finally, the ability to use the latter, an aspect which is close to the construct of self-efficacy (Bandura, 1997). The more severe the perceived and expected harm, the greater the fear felt and the motivation to protect oneself through strategies or

behaviours acquired as being safe. Recent studies about perception of vulnerability to Coronavirus disease have demonstrated the relevance of this psychological factor in adopting protective behaviours (Asmundson & Taylor, 2020; Stangier et al., 2021).The advent of the Covid-19 pandemic, precisely because of its characteristics of extreme diffusivity and potential health severity, can be approached, as regards analysis of the factors that favour the adoption of self-protective behaviours by the population, or in this case the youth population, through the Motivation Protection Theory, developed by Rogers (1975) and used in several studies to predict healthy behaviour and behaviours risky for health (Milne et al., 2006).

When an event of such magnitude that threatens the health and safety of individuals and societies occurs, it soon becomes the object of media exposure and overexposure (Galli, 2012; Moscovici, 2000). In this case, as the pandemic is caused by a viral pathogen, it entailed serious discussions at the level of specialist bio-medical knowledge that had, at least in Italy, a very strong mass-media amplification, pressing the problem of the «translation» of specialist knowledge into a more popular, albeit thorough knowledge, which is understandable to everyone, or at least to the majority of the population. Moscovici (2000), within the theory of social representations, addressed the issue of the transition from specialist-scientific knowledge to naive knowledge through the phenomenon of «social representations», highlighting the central role of mass information systems not only in the dissemination of information, but also, and perhaps above all, in the social construction of knowledge (Christidou et al., 2004; De Rosa & Mannarini, 2020; Galli, 2012; Moscovici, 2000). Furthermore, Farr (1994) sustains that social representations could be linked to the construction of personal beliefs and attitudes.

Moreover, as Covid-19 was a totally unpredictable event with a very rapid spread and great threat to global health, it has been the object, since its first manifestation, of intense media and social media attention. It is therefore conceivable, on the basis of the theoretical perspective linked to social representations, that the prevailing type of media people are exposed to can influence their perceived severity and vulnerability to it. These factors will then probably influence their decision to protect themselves or not from the virus. The youth population is also defined as the population of «digital natives» (Riva, 2019; Twenge, 2014), indicating the pervasive use of new media both for gaining information and for sharing information, opinions and ideas.

As now very numerous scientific studies in health psychology have shown, adolescent and youth age groups are particularly exposed to the assumption of health risk behaviours (Giombini et al., 2013; Zambianchi et al., 2010). Health risk behaviours are defined as those behaviours, actions, or real «lifestyles» that increase the possibility of compromising health in the short, medium and long term. Cigarette smoking has harmful effects both in the short term, e.g., by decreasing lung capacity, and in the long term, by increasing the risk of lung cancer. On the

contrary, protective behaviours are those behaviours or actions that protect against health risks both through their non-implication and through the reduction of their harmful effects if the risks were present (e.g. regular and constant physical activity).

A few months after the advent of the Covid-19 pandemic, several studies (Fazio et al., 2021; Golin et al., 2020; Leung et al., 2020; Liang et al., 2020; WHO, 2020) demonstrated the ability to protect oneself from catching Coronavirus using three main self-protective behaviours: the use of face masks to cover nose and mouth, hand sanitisation and social distancing. The synergistic use of all three of these behaviours is capable of consistently reducing the risk of contagion and the spread of Coronavirus. Furthermore, it is also possible to include vaccination against Covid-19 in self-protection strategies, the latter being certainly the most effective action to tackle and extinguish this pandemic over time. Despite repeated appeals to the population by the Italian health authorities and the repeated information that the media have relentlessly broadcast in recent months on protective behaviours, not all people have acquired these behaviours in a stable way or used them in situations defined at risk or regulated by specific institutional legislation despite their proven effectiveness. It therefore becomes necessary to reflect carefully on these aspects and to hypothesise that these behaviours for countering the spread of Coronavirus are comparable to risky and protective behaviours explored by the main models and the main theories of health psychology (Zambianchi, 2020), where research has highlighted the difficulty of subjects to adhere to protective health behaviours.

Knowing therefore the beliefs of young people about the severity of Covid-19 disease both for their age group and for other age groups, their perception of vulnerability to it, beliefs about the effectiveness of behaviours defined as protective by medical science (including the vaccine) and the level of adherence to these protective behaviours can improve knowledge about this crucial issue and the opportunity for interventions. Not having a questionnaire that evaluates these dimensions about Covid-19, one was designed *ad hoc* and the evaluation and the verification of its psychometrics properties constitutes the main objective of this study. Also differences in gender, school education and occupational condition for the variables indicated were evaluated. Three single items evaluated, separately from the questionnaire, sources of information about the Covid-19 pandemic, since they are considered relevant to beliefs about it.

Method

Participants

116 young people (mean age = 23.81; *SD* = 3.13; male 23%; female 71%) participated in the study. Regarding level of education: lower secondary school diploma

n = 6; upper secondary school diploma *n* = 33; degree *n* = 87; occupational condition: students *n* = 68; workers *n* = 51; neither student nor worker *n* = 8.

Measures

The Questionnaire on Motivation to Protect against Covid-19 (Zambianchi, 2021). It was constructed based on the Theory of Motivation to Protect (Rogers, 1975), and it consists of 20 items. These items were generated following the four dimensions envisaged by the Rogers' Theory.

- Beliefs about the perceived severity of the Covid-19 pandemic at a general level, on a personal level and for specific age groups (e.g. the elderly), n. 3 items (example of items: «I believe that the Covid-19 pandemic is a very serious problem for all of us»; «I believe that the Covid-19 pandemic is a less serious problem than what the mass media and political institutions present»).
- Perception of vulnerability to Covid-19 for people of the same age and for self. This part has 5 items; (example of items: «Most young people do not get ill from Covid-19»; «Covid-19 disease scares me personally and makes me feel vulnerable to it»).
- Beliefs on the efficacy of protective behaviours for health against Covid-19 highlighted by scientific research (use of face masks, hand sanitising gel, social distancing and perception of usefulness and efficacy of the vaccine against Covid-19). This part comprises 5 items (example of items: «Always using face masks covering mouth and nose is effective against infection from Covid-19»; «The vaccine against Covid-19 is an effective protection against infection»).
- Daily use of health protections against Covid-19 and the intention to get vaccinated as soon as possible for their age group. This part comprises 7 items (example of items: «I always maintain social distancing in shops, bars, restaurants and other public places»; «As soon as possible I will get vaccinated against Covid-19»).

The scale is a 5-point Likert scale (1 = «not at all true»; 5 = «completely true»).

Three single items evaluated the prevailing information sources for the Covid-19 pandemic. The sources evaluated are the following.

- Social media (e.g. Facebook, Twitter, Instagram, etc.): «I find out about the evolution of the Covid-19 pandemic mainly through social networks (e.g. Facebook; Instagram; WhatsApp)».
- Traditional mass-media (TV, newspapers, Internet browsing, e.g. Google): « I find out about the evolution of the Covid-19 pandemic mainly through traditional mass-media».
- Specialist scientific journals (e.g. Le Scienze Italian ed.; New England Journal of Medicine; the Lancet): «I find out about the evolution of the Covid 19 pandemic mainly through specialist scientific journals».

The rating scale is a 5-point Likert scale (1 = «not at all true»; 5 = «completely true»).

Procedures

The participants filled in the anonymous online questionnaire set up on the Google Forms platform. University students and young workers were contacted and asked to send the questionnaire link to friends and acquaintances aged between 18 and 30. The questionnaires were collected during the months of December 2020 and January 2021, during the second severe lockdown due to the spread of contagion, and before the start of mass vaccination in Italy.

Data analysis

Statistical analyses were performed in four steps. In the first step, means, standard deviations, skewness and kurtosis of all the variables under study were calculated. In the second step, Exploratory Factor Analysis (EFA, extraction method: Principal Axis Factoring, Varimax row) was run, in order to identify the latent factors of the questionnaire. Then, as a third step, correlation analyses were run utilising these factors and, in several cases, single items. The correlations between the emerged factors were also utilised as convergent reliability. As a fourth step, a series of Multivariate analyses evaluated the presence of differences for the structural variables gender, school education and occupational status on the factors assessed by the questionnaire for the Covid-19 pandemic and on the sources of information on the pandemic.

Results

Descriptive statistics of study variables

The youth evaluate the pandemic as a serious problem for all, but a part of them believes that if they become infected they not will have health problems and that Covid-19 regards mostly the elderly. They have a good knowledge of the main health behaviours for reducing the risk of contagion. Their main source of information about the pandemic is represented by traditional mass-media (see table 1).

The EFA solution of the Questionnaire on Motivation to Protect against Covid-19

Exploratory Factor Analysis highlights a four-factor solution, with eigenvalue ≥ 1 (see table 2). The adopted method is Principal Axis Factoring, Varimax Row,

capable of identifying the latent factor structure with items which have an abnormal distribution. Eigenvalue: F1 = 5.56 (29.24 % of total explained variance); F2 = 2.35 (12.37% of total explained variance); F3 = 9.18 (9.18% of total explained variance); F4 = 1.45 (7.65 % of total explained variance) (Goodness of fit test: Chi-square 188.54; $F = 116$; $p = 0.0002$).

The first Factor (F1) groups items about the use of protection (face masks, social distancing, using face masks indoors, protection to prevent others becoming infected even when others don't use it), and comprises 4 items. Reliability: Cronbach Alpha 0.69; $M = 4.05$; $SD = 73$; Skewness = -0.64; Kurtosis = -0.40. The second Factor (F2) comprises three items about vaccines (perceived efficacy of the vaccine; belief that the vaccine is dangerous and ineffective, with reverse coding; the willingness to get vaccinated when possible). Reliability: Cronbach Alpha = 0.82; $M = 4.21$; $SD = 0.80$; Skewness = -1.24; Kurtosis = 1.06. The third factor (F3) groups items about the perceived efficacy of protection behaviours (face masks, hand sanitising gel and social distancing) and comprises 3 items. Reliability: Cronbach Alpha = 0.85. $M = 4.17$; $SD = 0.80$; Skewness =- 1.00; Kurtosis = 0.36. The fourth Factor (F4) groups items about the denial of the seriousness of the Covid-19 pandemic (Young people do not get ill from Covid-19; The majority of young people do not get ill from Covid-19; If infected I would have no health problems; Covid-19 affects adults and the elderly, and I am not worried about it) and comprises 4 items. Reliability: Cronbach Alpha = 0.60. $M = 1.92$; $SD = 0.55$; Skewness = 0.54; Kurtosis = 0.25.

The items about risk behaviours (meeting friends although dangerous for contagion; not using face masks if other group members do not use them) have been computed as a single item. Their Pearson correlation coefficient is 0.14; $p = 0.08$.

Only the items with high factor loading converged into a latent factor; whilst for the other items, they are computed in statistical analyses as a single item.

The item «The pandemic is a less serious problem than mass-media and political institutions lead us to believe», referring to the mistrust in political institutions and mass-media regarding information about the pandemic, has been computed as a single item.

The scree-test (Cattell, 1966) highlighted a six-factor solution (see Appendix). The four-factor solution was chosen for its thrift and fidelity criteria (Ortalda, 2000), in other words the capacity to reproduce the original correlations and the number of factors related to the percentage of explained variance and variables.

Correlations between Denial of seriousness of pandemic, Protective behaviours, Perceived efficacy of protection and Beliefs on the efficacy of Covid-19 vaccine

The correlation matrix highlights that Denial of seriousness of the pandemic is negatively correlated with the adoption of protective behaviours, the percep-

tion of their efficacy and beliefs about the efficacy of the Covid-19 vaccine. The correlations are significant, but not very high, so that confirms their ability to identify the specific dimensions about Covid-19, as expected by Rogers' theory (see table 3).

Correlations between Mistrust in political institutions and mass-media regarding information about the pandemic, Denial of its seriousness, Protective behaviours, Perceived efficacy of protection and Beliefs on the efficacy of the Covid-19 vaccine

The correlational matrix shows that mistrust in political institutions and mass-media regarding information about the evolution of the pandemic is positively correlated with Denial of its seriousness, and negatively correlated with the adoption of protective behaviours, Perceived efficacy of them and Beliefs on the efficacy of the Covid-19 vaccine (see table 4).

Correlations between protective behaviours, Perceived efficacy of protection, Denial of seriousness of the pandemic, Beliefs on the efficacy of the Covid-19 vaccine and sources of information

The correlational analysis shows that social networks and traditional mass-media are associated with the utilisation of protection against Covid-19 (see table 5).

Correlations between risk behaviours for Covid-19 contagion, Mistrust in political institutions and mass-media, Perceived efficacy of protections, Denial of seriousness of the pandemic and Beliefs on the efficacy of the Covid-19 vaccine

The correlation matrix highlighted that risk behaviours are positively correlated with mistrust in political institutions and the mass-media and denial of seriousness of the pandemic for young people; the perception of efficacy of protection on the contrary diminishes involvement in risk behaviours. Beliefs on the efficacy of the Covid-19 vaccine proved uncorrelated to risk behaviours (see table 6).

Table 1

Mean, standard deviations, skewness and kurtosis of each study variable.

Variable	M	SD	Skewness	Kurtosis
1. The pandemic is a serious problem for all	4.25	0.83	-0.90	0.14
2. The pandemic is a serious problem for the elderly	4.07	0.98	-0.90	0.23
3. The pandemic is a less serious problem than mass-media and political institutions lead us to believe	2.14	0.91	0.59	0.21
4. Young people do not get ill with Covid-19	1.33	0.65	2.61	9.005
5. The majority of young people do not get ill with Covid-19	2.24	0.95	0.50	-0.10
6. If infected I would have no health problems	2.52	0.84	-0.19	-0.54
7. Covid-19 scares me and I feel vulnerable to it	3.11	1.16	0.15	-0.83
8. Covid-19 concerns adults and the elderly, therefore I'm not worried	1.58	0.81	1.34	1.68
9. Face masks are effective against Covid-19	4.11	0.97	-1.01	0.57
10. Hand sanitising gel is effective against Covid-19	4.11	0.93	- 0.92	0.30
11. Social distancing is effective against Covid-19	4.31	0.84	-0.90	-0.31
12. The vaccine is effective against Covid-19	3.96	0.93	-0.82	0.50
13. The vaccine against Covid-19 is ineffective and dangerous for health	1.46	0.68	1.48	1.95
14. Outdoors I use a face mask	4.60	0.67	-1.76	2.92
15. maintain social distancing in public places	4.19	0.82	-0.63	-0.48
16. I meet my friends although it is dangerous for contagion	2.12	1.01	0.67	-0.01
17. If my group of friends or family don't use a face mask, I don't either	2.04	1.17	1.05	0.38
18. I wear a face mask when visiting relatives	3.36	1.38	-0.41	-1.09
19. When possible, I'll get vaccinated	4.15	1.13	-1.18	0.38
20. It is right to protect myself and others, so I also do it when others do not	4.07	1.01	-0.84	-0.03
21. I keep updated about the pandemic through social media (e.g. Instagram, Facebook...)	2.79	1.16	0.38	-0.52
22. I keep updated about the pandemic through mass-media (e.g. TV, newspapers)	3.61	1.13	-0.53	-0.47
23. I keep updated about the pandemic through specialised journals (e.g. Science, The Lancet)	1.94	0.87	0.82	0.50

Table 2

EFA solution. Extraction: Principal Axis Factoring.

Variable	F1	F2	F3	F4
The pandemic is a serious problem for all	0.38	0.23	0.22	0.33
The pandemic is a serious problem for the elderly	-0.05	-0.06	-0.05	-0.22
The pandemic is a less serious problem than mass-media and political institutions lead us to believe	-0.47	-0.32	-0.09	-0.29
Young people do not get ill with Covid-19	-0.007	-0.13	-0.10	**-0.30**
The majority of young people do not get ill with Covid-19	-0.13	-0.15	-0.14	**-0.59**
The majority of young people do not get ill with Covid-19	0.13	-0.15	-0.14	-0.59
If infected I would have no health problems	-0.23	0.03	0.005	**-0.58**
Covid-19 scares me and I feel vulnerable to it	0.33	0.04	0.22	0.61
Covid-19 concerns adults and the elderly, therefore I'm not worried	-0.31	-0.01	-0.08	**-0.50**
Face masks are effective against Covid-19	0.13	0.21	**0.81**	0.11
Hand sanitising gel is effective against Covid-19	0.12	0.15	**0.86**	0.04
Social distancing is effective against Covid-19	0.09	0.11	**0.84**	0.04
The vaccine against Covid-19 is effective	0.07	**0.74**	0.36	0.001
The vaccine against Covid-19 is ineffective and dangerous for health	-0.03	**-0.77**	-0.04	0.001
Outdoors I use a face mask	**0.37**	0.23	0.41	0.22
I maintain social distancing in public places	**0.35**	0.17	0.34	0.08
I meet my friends although it is dangerous for contagion	-0.48	0.05	-0.19	-0.17
If my group of friends or family don't use a face mask, I don't either	-0.78	-0.02	-0.10	-0.12
I wear a face mask when visiting relatives	**0.50**	-0.09	0.33	0.13
When possible, I'll get vaccinated	0.08	**0.86**	0.17	0.09
It is right to protect myself and the others, so I do it even when others do not	**0.75**	0.20	0.21	0.03

Note. In bold: items entered in factors utilised for statistical analyses.

Table 3

Correlations between the Denial of the seriousness of the Covid-19 pandemic, Protective behaviours, Perceived efficacy of protection and Beliefs on the efficacy of the Covid-19 vaccine.

Variables	Denial of seriousness of the Covid-19 pandemic	Protective behaviours	Perceived efficacy of protection	Beliefs on efficacy of Covid-19 vaccine
Denial of seriousness of Covid-19 pandemic	----			
Protective behaviours	-0.29***	-----		
Perceived efficacy of protection	-0.21*	0.50***	----	
Beliefs on efficacy of vaccine	-0.16+	0.28**	0.38***	---

*+ p = 0.08; * p <0.05; **p<0.01; ***p<0.001.*

Table 4

Correlations between Mistrust in political institutions and mass-media regarding information about the pandemic, Denial of its seriousness, Protective behaviours, Perceived efficacy of protection against Covid-19 and Beliefs on the efficacy of the Covid-19 vaccine.

Variables	Mistrust in political institutions and mass-media
Denial of the seriousness of the Covid-19 pandemic	0.32***
Protective behaviours	-0.41***
Perceived efficacy of protections	-0.28***
Beliefs on efficacy of Covid-19 vaccine	-0.36***

***p<0.001.

Table 5

Correlations between Protective behaviours, Perceived efficacy of protection, Denial of the seriousness of the pandemic, Beliefs on the efficacy of the Covid-19 vaccine and sources of information.

Variable	Social networks as sources of information	Traditional mass-media as sources of information	Scientific journals as sources of information
Beliefs on the efficacy of Covid-19 vaccine	0.09	0.26**	0.03
Protective behaviours	0.20*	0.16+	0.09
Perceived efficacy of protections	0.09	0.01	-0.08
Denial of seriousness of Covid-19 pandemic	0.14	-0.07	-0.09

+ $p \leq 0.08$; * $p<0.05$.

Table 6

Correlations between risk behaviours for Covid-19 contagion, Mistrust in political institutions and mass-media, Perceived efficacy of protection, Denial of seriousness of the pandemic and Beliefs on the efficacy of the Covid-19 vaccine.

Variable	I meet with my friends although it is dangerous for contagion	If my group of friends or family don't use a face mask, I don't either
Mistrust in political institutions and mass-media regarding the seriousness of the pandemic	0.24**	0.46***
Denial of seriousness of pandemic	0.28**	0.25**
Beliefs on efficacy of Covid-19 vaccine	-0.04	-0.11
Perceived efficacy of protection	-0.17+	-0.20*
Protective behaviours	-0.48***	-0.59***

+$p<0.08$; *$p<0.05$; ** $p<0.01$; ***$p<0.001$.

Gender differences on beliefs about the pandemic, the efficacy of protection and the use of protection

A Multivariate Analysis (MANOVA) with gender as a «grouping variable» and perceived vulnerability highlighted a statistical significance (Wilk's lambda = 0.93; $F(3,122) = 3.05$; $p<0.05$), where females state they feel more frightened and vulnerable to Covid-19 than males (see figure 1).

A subsequent Multivariate Analysis with gender as a grouping variable highlighted a statistical significance for the use of protection behaviours against Covid-19 (Wilk's Lambda= 0.90; $F(7, 114) = 1.76$; $p<0.10$). Univariate Anova shows that females use protection more often than males: Male: $M = 3.83$; Female $M = 4.14$, $F(1,121) = 4.59$; $p<0.05$ (see figure 2).

Gender differences also emerged regarding sources of information about the pandemic (Wilk's Lambda = 0.95; $F(3, 122) = 1.77$; $p<0.15$). «Traditional mass-media» (TV, papers and also surfing the Internet for information) are more utilised by females than by males ($F = 4.90$; $p<0.05$; Female $M = 3.75$; Male $M = 3.27$).

Differences in school education on study variables

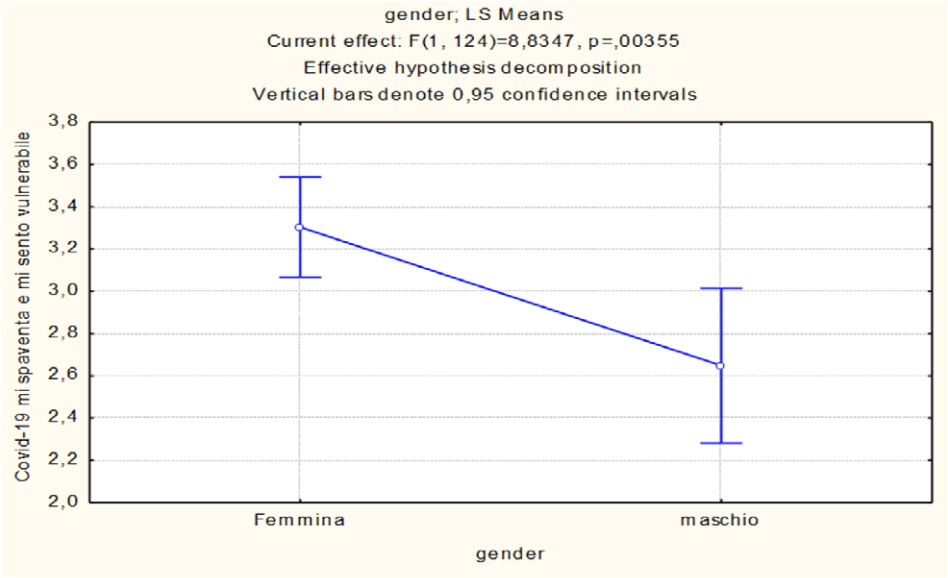
Differences in school education regarding the use of protection proved significant (Wilk's Lambda = 0.78; $F(14,220) = 2.05$; $p<0.01$. Subsequent Univariate Anovas highlighted that young people with a degree and with an upper secondary school diploma more often use a face mask in outdoor situations than those with a lower secondary school diploma ($F = 9.30$; $p<0.001$) (Degree $M = 4.65$; Upper secondary school diploma $M = 4.63$; Lower secondary school diploma $M = 3.50$).

Meeting with friends although forbidden is more frequent in young people with a lower secondary school diploma than in young people with a degree and upper secondary school diploma ($F = 2.35$; $p<0.09$) (Degree $M = 2.08$; Upper secondary school diploma $M = 2.18$; Lower secondary school diploma $M = 3.00$).

Differences in occupational condition on study variables

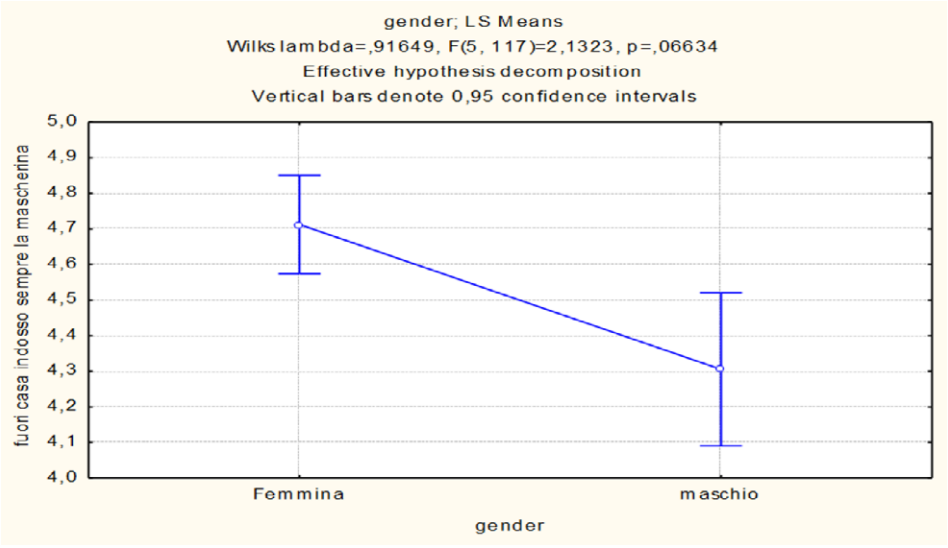
As for occupational condition there are no significant differences regarding beliefs about the seriousness of the pandemic ($p=0.53$), beliefs about vulnerability to Covid-19 ($p=0.40$) and the use of protection ($p=0.19$). However, a notable difference is related to Beliefs on the efficacy of the Covid-19 vaccine ($F= 4.05$; $p<0.01$). Students have a higher level of perceived efficacy of the vaccine than young working people and young people without any type of employment (Students: $M = 4.36$; Workers $M = 4.13$; Neither employed nor student $M = 3.58$).

Figure 1



Gender differences on the perception of vulnerability to Covid-19.

Figure 2



Gender differences in the use of protection against Covid-19.

Discussion

The study had the objective of testing a questionnaire on psychological motivation to protect against the contagion and disease of Covid-19, based on the Motivation Protection Theory (Rogers, 1975). The questionnaire took into consideration, on a small sample of Italian emerging adults, beliefs about the severity of the Covid-19 pandemic, perception of vulnerability to it, perceived efficacy of protective behaviours and the adoption of protective behaviours, including the Covid-19 vaccine, as expected by the Motivation to Protect Theory (Rogers, 1975). Sources of information for the pandemic and its evolution were also explored, and their relationships with the factors of the questionnaire were evaluated. Exploratory Factor Analysis, with the Principal Axis method of extraction and Varimax rotation on the items of the questionnaire, highlighted a four-factor solution, which corresponds partially to that envisaged by the Motivation Protection Theory.

The first factor, as expected by the theory, is related to items referring to the use of protection against contagion.

The second factor represents an interesting and, if confirmed by future research with broader samples, intriguing result. Contrary to expectations, it was discovered that vaccination emerged as a specific factor, comprising three items. This factor was labelled «Beliefs on the efficacy of the Covid-19 pandemic». The first two items, about the perception of efficacy and the belief that the vaccine is dangerous and ineffective were expected to saturate the third factor, which is related to the perceived efficacy of protection.

The third factor is related to the perceived efficacy of protection, with three items on face masks, hand gel and social distancing.

The fourth factor is related to perception of vulnerability to Covid-19 and, specifically, the denial of its seriousness.

The item about beliefs about the seriousness of the pandemic at a distal level (for all) and at a proximal level (for the young) did not enter into a unique specific factor. So, one of them, the item related to mistrust in political institutions and mass-media regarding information about the pandemic was tested as a single item for subsequent analyses.

Results of correlational analyses between the factors emerged, as table 3 shows, confirming the concurrent validity of the self-report instrument, as expected as specific factors from the Motivation Protection Theory. Also correlation between the two items about risk behaviours with the other factors, as shown in table 6, can confirm concurrent validity, being significantly correlated, and in the expected direction, with them.

Results of correlational analyses between these factors also confirms the hypothesis about the relevance of beliefs about the pandemic, and specifically

perception of vulnerability to it, as expected by Rogers' Model of Motivation Protection Theory (Rippetoe & Rogers, 1987; Rogers, 1975; Rogers & Prentice-Dunn, 1997) and results emerging in other recent research (Clements, 2020; Stangier et al., 2021). The latent factor labelled as «Denial of seriousness of the pandemic and perception of vulnerability» could be explained through initial information about the most critical age cohort for adverse outcomes for this disease, when mass-media and social media emphasised that the young were less affected by the more severe forms of Covid-19. Other future studies, on other age cohorts, may or may not confirm this hypothesis. The denial of its seriousness, related to the representation of this infection as not concerning young people but only adults and the elderly is associated with refusal of protection and perception of its ineffectiveness, exposing young people to the risk of contagion for themselves and for others.

The second factor represents an interesting and, if confirmed by future research with broader samples, intriguing result. Indeed, the vaccine as a specific latent factor emerged, contrary to expectation. Perhaps vaccines are perceived as different from the other types of protection (e.g. face masks, hand gel). It may be that they are represented as «internal body protections», and for this reason outside of personal locus of control (e.g. face masks can be personally controlled by deciding if and when to use them; the vaccine, when administered, is out of one's personal control because of its effects, which are at a molecular level). This result, if confirmed in the future, could help to comprehend the different reactions to vaccinations on behalf of the population. People who trust science accept the vaccine as «invisible protection» outside their personal control, as it operates at a molecular, non-visible level; on the contrary, people who mistrust science (and particularly medicine) refuse this type of protection, believing that they contain substances not clearly declared or that could be dangerous for people, or that have been created in order to damage society, as this research and other studies on this topic coming from epidemiology have highlighted (De Donno et al., 2017).

As expected, females tend to use protection more than males; the latter could be identified as a specific group at risk of contagion and non-compliant.

The confirmation of the hypothesis that beliefs about the perception of seriousness and vulnerability in turn influence the adoption of safe behaviours, and that a lack of trust in political institutions and mass-media is related to more exposure to contagion due to lack of protection suggests we pay special attention to the information conveyed by the mass media and by political institutions governing the territory, as other studies suggest (Lening et al., 2021).

The significant associations that emerged between beliefs about the efficacy of the vaccine and the mass-media as sources of information confirm this centrality of social communication for the construction of representations about

this issue, as they are of capital importance for reducing the spread of Covid-19 (De Rosa & Mannarini, 2020). The Social Representation Theory indeed posits the translation of scientific language (*reified universes of knowledge*) into common language (*consensual universes of knowledge*) as one of the most important and difficult issues for the correct and authoritative diffusion of qualified information (Galli, 2012; Smith et al., 2015).

The study has important limits, which must be taken into account.

First, the small sample does not allow the structure validity of the questionnaire to be confirmed, as it is intended as only a preliminary pilot study. The rapid evolution of knowledge and of the resources provided by medicine such as the vaccine will require adjusting several items of the questionnaire. One of them could be about Covid-19 vaccinations which have already been administered, since they are now available through the mass vaccination system. It is therefore appropriate to expand the sample in order to verify the latent factor structure of the questionnaire, testing also other age cohorts. The use of single items represents a very serious limit to the research. The questionnaire which was created ad hoc only evaluates issues on Covid-19 and requires broader samples for a clearer result about its latent structure and the evaluation of its concurrent and divergent validity. Furthermore, it could be important, in future research, to investigate the association between these dimensions and other psychological and psychosocial constructs in order to arrive at a more complex and broader picture of the perception of Covid-19 in young people and in other stages of life. The tested questionnaire proves, despite these limitations, to be a potential source of information about the factors that motivate people to act to reduce this dramatic situation, safeguarding their health, and for organising health and safety promotion initiatives (primary prevention).

In late adolescence the questionnaire could inform on prevention projects at secondary schools; in workplaces, training courses on Covid-19 could integrate the biomedical dimension with these psychological factors, improving their effectiveness. Public health institutions could improve their knowledge about the beliefs and behaviours of young people, and then set out actions for their compliance. Finally, social communication (e.g. brochures, media campaigns) could utilise results coming from this questionnaire in order to create more effective and motivating persuasive messages (Pietrantoni & Prati, 2013). The Motivation Protection Theory indeed posits among its theoretical assumptions the relevance of mass-media for the construction of beliefs and attitudes toward health and diseases.

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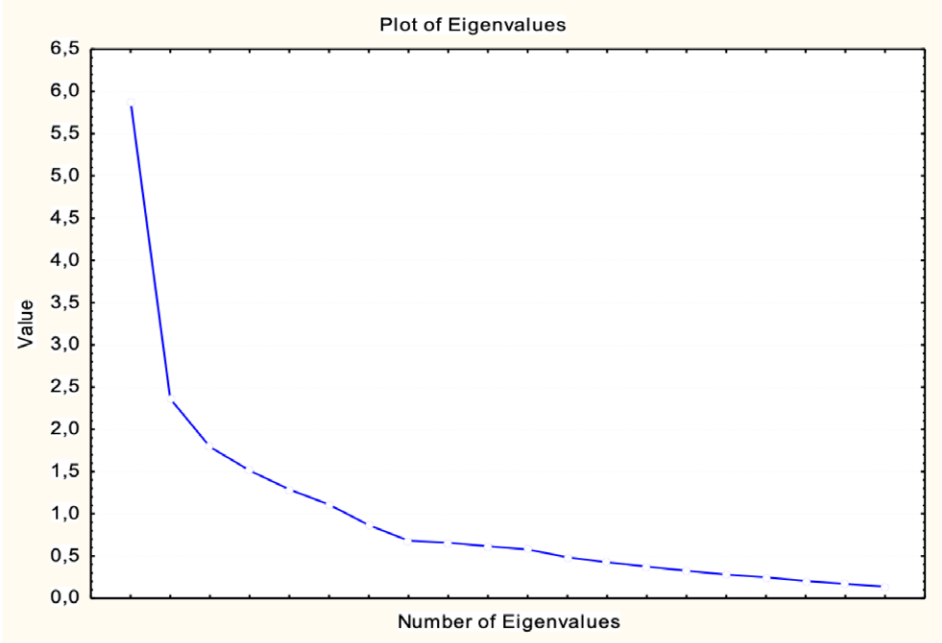
Figure 1



Scree-test (Cattell, 1966).