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## SYSTEMATIC REVIEW

# Coping Strategies During the COVID-19 Pandemic and Self-Determination: A Review of Russian Studies

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**Background.** The COVID-19 pandemic is a multifaceted stressor. Its impact suggests long-term psychological effects. Self-determination promotes flexibility of goals and actions and helps to overcome the difficulties caused by stress.

**Objective.** To analyze coping strategies during the COVID-19 pandemic presented in Russian scientific studies (RQ1), and their relationship with self-determination (RQ2).

**Design.** Relevant studies (2020–2022) were selected from the Russian citation index (RSCI) database. Strict selection criteria were used. Twenty-four articles were selected for the final review. For dynamic analysis, four stages of the pandemic were identified.

**Results.** Prevailing coping strategies have changed over time. At the beginning of the pandemic, respondents used familiar coping mechanisms. Six months later, active coping strategies were more often used, but deprivation and avoidance strategies increased. A year later, there was an increase in denial and avoidance strategies. Using non-constructive coping strategies may indicate that, due to the long course of the pandemic, meeting basic psychological needs became increasingly frustrated, leading to helplessness, alienation, and lack of control. Later dynamics reflect the growth of effective coping strategies and confirm that when basic needs are blocked for a long time, people seek alternative ways to satisfy them.

**Conclusion.** The dynamics of coping strategies during the pandemic reflected their close relationship with basic psychological needs, as described in the theory of self-determination. The results confirmed the importance of self-determination as a dispositional variable in predicting coping mechanisms.

**Keywords:**  
COVID-19,  
pandemic, stress,  
coping strategies,  
self-determination

## **Introduction**

In psychology, a pandemic is viewed as a multi-aspect stress factor, with hard-to-predict and far-reaching consequences for mental and physical health. Specialists evaluate the current situation around the COVID-19 pandemic as psycho-traumatizing, with such distinct characteristics as unpredictability and uncertainty, leading to elevated social and psychological risks (Bojko et al., 2020; Epishin et al., 2020; Grishina & Lupulyak, 2020; Malyh & Sitnikova, 2021; Pervushina & Shabalin, 2020).

A meta-analysis of studies published in 2020–2021 in the WSCC database showed that at the beginning of the pandemic in different countries, people were confused at the sudden onset of stress, unprecedented social restrictions, loss of a sense of security and stability (Kostromina et al., 2022). Many studies have described primarily emotional problems: symptoms of depression (27.5%), anxiety (26.9%), distress (26.5%) (Li, 2020; Sani et al., 2020), fear of COVID-19 infection and probability of death (Pakpour & Griffiths, 2020; Rasskazova & Tkhostov, 2021; Ravens-Sieberer et al., 2021), and such social problems as concern for the health of loved ones, uncertainty about fulfilling commitments (e.g., school, finances, work), difficulty adapting to remote work (Epishin et al., 2020; Kozhina & Vinokurov, 2020; Poluekhtova et al., 2020; Toscano et al., 2022), financial uncertainty (Cao et al., 2020; Islam et al., 2020; Khan et al., 2020; Sundarassen et al., 2020).

According to other studies, social restriction resulted in the following experiences: deprivation, dissatisfaction of needs, and low tolerance for uncertainty (Amin, 2020; Ausín et al., 2020; Brooks et al., 2020; Moore et al., 2020; Satici et al., 2020; Sood, 2020). A recent meta-analysis that included 123 systematic reviews of the prevalence of depression, anxiety, and posttraumatic stress disorder (PTSD) during the pandemic in different countries (December 2019 to August 2022; Russia was not included) showed heterogeneous data across populations. A slight but consistent deterioration of mental health was found at the beginning of the pandemic and during social restrictions in the general population and in people with chronic somatic diseases. Symptoms of depression increased during periods of social restriction, while signs of anxiety did not (Witteveen et al., 2023).

Many studies have focused on ways of coping with the pandemic. For example, a study of high-performance athletes during self-isolation and periods of uncertainty about competitions found that the athletes' use of cognitive restructuring and emotional calming was significantly negatively correlated with negative emotional states such as depression, stress, anxiety, and fatigue. The reason may be that high-performing professional athletes are more experienced in coping with competition-related anxiety (Leguizamo et al., 2021). Other factors have had an important role in the occurrence of negative emotional states, including gender, type of sport, qualifications, nationality, and personality traits. The role of adaptive and maladaptive perfectionism in relation to dominant mental states during social isolation and the choice of preferred coping strategies has been shown (Iancheva, et al., 2020). A meta-review of articles with samples of healthcare workers and employees of other professions found that levels of psychological distress (stress or emotional burnout) differ in different countries. An important factor in reducing stress to a minimum was job involvement, such as helping employees to understand their contribution to organizational

goals and their own personal growth (Adanaqué-Bravo et al., 2023). In another meta-survey, individual and group psychological strategies, family support, and professional training were the most frequently cited coping strategies for healthcare workers (Chutiyami et al., 2022).

In countries with different cultures and economic structures, people are simultaneously faced with uncertainty, unpredictability, novelty, the impossibility of realizing their aspirations, and everyday restrictions. Studies show that at the heart of social disadvantage is a blockage of fundamental psychological needs. As a stressful event, the pandemic has elicited a specific response: a set of actions to overcome conflict, ensure safety, and maintain a sense of “normality” in life.

Relying on Western studies (Kostromina et al., 2021; Ntoumanis et al., 2009), we suggest that self-determination has an important role in overcoming the negative psychological consequences of the pandemic, acting as an important personal resource for overcoming stress and reducing its negative impact (Bakker et al., 2021; Ntoumanis et al., 2009). Self-determination is a set of characteristics that provide free and autonomous regulation of one’s life. According to the self-determination theory (SDT) of E. Deci and R. Ryan (Ryan & Deci, 2000), the need for autonomy, competence, and relatedness are critical variables in behavioral regulation and psychological well-being. Self-determination requires a deep level of self-consciousness and makes for flexible aims and actions under stress (Amiot et al., 2008). Strategies of self-determination, such as helping those in need, searching for resources, taking initiative, and clear and transparent planning, help to overcome difficulties in the professional sphere caused by the COVID-19 pandemic (Klimochkina et al., 2022; Zinchenko et al., 2020; Zinovyeva et al., 2021).

This study conducted a meta-analysis of Russian studies during the pandemic to identify the main strategies for coping with the psychological threats of the pandemic and to analyze them in terms of self-determination and the realization of needs.

The aim of the study was to analyze strategies of coping with the experiences caused by the COVID-19 pandemic (2020–2022) as presented in Russian-language journals. We studied ways of coping with specific stressful experiences that emerged in the population during the pandemic and their dynamics over time.

## **Methods**

A search of full-text publications in the RSCI database (Russian citation index) was performed on July 11, 2022. The search was limited to peer-reviewed articles of all types, published from January 1, 2020 to June 30, 2022.

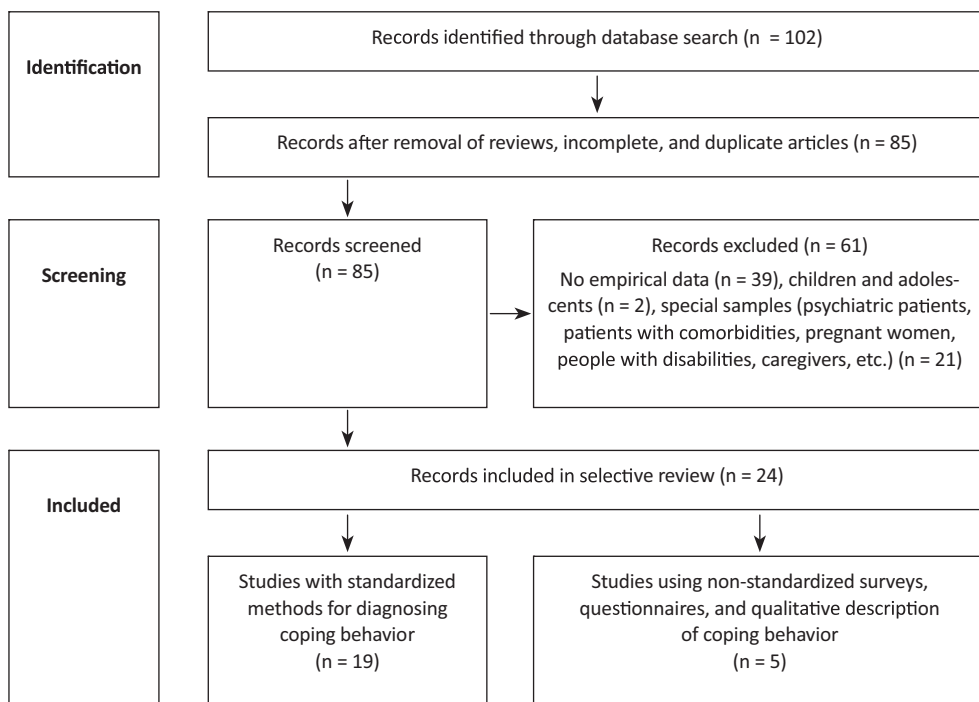
In order to identify all possible publications relevant to the research topic, the query was for “All fields” by two groups of keywords, with the AND operator between them. The following steps represented the search algorithm:

- 1) First search line: All fields — Coping OR coping strategies OR coping behavior;
- 2) Second search line: All fields — Covid OR coronavirus infection OR coronavirus.

The exclusion criteria were: theoretical reviews, abstracts without study descriptions, articles without empirical data, without a focus on coping strategies, or those that described unique samples.

A total of 102 results were obtained. Theoretical reviews (10 articles), abstracts without study descriptions (5 articles), and duplicate articles (1 article) were then excluded, leaving 85 articles for further analysis. All of these articles were reviewed for relevance to the review's aim. Two reviewers checked them for inclusion or exclusion from the primary analysis according to the defined criteria.

Furthermore, 61 articles that did not contain empirical data, did not focus on psychological coping, or described unique samples (pregnant women, people with disabilities) or a specific age group (children or the elderly) were excluded. The final sample included 24 publications whose full texts were suitable for the review analysis and were comprehensively studied. The selection process of articles is shown in the PRISMA flow chart in *Figure 1*.



*Figure 1.* PRISMA flowchart of systematic literature review process

### ***General Characteristics of the Selected Publications***

Studies conducted during the pandemic's two and a half years (2020, 2021, and the first half of 2022) were analyzed. Above all, we were interested in the variety of ways in which people overcome these specific experiences and how these change over time.

For analysis, the studies were divided according to the predominant methods for studying coping behavior (see *Table 1*):

- 1) Standardized methods for diagnosing coping strategies according to the theoretical framework;
- 2) Non-standardized methods, including surveys, questionnaires, and qualitative descriptions of coping behavior. Methods that had not been tested in Russia were included and interpreted as qualitative.

**Table 1***Distribution of articles selected for review by type of study methods*

Type of Study	Sample Size (N)	Time of the survey	Relevant Studies
Studies with standardized methods for diagnosing coping behavior			
Brief COPE instrument (Carver, 1997), including national versions and selected subscales	558	Spring 2020	Kryukova, 2020
	310	Spring 2020	Opekina, 2020
	232	Spring 2020	Bojko, 2020
	70	Spring 2020	Sergeeva, 2021
	1140	Spring 2021	Shpakov, 2021
Ways of Coping Questionnaire (Lazarus & Folkman, 1988), including national versions and selected subscales	218	Spring 2020	Kislyakov, 2020
	248	Spring 2020	Kuftyak, 2020
	119	Spring 2020	Shishkov, 2021
	629	Spring 2020	Korotkova, 2021
	169	Spring 2020	Pogonysheva, 2022
	64	Spring 2020	Kora, 2022
	736	Fall 2020	Kameristaya, 2021
	186	Spring 2021	Kuvaeva, 2021
	70	Fall 2021	Ochirova, 2022
	67	Fall 2021	Mamina, 2022
Other standardized methods for diagnosing coping strategies	55	Spring 2020	Yarmysh, 2020
	102	Fall 2020	Kozlova, 2020
	209	Fall 2020	Kovaleva, 2021
Studies using non-standardized methods, questionnaires, and qualitative description of coping behavior			
Foreign methods that are currently in process of approbation in Russia	248	Spring 2020	Govorkova, 2020
	279	Spring 2020	Prilutskaya, 2020
Studies based primarily on qualitative research methods	306	Spring 2020	Frolova, 2021
	14	Spring 2020	Petrakova, 2021
	136	Spring 2020	Volodina, 2022

The results were rated according to the time of the survey and corresponded to one of the periods described in *Table 2*.

The largest number of Russian studies concerned the beginning of the pandemic; after that, there has been an apparent decrease in studies of coping strategies during the pandemic. This may be due to the gradual adaptation of society to the pandemic, a change in the main topics of research interest towards private issues not involving coping mechanisms, and, ultimately, a decline in interest in the topic of the pandemic as a whole.

**Table 2**

*Number of articles selected for review depending on the time period of the survey*

Time period	Total number of surveys in this period	Total sample size
Spring 2020	16	3486
Fall 2020	3	1047
Spring 2021	2	1326
Fall 2021	2	137

Researchers' data on coping behavior during the COVID-19 pandemic were analyzed in chronological order.

## Results

### *Coping Strategies at the Beginning of the Pandemic (Spring 2020)*

This period saw the largest number of Russian-language publications. We grouped them according to the methodological apparatus used by the authors. The studies using the following methods are presented below: Lazarus' Ways of Coping Questionnaire (WCQ; these studies were the most numerous), the COPE methodology, the Proactive Coping Inventory, the Coping Inventory for Stressful Situations, and the Coping Flexibility Scale. Finally, studies using non-standardized methods are presented.

### *Analysis of Data on Coping Strategies Obtained with the WCQ*

Among the standardized methods, the Ways of Coping Questionnaire in various Russian-language adaptations was the most frequently used, covering a total sample of 1,447 people.

A uniform quantitative analysis of the results of studies using the WCQ is rather complicated, since different data presentation formats were used. Some authors give the percentages of occurrence of each type of coping, while others present only the most popular coping strategies or average data for each of the coping mechanisms. Thus, each study using this questionnaire became practically unique in content. Therefore, the description of results below further summarizes and analyzes the



prevalence of different coping strategies, coping mechanisms, and associated factors.

Most of the studies noted that in the first months of the pandemic, some of the most frequently encountered coping strategies were avoidance (Kislyakov, 2020; Kora, 2022; Korotkova et al., 2021; Pogonysheva & Protasova, 2022) and distancing (Kislyakov, 2020; Kora, 2022; Pogonysheva & Protasova, 2022). Thus, the primary reaction to stress was accompanied mainly by manifestations opposite to self-determination. But several works (Kislyakov, 2020; Shishkov et al., 2021) also indicated a high frequency of such coping strategies as “decision planning” and “search for social support” (Kislyakov, 2020; Korotkova et al., 2021; Pogonysheva & Protasova, 2022; Shishkov et al., 2021). These results were obtained in studies where the predominant sample was younger people (students and young adults). In general, it can be noted that multidirectional results may indicate a variety and mixed repertoire of coping strategies in the initial stage of the pandemic.

Several papers described the interrelation of the preferred coping strategies with life features before the pandemic. For example, Shishkov et al. (2021) found that people living alone most often used the strategies of “planning” (35.3%), “seeking social support” (33.6%), and “accepting responsibility” (27.7%), which are characteristic of self-determination. The authors attributed this to the fact that those living alone were used to planning their own time, and the onset of the pandemic had less of an impact on their daily routines and ability to plan their time. Respondents demonstrated similar results in objective isolation (associated with living alone, away from loved ones) or subjective isolation (related to the goal of shielding oneself or others from contact).

A relationship between stress level and preferred coping strategies was also found (Kuftyak & Bekhter, 2020). Participants with a low stress level more frequently chose proactive coping ( $p = 0.0001$ ), and those with a high stress level searched for instrumental support ( $p = 0.04$ ). Thus, the level of stress is associated with the ability to implement proactive coping strategies.

### ***Analysis of Data on Coping Strategies Obtained with COPE***

Using the COPE questionnaire (total sample of 1,170 people) showed great similarity of the results obtained by different authors (Bojko et al., 2020; Kryukova et al., 2020; Opekina & Shipova, 2020; Sergeeva & Kubekova, 2021). Generally, the prevalence of such strategies as acceptance, positive overestimation, emotional support, and active coping was noted. The most rarely encountered strategies were denial, avoidance, and substance use. It should be noted that the data on many coping strategies is close to that empirically deduced in the pre-pandemic norms. Differences are observed only for some nonconstructive strategies: denial, substance use, and self-blaming (their normative index is higher than that obtained in the present research).

Comparison of students who had and did not have COVID-19 (Shpakov et al., 2021) showed significant differences in their use of individual coping strategies: students who did not have COVID-19 more often used acceptance strategies ( $5.8 \pm 1.44$  and  $5.5 \pm 1.44$ , respectively,  $p = 0.01$ ) and planning strategy ( $6.5 \pm 1.33$  and  $6.2 \pm 1.36$ ,

respectively,  $p = 0.05$ ). The strategy of turning to religion was more common among students who recovered from Covid ( $3.7 \pm 1.81$  among healthy students,  $4.0 \pm 1.91$  among recovered patients,  $p = 0.05$ ). *Analysis of Data on Coping Strategies Obtained with Other Standardized Methods*

In addition to the preferred WCQ and COPE methods, researchers used other questionnaires to assess coping behavior. The Proactive Coping Inventory questionnaire (Greenglas et al., 1999), showed (Kufiyak & Bekhter, 2020) that the preferred types of proactive coping were:

- Proactive coping (a person's attitude toward a problematic situation as a source of positive experience) (17.2%);
- Reflexive coping (representation of possible behavioral options, cognitive evaluation of resources, and prediction of outcomes) (14.3%); and
- Preventive coping (ability to anticipate difficult situations by relying on experience) (13.75%).

The least preferred coping method was strategic planning (the ability to plan future actions with differentiation of individual tasks) (7.55%). The authors found that coping strategies are related to the level of stress and the reaction to the stressful event. Thus, respondents with a low level of stress significantly more often used methods of proactive coping (18.3% in the group with a low level of stress, 16.1% in the group with a high level of stress,  $p = 0.0001$ ). Respondents with high levels of stress significantly more often used instrumental support (9.6% in the low-stress group, 10.6% in the high-stress group,  $p = 0.04$ ). The authors note that prolonged mental strain caused by self-isolation reduces a person's ability to assess their resources and positively evaluate a stressful situation.

One of the studies (Yarmysh, 2020) provides data obtained using the Coping Inventory for Stressful Situations questionnaire (Endler & Parker, 1990). It showed that the predominant coping mechanisms in the COVID-19 pandemic are relatively adaptive ones. Cognitive coping mechanisms are the most popular (72%), and emotional coping mechanisms are the least popular (21%). The authors note that the identified coping mechanisms help to cope with difficulties, but only in situations with little stress and that are not very significant for the individual.

Another study (Govorkova et al., 2020) used the Coping Flexibility Scale (Gembeck & Skinner, 2018), which allows for assessing the degree of flexibility and stability of the coping system. The study showed that the frequency of different types of coping flexibility does not differ from the normal distribution. At the same time, the authors note that the flexible type of coping reduces stress level.

### ***Analysis of Data on Coping Strategies Obtained with Non-Standardized Methods***

Four studies used qualitative methods, including authors' questionnaires (Frolova & Vysokaya, 2021; Prilutskaya et al., 2020; Volodina et al., 2022) and semi-structured interviews (Petraikova et al., 2021), with a total of 735 people.

The authors distinguish cognitive, emotional, and behavioral ways of coping with stress in a situation of self-isolation in connection with the pandemic. Cognitive ways

include a search for new ideas, the ability to find meaning and positive aspects in the current situation, the actualization of their creative skills, the reflection of experiences and personal qualities, and the desire to understand other people (Frolova & Vysockaya, 2021; Petrakova et al., 2021), as well as self-organization and the selection of new priorities (Volodina et al., 2022). Emotional ways of coping with forced self-isolation are represented by the generation of new positively colored emotions in unfamiliar conditions, joy from the opportunity to do something that has long been planned, self-support of one's sense of humor, empathy with other people, and a feeling of unity with the whole world (Frolova & Vysockaya, 2021). Behavioral ways of coping include communication with friends, family, and classmates (Petrakova et al., 2021; Volodina et al., 2022), sports and hobbies (Petrakova et al., 2021; Prilutskaya et al., 2020), video games, self-education, and a focus on professional (clinical) activities (Prilutskaya et al., 2020).

It has been shown that girls, in comparison with boys, have a more pronounced resource of communication; however, such resources as self-organization, volitional qualities, and self-motivation are similar (Volodina et al., 2022).

### ***Coping Strategies Six Months After the Start of the Pandemic (Fall 2020)***

There were considerably fewer studies conducted in the fall of 2020. We found three studies devoted to the chosen topic. The focus of such research had shifted from direct study of prevailing coping strategies to their connection with the level of stress and the intensity of the personal situation.

It was shown that six months after the beginning of the epidemic, young people more often used active coping strategies (reflexive and preventive coping, planning). Young people more often used strategies of seeking support, positive reassessment, confrontation, self-blaming, fantasizing, distancing, and avoidance. In adults, future orientation, predicting the situation, and planning actions based on available resources prevailed (Kameristaya, 2021).

Based on the data from the Coping Behavior in Stressful Situations questionnaire, it was shown that the most frequently used coping strategies were problem-solving, avoidance, and focusing on emotions (Kovaleva et al., 2021; Kozlova & Kostrigina, 2020). However, the authors note that these data hardly differ from normative parameters, which allows us to conclude that at the time of the survey, most of the respondents were in the phase of resistance to the stressful situation.

The study, which included four consecutive measurements from September to December 2020 showed that the number of respondents with a high degree of coping strategies focused on emotion and avoidance increased simultaneously with an increase in the use of distraction and social distraction strategies. According to the authors, this may be a sign of depletion of the individual's adaptive resources (Kovaleva et al., 2021).

Finally, it was suggested that the preferred type of proactive coping may be related to the subjectively perceived level of tension in the situation (Kameristaya, 2021). This allows us to assume a growth of self-determination in prolonged stress during COVID-19.

### ***Coping Strategies One Year After the Start of the Pandemic (Spring 2020)***

We found only two studies analyzing preferred coping strategies a year after the pandemic's beginning (Kuvaeva & Strel'nikova, 2021; Shpakov et al., 2021), indicating a steady decline in interest in the topic.

In the first study, "Coping Behavior in Stress Situations" by N.S. Endler and J.A. Parker, the questionnaire of coping methods by R. Lazarus and S. Folkman was used (Kuvaeva & Strel'nikova, 2021). It was shown that while coping with the pandemic, respondents most frequently used positive reassessment strategies ( $11.33 \pm 3.89$ ), self-control ( $9.05 \pm 3.42$ ), problem-solving planning ( $8.65 \pm 3.04$ ), and distancing ( $8.23 \pm 2.83$ ), which corresponded to the respondents' stable coping styles. Furthermore, the authors concluded that respondents were more likely to turn to problem-solving-oriented coping ( $57.33 \pm 10.00$ ) during this period in stressful situations. On the other hand, respondents much less frequently used emotionally oriented ( $44.41 \pm 12.69$ ) and avoidant ( $41.94 \pm 11.05$ ) coping types. The persistent avoidance style was primarily manifested in visiting stores and restaurants, a tendency to sleep for a long time, overeating, watching TV, etc.

Another study was conducted by a team of authors using the COPE technique on an impressive sample of 1,140 people (Shpakov et al., 2021). It was shown that the preferred coping strategies were planning, active coping, positive reformulation, and personal growth, acceptance, seeking instrumental social support. The data presented by the authors allowed us to compare the scores on this methodology in 2020 and 2021 and to identify differences, which will be analyzed below.

Comparative studies about people's experiences during the pandemic became possible during this period. Thus, a comparison of preferred coping strategies among respondents infected and non-infected by COVID-19 was conducted (Kuvaeva & Strel'nikova, 2021). It was shown that the respondents who had contracted the coronavirus infection demonstrated increased social activity: they tried to be out in public, visited, spent time with a friend or loved one, and asked for advice from a significant other. According to the authors, the desire for social contact in stressful situations as a stable and habitual way to relieve stress may have contributed to COVID-19 infection and the spread of the disease. However, the study of interrelations between stable coping styles and strategies revealed a more complex structure in the group of respondents who had Covid-19.. Stress avoidance is associated with a more active search for social support and self-blaming: the more they immerse themselves in their experiences, the less they think about problem-solving. They are less likely to switch to other activities.

### ***Coping Strategies at the End of the Pandemic (Fall 2021)***

We found two studies (Mamina et al., 2022; Ochirova & Chuvashева, 2022) devoted to the analysis of coping strategies at the end of the pandemic. The Coping Behaviors questionnaire by Lazarus was used in both studies. Both studies focused not on the coping strategies themselves, but on their interrelation with the level of stress and anxiety experiences of the individual.

Mamina et al. (2022) showed that the choice of coping strategy was connected with the person's level of anxiety. Thus, among students with a high level of anxi-

ety, the most frequent coping strategies were avoidance ( $67.1 \pm 0.13$ ) and distancing ( $65.8 \pm 0.27$ ). The authors note that using intellectual techniques characterizes distancing, for example, rationalization, shifting attention, detachment, humor etc. The avoidance strategy is characterized by denial of the problem, fantasizing, etc. Thus, non-adaptive coping is more typical for students with high situational anxiety.

Such coping strategies as distancing ( $61.6 \pm 0.11$ ) and solution planning ( $54.9 \pm 0.26$ ) were most common among students with an average level of anxiety. This group of students is characterized by a combination of constructive and non-constructive coping. Most researchers consider decision planning to be an adaptive strategy, as it promotes constructive resolution of difficulties. This group of students is more characterized by the mixed type of coping.

Finally, among students with a low level of anxiety, the strategies of solution planning ( $60.8 \pm 0.19$ ) and positive reevaluation ( $58.6 \pm 0.32$ ) are most expressed. These ways of coping with stress are fully adaptive.

Similar results were obtained by Ochirova and Chuvashева (2022), who found that the most frequent coping strategies were avoidance, distancing, confrontation, and positive reassessment. However, the authors show that the preferred coping strategy is connected with the stress level and actual experiences. The higher the stress level of the subjects, the more they are inclined to use the strategy of avoidance; at a low level of stress, the participants choose the strategy of positive reassessment.

## **Discussion**

Analysis of the Russian-language publications on coping strategies during COVID-19 demonstrates unstable interest. Most studies occurred at the beginning of the pandemic, and then their number decreased significantly. Studies at the end of the pandemic are characterized by location-based studies and small sample sizes. In contrast, a review of foreign studies showed a steady increase in surveys during the two years of the pandemic, some of which focused on the dynamics of coping strategies and others on their comparative analysis by age, country, and living conditions (Kostromina et al., 2022).

The Russian comparison studies mainly focused on predominant coping strategies and whether they differed from pre-pandemic distribution. In the late period, the researchers' main focus shifted from the direct study of predominant coping strategies to their connection to stress and personal tension; comparative studies of coping strategies were carried out in groups with different stress levels. A year after the pandemic's beginning, the researchers' main interest was in comparing predominant coping strategies between those infected with COVID-19 and those not.

A comparison of Russian-language publications is difficult in part because of the lack of a common methodology in the study of predominant coping strategies, the lack of uniformity in methods and in processing of results. Nevertheless, it is possible to get a general idea of how the repertoire of coping strategies has changed during the pandemic in Russia. At the pandemic's beginning, adaptive and relatively adaptive defense mechanisms were used a great deal. Some researchers note the predominance of non-constructive, escape-oriented coping strategies and a variety of coping strategies in general. It is worth noting that different coping strategies' distribution

frequency is the same as the normative and reiterates pre-pandemic norms. Foreign studies' analysis yielded similar results, demonstrating a variety of coping strategies at the pandemic's beginning (Maykrantz et al., 2021; Morales-Rodríguez, 2021; Park et al., 2021).

With adaptation to the situation, there was a selection of effective coping strategies. Some of them were weakened, such as cooperative family activities or virtual communication (Adams & Smith, 2021). Others increased (e.g., active behavior strategies, seeking social support, or reframing) (Awoke et al., 2021; Babicka-Wirkus et al., 2021; Kryukova et al., 2021). In Russia, the dynamics were characterized by two trends. On the one hand, active coping strategies such as planning, reflexive, and preventive coping have increased. On the other, there was a slight increase in deprivation and avoidance strategies.

The worldwide trend of a gradual increase in proactive coping strategies during adaptation to COVID-19 (Diaz et al., 2021) further confirms that when basic psychological needs (autonomy, competence, and relatedness) have been blocked for a long time, people start looking for an outlet to satisfy them and choose those coping strategies that can do so (Ntoumanis et al., 2009). During the pandemic, social networking, peer support, teamwork, self-confidence, problem-solving, and self-care were the most frequently used coping strategies (Finstad et.al., 2021). This confirms the idea that in situations of isolation, preference is given to those coping strategies that directly or indirectly satisfy the need for self-determination. Overall, researchers note the effectiveness of proactive coping strategies among respondents with low stress and anxiety levels (Kameristaya, 2021; Kuftyak & Bekhter, 2020; Mamina et al., 2022; Ochirova & Chuvashva, 2022). This result confirms prior observations that proactive coping relates to readiness to act purposefully (Schwarzer & Taubert, 2002). However, targeted action is difficult when stress levels are high, so focusing on the problem helps to reduce anxiety and depression (Finstad et.al., 2021). Perhaps this circumstance can explain the fact that after one year of the pandemic, there has been an increase in denial strategies (e.g., reluctance to acknowledge the existence or threat posed by COVID-19) and avoidance strategies (e.g., avoidance of discussing the danger posed by COVID-19) among Russians. Similar trends have been reported in foreign studies. In the early phases of the pandemic, avoidance strategies allowed workers to limit their sense of helplessness and incompetence, contributing to resilience (Maiorano et al., 2020). In later periods of the pandemic, this may be due to general societal fatigue with the situation.

In general, the review of both Russian and foreign studies shows that in a situation of coping with anxiety and stress, any of the coping strategies is somehow connected with the realization of the needs for self-determination (Kostromina et al., 2022). The use of emotional coping strategies is largely determined by the need to regulate the self in response to stressors assessed as threats (Amiot et al., 2008). These strategies focus on self-management through physical activity, meditative practices (Burch et al., 2021), and the release of emotions (Zimmer & Dunn, 2021). Coping with helping others, learning new activities, and organizing and communicating in the pandemic situation allowed for a sense of connection with others, "distraction from stress," self-development, and increasing one's own competence. Coping focused on situational

awareness and reframing supported the need for autonomy by rethinking and giving meaning to what was happening. Such coping is recognized as one of the most successful means of promoting well-being (Kashdan & Rottenberg, 2010) in stressful and crisis situations.

## **Conclusion**

The trends in the dynamics of coping strategies during the pandemic reflect their close relationship with basic psychological needs in the theory of personality self-determination. This review showed a transition from confusion and habitual, pre-pandemic coping strategies to more effective ones, confirming that when basic needs are blocked for a long time, people seek a way to satisfy them. A gradual increase in active coping is an actualization of the need for competence, realized in conditions of social restrictions. An increase in coping associated with the search for new activities and hobbies helps satisfy the basic need for connectedness. Positive thinking and reframing strategies allow one to shift the locus of control from external circumstances to internal ones, to feel one's own role, thereby supporting the need for autonomy and competence, while setting clear goals and planning activity satisfies all three basic needs. The results of the studies reviewed confirmed the importance of self-determination as a dispositional variable in predicting patterns of coping with stress.

## **Limitations**

As noted, most empirical publications could not be included in the final analysis because they needed to provide more empirical evidence. Difficulties in the analysis were also associated with the use of different variants of the Russian adaptation of the applied methods, as well as the presentation of results in different formats.

## **Author Contributions**

S.K. conceived of the idea. E.Z. developed the theory. N.M. verified the analytical methods. E.K. wrote a first draft of the manuscript. All authors discussed the results and contributed to the final manuscript and agreed to be accountable for all aspects of their work.

## **Conflict of Interest**

The authors declare no conflict of interest.

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## PSYCHOGENETICS

### Verbal Abilities: Sex Differences in Children at Different Ages

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**Background.** The assertion of sex differences in verbal abilities is a highly controversial subject. Some studies have demonstrated a female advantage; other studies have found higher rates in males. The results depended on the type of verbal ability that was studied, the cultural context, and the ages of the subjects. There are two types of theories that have been developed to explain the existence of sex differences in cognitive abilities. Social theories explain the differences as caused by social determinants. Biological theories consider biological factors such as prenatal development conditions and hormone levels, among others, as the cause of sex differences.

**Objective.** To investigate sex differences in verbal abilities in children of different ages.

**Design.** Two different editions of Wechsler tests were used. For children age 2.5 to 5 years, the Wechsler Preschool Primary Scale of Intelligence (WPPSI-IV) was used. For children age 6 and older, we administered the Wechsler Intelligence Scale for Children (WISC-V). The total sample included 313 children.

**Results.** The study found significant sex differences in performance on the Verbal Comprehension Scale in children of different ages. At the age of 2 to 4 years, the girls performed better than the boys. In the group of boys, there was a significant increase in verbal abilities at the age of 8–9 years. By the age of 10–11 years, boys began outperforming girls on the Verbal Comprehension Index. Scores on the Verbal Comprehension and Visual Spatial subtests for the boy sample showed stronger correlations than in the girl sample in all age groups.

**Conclusion.** Sex differences in verbal abilities varied depending on the age of the children. The boys showed a stronger integration of their verbal abilities into the structure of their intelligence than the girls.

**Keywords:** verbal abilities, sex differences, age differences, intelligence, WISC, WPPSI

## Introduction

### *Sex differences in verbal abilities*

Verbal abilities can be defined as the ability to analyze language-based information and solve verbal reasoning and inference problems. Sex differences in verbal abilities have been the focus of many studies in psychology; however, their results have turned out to be rather contradictory. Some studies found an advantage for females in this type of ability (Shcheblanova, 2008; Stevenson & Newman, 1986; Strand et al., 2006; Barel & Tzischinsky, 2018; Hirnstein et al., 2023); others found higher rates in males (Hogrebe et al., 1985; Jensen & Reynolds, 1983; Liu & Linn, 2015; Pezzutti & Orsini, 2016; Sokolowski et al., 2020); and still other studies did not find any sex differences in verbal abilities at all (Rzhanova & Alekseeva, 2016; Cole & LaVoie, 1985; Lynn et al., 2005).

It's important to stress that all these results depended on what type of verbal ability was being studied. According to meta-analysis data, one can see that girls performed better in general verbal ability, vocabulary, and anagramming, while boys outperformed on verbal analogies (Hyde & Lynn, 1988). The ability of males to solve verbal analogies better than females was later confirmed in other studies (Colom et al., 2004). In a recent meta-analysis involving about 350,000 participants, girls/women outperformed boys/men in phonemic fluency, recall, and recognition. The dependence of the effect on the region and language of the subjects was also established (Hirnstein et al., 2023).

Sex differences in verbal abilities often rely on cultural differences. Thus, data obtained in one country could easily differ from similar studies conducted in another country. A study involving Italian children age 6 to 16 using the WISC-V (Pezzutti & Orsini, 2016), demonstrated an advantage for boys over girls on the Verbal Comprehension index (Similarity and Vocabulary subtests). In a sample of Taiwanese preschoolers, boys significantly outperformed girls on verbal WPPSI-IV subtests such as Information, Vocabulary, Comprehension, and Picture Naming (Chen & Lynn, 2021). At the same time, however, a U.K.-based study of children age 11 to 12 demonstrated that girls scored significantly higher than boys on the Verbal Reasoning of Cognitive Abilities Test index. The results revealed an advantage in all three subtests: Verbal classification, Sentence completion, and Verbal analogies (Strand et al., 2006).

The superiority of girls over boys in the U.K. sample was associated with the existence of gender equality policies in their schools. Gender equality policy has been practiced in educational institutions in the United Kingdom since the mid-1970s (Shcheblanova, 2008). The connection of sex differences in cognition with the policy of gender equality is supported by data from the French standardization of the four Wechsler scales from 1981 to 2016. Boys scored higher on the three WISC-III verbal subtests, but sex differences became insignificant on the WISC-IV and WISC-V verbal subtests in the 2000s (Grégoire, 2020).

Differences in verbal abilities may depend on general intelligence. This conclusion was reached on a sample of Russian children (Saulina, 2015). The study demonstrated that in the group of children with IQ scores above 115, girls coped signifi-

cantly better with verbal tests than boys did (in the Missing Words and Analogies tests). Meanwhile, in the sample of children with lower IQ scores, boys and girls demonstrated equal results in language abilities.

Apparently, age plays an important role in the influence of sex on verbal abilities. As we saw in previous studies, differences in verbal abilities between boys and girls depended on the age group they belonged to. A twin longitudinal study of sex differences in childhood and adolescence has shown that girls were ahead of boys in verbal ability tests at the ages of 2 to 4. Boys had significantly higher scores at ages 10 and 12. No sex differences were found in other age groups (Toivainen et al., 2017). A study of gifted children made by Shcheblanova on a Russian-speaking sample found no gender differences in elementary school children; in the fifth or sixth grade, boys began to outperform girls, but in the seventh grade, the differences were again erased (Shcheblanova, 2008).

Sex differences were examined in a study of Russian-speaking fourth graders at ages 10 and 11. Girls outperformed boys in all analyzed parameters: reading speed, the score on the Russian Language Achievement Test, and final grades at school. It is interesting that, in the boys' subsample, non-verbal intellect was a significant predictor of two indicators: success in the final Russian language test and reading skills (Tikhomirova et al., 2020).

### ***Theories of sex differences in cognitive abilities***

There are two types of theories which have been developed to explain the existence of sex differences in cognitive abilities. The first group explains the differences between boys and girls by social determinants. For example, parents and teachers are subjectively inclined to evaluate boys as more capable. Teachers often pay more attention to boys than girls in their classes (Shcheblanova, 2008). The second group of theories can be called biological, because they consider biological factors to be the cause for sex differences in verbal ability (Hirnstein et al., 2019). There are well-known studies of the effects of prenatal testosterone levels on cognitive abilities, particularly visuospatial abilities (Puts et al., 2008; Heil et al., 2011). Testosterone levels in the mother's amniotic fluid can influence the child's verbal abilities. Lutchmaya's study showed the effect of amniotic fluid testosterone levels on the development of verbal abilities of children between 1 and 2 years of age. A high hormone level was negatively associated with vocabulary size at this age (Lutchmaya et al., 2001).

Thus, one can see many factors influencing general language abilities: the age of respondents, their cultural background, and the type of specific language skills explored in the study, as well as the methods used in the study. The objective of our study was to investigate sex differences in verbal abilities at different age groups. We posed the following research questions:

- 1) How do sex differences in verbal abilities change depending on children's age?
- 2) How are verbal abilities related to general intelligence in different age groups of boys and girls?



## Methods

### *Participants*

A total sample of 313 children took part in our study. All the children had been attending the public kindergartens and schools in Moscow region. Informed consent was obtained from parents before the study. The data was collected from 2017 to 2020. Participants were divided into five groups depending on their age. The characteristics of each group are presented in *Table 1*.

**Table 1**

*Age characteristics of participants*

	N	M (years)	SD	female/male (%)
Group 1 (2.5-4 years)	84	3.5	0.3	45/55
Group 2 (4-5 years)	56	4.6	0.4	39/61
Group 3 (6-7 years)	64	6.4	0.4	58/42
Group 4 (8-9 years)	45	8.2	0.6	53/47
Group 5 (10-11 years)	64	10.6	0.3	42/58

### *Procedure*

Two different editions of Wechsler tests were used to assess the children's cognitive abilities.

### *Wechsler Preschool and Primary Scale of Intelligence (WPPSI-IV)*

For children age 2.5 to 5 years, the Wechsler Preschool and Primary Scale of Intelligence (WPPSI-IV) was used (see psychometric properties in Wechsler, 2012). In the age group from 2.5 to 4 years, this test has three integral scales: the Verbal Comprehension Index, the Working Memory Index, and the Visual Spatial Index. The Verbal Comprehension Index includes the Passive Vocabulary and Information subtests.

For the age of 4 to 5 years, the WPPSI-IV test includes five integral scales: the Verbal Comprehension Index, the Visual Spatial Index, the Fluid Intelligence Index, the Working Memory Index, and the Processing Speed Index. The Verbal Comprehension Index consists of the Information and Similarities subtests. The structure of the test on Russian preschoolers has been studied previously (Rzhanova et al., 2018).

### *Wechsler Intelligence Scale for Children (WISC-V)*

For children 6 years of age and older, we used the Wechsler Intelligence Scale for Children WISC-V (see psychometric properties in Wechsler, 2014). This test also contains five integral scales: the Verbal Comprehension Index, the Visual Spatial Index, the Fluid Intelligence Index, the Working Memory Index, and the Processing

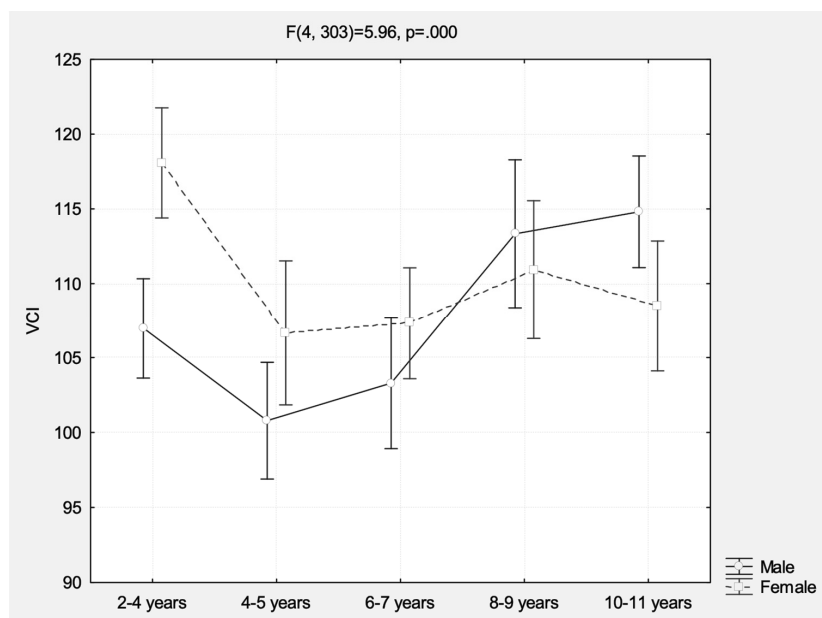
Speed Index. The Verbal Comprehension Index includes Similarities and Vocabulary subtests.

Pearson's correlation coefficient and Dispersion Analyzes (ANOVA) were used to process the data.

## Results

### *Verbal Comprehension Index: effects of age and sex*

The age dynamics of the Verbal Comprehension Index in the male and female samples are shown in *Figure 1*. Girls scored higher than boys in the younger age group ( $F = 19.26, p = .00$ ), but then the results in the girl sample decreased ( $F = 13.59, p = .00$ ); after this drop, they remained at approximately the same level. In the group of boys there was a significant increase in verbal abilities at the age of 8–9 years ( $F = 8.94, p = .00$ ); by the age of 10–11 years, boys began overtaking girls on the Verbal Comprehension Index ( $F = 4.70, p = .03$ ).



*Figure 1.* Verbal Comprehension Index: age and sex differences

In the girl sample we could see a decrease in the Verbal Comprehension score. This drop is observed from the younger preschool age to the middle preschool age. Most likely it could be attributed to different methods of diagnosing verbal comprehension abilities. At the younger age of 4–5 years, two subtests were used to evaluate general verbal abilities: Passive Vocabulary and Information. For children older than 6 years, another pair of subtests was used: Information and Similarities. It can be assumed that the Passive Vocabulary subtest is significantly easier than the Similarities subtest, so this could explain why girls in the younger group would obtain higher scores.

### Comparison of group data for Verbal Comprehension subtests

We then looked at the sex differences on the Passive Vocabulary subtest. According to our data, in the 2-4 year old age group, girls scored significantly better than boys ( $F = 17.08$ ,  $p = .000$ ). Sex differences for the Information subtest were observed only in the younger age group of 2-4 years old ( $F = 8.72$ ,  $p = .000$ ); the girls scored higher. However, we did not find any sex differences in the scores of the older group.

Figure 2 shows the scores on the Similarity subtest. In general, the data obtained in this subtest goes in line with the data for the general Verbal Comprehension Index. At a younger age (4-5 years), the results revealed a clear female advantage ( $F = 4.77$ ,  $p = .003$ ). At 6-9 years the differences were insignificant, and starting from 10 years, they began to reach a significant level but in the opposite direction: boys outperformed girls ( $F = 3.85$ ,  $p = .05$ ). Moreover, boys significantly improved their results at the age of 8-9 years compared with younger ages ( $F = 5.20$ ,  $p = .002$ ).

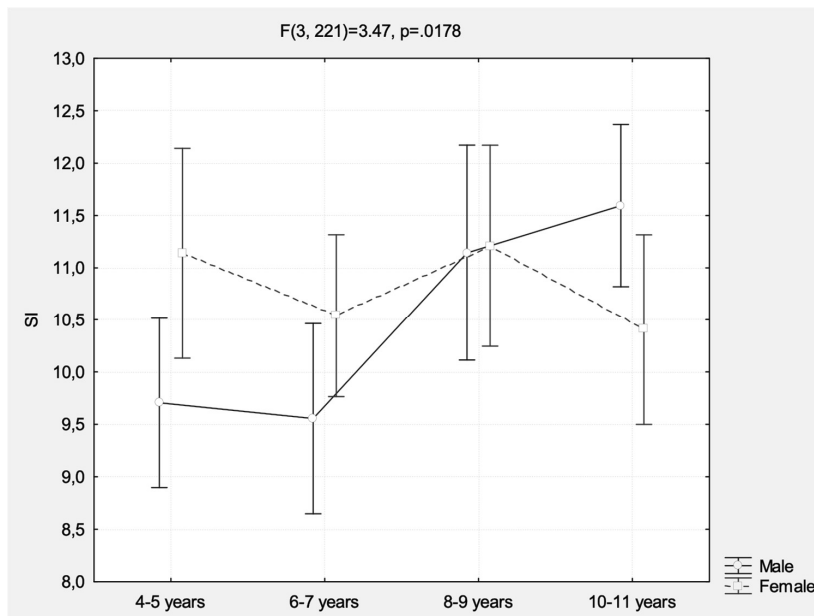


Figure 2. Similarity subtest: age and sex differences

There were no significant differences between the groups of boys and girls on the Vocabulary subtest scores. However, boys significantly improved their performance at the age of 8-9 years ( $F = 8.93$ ,  $p = .00$ ).

### The relationship of verbal abilities and general intelligence depending on age and sex

We analyzed the connections between verbal ability and general intelligence. Figure 3 shows the correlation coefficients on the Verbal Comprehension Index and the Full-Scale Intelligence Quotient. All these relationships were significant. Moreover, in the older groups (from 8-years-old on) higher correlations were observed between

verbal ability and general intelligence in the group of boys compared to the group of girls.

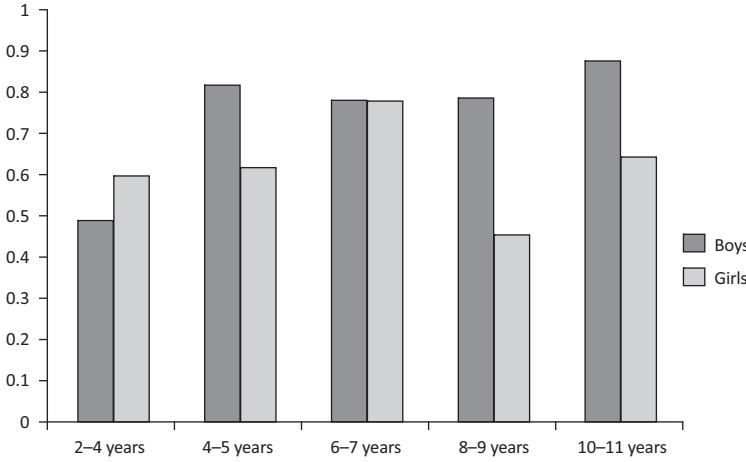


Figure 3. Correlations between the verbal comprehension index and the total score in the groups of boys and girls.

The relationships between the verbal scale and other main integral scales of the Wechsler tests were investigated (see Table 2). Results on the Verbal subtests and Visual Spatial subtests in the male sample showed stronger correlations than in the female sample in all age groups. Similar results were obtained for the scores on the Fluid Intelligence Index: the correlations of those scores with the general verbal abilities in the male sample were higher than in the female sample (except for the age group of 4-5 years). The most obvious differences in the pattern of relationships were observed in the oldest group, where the correlations between verbal abilities and all other cognitive characteristics were higher for the boys.

**Table 2**

*Correlations of the Verbal Comprehension Index scores with other cognitive scales in the samples of boys and girls*

	VSI		WMI		FRI		PSI	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
2-4 years	.38*	.31	.28	.29				
4-5 years	.59**	-.10	.35	-.36	.17	.22	.37	-.19
6-7 years	.43*	.42*	.57**	.71**	.46*	.35	.31	.39*
8-9 years	.31	.23	.56**	.64**	.59**	.26	.27	.15
10-11 years	.62**	.07	.64**	.44*	.52**	.33	.49*	.33

\*  $p < 0.05$ ; \*\*  $p < 0.01$

## **Discussion**

The assertion of sex differences in verbal abilities is highly controversial. Some studies have demonstrated a female advantage (Strand et al., 2006; Hirnstein et al., 2023; Reilly et al., 2019; Peterson, 2018); other studies have found higher rates in men (Pezutti & Orsini, 2016; Sokolowski et al., 2020; Lynn, 2021).

The current study investigated sex and age differences in verbal abilities and their associations with other cognitive abilities. Analysis of different age groups revealed that at the younger preschool age, the girls coped better with verbal ability tasks than the boys did. These findings are consistent with a lot of early research (Reilly et al., 2019; Peterson, 2018). Then, at older ages, the differences began to disappear, and by the age of 8-9 years, boys significantly improved their performance, while the results in the female sample remained at the same level. The differences became significant in favor of boys by the age of 10-11 years.

Apparently, the critical point for the development of verbal abilities in the male sample was their beginning school education (in the current sample, children age 6-7 have not yet attended school). Similar results were obtained in a twin longitudinal study by Toivainen (Toivainen et al., 2017). In this study girls outperformed boys in general verbal abilities during the early preschool years. However, by the age of 11 years, boys significantly outperformed girls (Toivainen et al., 2017). It is difficult to declare without additional research what exactly influences the success boys achieve with the beginning of schooling: these can be due to both physiological features (the next stage in the maturation of brain areas involved in speech production) and social factors (a preference for boys by both parents and teachers). It should also be noted that education in Russian schools is based mainly on verbal activities, and it is possible that the verbal abilities of boys at primary school age are more sensitive to environmental influences than those of girls.

The Similarities subtest allows us to estimate the development of children's conceptual thinking and their ability to generalize and classify verbal material, as well as their ability to compare and organize information (Wechsler, 2014). At the preschool age, girls performed better on this subtest than boys did; at primary school age, the sex differences were insignificant, but starting from the age of 10, they began to reach a level of significance in favor of boys. For the rest of the verbal comprehension subtests no significant sex differences were found. However, data analysis of the Similarities subtest produced very similar results to the score level obtained in the analysis of the overall Verbal Comprehension Index score. This suggests the Similarities subtest is the key one in assessing differences in verbal ability.

Our data revealed sex differences for the relationship between general Verbal Comprehension and other cognitive abilities. A clear trend can be seen for verbal abilities. The relationship between verbal ability and general intelligence and other cognitive abilities increases with age in boys, while the correlation begins to weaken in girls. At primary school age, boys' verbal ability is more cognitively based than that of girls. Similar results were obtained earlier on a sample of fourth graders: the success of boys in completing tasks in the Russian language turned out to be more associated with non-verbal intelligence compared to girls (Tikhomirova et al., 2020).

## Conclusion

The present study revealed the dependence of verbal intelligence scores, as assessed by the Wechsler test, on age and sex. At a younger preschool age, girls got better results on the Verbal Comprehension Index than boys. The differences became significant in favor of boys by the age of 10-11 years. The study found sex differences for the correlations between Verbal Comprehension and other cognitive abilities. The relationship between verbal ability and other abilities increased with age in boys, while it began to weaken in girls. Further work will be required to conduct a longitudinal study in order to examine the development of verbal abilities in childhood.

## Limitations

The limitations of the study are related to the available data. Although the children participating in the study lived in the same language region with the same educational traditions, we collected no data on their socio-demographic status and the types of schools and kindergartens they attended; therefore, it is not possible to conclude that the cohort samples were equal.

## Conflict of Interest

The authors declare no conflict of interest.

## Ethics statement

The study and procedures were approved by the Ethics Committee of the Psychological Institute of the Russian Academy of Education (Approval no.11; November 15, 2021).

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## CLINICAL PSYCHOLOGY

# Medically Unexplained Symptoms among Adults from Russia: An Assessment using the Patient Health Questionnaire-15

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**Background.** The Patient Health Questionnaire-15 (PHQ-15) is one of the most frequently used instruments to measure medically unexplained symptoms in the general population, as well as in groups of patients with mental and physical health problems.

**Objective.** This study aimed to examine the psychometric properties of the PHQ-15 in assessing a Russian community sample.

**Design.** A total of 1153 Russian adults age 18 or older participated in this cross-sectional study. They completed the Russian versions of the PHQ-15 and Symptom Check List-90-Revised, SCL-90-R (SCL-90-R). Exploratory and confirmatory factor analyses were used to examine the factor structure of the Russian PHQ-15, and multi-group confirmatory factor analyses were used to test measurement invariance across sex and age. Cronbach's alpha coefficients and Pearson's correlation coefficients were used to evaluate the internal reliability and convergent validity of the Russian PHQ-15.

**Results.** Exploratory factor analysis revealed a three-factor solution highlighting pain-fatigue, gastrointestinal, and cardiopulmonary symptoms. Confirmatory factor analysis confirmed a bifactor structure for the Russian PHQ-15 merging general and specific somatic symptoms. A multi-group confirmatory factor analysis showed partial invariance across sex and age. The Russian PHQ-15 demonstrated acceptable Cronbach's alpha coefficients ranging from 0.72 to 0.75 for specific factors and a good Cronbach's alpha for the total score ( $\alpha = 0.85$ ), proving the questionnaire's internal reliability. Finally, positive correlations between the PHQ-15 and SCL-90-R dimensions, and positive intercorrelations between PHQ-15 specific factors, suggested convergent validity.

**Conclusion.** The Russian PHQ-15 is a reliable and valid instrument for assessing medically unexplained symptoms in the general population. This instrument can be used in diagnostic and counseling settings.

**Keywords:** Patient Health Questionnaire-15, factor structure, measurement invariance, psychometric properties, medically unexplained symptoms

## **Introduction**

### ***Medically unexplained symptoms***

Medically unexplained symptoms refer to mysterious somatic complaints, the nature of which physicians cannot attribute to any specific diseases or diagnoses. Reid et al. (2003) identified three criteria for a medically unexplained episode: a) the patient has physical symptoms; b) the patient has been medically examined; and c) clinical examination revealed either no abnormality or abnormalities that were thought to be trivial or incidental (p. 520).

These symptoms are an irritant for patients, physicians, and public health systems alike. Epidemiological studies have established that medically unexplained symptoms make up two-thirds of all symptoms reported by people consulting primary care physicians, with the prevalence of somatoform disorders as high as 22.9% for one year, and their comorbidity with at least one other psychiatric disorder in 43.2% of cases (Steinbrecher et al., 2011). Overall, medically unexplained symptoms persisted or worsened in 67% of these primary care patients after one year and in 48.7% after five years (van Westrienen et al., 2019). Although the mean time for recognizing medically unexplained symptoms is 2 to 4 minutes (Houwen et al., 2020), these patients require special attention to their medical history and personal circumstances, adherence to symptoms, and communication with the general practitioner (Houwen et al., 2017). As Rasmussen (2020) noted, these symptoms represent a “junk drawer” in which the general practitioner stores the accumulated data about the patient, which he does not yet know how to categorize or process. Finally, public health systems spend significant resources on the diagnosis and treatment of medically unexplained symptoms (Poloni et al., 2019).

### ***Measurement of medically unexplained symptoms***

In 2013 Zijlema et al. published a systematic review of 40 instruments to measure self-reported medically unexplained symptoms. Based on the criteria of usability and the burden on respondents, they concluded that the Patient Health Questionnaire-15 (PHQ-15) and Symptom Checklist-90 somatization scale are the most suitable for large-scale studies of medically unexplained symptoms. An additional advantage of the PHQ-15 is that it is suitable for evaluating DSM somatic diagnoses (Liao et al., 2016).

The PHQ-15 was developed as a short version of the Primary Care Evaluation of Mental Disorders (PRIME-MD) (Spitzer et al., 1999) for the purpose of evaluating the 15 most common physical complaints in primary care (Kroenke et al., 2002). Later, psychometric studies showed that two items could be excluded from the PHQ-15 due to their gender-specific content (item 4; menstrual problems or other problems with a woman's period) and low incidence in the population (item 8; fainting spells) (Witthöft et al., 2013). In addition, several studies confirmed that the PHQ-15 evaluates both general somatization and specific pain-fatigue, gastrointestinal, and cardiopulmonary symptoms (Cano-García et al., 2020; Claassen-van Dessel et al., 2017; Witthöft et al., 2016). This makes the PHQ-15 effective and convenient in assessing medically unexplained symptoms in oncology (Tang et al., 2017), cardiology

(Kohlmann et al., 2013), rheumatology (Wolfe et al., 2014), gastroenterology (Derwa et al., 2018), hepatic practice (Sockalingam et al., 2013), pain management (Lanzara et al., 2020), and primary care settings (van Ravesteijn et al., 2009).

The basic psychometric properties of the PHQ-15 were confirmed when the instrument was adapted for Arabic (AlHadi et al., 2017), Chinese (Zhang et al., 2016), Dutch (Terluin et al., 2022), German (Leonhart et al., 2018), Korean (Han et al., 2009), Spanish (Montalbán et al., 2010), and Swedish (Nordin et al., 2013) populations. The diagnostic accuracy of the PHQ-15 was proven on samples of participants from the general population (Laferton et al., 2017), outpatients from general hospitals (Cao et al., 2022), and outpatients from a clinic for the treatment of affective, anxiety, eating, and somatoform disorders (Toussaint et al., 2020).

Due to the obvious advantages of the PHQ-15 and the lack of its Russian version, the aim of this study was to adapt the PHQ-15 for a Russian community sample.

## Methods

### Participants

The data were collected by Anketolog, a company that collects empirical data in Russia. The criteria for inclusion in the sample were as follows: 1) 18 years of age or older; 2) native Russian speaker; and 3) residence in Russia during the period of the study. All respondents received a financial reward for participating in the study.

**Table 1**

*Baseline characteristics of study participants*

Characteristics	n (%)
Sex	
Male, n (%)	560 (48.6)
Female, n (%)	593 (51.4)
Age	
18–30 years	297 (25.8)
31–45 years	551 (47.8)
46–84 years	305 (26.4)
Marital status	
Single, n (%)	303 (26.3)
Married, n (%)	643 (55.8)
Divorced, n (%)	170 (14.7)
Widowed, n (%)	37 (3.2)
Parental status	
No children, n (%)	387 (33.6)
One child, n (%)	382 (33.2)
Two children, n (%)	309 (26.8)
Three children or more, n (%)	73 (6.4)

## Education level

Basic school qualifications, n (%)	93 (8.1)
Vocational training qualifications, n (%)	236 (20.5)
Higher education qualifications, n (%)	802 (69.5)
Doctor degrees, n (%)	22 (1.9)

Note. *n* = absolute frequency; % = relative frequency.

The baseline participant characteristics are displayed in *Table 1*. A total sample of 1153 Russian adults (51.4% females) age 18 to 84 years ( $M = 41.45$ ,  $SD = 12.56$ ) participated in this study.

### Instruments

Participants filled out a questionnaire containing a block of socio-demographic questions (sex, age, marital status, parental status, and educational level) and the following instruments:

**The Patient Health Questionnaire-15 (PHQ-15).** The PHQ-15 is a 15-item measure assessing medically unexplained symptoms via a list of 15 common physical complaints heard in a primary care setting (Kroenke et al., 2002). These symptoms include 1) stomach pain; 2) back pain; 3) pain in arms, legs, or joints; 4) menstrual cramps or other problems during a woman's period; 5) headaches; 6) chest pain; 7) dizziness; 8) fainting spells; 9) heart pounding or racing; 10) shortness of breath; 11) pain or problems during sexual intercourse; 12) constipation, loose bowels, or diarrhea; 13) nausea, gas, or indigestion; 14) feeling tired or having low energy; and 15) trouble sleeping. Each somatic symptom is rated on a three-point Likert scale which ranges from 0 ("not bothered at all") to 2 ("bothered a lot"). Based on a recent study highlighting the shortcomings of back translation (Behr, 2017), the original version of the PHQ-15 was translated into Russian by two Russian-speaking specialists in psychosomatic medicine.

**The Symptom Check List-90-Revised (SCL-90-R).** The SCL-90-R is a 90-item measure assessing nine dimensions of psychological distress: 1) somatization (headaches, chest pain, nausea, etc.); 2) obsessive-compulsive (obsessive thoughts and uncontrolled behavior); 3) interpersonal sensitivity (feeling of personal inadequacy and inferiority); 4) depression (dysphoria, suicidal ideas and intentions); 5) anxiety (nervousness, tension, panic attacks); 6) hostility (aggression, irritability, etc.); 7) phobic anxiety (fear of a particular person, place or object); 8) paranoid ideation (delirium, suspicion, etc.); and 9) psychoticism (symptoms ranging from schizoid to clinical psychosis). The SCL-90-R assesses three summary outcomes it identifies as global scores: the Global Severity Index (GSI), the Positive Symptom Distress Index (PSDI), and the Positive Symptom Total (PST) (Derogatis, 1994). Each item describes a symptom that is rated on a five-point Likert scale which ranges from 1 ("not at all") to 5 ("extremely"). Tarabrina (2001) assessed the psychometric properties of the SCL-90-R in Russian clinical and non-clinical samples, including students, emigrants, war veterans, bank employees, patients with schizophrenia, and patients with somatoform disorders.

## Data analysis

The data were analyzed in six steps using the AMOS and SPSS version 27.0. First, preliminary analyses calculated the frequencies and percentages for categorical variables and the means and standard deviations for the numerical variables. Second, exploratory factor analysis (EFA) was used to examine the factor structure of the Russian PHQ-15. Specific tests such as Kaiser-Meyer-Olkin (KMO) test for measure of sampling adequacy and Chi square for Bartlett's test of sphericity were used to evaluate the data's suitability. In particular, KMO values greater than 0.50 and significant Chi squares for Bartlett's test of sphericity were considered suitable for EFA (Tabachnick & Fidell, 2007).

Third, confirmatory factor analysis (CFA) was used to test different factor solutions for the Russian PHQ-15. The goodness of fit of the CFA models was measured via three fit indexes: the comparative fit index (CFI), the Tucker Lewis index (TLI), and the root mean square error of approximation (RMSEA). A model was considered fit when CFI and TLI values were greater than 0.90, and RMSEA values were less than 0.80 (Hu & Bentler, 1999).

Fourth, multi-group CFAs were performed to evaluate the measurement invariance of the Russian PHQ-15. Traditionally, there are three invariance models (Chakraborty, 2017; Milfont & Fischer, 2010): a) the configural invariance model, which shows that respondents from different group conceptualize a phenomenon in the same way; b) the metric invariance model, which assesses whether comparable groups respond to the items in the same way; and c) the scalar invariance model, which compares latent means across different groups. Thus,  $\Delta$ CFI between the previous and subsequent models must be equal or below 0.010 (Cheung & Rensvold, 2002).

Fifth, Cronbach's alpha coefficient was used to assess the internal reliability of the Russian PHQ-15. Values of 0.70 or higher and 0.90 or higher indicate acceptable and excellent internal consistency, respectively (Kline, 1999). Finally, Pearson's correlation coefficient was used to evaluate the convergent validity of the Russian PHQ-15. Regarding magnitude of effect sizes, correlation coefficients greater than 0.10 are small, those of 0.30 are medium, and those of 0.50 are large (Cohen, 1988).

## Results

### Preliminary analyses

The characteristics making up the Russian PHQ-15 items are shown in *Table 2*. Prior to the analysis, item 4 (menstrual cramps or other problems associated with a woman's period) was excluded due to its gender-specific content (Kroenke et al., 1998). After the frequency analysis, item 8 (fainting spells) and item 11 (pain or problems during sexual intercourse) were also excluded as rare in this population.

The frequency of the somatic symptoms is presented in *Table 3*. The PHQ-15 total score ( $\alpha = 0.85$ ) had good internal consistency, which did not improve when specific items were excluded (with values ranging from 0.82 to 0.84).

**Table 2***Characteristics of the Russian PHQ-15 items*

	Item	Mean	SD	Cronbach's $\alpha$
PHQ01	Stomach pain	0.44	0.57	0.83
PHQ02	Back pain	0.77	0.69	0.84
PHQ03	Pain in arms, legs, or joints	0.72	0.68	0.84
PHQ05	Headaches	0.73	0.64	0.84
PHQ06	Chest pain	0.28	0.51	0.84
PHQ07	Dizziness	0.35	0.56	0.83
PHQ09	Heart pounding or racing	0.40	0.58	0.83
PHQ10	Shortness of breath	0.33	0.55	0.83
PHQ12	Constipation, loose bowels, or diarrhea	0.32	0.56	0.84
PHQ13	Nausea, gas, or indigestion	0.39	0.59	0.83
PHQ14	Feeling tired or having low energy	0.91	0.71	0.82
PHQ15	Trouble sleeping	0.68	0.72	0.83

Note. SD = standard deviation; Cronbach  $\alpha$  = Cronbach's alpha coefficients if item dropped.

**Table 3***Frequency of somatic symptoms among Russian adults*

	Item	n (%)
PHQ01	Stomach pain	456 (39.5)
PHQ02	Back pain	708 (61.4)
PHQ03	Pain in arms, legs, or joints	673 (58.4)
PHQ04	Menstrual problems or other problems with period	283 (24.5)
PHQ05	Headaches	717 (62.2)
PHQ06	Chest pain	289 (25.1)
PHQ07	Dizziness	356 (30.9)
PHQ08	Fainting spells	35 (3.0)
PHQ09	Heart pounding or racing	404 (35.0)
PHQ10	Shortness of breath	338 (29.3)
PHQ11	Pain or problems during sexual intercourse	78 (6.8)
PHQ12	Constipation, loose bowels, or diarrhea	313 (27.1)
PHQ13	Nausea, gas, or indigestion	391 (33.9)
PHQ14	Feeling tired or having low energy	807 (70.0)
PHQ15	Trouble sleeping	618 (53.6)

Note: n = absolute frequency; % = relative frequency.

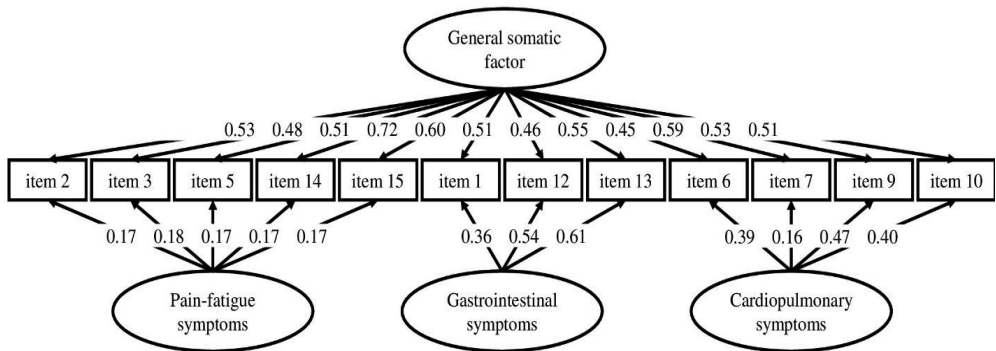
**Factor structure and measurement invariance**

The first step was to disclose the factor structure of the Russian PHQ-15. The results of the EFA suggested that three factors explained over 55% of the variance. The Kaiser-Meyer-Olkin (KMO) test for measure of sampling adequacy showed 0.890, and Chi square for Bartlett’s test of sphericity was significant ( $\chi^2 = 3775.130$ ,  $df = 66$ ,  $p < 0.001$ ). The first factor included item 2 (back pain;  $\lambda = 0.78$ ), item 3 (pain in arms, legs, or joints;  $\lambda = 0.68$ ), item 5 (headaches;  $\lambda = 0.48$ ), item 14 (feeling tired or having low energy;  $\lambda = 0.64$ ), and item 15 (trouble sleeping;  $\lambda = 0.55$ ). This factor reflected the pain-fatigue symptoms.

The second factor included item 1 (stomach pain;  $\lambda = 0.69$ ), item 12 (constipation, loose bowel, or diarrhea;  $\lambda = 0.83$ ), and item 13 (nausea, gas, or indigestion;  $\lambda = 0.80$ ). This factor expressed the gastro-intestinal symptoms.

The third factor included item 6 (chest pain;  $\lambda = 0.73$ ), item 7 (dizziness;  $\lambda = 0.50$ ), item 9 (heart pounding or racing;  $\lambda = 0.76$ ), and item 10 (shortness of breath;  $\lambda = 0.71$ ). This factor represented the cardiopulmonary symptoms.

The next step was to examine the single-factor, three-factor, and bifactor structure of the Russian PHQ-15. As shown in *Table 2*, the bifactor model had the best fit indexes. Factor loadings for the bifactor structure of the Russian PHQ-15 are displayed in *Figure 1*.



*Figure 1.* Factor structure of the Russian PHQ-15

The final step was to assess the measurement invariance with regard to sex and age (*Table 4*). Regarding sex, the configural invariance, metric invariance, and scalar invariance models fit the data well. However, the  $\Delta CFI$  between metric and scalar invariance models were greater than 0.010. Regarding age, the configural invariance, metric invariance, and scalar invariance models also fit the data well. All  $\Delta CFI$  were greater than 0.010.

**Table 4***Factor structure of the Russian PHQ-15 and measurement invariance across sex and age*

	$\chi^2$	df	RMSEA (90% CI)	CFI	TLI	$\Delta$ CFI
Single group solutions						
Model 1. Single-factor structure	626.745*	54	0.096 (0.089-0.102)	0.846	0.812	
Model 2. Three-factor structure	195.679*	51	0.050 (0.042-0.057)	0.961	0.950	
Model 3. Bifactor structure	146.839*	46	0.044 (0.036-0.052)	0.973	0.961	
Invariance models across sex						
Model 4. Configural invariance	195.289*	93	0.031 (0.025-0.037)	0.972	0.960	
Model 5. Metric invariance	214.663*	110	0.029 (0.023-0.034)	0.971	0.965	0.001
Model 6. Scalar invariance	328.208*	122	0.038 (0.033-0.043)	0.943	0.939	0.028
Invariance models across age						
Model 7. Configural invariance	262.312*	140	0.028 (0.022-0.033)	0.965	0.951	
Model 8. Metric invariance	346.893*	174	0.029 (0.025-0.034)	0.951	0.944	0.014
Model 9. Scalar invariance	527.540*	198	0.038 (0.034-0.042)	0.907	0.907	0.044

Note. \*  $p < 0.001$ .  $\Delta$ CFI refers to the change from the configural to the metric models as well as from the metric to the scalar models.

### **Reliability and validity**

As presented in *Table 5*, the Russian PHQ-15 subscales significantly correlated with each other and the general somatization index. The intercorrelation values ranged from 0.45 to 0.58, and the correlation values with the total index ranged from 0.74 to 0.90. Cronbach's alpha coefficients were 0.73, 0.75, and 0.72 for pain-fatigue, gastrointestinal, and cardiopulmonary symptoms, respectively. As mentioned earlier, the Cronbach's alpha coefficient was 0.85 for the general somatization index.

**Table 5***Intercorrelations and Cronbach's alpha coefficients for PHQ-15 subscales*

PHQ-15 subscales	Pain-fatigue symptoms	Gastroint. symptoms	Cardiopul. symptoms	Cronbach $\alpha$
Pain-fatigue symptoms				0.73
Gastrointestinal symptoms	0.50*			0.75
Cardiopulmonary symptoms	0.58*	0.45*		0.72
General symptoms	0.90*	0.74*	0.81*	0.85

Note. \*  $p < 0.001$ . Gastroint. = gastrointestinal; Cardiopul. = cardiopulmonary.



The Russian PHQ-15 scores were also correlated with the SCL-90-R scores (Table 6). All indexes of psychopathology were positively correlated with pain-fatigue (with values ranging from 0.41 to 0.73), gastrointestinal (with values ranging from 0.33 to 0.55), and cardiopulmonary symptoms (with values ranging from 0.43 to 0.73), as well as the general somatization index (with values ranging from 0.51 to 0.82).

**Table 6**  
Correlations between the PHQ-15 and SCL-90-R

	Pain-fatigue symptoms	Gastroint. symptoms	Cardiopul. symptoms	General symptoms
Somatization (SOM)	0.73*	0.55*	0.73*	0.82*
Obsessive-compulsive (OBS)	0.59*	0.44*	0.53*	0.64*
Interpersonal sensitivity (INT)	0.55*	0.41*	0.48*	0.59*
Depression (DEP)	0.62*	0.44*	0.54*	0.66*
Anxiety (ANX)	0.58*	0.47*	0.63*	0.68*
Hostility (HOS)	0.52*	0.42*	0.48*	0.58*
Phobic anxiety (PHOB)	0.41*	0.36*	0.50*	0.51*
Paranoid ideation (PAR)	0.47*	0.33*	0.44*	0.51*
Psychoticism (PSY)	0.46*	0.34*	0.47*	0.52*
Global Severity Index (GSI)	0.65*	0.49*	0.63*	0.72*
Positive Symptom Distress Index (PSDI)	0.66*	0.50*	0.60*	0.72*
Positive Symptoms Total (PST)	0.55*	0.35*	0.43*	0.55*

Note. \*  $p < 0.001$ . Gastroint. = gastrointestinal; Cardiopul. = cardiopulmonary.

## Discussion

The current study aimed to adapt the PHQ-15 for a Russian community sample. Thus, the findings relate to the psychometric properties of the Russian PHQ-15. Preliminary analysis showed that item 4 (menstrual cramps or other problems associated with a woman’s period), item 8 (fainting spells), and item 11 (pain or problems during sexual intercourse) should be excluded from the questionnaire due to their gender specificity or low frequency in a Russian population. Many previous studies confirmed that items 4 and 8 should be deleted for greater psychometric coherence of the PHQ-15 (Cano-García et al., 2020; Leonhart et al., 2018; Witthöft et al., 2013), but only one study suggested that item 11 should also be excluded (Kroenke et al., 1998).

Sexual dysfunctions are fairly common complaints in both clinical and general population settings: 3%-18% people suffered from dyspareunia (Schultz et al., 2005); 10–28% from vulvodinia (Harlow et al., 2014); and 3–76.5% from erectile dysfunc-

tion (Kessler et al., 2019). The prevalence of these complaints is up to 51.2–92% among patients with mental and physical diseases (Abdelatti et al., 2020; Dastoorpoor et al., 2021). However, there are strong differences between objective and self-report measures of sexual dysfunctions. People tend to downplay the frequency and significance of their sexual complaints due to misperceptions, lack of knowledge, and personal factors (Takeuchi et al., 2021).

Thus, the final version of the Russian PHQ-15 consisted of 12 items. Factor analyses revealed a bifactor solution with a general somatic symptoms factor and specific factors: pain-fatigue, gastrointestinal, and cardiopulmonary symptoms. Previous psychometric studies demonstrated that the PHQ-15 includes a general somatic burden factor, but with variations of at least seven specific factors: they are neurological, gastrointestinal, and cardiopulmonary symptoms; somatization; pain; fatigue; and pain-fatigue symptoms (Lee et al., 2011; Walentynowicz et al., 2018; Zhang et al., 2016).

The current study also revealed only partial invariance across sex and age, which is consistent with earlier findings (Cano-García et al., 2020; Zhou et al., 2020). The possible reason for this could be the well-established fact that there are sex- and age-specific manifestations of the psychosomatic burden. Thus, females reported “more intense, more numerous, and more frequent” somatic symptoms than males due to greater visceral sensitivity; special bodily symptom labelling, description, and reporting; and social and cultural circumstances (Barsky et al., 2001, p. 266). A recent study described changing trajectories of functional somatic symptoms from adolescence to middle age, highlighting the close relationship between ageing and the psychosomatic burden (Nummi et al., 2017).

The Russian version of PHQ-15 showed good internal reliability and convergent validity. The evidence was provided by the acceptable Cronbach’s alpha coefficients, positive intercorrelations between PHQ-15 specific factors, and positive correlations between the PHQ-15 and SCL-90-R scores, which are considered the two most suitable instruments for assessing medically unexplained symptoms (Zijlema et al., 2013).

## **Conclusion**

In conclusion, this study revealed that the Russian PHQ-15 is a psychometrically sound instrument for assessing medically unexplained symptoms in a Russian community sample.

## **Limitations**

This study has a number of limitations. Primarily, its reliance on self-reporting carries the risk of the results being distorted by social desirability, because persons with a high somatic burden tend to view lying as more acceptable (Butean et al., 2020). In addition, this study provided evidence of convergent validity, but predictive validity is more important for a clinical self-reported instrument. An objective criterion for the usability and effectiveness of the PHQ-15 may be its ability to diagnose somatic

symptoms and related disorders in accordance with the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (Toussaint et al., 2020).

Another limitation is that only the SCL-90-R was used to establish the convergent validity of the Russian PHQ-15, whereas other adapted versions have been validated using measures of subjective well-being, self-reported physical health, and health-related quality of life (Kocalevent et al., 2013; Stauder et al., 2021; Wilkie et al., 2018). Finally, this study was population-based, although the PHQ-15 was developed to assess medically unexplained symptoms presented in primary care facilities (Kroenke et al., 1998). One avenue for future research is to test the sensitivity and specificity of the Russian PHQ-15 in clinical settings.

### **Ethics Statement**

This study was approved by the Institutional Review Board at HSE University (protocol no. 67, dated August 25, 2020).

### **Informed Consent**

All volunteers gave written informed consent, having been provided with a description of the purpose of this study and told they could stop participation at any time.

### **Conflict of Interest**

The author declares no conflict of interest.

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## Adverse Childhood Experiences in Mexico: Prevalence and Association with Sociodemographic Variables and Health Status

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**Background.** Adverse Childhood Experiences (ACEs) refer to a semantic field of negative childhood events that, in conjunction with insufficient personal, family, or contextual coping resources, have the potential of becoming traumatic.

**Objective.** To assess the prevalence of Adverse Childhood Experiences (ACEs) and their association with sociodemographic variables and physical and mental illnesses in a Mexican sample.

**Design.** A cross-sectional design was used. The sample included 917 Mexican adults who responded to the Adverse Childhood Experiences International Questionnaire (ACE-IQ). Most of the participants were female (79.3%) with an average age of 37 years, a monthly income between 500 and 2,500 USD (59.2%), had completed university education (45.6%) and were married or in a common-law marriage (53.1%). Data was collected through Google Forms, and the link to the form was shared through electronic social networks.

**Results.** A total of 48.3% of the participants presented seven to nine types of ACEs. Among their responses, the most prevalent categories were emotional neglect (95.1%), family violence (83.3%), and emotional abuse (78.6%). A significant association was found between the number of ACEs and the mental illness diagnosis ( $\chi^2(20) = 15.16; p < .001$ ). Women were found to report more experiences of sexual abuse ( $z = -6.62, p < .001$ ), whereas men reported more experiences of community violence ( $z = -4.27, p < .001$ ) and collective violence ( $z = -3.94, p < .001$ ).

**Conclusions.** The prevalence of ACEs in the Mexican population is high. However, men and women reported differences in certain types of ACEs. It was found that people with a diagnosis and family history of mental illnesses presented a higher number of ACE categories.

**Keywords:** Adverse Childhood Experiences, mental illnesses, sexual abuse, community violence, ACE-IQ, ACEs prevalence



## Introduction

The concept of adverse childhood experiences (ACE) has been defined as events that occur in childhood, which vary in severity and are often chronic, that occur in the child's family or social environment and cause harm or distress and could affect the health and physical or psychological development of the child (Kalmakis & Chandler, 2014). ACEs are influenced by cultural, social, environmental, and economic factors. They cause children distress with possible cumulative effects, having repercussions on their development and physical and psychological health (Alhowaymel et al., 2021).

The dimensions included in ACEs are diverse. Some of the main ones are (1) physical, emotional, or sexual abuse; (2) emotional or physical neglect; (3) living in a family with at least one member suffering from a mental illness; (4) substance abuse; (5) incarceration or death; (6) witnessing domestic violence; and (7) parental separation or divorce (American Academy of Pediatrics, 2020).

### *ACE Prevalence and Implications*

Worldwide, about 60% of children have been exposed to an adverse experience and, in research done for Latin American countries, this prevalence can rise to 80% (UNICEF, 2022). In Mexico, at least 63% of children have suffered or are suffering from these events, being from rural and impoverished environments where this prevalence is higher (UNICEF, 2019).

Adversity and maltreatment negatively affect children's emotional, physical, cognitive, and social domains. There is now evidence linking ACEs to health problems among adults. The Centers for Disease Control and Prevention (CDC) reported that adults who had greater exposure to ACEs as children were more likely to have chronic health problems, depression, smoking addiction, excessive alcohol use, and socioeconomic problems compared to those who did not have adverse experiences. Furthermore, it was found that preventing ACEs could reduce the prevalence of heart disease by up to 13%, of becoming overweight or obese by 2%, and of depression by 44% among U.S. adults (CDC, 2019).

Regarding mental health, ACEs contribute to the risk of developing a wide range of psychological disorders. Among the most consistent relationships found with ACEs are anxiety disorders and depression (De et al., 2013; Heim et al., 2008; Heim et al., 2010; Li et al., 2016; Lindert et al., 2014; Liu et al., 2012; Sachs-Ericsson et al., 2017; Sareen et al., 2013; Tan & Mao, 2023); generalized anxiety disorder, social anxiety disorder, and panic disorder (Cogle et al., 2010); post-traumatic stress disorder (Cogle et al., 2010; Sachs-Ericsson et al., 2017), dysmorphic disorders (Longobardi et al., 2022); borderline personality disorder, obsessive-compulsive disorder, and schizophrenia (Battle et al., 2004); and an increased likelihood of suicide attempts and self-harm (Kappel et al., 2021).

ACEs are also positively related to risk behaviors. These include smoking, alcoholism, drug addiction, high number of sexual partners and risky sexual practices, sedentary lifestyle, and delinquency. The risk increases when one has experienced four or more ACE categories (Campbell et al., 2016; Douglas et al., 2010; Downey

et al., 2017; Felitti, 1998; Ford et al., 2011; Hahm et al., 2010; Kappel et al., 2021; Tietjen et al., 2012).

The number of ACEs is also related to the presence of physical diseases. These include ischemic heart disease, cancer, chronic obstructive pulmonary disease, bronchitis, emphysema, skeletal fractures, liver disease, diabetes, and migraine (Felitti et al., 1998; Felitti et al., 2019; Li & Lacey, 2020; Merrick et al., 2019; Pierce et al., 2020; Tietjen et al., 2012). The factors mentioned above may increase the likelihood of people with ACEs dying prematurely. Brown et al. (2009) found that on average, people with six or more ACEs lived almost 20 years less than people without ACEs.

Regarding social and cognitive aspects, stressful events during childhood increase the risk of “proliferative chains” of additional stressors. These are manifest in different aspects of life such as education, work, and socioemotional relationships. For example, these events negatively impact learning and academic performance; therefore, they affect success in educational, occupational, and socioeconomic settings in adulthood (Halfon et al., 2017; Metzler et al., 2017).

In Mexico, some ACE data have been reported in specific populations such as women and university students (Esparza-del Villar et al., 2022; Flores-Torres et al., 2020). However, these studies used instruments that did not include all the ACE dimensions considered by the World Health Organization (WHO, 2017). Therefore, the aim of the present study is to evaluate ACEs' prevalence and their association with sociodemographic variables and the presence of physical or mental illnesses in a Mexican sample. The results of this study will be useful in generating scientific evidence on the prevalence of ACEs in the Mexican population. Primary health care is a favorable setting for the use of early adversity impact detection tools (Vega-Arce & Nuñez-Ulloa, 2017), since their identification is an opportunity to direct health care efforts to programs and specialists that can help limit the damage caused by ACEs or to help strengthen protective factors and prevent damage to health.

## **Methods**

### ***Participants***

A cross-sectional design was used. The final sample consisted of 917 participants. Most of the participants were female (79.3%), with an average age of 37.8 years (SD = 12.6), with a monthly income between USD 500 and USD 2,500 (59.2%), had completed university education (45.6%), and were married or in a common-law marriage (53.1%). Additionally, 20.3%, 19.6%, and 6% reported a family history of a mental illness, physical illness, and mental illness, respectively. The most frequently reported ACE categories were emotional neglect (95.1%), family violence (83.3%), emotional abuse (78.6%), and bullying (78.3%). Approximately half of the participants (48.3%) reported that they had experienced seven to nine ACE categories (*Table 1*).

**Table 1***Participants' Sociodemographic, Clinical, and Psychological Characteristics*

	F (%)
<b>Sex</b>	
Male	190(20.7)
Female	727(79.3)
<b>Age</b>	
18–27	201(21.9)
28–37	299(32.6)
38–47	215(23.4)
48–57	123(13.4)
58–67	72(7.9)
67 or more	7(.8)
<b>Monthly income (USD)</b>	
4,000 or less	58(6.3)
4,000–9,000	211(23.0)
10,00–050,000	546(59.5)
51,000–99,000	78(8.5)
More than 100,000	24(2.6)
<b>Schooling</b>	
No formal education	2(.2)
Completed secondary education	9(1.0)
Truncated secondary education	1(.1)
Technical education	25(2.7)
Completed high school	73(8.0)
Truncated high school education	9(1.0)
Finished university education	418(45.6)
Truncated university education	64(7.0)
Graduate degree	316(34.5)
<b>Marital status</b>	
Single	322(35.1)
Married/unmarried	487(53.1)
Divorced/separated	94(10.3)
Widowed	14(1.5)
<b>Family history of mental illness</b>	
Yes	186(20.3)
No	737(79.7)
<b>Mental illness</b>	
Yes	55(6.0)
No	862(94.0)
<b>Chronic disease</b>	
Yes	180(19.6)
No	737(80.4)

Adverse Experiences (Yes)	
Physical abuse	685(74.7)
Emotional abuse	721(78.6)
Sexual abuse	366(39.9)
Alcohol or drug abuse	272(29.7)
Incarceration	62(6.8)
Chronic mental illness	244(26.6)
Family violence	767(83.3)
Separation from parents	442(48.2)
Emotional neglect	872(95.1)
Physical neglect	384(41.9)
Bullying	718(78.3)
Community violence	698(76.1)
Collective violence	108(11.8)
Number of ACEs	
0	4(.4)
1–3	66(7.2)
4–6	321(35)
7–9	443(48.3)
More than 10	83(9.1)

*Note.* *F* = Frequency. (%) = Percentage.

### **Measurement Instruments**

#### *Data Questionnaire*

Sociodemographic data such as age, sex, income, and educational level were obtained. Additionally, participants were asked for any diagnoses of chronic physical and mental illnesses given by a health professional, as well as history of family diagnoses of mental illnesses.

#### *Adverse Childhood Experiences International Questionnaire (ACE-IQ)*

The Adverse Childhood Experiences International Questionnaire (ACE-IQ) is intended to measure exposure to adverse childhood experiences. It is designed to be administered to persons of legal age, and respondents are asked to answer questions based on their experiences during the first 18 years of their lives. It comprises a sociodemographic data section and 43 items grouped into the following categories: 1) Physical Abuse, 2) Emotional Abuse, 3) Sexual Abuse, 4) Alcohol Abuse, 5) Incarceration, 6) Chronic Mental Illness, 7) Family Violence, 8) Parental Separations, 9) Emotional Neglect, 10) Physical Neglect, 11) Bullying, 12) Community Violence, and 13) Collective Violence. The response options have three formats: dichotomous for items F1–F5 (yes/no); on a 5-point Likert scale for items P1–P2 (from “never” to “always”); and on a 4-point Likert scale for all remaining items (from “never” to “many times”) (World Health Organization, 2018). This instrument has obtained reliability values greater than .80 for the overall questionnaire. The version of the instrument adapted for the Mexican population was used in the present study. It obtained an overall reliability value of .85, and .69 to .90 in the subscales.

### **Procedure**

Data was collected through Google Forms, and the questionnaire link was shared through electronic social networks. The participants were asked for their informed consent upon entering the questionnaire link. Here, the nature of the research and the confidential handling of the data were explained. Those who voluntarily participated were directed to the sociodemographic data and ACE-IQ forms.

### **Data Analysis**

The data were analyzed using SPSS 23 and descriptive data for the variables were obtained. The Chi-square test was performed to identify the association between the variables. A comparison analysis was performed between people with and without physical illnesses and those with and without mental illnesses, using the Mann-Whitney U test.

## **Results**

### **Analysis of Associations**

A significant association was found between the number of ACEs and the 38–57 years of age group ( $\chi^2(20) = 85.45; p < .001$ ) with a higher frequency in the “four to seven ACEs” category. No significant association was found between ACEs and sex, schooling, or monthly income, or between the number of ACEs and physical illnesses. However, there was a significant association between the category of “four to seven ACEs” and diagnosis of a mental illness ( $\chi^2(20) = 15.16; p < .001$ ).

### **Comparison Analysis**

Regarding the prevalence in ACE types by sex, it was found that women reported more experiences of sexual abuse ( $z = -6.62, p < .001$ ) and chronic mental illness of a family member ( $z = -2.13, p < .05$ ), whereas men reported greater community violence ( $z = -4.27, p < .001$ ) and collective violence ( $z = -3.94, p < .001$ ).

Participants with a family history of psychiatric illness reported significantly higher frequencies of physical abuse ( $z = -2.08, p < .05$ ), emotional abuse ( $z = -2.55, p < .01$ ), a family history of violence ( $z = -2.75, p < .01$ ), alcohol abuse ( $z = -4.51, p < .001$ ), incarceration ( $z = -3.02, p < .001$ ), and chronic mental illness ( $z = -11.23, p < .001$ ).

Significant differences were also observed between people with and without physical illnesses. Specifically, those who had a physical illness had experienced more collective violence ( $z = -2.26, p < .05$ ). Significant differences were also found between people with and without a diagnosis of a mental illness in terms of alcohol or drug abuse ( $z = -2.64, p < .01$ ) and chronic mental illness of a family member ( $z = -4.51, p < .001$ ). These ACE categories were more frequent among people with a diagnosis of a mental illness (Table 2).

**Table 2***Comparison of ACE Categories*

%	PA	EA	SA	AA	I	CMI	FV	PS	EN	PN	B	CV	CLV
<b>Sex (n)</b>			**			*						**	**
Female (727)	73.7	79.4	45.4	30.8	7	28.2	83.9	47.3	95	42.6	77	73	9.6
Male (190)	78.4	75.8	18.9	25.3	5.8	20.5	82.6	51.6	95.3	38.9	83.2	87.9	20
<b>Physical illness</b>												*	
Yes (180)	71.7	73.3	45	31.7	5	24.4	81.1	94.4	94.4	45.6	10	75.6	16.7
No (737)	75.4	79.9	38.7	29.2	7.2	27.1	84.3	95.3	95.3	41.0	11.4	76.3	10.6
<b>Mental illness</b>				**		**							
Yes (55)	81.8	89.1	50.9	45.5	7.3	52.7	92.7	100	100	50.9	7.3	74.5	11.7
No (862)	74.2	78.0	39.2	28.7	6.7	24.9	94.8	94.8	94.8	41.3	11.4	76.2	12.7
<b>Family history of mental illness</b>				**	*	**	**						
Yes (186)	80.6	85.5	41.9	38.7	10.2	59.1	90.3	97.3	97.3	44.6	9.7	76.9	12.4
No (731)	73.2	76.9	39.4	27.4	5.9	18.3	81.9	94.5	94.5	41.2	11.5	75.9	11.6

Note. Frequencies: physical abuse (PA), Emotional abuse (EA), Sexual abuse (SA), Alcohol abuse (AA), Incarceration (I), Chronic mental illness (CMI), Family violence (FV), Parental separation (PS), Emotional neglect (EN), Physical neglect (PN), Bullying (B), Community violence (CV), Collective violence (CLV). \*\*  $p \leq .001$ , \*  $p \leq .05$ .

## Discussion

This study aims to explore ACEs' prevalence, as well as their association with sociodemographic variables and the presence of physical and mental illnesses in a Mexican sample. An association was found between age and the number of ACEs. Specifically, the group aged 38 to 57 years reported the highest number of ACEs. However, these results differ from those found by Sonu et al. (2019), where the group aged 18 to 34 years reported the highest levels of ACEs.

In line with the studies by Choi et al. (2017) and Kidman et al. (2019), the present study also found that men had experienced greater community violence while women had experienced a higher prevalence of sexual abuse. The World Health Organization (2022) reports that one in five girls and one in 13 boys have suffered sexual abuse. Furthermore, some systematic reviews in different countries show that their prevalence rate is approaching 20% for girls and 8% for boys (Stoltenborgh et al., 2011). However, there are variations between 8–31% for girls and 3–17% for boys (Barth et al., 2013). Thus, these results are very similar to those found in the present study. Escribano et al. (2020) mentioned that there are risk factors contributing to child abuse and neglect. They highlighted gender as one of the most important in terms of sexual abuse. This is because girls are five times more likely to be abused by male figures within the family and are at a greater risk of being abused for a longer period compared to boys.

The findings discussed above are crucial, since the consequences of ACEs are different with respect to gender. Some studies even show that men are reported to have higher substance dependence and women have higher rates of chronic mental

illnesses. These differences show the need to create specialized prevention programs for each gender (Almuneef et al., 2017; Kappel et al., 2021).

In relation to educational level, most participants in the present study reported having completed their undergraduate and graduate university education. Moreover, 92.4% of the sample reported four or more ACEs. These results differ from the study conducted by Hardcastle (2018), where it was found that people with an incomplete university education or those who are unemployed reported four or more ACEs.

Regarding ACEs' prevalence, the present study's results showed that almost 100% of the sample had suffered at least one adverse experience. This result is similar to what was found in the study of Almuneef et al. (2017), who used the same instrument and a similar sample, and found that 80% of the participants reported at least one ACE. Sciolla et al. (2019) and Felitti et al. (2019) found that more than half of the sample had at least one ACE. However, these two studies used different instruments and populations. Regarding the number of ACEs experienced, the present study showed that most participants had suffered between seven and nine ACEs. It should be noted that other studies categorize the number of ACEs as "0," "1," "2," "3," and "4 or more," whereas the present study categorized them as "0," "1 to 3," "4 to 6," "7 to 9" and "more than 10." Thus, the results are similar to other studies, where most participants reported four or more ACEs (Almuneef et al., 2017; Ford et al., 2011).

In Mexico, Flores-Torres et al. (2020) pointed out that 13.7% of the sample reported four or more ACEs. This result is lower than what was found in our study, where 92.4% reported that they had suffered four or more ACEs. This may be explained by the fact that the previous study used a different instrument, with fewer categories of ACEs assessed.

Currently, child abuse and maltreatment have become alarmingly growing public health problems worldwide. They have serious consequences that result in lifelong repercussions for their victims. These problems have led to countless adults having a history of child abuse and who are at greater risk of repeating patterns of violence from one generation to the next (Benavides & Miranda, 2007).

In the case of Mexico, the situation of family violence and child abuse is alarming and requires urgent attention. In this regard, Sotelo (2014) mentions that, according to INEGI data, various studies reported that 10% of minors were victims of mistreatment and abuse in 2010.

The most prevalent types of ACEs in this sample were emotional neglect, family violence, and emotional abuse. This finding is similar to what was found in the study of Almuneef et al. (2017), where the most prevalent ACE was domestic violence. However, the present study differs from that of Felitti et al. (2019), where the most prevalent ACE was a family member's substance abuse at home. The results are similar to what was reported in Mexico, where the highest ACE categories were physical abuse (Esparza et al., 2020) and substance abuse by a family member at home (Flores-Torres et al., 2020).

Regarding physical illness, only a few people in our study reported suffering from a chronic illness, even though there was a high prevalence of emotional and physical abuse in this research. This is different from the findings obtained in other studies, where the presence of chronic illnesses was significantly associated with emotional, physical, and drug abuse in the family (Chang et al., 2019).

However, it was found in this study that people with chronic physical illnesses had more experiences of collective violence. This is similar to what was reported by Al-Shawi and Lafta (2015), who mentioned that exposure to high levels of community-collective violence in conjunction with dysfunction-abuse in the family during childhood has serious consequences for adults' health. Moreover, they found that these factors approximately doubled the risk of chronic illness, as compared to those with lower exposure levels. Similarly, in a study conducted in Mexico with older adult participants, it was found that greater collective violence was related to a worse health status (García-Peña et al., 2018). Several authors have reported an association between exposure to community violence and different physical conditions such as upper respiratory diseases (Wilson et al., 2005), insulin resistance, and sleep disorders among adolescents (Kliewer et al., 2019), and cardiovascular diseases among adults (Suglia et al., 2015).

The instrument used in the present study refers to secondary exposure. This is important, as the phrase exposure to violence signals a division of violence into two categories: primary exposure, which refers to a person's direct victimization; and secondary exposure, where one observes or hears an act of violence against another person (Zimmerman & Posick, 2016). Thus, there is a division between being a victim and a witness. This is considered relevant, since being a witness is enough to affect physical and mental health (Hensel et al., 2015; Zimmerman & Kushner, 2017).

According to this study's results, having suffered ACEs is significantly associated with a mental illness diagnosis. This finding is similar to that of other studies, suggesting that the presence of ACEs increases the likelihood of suffering from mental illnesses in adulthood (Almuneef et al., 2017; Barrera et al., 2019).

This could be explained by the fact that from birth to six years, the brain goes through its fastest period of growth and development, since this is a stage that is highly sensitive to the detrimental effects of adversity (American Academy of Pediatrics, 2020; Felitti & Anda, 2010). ACEs are early and often chronic stressors, which can lead to biological and behavioral dysregulation, which can affect functioning both physiologically and psychologically, resulting in greater sensitivity to stressors in adult life. It has been hypothesized that people exposed to early adversity have sensitive cortico-amygdala neural circuitry, which is associated with increased hypervigilance and reactivity to threatening stimuli. The amygdala acts as an initial trigger for the body's response to stress, with mobilizing influences on the sympathetic nervous system and the hypothalamic-pituitary-adrenocortical (HPA) axis. In this way, ACEs increase physiological arousal in response to stressors, which has an effect later in life (Miller et al., 2011; Nusslock & Miller, 2016).

In our study, people who reported a family history of mental illnesses mentioned a higher frequency of ACEs. Particularly, they experienced a higher prevalence of emotional and physical abuse, family history of violence, alcohol abuse, and incarceration. Other studies have also shown that a close family member's mental health is directly related to an increased risk of physical abuse, emotional abuse, sexual abuse, and emotional neglect during childhood (Vaithianathan et al., 2018; Wilson et al., 2015). Similarly, it has been found that the risk and frequency of ACEs in children are increased in families where either parent presented symptoms of depression, anxiety,



or stress, and a history of traumatic childhood events (Lawson et al., 2020). This suggests that mental illness in either parent leads to a cycle of intergenerational maltreatment or the initiation of a new one; the transmission of physical, emotional or sexual abuse can occur in up to three generations; victims of abuse in previous generations can also perpetuate the risk factors for victimization in future generations (Badenes-Ribera et al., 2020).

### **Limitations and Strengths**

One limitation of the study was that the sample is extremely well educated, with 34% having a graduate degree, and the sample was self-selected via social networks. It is recommended that the study be replicated in a more heterogeneous population that includes different socioeconomic strata. Moreover, it should be carried out in different states of Mexico, to learn about the phenomenon at the national and regional levels. Lastly, future studies must explore different variables that include protective factors, such as resilience and optimism. These will help in understanding how ACEs can affect people differently according to their personality characteristics.

This study has several strengths. First, the Mexican version of the ACE-IQ was used. This instrument is recommended by the WHO to standardize the criteria by which the presence of ACEs is evaluated. Second, this study considers variables that have not been tested in other types of questionnaires, such as collective violence. Third, the present study made it possible to obtain updated prevalence rates of ACEs in Mexico, which can be compared with the results of studies from other countries. Lastly, this work can open the way for future research, such as the investigation of risk factors associated with ACEs. This can help in the development and implementation of intervention and prevention programs in vulnerable populations.

### **Conclusion**

This study found that ACEs' prevalence in this sample of Mexican population is high. Most of the participants in this study presented seven to nine types of ACEs. The most prevalent ACE categories were emotional neglect, family violence, emotional abuse, bullying, community violence, and physical abuse. People with a family history of a mental illness diagnosis had a higher number of ACEs, particularly in the categories of physical abuse, emotional abuse, family history of violence, alcohol abuse, incarceration, and chronic mental illness. Females reported a higher prevalence of sexual abuse and mental illness of a family member, whereas males experienced greater community and collective violence. Furthermore, participants diagnosed with a physical illness experienced greater collective violence. Participants diagnosed with a mental illness experienced more alcohol or drug abuse and chronic mental illness by a family member.

### **Conflict of Interest**

The authors declare no conflict of interest.

## Ethics Statement

The study protocol was reviewed and approved by the Ethics Committee of University Emiliano Zapata (the approval no: UNEZ-CEIE108).

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## The Relationship between Perceived Infectability and Psychological Well-being: The Mediating Role of Covid-19 Anxiety

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**Background.** COVID-19 has adversely affected economies and individuals globally. To this day, countries are facing the economic effects of the pandemic directly, and individuals' mental health is in danger as they are still indirectly dealing with the pandemic. It is imperative to understand how pandemic-related anxiety affected individuals' mental health so that all stakeholders can take essential remedial steps.

**Objective.** The current research aimed to investigate the relationship between Perceived Infectability, Coronavirus Anxiety, and Psychological Well-being. It also sought to explore the role of coronavirus anxiety in mediating between perceived infectability and psychological well-being.

**Design.** A cross-sectional correlational study design and non-probability convenience sampling technique were used to collect the data. The data were collected from 321 Pakistani adults, who filled out Google forms on the Perceived Infectability subscale of the Perceived Vulnerability to Disease Scale; the Coronavirus Anxiety Scale; and the Psychological Well-being Scale.

**Results.** Correlation analysis indicated that both perceived infectability and coronavirus anxiety were negatively related to psychological well-being. However, a significant positive relationship was observed between perceived infectability and coronavirus anxiety. Our findings further proved the mediating role of coronavirus anxiety between perceived infectability and the psychological well-being of adults.

**Conclusion.** Understanding perceived infectability and its association with COVID-19 anxiety and psychological well-being is pertinent in this post-pandemic period in both developing and developed nations. The post-pandemic world is still being jolted with the aftereffects of the pandemic. An in-depth understanding of how individuals coped with the pandemic, might help in designing better intervention and community health programs after the pandemic, and it could also help in preparing for the crises attending future pandemics (if any).

**Keywords:** perceived infectability, coronavirus anxiety, psychological well-being, mediation, COVID-19

## **Introduction**

In December 2019, a pneumonic outbreak in Wuhan, China turned into a global pandemic. This outbreak, later termed Coronavirus (COVID-19), caused considerable concern, fear, and discomfort in healthcare settings globally in terms of potential contamination (Morawska et al., 2020). Pakistan, being a neighbor of the epicenter of COVID-19, got its first case of the virus on February 26, 2020 in Karachi (Naqvi et al., 2020); afterwards, the virus spread across the country rapidly. This rapid spread led to smart lockdowns and closures of all public institutions (including educational ones) to control the spread of the virus.

Due to its contagious nature and high transmission rate, COVID-19 spread worldwide. With the surge in cases, individuals' concerns about the risk of getting the disease and perceived infectability increased (Van Bavel et al., 2020). Developing countries like Pakistan were at a higher risk due to lack of awareness and limited resources. The virus could affect both the immune-suppressed and normal populations. The risk of contracting the virus led to perceived infectability, which further resulted in inducing coronavirus anxiety (Ovetuniji et al., 2020). In these uncertain times, constant feelings of risk and worry about contracting the virus had an unprecedented and negative impact on well-being. Both the normal and vulnerable populations were at high risk of COVID-19 related stressors (anxiety) as the situation got more muddled and severe day by day, with no clear end in sight and with the non-availability of the vaccine for the general public and underprivileged.

In Pakistan, the third wave of COVID-19 (May 2020, the time of the present research) and the lengthy process of providing the vaccines contributed greatly to anxiety. People were surrounded by a great deal of uncertainty and fear because they had faced a new, unusual, and unfamiliar health-related threat with limited and continuously evolving information. An individual's susceptibility to anxiety and vulnerability increases in any crisis, and they actively engage in information-seeking from different sources to reduce their worries. However, the media coverage of the recent pandemic amplified the global fear and caused significant psychological distress among individuals (Bendau et al., 2020) as in the case of other pandemics (Bernstein et al., 2019) and related events (Garfin et al., 2015). These factors directly affected people's well-being (Amin, 2020), and are therefore a great concern for the scientific community.

During past pandemics, investigations have been directed at the effect of risk perception of the disease on the sentiment of anxiety (Bults et al., 2011), and how mass tragedies, especially those including uncontrolled illnesses, regularly trigger anxiety; such anxiety is known to create disturbances in behavior (Balaratnasingam & Janca, 2006). Since previous studies have established that pandemic-related anxiety dramatically affects individuals' mental health, it is imperative to understand how COVID-19 related anxiety affects the public's psychological well-being (Wang et al., 2021).

Coronavirus anxiety and perceived infectability are real threats to people's psychological well-being, since up until now, people have drawn an unmistakable and hopeless picture of what the present and future holds for a great part of the world as it wrestles with the coronavirus (Arden, 2020); the fear of transmission and life-



threatening nature of the virus is affecting the psychological well-being of populations overall (Feinman et al., 2020). In Pakistan, very few studies until now have addressed the psychological aspects of the virus during the coronavirus era. This means that these aspects need more exploration, since much of our attention is being taken up by the danger of this disease, which is greatly disturbing people's mental health (Mukhtar, 2020). Moreover, all the prevention programs and strategies imposed by the Pakistani government primarily focused on the physical aspect of the virus and did not provide any information about the psychological aspects of the current pandemic. Yet, the psychological fallout is a very important area of concern not only around the world but also for developing countries like Pakistan, where the mental health of the population is already overburdened.

Therefore, the current study aimed to investigate the relationship between perceived infectability, coronavirus anxiety, and psychological well-being. The present study further investigates the mediating role of coronavirus anxiety within the Pakistani population due to the current global pandemic and will add to knowledge about the psychological aspects of the coronavirus outbreak in Pakistan.

## **Methods**

### ***Participants***

A cross-sectional correlational study design and non-probability convenience sampling technique were used to collect the data. Prior to data collection, formal approval of the research design was obtained from the research ethics committee (Psy/IRB/Letter-A0012), followed by receiving permission from the original authors of the measures used in the present study. The questionnaires were constructed electronically via Google forms and distributed through emails and other communication apps by creating a link where respondents had to click to get access to the questionnaire.

The consent form for the participation included all the necessary information about the researchers and the purpose of the research, accompanied by contact information for research-related queries and assurance about the anonymity and confidentiality of the data. Participants accessed the questionnaire after providing their consent. Instructions were provided before the participants filled out the questionnaire. Lastly, each questionnaire concluded with a note of appreciation to the participant for their participation. The age range of the sample ( $N = 321$ ), which had a response rate of 64%, ranged from 18 to 65 years ( $M = 28.88$ ,  $SD = 10.46$ ). The sample was comprised of 60.1% female and 39.9% male participants. Among them, 16.8% were older adults, and 83.2% were younger. Moreover, 74.8% had intermediate or bachelor's degrees, while 25.2% had master's degrees and a higher level of education.

### ***Questionnaires***

***The Perceived Vulnerability to Disease Scale.*** This instrument, developed by Duncan and colleagues (2009), is used to assess risk perception. The scale has 15 items with two subscales; Perceived Infectability (7 items) evaluates the individual's convic-

tion about his helplessness in the face of an overwhelming illness, and Germ Aversion (8 items) assesses the individual's level of uneasiness in settings that portend a particularly high potential for microorganism transmission. The participants respond on a 7-point Likert Scale (1-7) from Strongly Disagree to Strongly Agree, with a few reverse coded items (3, 5, 11, 1, 13, & 14). The Cronbach's Alpha reliability of both scales and overall composite scale ranged between .74 to .87 (Duncan et al., 2009). For the present research only the Perceived Infectability subscale was used; high scores on the scale represented high fear of infectability by the Coronavirus, with a score range of 7- 49.

***The Psychological Well-being Scale.*** This 18-item scale, developed by Ryff and Keyes (1995), assesses individuals' psychological well-being on a 7-point Likert scale (1 = Strongly Agree to 7 = Strongly Disagree). Overall, the scale has satisfactory reliability ( $\alpha = .82$ ) and scores ranged between 18 to 126. High scores represent higher well-being since positive statements are reverse coded (items: 1, 2, 3, 8, 9, 11, 12, 13, 17, & 18).

***The Coronavirus Anxiety Scale.*** This 5-item scale, developed by Lee (2020), was used to evaluate the COVID-related anxiety of the study participants. Participants responded on a 5-point Likert scale, which ranged from 0 (not at all) to 4 (nearly every day) about their anxiety during the previous 14 days, with high scores (20) representing higher anxiety and low scores (0) lower anxiety. The scale had satisfactory reliability ( $\alpha = .93$ ).

### ***Hypotheses of the Study***

Based on the literature and aims of the study, the following hypotheses were formulated.

1. There will be a positive association between perceived infectability and coronavirus anxiety among adults.
2. Coronavirus-related anxiety will be negatively associated with the psychological well-being of adults.
3. Coronavirus-related anxiety will mediate the association between perceived infectability and the psychological well-being of adults.

### ***Procedure***

Cronbach's Alpha reliability and correlational analysis were computed using SPSS. Similarly, mediation analysis was carried out on Andrew Hayes' SPSS Process Macro through model 4 without any control variables. Alpha reliabilities were in the acceptable to good range.

### ***Results***

*Table 1* indicates that a significant positive relationship between perceived infectability and corona virus anxiety exists. Similarly, a significant negative relationship was apparent between perceived infectability and coronavirus anxiety, and psychological well-being.

**Table 1**

*Correlation between Perceived Infectability, Coronavirus Anxiety, & Psychological Well-Being among Adults (N = 321)*

Variables	$\alpha$	M	SD	2	3
1 Perceived infectability	.76	29.67	7.57	.47**	-.37**
2 Coronavirus anxiety	.86	4.24	4.06	-	-.50**
3 Psychological well being	.79	81.62	14.79	-	-

Note. \*\* $p < .01$ .

**Table 2**

*The mediating Role of Coronavirus Anxiety in the Relationship between Perceived Infectability & Psychological Well-Being among Adults (N = 321)*

Model	B	SE	p	CI (lower)	CI (Upper)
Model without a Mediator					
Constant	102.79	3.12	.00	96.66	108.92
PI—PWB(c)	-.71	.10	.00	-.91	-.51
R <sup>2</sup> (Y, X)	.13				
Models with a Mediator					
Model 1: Coronavirus Anxiety as a Dependent Variable					
Constant	-3.31	.81	.000	-4.90	-1.72
PI----CA (a)	.25	.03	.000	.20	.31
R <sup>2</sup>	.23				
Model 2: Psychological Well-Being as a Dependent Variable					
Constant	97.70	2.94	.000	91.92	103.47
CA---PWB(b)	-1.54	.20	.000	-1.93	-1.15
PI---PWB (c')	-.32	.11	.002	-.53	-.11
Indirect effect	-.39	.004		-.04	-.02
R <sup>2</sup> (Y, M, X)	.27				

Note. (sobel  $z = -6.03$ ,  $p < .01$ ). PI = Perceived Infectability; CA = Coronavirus Anxiety; PWB = Psychological Well-Being.

Table 2 confirms the mediating role of coronavirus anxiety in the relationship between perceived infectability and psychological well-being. As evident, the model without a mediator accounted for a 13 % variance in psychological well-being due to perceived infectability, whereas in model 2, both perceived infectability and coronavirus anxiety significantly and negatively predicted psychological well-being, accounting for a 17 % variance.

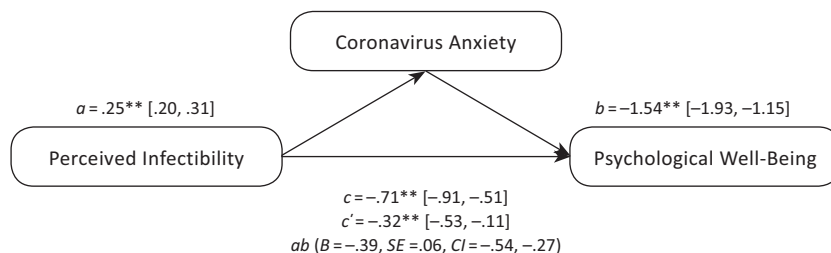


Figure 1. The mediating role of coronavirus anxiety in the relationship between perceived infectability and psychological well-being

## Discussion

One of the main objectives of the present research was to examine the relationship between perceived infectability, coronavirus anxiety, and psychological well-being. Correlational analysis confirmed that perceived infectability and coronavirus anxiety are both positively correlated and negatively related to psychological well-being. These findings are in line with the existing literature (Wang et al., 2019), indicating that high perceived infectability of the coronavirus leads to psychological distress (anxiety) among individuals.

Previous pandemic-related studies, dealing with the Ebola virus and severe acute respiratory syndrome (SARS), established similar phenomena that individuals who perceive the disease as life-threatening and contagious, experience more negative emotions such as anxiety (Wu et al., 2009). The plausible reasons could be the sudden and rapid transmission rate of the virus, since the transmission of COVID-19 is through the air (Zhong et al., 2020). This rapid transmission evokes anxiety among adults for a number of reasons, including high-risk perception, uncertainty of the future, and serious threats to both health and life itself.

Increased COVID-19-related anxiety (Ahuja et al., 2020) and perceived infectability are associated with a deterioration in psychological well-being (Ding et al., 2020). The plausible reasons for the increased anxiety could be deficient information about the virus, its rapid transmission, the non-availability of vaccine (to the youngsters and general public), elevated levels of perceived infectability, prompt changes such as self-isolation, social distancing, misleading information in the media, restrictions on travelling, and lockdowns. These factors further foster a disturbed mental state, prompting restlessness and uncertainty, and thus unfavorably influence the psychological well-being of the populace. Research on past pandemics also provides supportive evidence that other life-threatening illnesses like SARS also prompted a lower level of psychological well-being (Lau et al., 2008).

In addition, we explored the mediating role of Coronavirus anxiety in the relationship between perceived infectability and psychological well-being. Our findings emphasize that the addition of coronavirus anxiety as a mediator explains a further 14% variance. Constant worrying about health, and fear about the coronavirus and the future of the world, adds to coronavirus anxiety and thus hinders the daily functioning of the masses. People become more vulnerable to the perceived infectability

of the virus, which is a real threat to their lives, overall, negatively affecting their psychological well-being.

Although there is no direct evidence concerning the mediating role of coronavirus anxiety in perceived infectability and psychological well-being, a recent study (Silva et al., 2021) suggested the mediating role of coronavirus anxiety in the relationship between mortality awareness and psychological well-being. Coronavirus anxiety is a variable which needs further exploration, as it is buffering many psychological issues and concerns including perceived infectability, which is a threat to individuals' psychological well-being.

## **Conclusion**

Coronavirus anxiety significantly mediates the relationship between perceived infectability and psychological well-being. Future research needs to incorporate coronavirus anxiety as a factor, since the fear of the coronavirus, constant worrying about the future, and perceived infectability are potential risk factors for low psychological well-being. Furthermore, coronavirus anxiety management techniques need to be considered in providing community help programs and should also be included on coronavirus helplines. Interventions aimed at controlling the physiological aspects of the coronavirus outbreak should also include dealing with the psychological effects of the coronavirus.

## **Limitations and Future Directions**

The present study used a survey method based largely on network invitation rather than face-to-face random sampling, and thus the participants were required to be able to use or have knowledge about network tools. Therefore, one limitation of the study was that it did not include the sections of the population who cannot use network tools. Future research (post-pandemic) could avoid this issue by contacting individuals face to face and drawing a comparison between healthy and COVID-19 victims. Lastly, the study configuration was cross-sectional; future research could use longitudinal study methods to grasp changes in psychological distress level and psychological well-being over the span of the COVID-19 pandemic.

## **Ethics Statement**

Ethical approval was obtained from the research ethics committee of the Department of Psychology, Rawalpindi Women University, Rawalpindi wide letter number (Psy/IRB/Letter-A0012). Written informed consent to participate in this study was provided by the participants.

## **Author Contributions**

S.K. and S.M.F. conceived the idea, developed the theory, and wrote the initial draft. R.S. verified the data analysis, revised the initial manuscript, and incorporated reviewers' comments to finalize the manuscript. All authors discussed the results and contributed to the final manuscript.

## Conflict of Interest

The authors declare no conflict of interest.

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## DEVELOPMENTAL PSYCHOLOGY

# Toy Preferences among 3-to-4-Year-Old Children: The Impact of Socio-Demographic Factors and Developmental Characteristics

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**Background.** Today's common typologies and categories of children's toys are mainly decided by the manufacturers and retailers of children's products. Such categorizations are not based on a theoretical understanding of child development and therefore cannot provide information about the opportunities that toys provide for the young.

**Objective.** This study proposed three criteria for categorizing toys based on the cultural-historical approach: their degree of realism; their degree of anthropomorphism; and their degree of detail. These criteria were chosen as a result of an analysis of theoretical works carried out in the framework of cultural-historical approach.

**Design.** The proposed criteria were tested through an experiment measuring children's toy preferences. The participants were 129 children of ages 3-4 years. Experimental data confirmed that most children do prefer realistic and detailed toys rather than those with fewer of these properties. The contribution of socio-demographic factors and the children's individual developmental indicators to their toy preference was also analyzed.

**Results.** The study revealed that among various socio-demographic factors, only the child's gender and the number of siblings in the family acted as significant predictors for the toy preferences. None of child's developmental characteristics (non-verbal intelligence, executive functions, and emotional understanding) were found to be significant predictors of preference for particular toys.

**Conclusions.** The assumption that toys can be assessed in terms of their realism and degree of detail found empirical support. The results of this study may be useful in designing further research and in the practical issue of toy selection for children age 3-4 years.

**Keywords:** child psychology, cultural-historical approach, play, toy preference, executive functions, emotion understanding



## Introduction

A toy is not just an object; it is the material for children's play and a means of child development (Francis, 2010; Wynberg et al., 2022). Pre-school children are naturally motivated to play (Bondi et al., 2021; Guirguis, 2018; Lillard, 2017; Ryabkova et al., 2019; Veraksa et al., 2020; Whitebread, 2017, 2018). Previous studies have reported that play promotes the development of executive function skills (Doebel et al., Fleer et al., 2019; Kelly et al., 2011; Veraksa et al., 2020; Vidal Carulla et al., 2021); emotional and social development (Colliver et al., 2021; Howard et al., 2017; Mathieson et al., 2011); and speech (Nicolopoulou et al., 2015; Quinn et al., 2018).

Certain studies of child development and play have dealt with some aspects of the specifics of toys and their choice (Davis et al., 2020; Francis, 2010; Mertala et al., 2016; Wynberg et al., 2022; Fleer, 2022). Mostly, such works were focused on children's gender and age as the main factors determining their preferences (Ban et al., 2022; Hassett et al., 2008; Liu et al., 2020; Mertala et al., 2016). Only very few studies were in fact related to the role of individual psychological predictors of toy preferences (Francis, 2010; Liu et al., 2020). Some of them were conducted within the framework of the cultural-historical approach. For instance, a significant study under the guidance of Smirnova was done to create a whole methodology for determining the psychological and pedagogical expertise of skills toys can provide (Smirnova et al., 2008; Smirnova, 2011a; Smirnova, 2011b).

The relevance of conducting further research on toys and children's preferences is that, with the huge variety of contemporary toys, there is a lack of the evidence-based data needed to examine toys and their potential impact on child development. This often results in children being exposed to toys that not only do not contribute to their mental development, but can also be harmful (Smirnova et al., 2016).

### *Toy categorization approaches*

There is no single categorization of toys, since that process is based on different theoretical approaches and concepts (Kudrowitz & Wallace, 2010). The most common method of categorization is used for mass market toys. It is based on the particular physical category used in their production, like the materials and technology (e.g., soft toys, dolls, bricks) (Clark, 2007). Another widespread method of toy categorization is based on the definition of the toy's main function or expected developmental effect (e.g., sensory toys, musical toys, puzzles) (Kudrowitz & Wallace, 2010). Such approaches, in addition to dividing toys by children's gender or age, are not sufficiently theoretically grounded. They can rather be seen as an attempt to structure the abundant toy market.

What is much more useful is to evaluate toys according to the opportunities they provide for a child to develop through play. Such an approach requires not only a detailed theoretical understanding of child development stages and mechanisms, but also extensive qualitative experience in observing children's play (Veraksa et al., 2022). Such a categorization of toys associated with Piaget's stages of cognitive development is described in the Kudrowitz & Wallace study (2010). Based on a review of hundreds of toys, the authors proposed four categories that define the "play value" of a toy: sensory, fantasy, construction, and challenge. They emphasized that each

category of toys is of interest to children especially during the corresponding cognitive development periods (the sensory-motor period, preoperational stage, period of concrete operations, and period of formal operations).

From a cultural-historical point of view, the child recreates life experiences when playing. In this approach, play is considered one of the most important sources of development during the preschool years. The child not only acts out stories, but also learns about the nature of social relationships. Therefore, toys should have certain properties to help the child create an imaginary situation. Toy characteristics that should be of interest to children, according to the cultural-historical approach, are described below.

*Realistic toys.* Vygotsky emphasized that a toy should contribute to the creation of an imaginary or pretended situation (Vygotsky, 1972). Realistic toys are objects that are a small replica of real objects used by adults. They include, for example, home furnishings (furniture, dishes), food (fruit, vegetables), and themed sets (doctor, fireman, supermarket). Such toys encourage the child to play out familiar scenes.

*Anthropomorphic toys.* Elkonin has shown that most often children act out relationships between people in play (Elkonin, 2005). In other words, the main content of play is human interaction in different situations. Therefore, children should be more interested in toys that provide an opportunity to represent stories related to social interaction and human activities. Anthropomorphic toys may include those toys that have human features (family doll set, human figures).

*Detailed toys.* Smirnova emphasizes that the toy should have enough details and necessary attributes for recreating real situations in play (Smirnova, 2011). In this case the child will better understand what actions can be taken with the toy. A detailed toy will be of more interest to the child than the others, because it contains "hints" as to what activities can be done with it.

### ***Main research paradigms on children's toy preferences***

Children's preferences in toys are mostly measured by questionnaires or observation. Both children and the adults who spend a lot of time with them can become the respondents for the surveys (Sung, 2018). Some researchers opt for the format of a retrospective report, when adults report which toys they preferred in their young years. However, when a grown-up is interviewed, there is a risk of distorted information about his/her real preferences as a child. Moreover, the toy market changes over time. The observation of the process of choosing a toy can take place both in natural and experimental conditions (Hassett et al., 2008; Liu et al., 2020). The paradigms that define the way these observations are conducted can be divided into four categories: free play (Fagot et al. 1969; Pasterski et al., 2005); the naturalistic approach (Downs, 1983; Nelson, 2005); visual preference; or choosing among given options (Golombok, 2010).

### ***Current study***

This study aimed to specify scientific data on young children's toy preferences. The research design was developed on the basis of the paradigm of a forced choice from a number of options. This approach ensures equal experimental conditions for data

collection. The novelty of this study derives from its exploration of not only socio-demographic predictors, which have been studied previously (Davis & Hines, 2020), but also the chief developmental characteristics which may impact children's toy preferences. Among socio-demographic factors considered in this study were the gender and age of the children, the level of mother's education, and the number of siblings cohabiting with the child. Non-verbal intelligence, executive functions, and emotional understanding were considered the indicators of the main developmental areas which are potentially able to impact toy preferences.

This study aimed to address the following research questions: a) Would the children prefer more realistic toys over those that are less related to children's real-life experiences? b) Would the children prefer more anthropomorphic toys to those with less human traits? c) Would the children prefer more detailed toys to those with few details and attributes? d) Do socio-demographic factors or developmental characteristics significantly predict a child's preference in toys?

## Methodology

### Sample

One hundred twenty-nine 3-to-4-year-old children attending Moscow preschool institutions and their mothers participated in the study. Their average age was 42 months (3.92 y.o.). The proportion of male and female respondents was approximately equal (51% were girls). The level of education of the mothers who took the survey was distributed as follows: secondary vocational education = 4.9%; higher professional education (bachelor, master, or specialist) = 87%; and scientific degree = 4.8%. A few (2.4%) mothers refused to provide this information.

This data was collected from October to December 2022, and the procedure consisted of three stages. In the first, a parental survey was carried out to clarify the socio-demographic situation of the family. The survey was conducted by means of printed questionnaires that were handed out to the parents in the kindergarten. Only those children whose parents provided their answers were included in the study.

The second stage consisted of a developmental outcome assessment; several individual sessions were held with each child. The diagnosis was performed by experienced testers who had psychological training. All techniques followed the same order, and each session didn't last more than 15 minutes. Not all the children completed all the tests (some children refused to complete certain tasks, and if that was the case, the assessment was terminated).

The third stage included individual sessions where each child was asked to choose one toy among others in three experimental trials.

### Tools

Five tools successfully validated for a Russian sample were used to measure the children's cognitive regulation: 1) the *Dimension Card Change Sorting* (Zelazo, 2006) for the level of cognitive flexibility; 2) the subtest *Memory for Designs* (Korkman et al., 2007) for visual working memory; 3) the *Inhibition* subtest of NEPSY-II (Korkman et al., 2007) for inhibitory control; 4) the *Sentences Repetition* subtest of NEPSY-II

(Korkman et al., 2007) for the volume of auditory working memory; and 5) the *Statue* subtest of NEPSY-II (Korkman et al., 2007) for the level of physical inhibitory control.

The Russian version of the *Test of Emotion Comprehension* (TEC) (Pons et al., 2000) was used to evaluate the children's level of emotional development. The Russian version of the TEC has been successfully adapted and validated for use in a Russian sample (Veraksa et al., 2021). The test assesses three levels of emotional understanding: External, Mental, and Reflexive. The External level focuses on the child's ability to recognize emotions, to understand the external causes of emotions, and the impact of desires on emotions. The Mental level concerns understanding the role of beliefs and memories on emotions, as well as understanding of hidden emotions. The Reflexive level is the most complex and evaluates understanding of mixed feelings, the possibilities of emotional regulation via cognitive strategies, and the influence of moral self-reflective rules on emotions.

Non-verbal fluid intelligence was assessed by means of the Russian adaptation of *Raven's Coloured Progressive Matrices* (CMPM) (Raven et al., 2002).

A parental survey in the form of printed questionnaires was administered to collect the socio-demographic data (gender and age of the children, the level of the mother's education, and the number of siblings living together with the child).

### **Experimental procedure**

The experimental session aimed at investigating the children's toy preferences was held within the framework of a forced choice paradigm. The experiment included three trials corresponding to the research questions on toy preference. In each trial,



*Figure 1.* Toys presented in three toy-preference trials.

*Notes:* a) toy realism trial with three levels (low=dragon, middle=space, high=shop); b) toy anthropomorphism trial with three levels (low=a tiger family, middle=a family of pigs, high=a human family); c) toy detail trial with three levels (low=a doctor bear, middle=a doctor doll, high=a hospital play set).

the child was shown three toys, which had been selected based on the degree of the three variables (level of realism, anthropomorphism, or detail) (see *Figure 1*).

*The first trial* was designed to explore whether the children preferred more realistic toys to those that were less related to their real-life experiences. For this purpose, the three options were the following: “a) the shop where we go every day; b) the space where just a few people can travel; and c) the dragon that only exists in the fairy-tales.”

*The second trial* was designed to examine whether the children preferred more anthropomorphic toys to those with less human traits. In this trial the options to choose from were three sets of families: a human family, a family of pigs looking like people (Peppa Pig™), and a tiger family.

*The third trial* was designed to investigate whether the children preferred more detailed toys to those with fewer details and attributes. The options were three toys relating to the same theme (playing doctor) but differing in degree of detail: a doctor bear, a doctor doll with medical paraphernalia, and a hospital play set.

In all the experimental sessions, the trials were carried out in an identical manner. The toys were equal in size and set out on a dense white cloth at the same distance from each other. While the experimenter established contact with the child and gave the instructions, the latter could not see the toys. Also, when one category of toys was presented, the others were out of sight. This instruction was given to the child: “Please take these two circles, a big and a small one (two cardboard circles were demonstrated). I will show you some toys now, and I will ask you to place the circles in such a way that they would show which toys you like more, and which less. The big circle should go with the toy you would like to play with the most, and the small circle with the one that you would pick in the last place.” The average total time of the experiment with each child was 9-10 minutes.

## Results

### *Descriptive statistics*

The results of individual testing of the participants’ intellectual, executive function, and emotional development are presented in *Table 1*. As a result of the examination, certain age-related specifics of mental development of 3-to-4-year-old children were revealed. The majority of children were unable to switch between rules while performing the cognitive flexibility tasks, and a lot of erroneous (impulsive) answers were given during the inhibitory control task, without any intention of correcting them. Moreover, the participants could only retain in their memory the words and the semantic elements of short and grammatically simple sentences. They also demonstrated low skills of understanding the reasons for their emotions.

However, if we study the results individually, the values for each factor varied. For instance, some children obtained almost the highest possible score in nonverbal intelligence, cognitive flexibility, and auditory and verbal working memory, already at the age of 3. They also managed to complete the inhibitory control task without any mistakes. The scores on visual working memory and understanding the reflexive reasons for emotions demonstrated the least dispersion in this sample.

*Table 2* provides the experimental data on toy preference among children. As can be seen from the table, more than half of the children (55.8%) preferred the most re-

**Table 1**

*The results of individual testing of children's intellectual, executive function, and emotional development*

	Range	M	SD	Min	Max
Nonverbal intelligence	0–36	5.73	3.78	1	21
Cognitive flexibility	0–24	16.36	2.30	8	23
Visual working memory	0–150	37.12	8.56	13	81
Inhibitory control (corrected errors)	0–40	1.65	1.85	0	8
Inhibitory control (uncorrected errors)	0–40	11.36	9.02	0	35
Auditory and verbal working memory	0–34	9.65	6.39	0	25
Understanding of external reasons of emotions	0–3	0.81	0.72	0	3
Understanding of mental reasons of emotions	0–3	0.86	0.73	0	3
Understanding of reflexive reasons of emotions	0–3	0.57	0.64	0	2
General emotional intelligence	0–9	2.25	1.35	0	7

*Notes.* The “Inhibitory control (corrected errors)” variable refers to the number of errors that the child corrected while performing this task, while the “Inhibitory control (uncorrected errors)” variable refers to the number of errors that were left intact.

**Table 2**

*Children's preferences on toy choice in the three experimental trials*

Experimental trial	Options	Counts	% of Total
Degree of toy realism	Low level (dragon)	16	12.4%
	Middle level (space)	41	31.8%
	High level (shop)	72	55.8%
Degree of toy anthropomorphism	Low level (a tiger family)	33	25.6%
	Middle level (a family of pigs)	55	42.6%
	High level (a human family)	41	31.8%
Degree of toy detail	Low level (a doctor bear)	19	14.7%
	Middle level (a doctor doll)	28	21.7%
	High level (a hospital play set)	82	63.6%

alistic toys over toys less connected to their real-life experiences. The least preferred toy in this trial was the dragon, which, according to the instructions, only exists in fairy tales (12.4%). In the anthropomorphism trial, the most popular choice was not a human family, as expected, but a family of pigs looking like people (42.6%). However, the most unpopular choice was the tiger family (25.6%). Finally, the majority of children (63.6%) preferred to choose more detailed toys among those with fewer details and attributes. The plush doctor-bear, which was the least detailed toy, was chosen by the children the least number of times (14.7%).

### ***Socio-demographic factors and developmental characteristics impact on toy preferences***

The socio-demographic factors that could affect children's toy preferences included in this study were their age and gender, the mother's level of education, and the number of siblings. Gender-related specifics of toy preferences and play behavior were explored by using the Independent Samples T-Test. The analysis revealed significant differences between girls and boys only in the degree of toy detail trial ( $t(127) = 2.36$ ,  $p = 0.020$ ). In that trial, the boys chose more detailed toys significantly more often than the girls ( $M = 2.64$ ,  $SD = 0.67$ ;  $M = 2.34$ ,  $SD = 0.77$ , respectively). No significant gender-related differences were found in the trials on the degrees of realism and anthropomorphism.

Correlation analysis was applied to explore the potential relationship of toy preferences and the children's ages, their mothers' education level, and their number of siblings. The only variables that demonstrated significant correlation were the number of siblings and the degree of realism of the toy ( $r = .278$ ,  $p = 0.01$ ). The more siblings a child had, the more he or she tended to choose the most realistic toys compared to toys not related to real experiences.

Next, correlation analysis was used to answer the question of whether developmental characteristics significantly predict a child's toy preferences. The number of siblings in the family was taken as the control variable because this factor turned out to be significantly correlated to some toy preferences. However, no significant associations were found between the toy preferences and children's non-verbal intelligence, executive function skills, or emotional understanding ( $p > 0.05$ ).

### **Discussion**

As mentioned in the Introduction, the currently common toy typologies and categories are mainly decided by manufacturers and retailers of children's products. Thus, toys often are categorized according to the technology by which they are constructed. This approach does not provide valuable information about what opportunities a particular toy provides for a child's play and development, because it is not based on a theoretical understanding of developmental principles (Veraksa et al., 2022).

This study proposed three criteria for categorizing toys based on the cultural-historical approach: the degree of toy realism (Vygotsky, 1972); the degree of toy anthropomorphism (Elkonin, 2005); and the degree of toy detail (Smirnova, 2011). In the cultural-historical approach, play is understood as a source of child development. In play, the child recreates the events and processes of real life and thereby learns how to deal with them. In play, the child achieves a better understanding of the world and the culture he or she is growing up in. Realistic, anthropomorphic, and detailed toys are supposed to have a special value for play because they help to create an imaginative play situation that is closest to reality.

A toy preference experiment was conducted on a sample of 129 3-to-4-year-old children to test the performance of the proposed toy categorization criteria. The data from the children's choice of toys in the three experimental trials supported

the assumption that children would prefer more realistic and detailed toys. However, in the test for the degree of anthropomorphism of the toy, the expected result was not obtained. Children were expected to be more likely to choose a human family. But the most frequent choice in this sample was a family of pigs that look like humans. This result is probably due to the popularity of the character from the Peppa Pig™ play set. Children may have chosen the pig family because they were familiar with the brand (e.g., from watching cartoons). This risk was assumed in the design of the study. However, no alternative option was found in the toy market (see Limitations).

The present study also analyzed the impact of socio-demographic factors (gender and age of the children, the level of the mother's education, and the number of siblings) on toy preferences. We found that the number of siblings was a statistically significant predictor of children's preferences for more realistic toys. The more children there were in the family, the more often they chose more realistic toys over those that were unrelated to their life experiences. It was also found that boys tended to choose more detailed toys than girls. The lack of correlation between play and the age of children can be interpreted as a confirmation of the universality of the play need at an early age, which actively develops regardless of the socio-demographic factors determining the children's environment.

For the first time, this study also considered a child's developmental characteristics (non-verbal intelligence, executive functions, and emotional understanding) as possible predictors of preference for particular toys. Still, this experiment did not detect any evidence for such a relationship.

## **Conclusion**

This study proposed three criteria for categorizing toys based on the cultural-historical approach: the degree of realism, the degree of anthropomorphism, and the degree of detail of the toy. These criteria were highlighted as a result of analysis of theoretical works carried out in the framework of cultural-historical approach. It was assumed that realistic, anthropomorphic, and detailed toys have a special value for play because they help the child to create lifelike play situations and explore the world through them. The proposed criteria were tested through an experiment on the children's toy preferences. Experimental data confirmed that most children do prefer realistic and detailed toys to those with fewer of these properties. It was revealed that among various socio-demographic factors, only the child's gender and the number of siblings in the family was significant predictors for the toy preferences. None of child's developmental characteristics (non-verbal intelligence, executive functions, and emotional understanding) were found to be significant predictors of preference for particular toys.

## **Limitations**

Among the limitations of this research one can include the narrow age coverage of the sample that only included 3-to-4-year-old children, as well as certain flaws related to the application of the forced choice paradigm to explore the participants' toy pref-



erences. Compared to the naturalistic approach, or free play analysis, this paradigm implies the formation of toy sets to be offered under certain criteria, together with the experimenter's presence while the child makes his/her choice. Both these factors can potentially affect the expressed preference. However, the naturalistic approach (the analysis of the toys that belong to the child) would entail even more limitations. For instance, these toys do not always reflect real interests and affections of children, but rather the values and the preferences of the adults that purchased them. There are concerns that in the experimental anthropomorphic trial, the toys were not selected optimally. In this trial children chose toys with a medium level of anthropomorphism (the pig family), which was probably due to the fact that children recognized their similarities with popular animated heroes (Peppa Pig™ play set.).

### **Conflict of Interest**

The authors declare no conflict of interest.

### **Author contributions**

M.G., V.S., and N.V. conceived, conceptualized, and designed the study; gathered and analyzed the data; and acquired the resources required. M.G. drafted the manuscript.

### **Ethics Statement**

As the study involved human participants, it was reviewed and approved by the Ethics Committee of Faculty of Psychology at Lomonosov Moscow State University (the approval no: 2022/21). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

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