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Psychosocial Implications of the COVID-19 Pandemic on the Employees of the Automotive Industry in Germany

Ivan Titov [a], Kira Sedykh[b], Tetiana Titova [c], Olena Myroshnyk [d] Salvatore Giacomuzzi [e],Markus Ertl [f], Martin Rabe [g]

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Corresponding Author [a]

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Abstract

This study aims to evaluate the impact of COVID-19 coronavirus on employees' psychological well-being; to explore whether socio-demographic characteristics of employees predict the negative effect of the pandemic on their well-being; to analyze factors (level of trust in the official and informal sources of information, expectations and concerns, coping activities and emotional states) associated with such negative effect. A total of 1.937 completed online surveys were gathered from May 11–to June 7, 2020. After excluding participants whose psychological well-being subjectively was not affected by the COVID-19 outbreak, the overall sample was divided into high (374 employees) and low-affected (762 employees) groups. Statistically significant differences between emotional states, concerns, and coping activities of participants from high- and low-affected groups were found. The high intensity of the COVID-19 outbreak's influence on employees' psychological well-being has positive correlations with respondents' financial circumstances, negative emotional states (tension, stress, anxiety, and depression symptoms), concerns and expectations regarding work, and financial complications, health, and social issues. It also positively correlates with such coping activities as seeking support from a professional psychotherapist or psychologist. Multiple linear regression analysis revealed that high-affected group participants' employment status ($p = 0.033$) could be regarded as a predictive factor for experiencing the severe influence of the COVID-19 epidemic outbreak.

[a] Poltava V. G. Korolenko National Pedagogical University, Poltava, Ukraine
[b] Poltava V. G. Korolenko National Pedagogical University, Poltava, Ukraine
[c] Poltava V. G. Korolenko National Pedagogical University, Poltava, Ukraine
[d] Poltava V. G. Korolenko National Pedagogical University, Poltava, Ukraine
[e] Sigmund Freud University, Wien, Austria
[f] Bureau for statistical studies, Innsbruck, Austria
[g] MAN SE and MAN Truck & Bus SE, Munich, Bayern, Germany

Contents

1 Introduction

The spreading of COVID-19 has significantly resulted in a large number of psychological consequences never encountered before. The fears of contracting coronavirus or dying from it, concerning about the safety of family, relatives, and friends, experiencing loneliness and reduced social contacts, feeling of uncertainty about job-related perspectives, and expectations of financial losses are considerable stressors that can negatively affect people's mental health and psychological well-being (Lai et al., 2020; Lima et al., 2020; Rajkumar, 2020; Sood, 2020; Titov et al., 2020). Facing the outbreak's continuous escalation and potential disease threat causes anxiety, depression, and behavioral overreactions, especially in case of less appropriate guidance from authorities and misinformation from mass and social media (Brooks et al., 2020; Hiremath et al., 2020; Saladino et al, 2020; Salari et al., 2020). Therefore, it is essential to understand the psychological changes caused by the COVID-19 outbreak.

Previous studies (Liang et al., 2020; Pieh et al., 2020; Salari et al., 2020; Shevlin et al., 2020; Sulaimani & Bagadood, 2020; Warden et al., 2021), have reported adverse mental reactions to the coronavirus pandemic (obsessive compulsion, interpersonal sensitivity, phobic anxiety, psychoticism, depression symptoms, acute posttraumatic stress syndrome, etc.) and highlighted the prevalence of different predictors and risk factors of negative psychological response to COVID-19 (age, gender, education background, marital status, location, etc.).To our knowledge, there are no studies so far, that have examined the psychosocial implications of the COVID-19 pandemic on the automotive industry employees (Belzung & Griebel, 2001; Lee et al., 2020). The automotive industry is one of the four dominant industrial sectors in Germany (automotive, mechanical engineering, chemical, and electrical industry) and was used as a lump sample for the German industrial sector. Furthermore, it was expected that the industry would be affected earliest and most severely by the pandemic after the industry came to a partial standstill in 2020 due to the permanent loss of production capacities (Ragnitz, 2020), and disrupted international supply chains (Bunde, 2021). Thus, our present study was designed and conducted for the following purposes: (1) to evaluate the impact of COVID-19 coronavirus on employees' psychological well-being; (2) to explore whether socio-demographic characteristics of employees predict the negative effect of the pandemic on their well-being; (3) to analyze factors (level of trust to the official and informal sources of information, expectations and concerns centered towards different spheres of life, coping activities, coping activities, and emotional states) associated with such negative effect.

2 Materials and Methods

Participants

The initial sample comprised 1.937 employees of the German automotive industry who have undergone the assessment of the COVID-19 outbreak's influence intensity on their psychological well-being. We consider this differentiating criterion to be exclusively relevant because suffering such negative influence is recognized as an emerging risk factor for basic needs frustration, emotional disorders, and maladaptive behaviors. Thus, respondents reported how the situation with the coronavirus has affected their psychological well-being using a 5-item Likert rating scale ranging from 1 (not affected) to 5 (strongly affected). After eliminating the incomplete records, missing data, and invalid responses to the item "How the situation with the coronavirus has affected your psychological well-being?" the overall sample was divided into high- and low-affected groups (3-score cut-off point). The high-affected group consisted of 374 respondents who experienced the severe influence of the COVID-19 epidemic outbreak (3-5 rating scores); the low-risk group comprised 762 employees who reported that their mental health was not strongly affected by the situation with coronavirus (1-2 rating scores). The data obtained in these two groups were included in the final quantitative and qualitative analyses. Although the sampling technique does present limitations in that it was not purely random, every attempt was made to access a wide range of respondents in terms of age, gender, educational level, etc. The anonymity of the respondents was assured.

Measures

A study was conducted between May 11 and June 7, 2020, using an online survey platform. In the survey, the mandatory fields were not used, so the questions were displayed not depending on the subject's answer to the previous question. The study instrument comprised a structured questionnaire packet that inquired about demographic information, psychological and financial consequences of the COVID-19 outbreak, level of trust in the official and informal sources of information regarding the situation with coronavirus, expectations, and concerns centered on different spheres of life, coping activities, emotional states, and moods.

Socio-demographic information

Participants were asked to report their gender (male or female), age (15 to 30 years, over 30 to 45 years, over 45 years), educational level (no school leaving certificate, primary/secondary school leaving certificate, completed vocational training, Matura/Abitur, University of applied sciences/University studies), marital status (living alone, married/live in cohabitation), employment status during last two weeks (100% short-time working, short-time work (in some cases) with less than 24 hours per week work volume, no short-time work/regular work volume, part-time employee on short-time work, part-time employed/no short-time work), and living conditions (private house, own apartment, rented apartment, rented house, flat-sharing community), including the number of adults and children they stayed together in the same apartment during the quarantine.

The impact of the situation with coronavirus on psychological well-being and financial status

Participants were asked to rate, using a 5-point scale (1 = not affected to 5 = strongly affected), how strongly they experienced the psychological effects of the coronavirus outbreak by the item, "How the situation with the coronavirus has affected your psychological well-being?" Participants were asked to rate, using a 5-point scale (1 not affected to 5 strongly affected), the financial consequences of the COVID-19 pandemic by the item, "How has the situation with the coronavirus affected your financial circumstances?"

The level of trust in the sources of information

Participants were asked to rate, using a 10-point scale (1 = have no trust to 10 = trust completely), how much they trust the majority of people, people they know personally (relatives, family, friends, etc.), media

(television, radio, print media, online resources, etc.), social networks, forums, blogs in the Internet, public authorities (president, parliament, government), health care institutions, the management of the holding. They were also inquired about how truthful and convincing information about the coronavirus in official or informal sources was during the last 1-2 weeks.

Expectations

Participants were asked to rate ten items, using a 5-point s scale (1 = negatively to 5 = positively), to what extent the situation with the coronavirus would affect their financial situation, the accustomed way of their lives, their relationships with others, their physical and/or mental health, keeping their work, their social status, the realization of their plans, the need to look for an additional income or another, better-paid job, the economic and social situation in the country, their family relationships.

Concerns

Participants were asked to rate 16 items, using a 5-point s scale (1 = disagree to 5 = agree), their concern about the need for regular payment of utility bills and other obligatory payments; being able to perform your work well enough; financial problems and the difficulty of paying your own expenses; inability to control the events of your life; the possibility of contracting coronavirus or dying from it; the safety of your relatives and family; uncertainty of future quarantine terms; not being able to take part in social activities and occasions; possibility of dismissal, loss of work; the need to adapt your social and professional life increasingly to digital platforms (make online payments, order online, communicate virtually etc.); future job-related perspectives (salary stability and adequacy, keeping social package, workload, career opportunities, etc.); inability to resolve family conflicts; state of the national economy; restrictions on the rights of free movement, travelling abroad, etc.; well-being of your relatives and friends who live far away from you; the need to repay credits, loans, arrears etc. This allowed revealing respondents' basic needs frustration and distress over physiological needs, money, security and stability, and social issues (McKay et al., 2006; Beck et al., 1997).

Coping activities

Participants were asked to rate 17 items, using a 5-point s scale (1 = disagree to 5 = agree), what they do to mitigate stress in the coronavirus situation. These items were aimed at capturing manifestations of respondents' social, cognitive, and physiological coping activities. For example, social coping was assessed with the item "To reduce the feelings of discomfort in the coronavirus situation I use social networks". Cognitive coping was measured with the item "To reduce the feelings of discomfort in the coronavirus situation I logically evaluate and analyze the situation, carefully consider what steps should be taken, and draw up an action plan". Physiological coping was measured with the item "To reduce the feelings of discomfort in the coronavirus situation I do physical exercises, sports, go for a walk".

Emotional states

To evaluate participants' dominating emotional states, they were asked to rate 4 items, using a 5-point s scale (1 = never to 5 = always), how often during the last week they have been bothered by the feelings of (1) of no longer being able to control the difficulties, (2) of anxiety due to the uncertain future, (3) of energy, inspiration and high working performance, and (4) of nervous tension or stress. Moreover, all participants answered a personality questionnaire: in the state section of the State-Trait-Anxiety-Depression Inventory (STADI) by Laux et al. (2013). This section consists of four scales ("State Arousal", "State Worrying", "State Dysthymia", and "State Euthymia") each with five items. "State Arousal" and "State Worrying" scales form a superordinate scale "State Anxiety" (Cronbach's $\alpha = .90$); "State Dysthymia" and "State Euthymia" are facets of the "State Depression" factor (Cronbach's $\alpha = .87$). The items are rated on 4-point scales (1 = not at all, 4 = very much; scores for "Euthmymia" are inverted). Higher sum scores suggest higher levels of anxiety/depression state.

Statistical Analysis

Statistical analysis was performed using SPSS 21.0 for Windows. An analysis of descriptive statistics was conducted to illustrate the socio-demographic characteristics of the respondents. The nonparametric Spearman correlation coefficient (rs) was applied to evaluate the association between variables in each of the two groups. The nonparametric Mann-Whitney U test was performed for data comparison between two groups. The significance level was determined at $p < .05$, and all tests were 2-tailed. Multiple linear regression analysis was conducted to identify the socio-demographic risk factors (independent variables) for participants who met a high level of impact of the situation with coronavirus on psychological well-being (dependent variable).

3 Results and Discussions

3.1 Group's socio-demographic characteristics

Among participants, who formed high- and low-affected groups, 71.93% and 82.81% were male, respectively. In consideration of the large age span, the participants in both groups were divided into 3 different age clusters: 15 to 30 years; over 30 to 45 years, and over 45 years. In the high-affected group, 9.89% of participants were from 15 to 30, 53.21% were between 30 and 45, and 36.9% were over 45. In the low-affected group, 8.0% of participants were from 15 to 30, 45.41% were between 30 and 45, and 46.59% were over 45.

Of the participants in the high-affected group, 0.3% did not have a school-leaving certificate, 4.9% received primary or secondary education, 22.9% completed vocational training, 3.0% were Matura/Abitur, and 69% graduated from University. Of the participants in the low-affected group, 3.81% got primary or secondary school leaving certificates, 3.15% were Matura / Abitur, 21.02% completed vocational training, and 72.01% received University education.

As for marital status, 14.56% of respondents of the high-affected group reported that they were living alone, while 85.48% reported that they were married or living in cohabitation. 14.76% of respondents from the low-affected group lived alone, whereas 85.24% were married or lived in cohabitation.

43.82% of respondents from the high-affected group lived in a private house, 16.94% – in their apartment, 32.26% – in a rented apartment, 5.91% – in a rented house, and 1.01% – in a flat-sharing community. In the low-affected group, 51.25% of respondents lived in a private house, 15.24% – in their apartment, 25.89% – in a rented apartment, 6.18% – in a rented house, and 1.45% – in a flat-sharing community. Among all participants, in the high-affected group (92.25% and 58.56%) and low-affected group (91.47% and 50.66%) employees stayed together with adults and children in the same apartment during the quarantine, respectively.

In terms of the employment status of the high-affected group representatives, the majority had regular work volume (62.7%) followed by short-time workers with less than 24 hours per week work volume (23.51%), while only 3.7% had total short-time work. Almost the same distribution in the low-affected group was found. Most participants of that group had regular work volume (62.7%) and short-time work with less than 24 hours per week work volume (21.63%), while only 2.67% had total short-time work. It is evident from above that there are no significant differences in the percentage distribution of socio-demographic characteristics of the two studied groups.

Linear regression for socio-demographic factors

The multiple regression (the scores of COVID-19 outbreak's influence intensity on psychological well-being (from 3 to 5 scores) was the dependent variable) was conducted in both groups. In the low-affected group, there were no predictive factors revealed. Multiple linear regression analysis showed that high-affected group participants' gender, age, education, and living conditions were not related to the intensity of the outbreak's influence on their psychological well-being. It was noteworthy that employment status ($p = 0.033$) could be

regarded as a predictive factor for experiencing the severe influence of the COVID-19 epidemic outbreak. The results of the regression analysis are shown in Table 1.

Table 1
Regression analysis with scores of COVID-19 outbreak's influence intensity on psychological well-being as the dependent variable (n = 374)

Socio-demographic variables	Scores of COVID-19 outbreaks influence the intensity of psychological well-being					
	B	95% CI		t	*p*-value	Beta
Gender	.098	-.010	.206	1,792	.074	.098
Age	-.031	-.113	.050	-.761	.447	-.044
Education	-.028	-.090	.034	-.877	.381	-.048
Marital status	-.103	-.245	.039	-1.431	.153	-.081
Living conditions	.009	-.037	.056	.402	.688	.022
Living with Adult / Children	.019	-.038	.076	.657	.512	.036
Employment status	-.065	-.124	-.005	-2.145	.033	-.111

3.2 Group differences in emotional states

In this study, we compare the emotional states of participants from high- and low-affected groups. The findings drawn out from the data analysis are given below in Table 2.

Table 2
Showing group-wise differences in emotional states (n = 1136)

Emotional states	High-affected group		Low-affected group		Mann-Whitney test	
	M	SD	M	SD	U	*p*-value
Feeling no longer being able to control the difficulties[1]	2.60	1.056	2.00	.855	67569.500	.000
Feeling anxious because of uncertain future[2]	3.62	1.016	2.90	.839	73401.000	.000
Feeling nervous tension or stress[3]	3.41	.987	1.70	.762	67297.500	.000
Filling energy, inspiration and high working performance[4]	2.39	1.008	3.07	.967	95799.000	.000
State Arousal (STADI)[a, c]	8.49	3.473	6.37	2.003	85105.500	.000
State Worrying (STADI)[a, d]	12.31	3.784	9.03	2.826	70360.500	.000
State Euthymia (STADI)[a, e]	14.45	3.292	11.89	3.221	81304.500	.000
State Dysthymia (STADI)[a, f]	7.95	3.536	5.74	1.586	82802.000	.000
State Anxiety (STADI)[b, g]	20.80	6.607	15.40	4.257	68968.500	.000
State Depression (STADI)[b, h]	22.40	5.847	17.63	4.072	71177.500	.000

[1-4]: 1 = disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = agree.
[a] range 5-20 (5 = the lowest mark vs 20 = the highest mark).
[b] range 10-40 (10 = the lowest mark vs 40 = the highest mark).
[c] consider a raw score of 10 as an increased level (according to the norms of the general sample).
[d] consider a raw score of 13 as an increased level (according to the norms of the general sample).
[e] consider a raw score of 16 as an increased level (according to the norms of the general sample),.
[f] consider a raw score of 9 as an increased level (according to the norms of the general sample),.
[g] consider a raw score of 22 as an increased level of anxiety (according to the norms of the general sample),.
[h] consider a raw score of 23 as an increased level of depression (according to the norms of the general sample).
It is evident from the above table that *p*-values are more than 0.001 for all emotional states, so it is concluded that there are significant group-wise differences over all these states.

3.3 Group differences in participants' concerns

We found statistically significant differences between all participants' concerns, as shown in Table 3.

Table 3
The group differences regarding concerns (n = 1136)

Concerns	High-affected group		Low-affected group		Mann-Whitney test	
	M	SD	M	SD	U	*p*-value
Regular payment of utility bills and other obligatory payments	2.08	.876	1.70	.762	108079.000	.000
Being able to perform your work well enough	2.21	.934	1.71	.812	99164/500	.000
Financial problems and the difficulty of paying your own expenses	2.12	.883	1.72	.758	105592.000	.000
Inability to control the events of your life	2.51	.907	1.80	.806	81665.500	.000
The possibility of contracting coronavirus or dying from it	2.12	.934	1.89	.763	124255.500	.000
The safety of your relatives and family	2.83	.937	2.56	.846	117421.000	.000
Uncertainty of future quarantine terms	2.75	.873	2.14	.811	88733.000	.000
Not being able to take part in social activities and occasions	2.70	.942	2.28	.892	106927.500	.000
Possibility of dismissal, loss of work	2.76	.925	2.29	.911	102023.500	.000
The need to adapt social and professional life increasingly to digital platforms (make online payments, order online, communicate virtually, etc.)	1.82	.892	1.60	.757	122512.000	.000
Future job-related perspectives (salary stability and adequacy, keeping social package, workload, career opportunities, etc.)	2.88	.842	2.40	.874	98621.000	.000
Inability to resolve family conflicts	1.88	.831	1.46	.650	101422.000	.000
State of the national economy	3.33	.707	3.08	.732	114615.500	.000
Restrictions on the rights of free movement, traveling abroad, etc.	2.86	.916	2.47	.900	108462.500	.000
The well-being of your relatives and friends who live far away from you	2.65	.888	2.44	.864	120154.500	.000
The need to repay credits, loans, arrears, etc.	2.20	1.007	1.76	.829	106897.500	.000

1 = disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = agree.

3.4 Group differences in coping activities

The results also showed that there were significant differences between the two groups concerning some kinds of coping activities used to reduce the feelings of discomfort in the coronavirus situation. These results are presented in Table 4.

Table 4
Showing group-wise differences in coping activities (n = 1136)

	High-affected group		Low-affected group		Mann-Whitney test	
	M	SD	M	SD	U	*p*-value
Directly seek the support of family, relatives or friends	1.28	.450	2.61	.862	129404.000	.011

Seek the support of a professional psychotherapistor psychologist	2.75	.863	1.05	.260	130549.000	.000
Strive to follow the recommendations of public authorities and health care institutions	1.16	.499	3.33	.725	131861.000	.035
Use social networks	3.21	.817	2.11	.986	124588.000	.001
Devote oneself to a particular hobby	2.31	1.013	2.83	.867	128530.000	.011
Try to force oneself to think about something else or to distract oneself from thinking about a problem	2.67	.964	1.63	.830	94193,000	,000
Consume more alcohol	2.17	.925	1.40	.688	122655,500	,000
Do physical exercises, sports, go for a walk	1.66	.914	3.17	.870	127300,500	,003

Only statistically significant differences are presented.
1 = disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = agree.

There were no statistically significant differences between such coping activities as playing video games alone, fully dedicating myself to my work/study, communicating by phone or through other remote communication with colleagues, watching entertainment programs and movies, dedicating myself to helping other people, want to logically evaluate and analyze the situation, carefully consider what steps should be taken, and draw up an action plan, take care of relatives, keep a clear agenda, and want to read more.

3.5 Correlations

In Table 5, the significant correlations between the COVID-19 outbreak's influence intensity on psychological well-being and other variables are shown.

Table 5
Correlations between the COVID-19 outbreak's influence intensity on psychological well-being and major variables in the high-affected group (n = 374)

Related variables	COVID-19 outbreak influences intensity of psychological well-being	
	r_s	*p*-value
Impact on the financial status	.160	≤ .01
Sources of information: media (television, radio, print media, online resources, etc.)	–.109	≤ .05
Expectations: financial situation	–.102	≤ .05
Expectations: physical and/or mental health	–.141	≤ .01
Expectations: social status	–.162	≤ .01
Expectations: realization of plans	–.107	≤ .05
Emotional state: no longer being able to control the difficulties	.179	≤ .01
Emotional state: being anxious because of an uncertain future	.145	≤ .01
Emotional state: feeling nervous tension or stress	.216	≤ .01
Emotional state: State Arousal (STADI)	.160	≤ .01
Emotional state: State Worrying (STADI)	.203	≤ .01
Emotional state: State Euthymia (STADI)	.131	≤ .05
Emotional state: State Dysthymia (STADI)	.233	≤ .01
Emotional state: State Anxiety(STADI)	.211	≤ .01
Emotional state: State Depression(STADI)	.210	≤ .01
Concerns: being able to perform your work well enough	.131	≤ .05
Concerns: financial problems and the difficulty of paying your expenses	,177	≤ .01
Concerns: inability to control the events of your life	.111	≤ .05
Concerns: the safety of your relatives and family	.152	≤ .01
Concerns: possibility of dismissal, loss of work	.110	≤ .05

Concerns: restrictions on the rights of free movement, traveling abroad, etc.	.124	≤ .05
Concerns: the need to repay credits, loans, arrears, etc.	.198	≤ .01
Coping activities: communicate by phone or through other remote communication with colleagues	–.110	≤ .05
Coping activities: seek the support of a professional psychotherapist or psychologist	.186	≤ .01

As it can be seen in the above table, the high intensity of the COVID-19 outbreak's influence on psychological well-being has the expected positive correlations with the strong effect of the situation with the coronavirus upon participants' financial circumstances, negative emotional states, concerns, and expectations regarding work, financial complications, health, and social issues. It also positively correlates with such coping activities as "seeking the support of a professional psychotherapist or psychologist", except for the negative relation with the variable "communicate by phone or through other remote communication with colleagues." Important to be noted is the high negative correlation with the trust in media (television, radio, print media, online resources, etc.). The significant correlations between the COVID-19 outbreak's influence intensity on psychological well-being and other variables are presented in Table 6.

Table 6
Correlations between the COVID-19 outbreak's influence intensity on psychological well-being and major variables in the low-affected group (n = 762)

Related variables	COVID-19 outbreak influences intensity of psychological well-being	
	r_s	p-value
Impact on the financial status	.210	≤ .01
Sources of information: social networks, forums, blogs on the Internet	.104	≤ .01
Sources of information: healthcare institutions	–.089	≤ .05
Sources of information: the management of the holding	–.093	≤ .05
Sources of information: I have mainly received information about the coronavirus situation from informal sources (relatives, friends, acquaintances, eyewitnesses, etc.)	.153	≤ .01
Expectations: financial situation	–.115	≤ .01
Expectations: the accustomed way of life	–.130	≤ .01
Expectations: relationships with others	–.084	≤ .05
Expectations: physical and/or mental health	–.136	≤ .01
Expectations: keeping work	–.135	≤ .01
Expectations: social status	–.074	≤ .05
Expectations: realization of plans	–.131	≤ .01
Expectations: economic and social situation in the country	–.104	≤ .01
Emotional state: no longer being able to control the difficulties	.187	≤ .01
Emotional state: being anxious because of an uncertain future	.235	≤ .01
Emotional state: feeling nervous tension or stress	.266	≤ .01
Emotional state: felt energy, inspiration and high working performance	–.126	≤ .01
Emotional state: State Arousal (STADI)	,213	≤ .01
Emotional state: State Worrying (STADI)	,287	≤ .01
Emotional state: State Euthymia (STADI)	,174	≤ .01
Emotional state: State Dysthymia (STADI)	,115	≤ .01
Emotional state: State Anxiety(STADI)	,305	≤ .01
Emotional state: State Depression(STADI)	,179	≤ .01

Concerns: the need for regular payment of utility bills and other obligatory payments	.100	≤ .01
Concerns: being able to perform your work well enough	.183	≤ .01
Concerns: financial problems and the difficulty of paying your expenses	.119	≤ .01
Concerns: inability to control the events of your life	.171	≤ .01
Concerns: the possibility of contracting coronavirus or dying from it	.146	≤ .01
Concerns: the safety of your relatives and family	.154	≤ .01
Concerns: uncertainty of future quarantine terms	.129	≤ .01
Concerns: not being able to take part in social activities and occasions	.074	≤ .05
Concerns: possibility of dismissal, loss of work	.146	≤ .01
Concerns: future job-related perspectives (salary stability and adequacy, keeping social package, workload, career opportunities, etc.)	.162	≤ .01
Concerns: inability to resolve family conflicts	.134	≤ .01
Concerns: state of the national economy	.075	≤ .05
Concerns: restrictions on the rights of free movement, traveling abroad, etc.	.075	≤ .05
Concerns: the well-being of your relatives and friends who live far away from you	.144	≤ .01
Concerns: the need to repay credits, loans, arrears, etc.	.094	≤ .01
Coping activities: directly seek the support of family, relatives, or friends	.108	≤ .01
Coping activities: watch entertainment programs and movies	.077	≤ .05
Coping activities: use social networks	.082	≤ .05
Coping activities: keep a clear agenda	.084	≤ .05
Coping activities: try to force myself to think about something else or to distract myself from thinking about a problem	.192	≤ .01
Coping activities: consume more alcohol	.099	≤ .01
Coping activities: want to read more	.082	≤ .05

Table 6 shows that the low intensity of the COVID-19 outbreak's influence on psychological well-being has a high positive relation with the trust in social networks and informal sources of information (relatives, friends, acquaintances, eyewitnesses, etc.), low level of tension, stress, anxiety, and depression symptoms, low worrying about the occupational, economic, health and social consequences of the pandemic. Cognitive, emotional, social, and physiological coping activities were also positively correlated with the low level of the COVID-19 outbreak's influence on psychological well-being. In addition, the results suggested a negative association between this variable and trust in official sources of information (health care institutions, authorities, etc.), expectations, and feelings of energy, inspiration, and high working performance (Chick et al., 2020).

The discussion of the results should be started with the consideration of the fact, that 374 respondents (32.92%), enrolled in the survey, reported that they experienced a severe influence of the COVID-19 pandemic outbreak on their psychological well-being. Indeed, fears of becoming infected, uncertainty and low predictability of the upcoming situation, reduced social and physical contacts, and financial loss due to interruption or reduction of professional activities – all may cause a feeling of mental discomfort in a person (Wang et al., 2020), but in abovementioned participants, this feeling had reached a level of extreme concerning about potential disease threats. It somehow refers to their self-protection (e.g. avoiding contact with potential contaminants), however, on other hand, long-term experiencing such mental discomfort can be a risk factor that triggers stress responses containing a high level of anxiety and other negative emotions (Lima et al., 2020; Salari et al., 2020). The reliability of the last assumption was confirmed by the high prevalence of negative emotional states among these 374 participants in comparison with the rest of the

respondents. Therefore, we separated them into a high-affected group, while the rest 762 participants formed a low-affected group.

The comparison of *socio-demographic saliences* of the high- and low-affected group showed no differences in participants' gender, age, educational level, marital status, employment, and living conditions. Although there is mixed evidence in the literature for whether participants' demographics are predictors of the psychological impact of COVID-19 (Ferreira et al., 2020), in our study the employment status was identified as a predictive factor for experiencing the severe influence of the COVID-19 epidemic outbreak on psychological well-being.

In this study, there were significant differences in the participants' *emotional states*. A significant proportion of high-affected group representatives felt anxious because of an uncertain future, nervous tension, and stress. They reported low energy, inspiration, and working performance, being no longer able to control the difficulties. Comparisons of the STADI scores indicated significant differences in Arousal, Worrying, Euthymia, and Dysthymia states for the studied groups. Although the intensity of nervousness and worry (state anxiety) and experienced sad mood and a lack of positive mood (state depression) was more severe in representatives of the high-affected group, this did not enhance their state anxiety/depression to a clinically relevant level. Nevertheless, the relatively high level of anxiety and depression, nervous tension, and stress positively relate to the experiencing a severe influence of the pandemic on employees' psychological well-being (Haines et al., 2006; Wang & Luo, 2005). Thus, mental health professionals and clinical psychologists should be attentive to such impending issues and try to help employees to cope with their current negative emotional states (Salari et al., 2020).

The rise of emotional challenges like stress, anxiety, depression, and associated negative feelings along with people's awareness of possible job loss and financial complications increases the role of media in the situation with coronavirus (Sahni & Sharma, 2020). Giving both adequate and inadequate information, media can either amplify negativities or assist people in understanding the problem and direct them to manage their behavior adaptively. According to this, we evaluated the level of participants' *trust in the different sources of information* regarding the coronavirus pandemic. The finding of our study is that a higher level of the negative impact of coronavirus on psychological well-being is associated with low trust in media (television, radio, print media, online resources, etc.), whereas a low level of COVID-19 impact is associated with high trust to social networks and low confidence to official sources of information (health care institutions, authorities, etc.). In the first case, participants may perceive information from media as a stressor that exacerbates their negative mental state, leading them to fear the worst. In the second case, poor information, insufficient clear guidelines about actions to take as well as lack of transparency about the severity of the pandemic induce participants from low-affected groups to search for information about the coronavirus situation in informal sources (relatives, friends, acquaintances, eyewitnesses, etc.), considering them more trustworthy.

In this study, we aimed to examine the employee's *concerns and expectations* as indicators of their basic needs and frustration. In the high-affected group, such concerns and expectations in the situation of coronavirus pandemic are centered mostly on work (being able to perform work well enough, the possibility of dismissal and loss of work), financial problems (difficulty of paying your expenses, credits, loans, arrears, etc.), physical and mental health and social issues (Souri & Hasanirad, 2011; Steptoe et al., 2008). We can suggest that the negative impact of the coronavirus pandemic on employees' psychological well-being refers to the deprivation of basic needs, which have become deficient (Jin & Kim, 2017). Our findings supported the significant association between these two factors. It was also noteworthy that all employees from this group showed concern for their inability to initiate behavior volitionally due to the restrictions on their rights (lack of autonomy), to control their life events, achieve goals and implement plans (lack of competence). The frustration of the need for autonomy and competence is essential: if employees feel being not autonomous and competent during stressful encounters, they would be more likely to appraise the events as threats (potential harm) or damages (actual harm) that can undermine their well-being (Ryan, 1995; Ryan, Deci, 2017). The last was confirmed by the results of correlation analysis.

Our results indicated the differences in both groups in *coping activities* related to the cognitive, emotional, and behavioral efforts to manage specific external and/or internal demands. Existing studies primarily examined coping strategies along the approach-avoidance dimension (Herman-Stahl et al., 1995), but this study focused on how cognitive, emotional, and behavioral domains of coping activities are associated with low and high levels of experiencing COVID-19 impact. In our research, participants who stated the low

subjective impact of the situation with coronavirus demonstrated a wider range of different coping activities than those, who reported a high level of such impact. The low intensity of influence of COVID-19-related stressors on participants' psychological well-being was positively associated with emotional and cognitive processing that helped to explore meanings, accept or change interpretation about the negative life events, and see them as opportunities to learn new things and strengthen relationships (Kistan et al., 2022). The coping repertoire of participants with negative psychological impacts of COVID-19 was poor: they only seek the support of a professional psychotherapist or psychologist. As suggested by previous studies (Khosravi, 2020), people who perceive negative events as threatening may dwell on their coping deficiencies and magnify the severity of possible threats. That may hinder some coping processes that help reduce the feeling of discomfort in the coronavirus situation.

The results of the research give opportunities to propose a *model for improving employees' psychological well-being,* which comprises a set of psychological, organizational, and informational components (Fig. 1).

To purposefully design interventions, we suggest that the *psychological component* should incorporate key elements of A. Antonovsky's salutogenic model (Antonovsky, 1979, 1987, 1996), R. S. Lazarus' and S. Folkman's stress and coping model (Lazarus & Folkman, 1984), and E. L. Deci's and R. M. Ryan's self-determination theory (Deci & Ryan, 1985, 2002; Ryan, 1995).

According to Antonovsky's *salutogenic model* (Antonovsky, 1979, 1987) psychological well-being and health promotion should focus on:

- the health ease/dis-ease continuum (instead of focusing on disease as dichotomous outcomes, ill / not ill);
- the entire person (rather than the disease), including his / her physical, mental, and social aspects;
- mobilizing cultural, psychosocial, and constitutional generalized resistance resources of a person which facilitate successful coping with the inherent stressors of human existence;
- strengthening the sense of coherence – a generalized orientation toward the world which perceives it, on a continuum, as comprehensible, manageable, and meaningful.

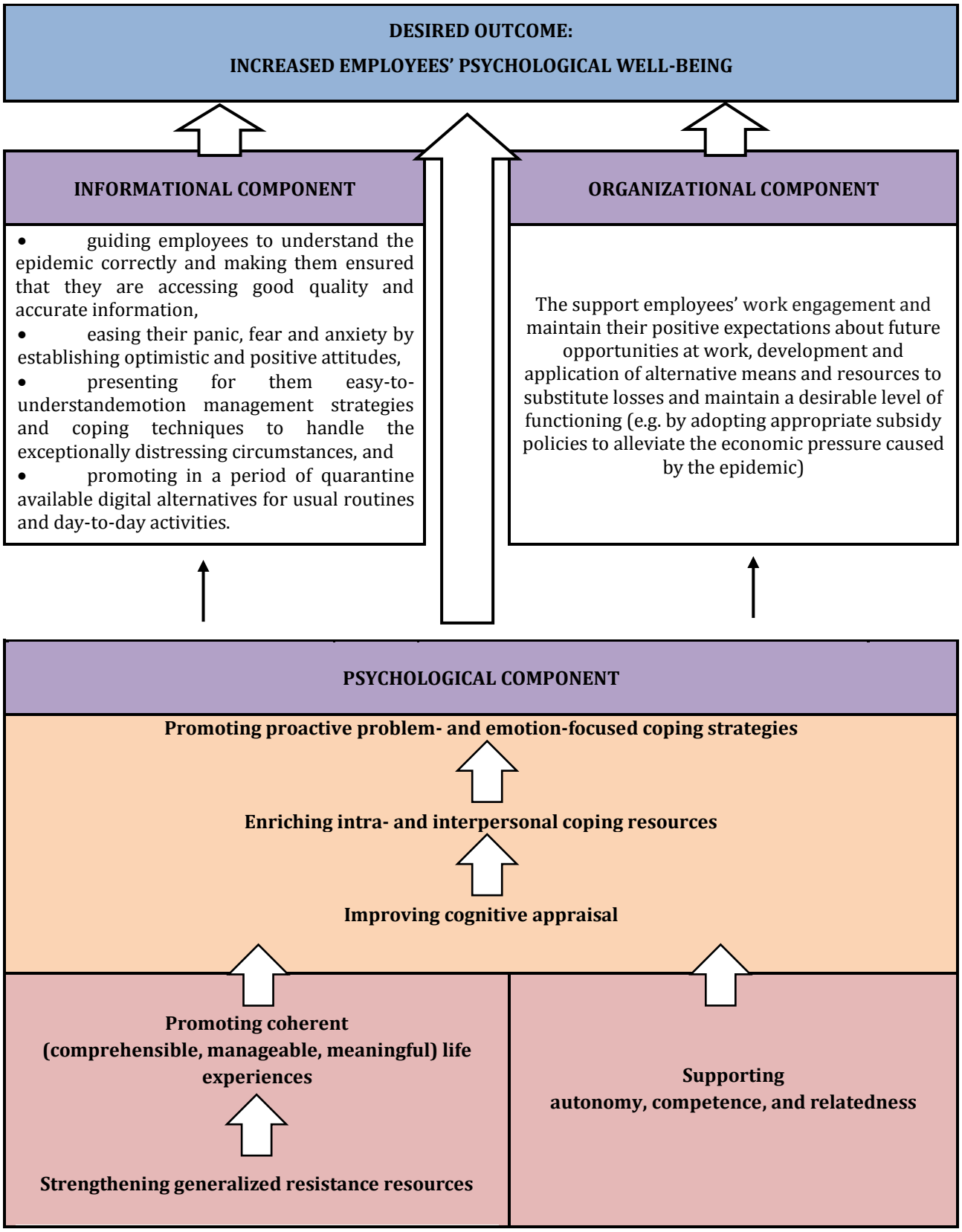

Figure 1. A model of improving employees' psychological well-being

It could be shaped by three kinds of life experiences: consistency, underload-overload balance, and participation in socially valued decision-making.

For an intervention model, the abovementioned implies that the intervention process itself, and the changes induced by the intervention should aim for strengthening resources, promoting coherent (i.e. comprehensible, manageable, meaningful) life experiences, and positive psychological health outcomes. Specifically, interventions should be designed to enable participants to create shared life visions and to be part of socially valued decision making (meaningfulness); develop shared mental models about the change process and desired outcomes (comprehensibility); enable participants to identify life demands (e.g. stressors, challenges, etc.) and generalized resistance resources that need to be balanced (manageability) as well as life opportunities that stimulate health development and well-being (Antonovsky, 1996).

The *stress and coping model* (Lazarus & Folkman, 1984), provides an appropriate framework to understand growth after negative life events. It postulates that when individuals face a stressful event, they will cognitively appraise the potential demands of the stressors, identify the available coping resources and then decide what strategies to use for coping with the stressors. Cognitive appraisal is an evaluative process that reflects a person's subjective interpretation of an event (Lazarus & Folkman, 1984). Individuals may evaluate a negative life event differently (as a threat, harm, or a challenge) based on their perception of situational demands of the stressors concerning their coping resources (Joseph, Murphy, & Regel, 2012).

Coping resources are relatively stable characteristics of a person's disposition and the environment and refer to what is available to the person that can help with coping (Hobfoll & Lilly, 1993). Coping resources can be intrapersonal (e.g., the intrapsychic processes that a person brings to the coping task) and interpersonal (e.g., the people and related social structures from whom the person can receive social support). Coping strategies are defined as the constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding people's resources (Yeung et al., 2016). Coping has two main functions: management of the human-environment transactions that are the source of stress (problem-focused coping) and regulation of the emotions, evoked by the stress (emotion-focused coping). Preferences for problem or emotion-focused engagement/disengagement is a function of the appraisal process: events that are assessed as providing fewer possibilities for a favorable change will more probably provoke emotion-focused coping, whereas events, assessed as giving options for improvement through personal efforts, will probably predict problem-focused coping responses (Stanton et al., 2000). Applying these statements to the practice would mean that the psychological intervention and assistance are aimed at:

- helping participants to change their interpretation of the negative life events by stimulating conscious processing of the trauma-related information and emotional states, fostering positive reframing and positive reappraisal as well as facilitating the meaning-making process;
- maintaining an adequate level of participants' interpersonal (quality of social network) and intrapersonal (self-efficacy and perceived control over future outcomes) coping recourses; and
- supporting and broadening both cognitive and emotional domains of proactive coping strategies, used to diminish distress.

Because of the results of our study, including impaired mental well-being, increased level of anxiety and depression symptoms, the narrowed repertoire of coping skills, promoting such proactive emotional coping skills to the group severely affected by the pandemic could also reduce the intensity, frequency, and duration of negative emotional states regarding COVID-19 and modify emotional reactions positively.

According to the *self-determination theory* (Deci & Ryan, 2002; Ryan, 1995), the satisfaction of three fundamental human psychological needs (needs for autonomy, competence, and relatedness) is important in affecting well-being. The need for autonomy refers to individuals' need for feeling volitional and responsible for the initiation of their behavior; the need for competence refers to individuals' need for feeling able to achieve their goals and motivated behavior, and the need for relatedness refers to the need for feeling connected to and accepted by others in social milieus. If people feel autonomous, competent, and related in their social context during their stressful encounters, they would be more likely to appraise the events as challenges that can be overcome, instead of threats or damages that can undermine well-being. Thus, the

support of participants' autonomy, competence, and relatedness is considered to be important in contributing to their well-being (Taylor & Stanton, 2007).
As it has been reported, that media coverage regarding the spread of the virus had both positive and negative impacts on employees' well-being, the informational support through multiple channels (television, Internet, telephone, etc.) is considered to be exclusively important. Such *informational component* of the intervention model should be aimed at:

- guiding employees to understand the epidemic correctly and making them ensured that they are accessing good quality and accurate information;
- easing their panic, fear, and anxiety by establishing optimistic attitudes;
- presenting for them easy-to-understand emotion management strategies and coping techniques to handle the exceptionally distressing circumstances; and
- promoting in a period of quarantine available digital alternatives for usual routines and day-to-day activities (Boyko et al., 2020).

The *organizational component* of the model refers to the recommendations and suggestions on the organizational level that are to be implemented by officials and managers. According to the fact, that in our study the employment status was identified as a predictive factor for experiencing the severe influence of the COVID-19 epidemic outbreak on psychological well-being, it seems to be expedient to preserve employees' work engagement and maintain their positive expectations about future opportunities at work. The support of employees in accomplishing job tasks, providing flexible work schedules, development and application of alternative means and resources to substitute losses and maintain a desirable level of functioning (e.g. by adopting appropriate subsidy policies to alleviate the economic pressure caused by the epidemic) are expected to be positively associated with well-being (Adkins, 1999).

In addition, along with further strengthening and improving accessibility to the medical service system, the centers for psychological assistance and counseling (including call- and online centers for psychological first aid) should be established. We expect that this model, being practically implemented, can result in better ways for employees to cope with stress, anxiety, and depression, ensuring a better adaptation to the social milieu requirements and inner transformations in the situation with coronavirus. Anyway, the empirical development and testing of such intervention theory and strategies are required to clarify how they lead to changes in employees' mental well-being.

As to *shortcomings and limitations of the present empirical investigation*, it has to be noted that, firstly, we split the overall cohort of participants into two groups using a single-item scale to assess the level of COVID-19 impact on employees' psychological well-being, which could have reduced the validity of measured psychological constructs. Although single-item scales are efficient and can yield comparable psychometric properties, future research should nonetheless reproduce this study using multi-item measures, including standardized questionnaires and tests. Secondly, the results of this study may underestimate the psychological impact of the COVID-19 pandemic because the data were collected only at a single time point (during the first stage of quarantine requirements lifting). Therefore, the obtained results may not reflect the effects of long-term exposure to the psychosocial factors related to the pandemic in different regions. Hence, future research should implement longitudinal designs to track the psychological effects of the pandemic crisis. Thirdly, since the investigation was carried out by order of the MAN Company we mainly focused on descriptive research, which, according to U. Sekaran (2003), is the best tool to analyze relevant aspects of the phenomena of interest from an organizational perspective, such as "learn about and describe the characteristics of a group of employees" (Sekaran, 2003). Notwithstanding these limitations, this study reports essential data regarding the psychological effects of COVID-19 and provides health specialists with the results that could assist them in fighting this global health crisis.

4 Conclusion

COVID-19 outbreak disrupts the psychosocial life of the public, especially working people, creating in them an impending sense of fear, stress, frustration, anxiety, and other psychological disorders. This study has been conducted for understanding the psychosocial effect of COVID-19 on automotive industry workers.

During the early phase of the COVID-19 pandemic, 374 respondents (32.92%) reported that they experienced the severe influence of the COVID-19 epidemic outbreak on their well-being, whereas 762 employees (67.08%) reported that their mental health was not affected by the situation with coronavirus at all. The respondents of the first group have less differentiated expectations about the pandemic situation shortly and its impact on their lives; they tend to experience asthenic emotions, anxiety, and depressive states, overcoming them by avoidance and social distraction. The respondents of the second group have more differentiated expectations about the peculiarities of the pandemic situation, tend to analyze the circumstances and develop a specific action plan, are not prone to anxiety and depression; use problem-oriented ways to overcome stress, which determines, in general, their high level of psychological well-being.

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Biography of Authors

Titov Ivan
He received Ph.D. in Psychology, majoring in Developmental and Pedagogical Psychology. For 20 years, he has worked as a classroom instructor and Associated Professor at Poltava V. G. Korolenko National Pedagogical University. His research interests include neuroscience, psychodiagnostic, and psychology of worldview.
orcid.org/0000-0002-5529-1568
Email: titovpsy@gmail.com

Sedykh Kira
She received a doctorate in Psychology from G.S. Kostiuk Institute of Psychology at the Academy of Pedagogical Science of Ukraine. She is a Professor and Head of the Psychology Department of Poltava V. G. Korolenko National Pedagogical University. The main topic of her scientific work is Psychotherapy,
orcid.org/0000-0003-3528-7569
Email: sedykhkira@gmail.com

Titova Tetiana
She received Ph.D. in Psychology from the Central Institute of Post Diploma Pedagogical Education (Kyiv, Ukraine). She is an Associate Professor at the Psychology Department of Poltava V. G. Korolenko National Pedagogical University. Her scientific interests are focused on the area of experimental psychology and training technologies.
orcid.org/0000-0002-0276-4050
Email: titovapsy@gmail.com

Myroshnyk Olena – She has a Ph.D. in Developmental and Pedagogical Psychology. She is currently an Associate Professor at the Psychology Department of Poltava V. G. Korolenko National Pedagogical University. Her research interests span the areas of General and Social Psychology.
orcid.org/0000-0001-5956-1185
Email: elenamirosha@ukr.net

Salvatore Giacomuzzi
He graduated from the University of Innsbruck(Austria). He holds a Ph.D. in Physics and Psychology. He is a distinguished professor in Psychology and Forensics, orcid.org/0000-0001-8059-0474
Email: salvatore.giacomuzzi@gmx.at

Markus Ertl
He is a clinical and health psychologist and biostatistician. He works as an expert in the Psychological Service of the child and youth welfare in addition to teaching at various universities and educational institutions. The main topics of his scientific work are quality of life, dependency disorders, child welfare and parenting skills, orcid.org/0000-0002-6408-5045
Email: ertl.psychologe@gmail.com

Martin Rabe
He graduated and obtained doctorate degree at the University of Innsbruck (Austria). He is a Chief Personnel Officer at MAN SE (Munich, Germany). His research interests span the areas of Organizational Psychology and HR processes.
Email: Martin.Rabw@man.eu