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ABOUT THIS JOURNAL

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The Journal of Neurobehavioral Sciences (J Neuro Behav Sci) is a peer-reviewed open-access neuroscience journal without any publication fees. All editorial costs are sponsored by the Üsküdar University Publications and the Foundation of Human Values and Mental Health. Each issue of the Journal of Neurobehavioral Sciences is specially commissioned, and provides an overview of important areas of neuroscience from the molecular to the behavioral levels, delivering original articles, editorials, reviews and communications from leading researchers in that field. JNBS is published electronically and in the printed form 3 times a year by Uskudar University. The official language of JNBS is English. The average time from delivery to first decision is less than 30 days. Accepted articles are published online on average on 40 working days prior to printing, and articles are published in print at 3-6 months after acceptance. Please see our Guide for Authors for information on article submission. If you require any further information or help, please email us (jnbs@uskudar.edu.tr)

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Assoc. Prof. Dr. Huseyin Ozan Tekin, Ph.D Co-Editor, Journal of Neurobehavioral Sciences Department of Psychology

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All cover letters must contain the following: A statement that

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We strongly encourage you to use MathType (third-party software) or Equation

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All manuscripts must include an English abstract containing a maximum of 250 words typed on a separate page. (It should contain headings such as Background, Aims and Objectives, Materials and Methods, Results, Conclusion etc.) After the abstract, please supply up to five keywords or brief phrases.

References:

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- Use Arabic numerals (1,2,3,4,5,6,7,8,9).
- Either square [ ] or curved brackets ( ) can be used as long as it is consistent.
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According to some estimates, the prevalence of ADHD has increased up to 30% in the last 20 years.[1]
S variant is associated with the lower transcriptional activity of the promoter when compared to the L variant.[4,7-9,11]

The Reference Section:

• Journal Article:

Russell FD, Coppell AL, Davenport AP. In vitro enzymatic processing of radiolabelled big ET-1 in human kidney as a food ingredient. Biochem Pharmacol 1998;55(5):697-701. doi: 10.1016/s0006-2952(97)00515-7.

Gonen, M. Planning for subgroup analysis: a case study of treatmentmarker interaction in metastatic colorectal cancer. Controlled Clinical Trials 2003;24 : 355-363. doi: 10.1016/s0197-2456(03)00006-0.

• Authored Book:

Lodish H, Baltimore D, Berk A, Zipursky SL, Matsudaira P, Darnell J. Molecular cell biology. 3rd ed. New York: Scientific American; 1995.

Millares M, editor. Applied drug information: strategies for information management. Vancouver: Applied Therapeutics, Inc.; 1998.

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The Journal of Neurobehavioral Sciences

Volume 8 ¦ Issue 2 ¦ April-August 2021

Contents

ORIGINAL ARTICLE

REVIEW ARTICLE

Review Article

Critical Appraisals on Depression and Psychotic Symptoms

Abstract

Psychosis includes hallucination, illusion, and delusion. Psychotic symptoms are quite uncommon in disorders like posttraumatic stress disorder (PTSD) and Biploar affective disorder (BPAD) but Schizophrenia is a psychotic disorder. In this review, we focus on PTSD with psychosis, depression with psychosis and BPAD with psychosis. We mainly shed light on how psychosis related to PTSD, BPAD, and depression as well cover the pharmacological approach to deal with these disorders. We also extend our limit to other management like electroconvulsive therapy and lithium. The main aim of this review is to cover the role of psychosis in different psychiatric disorders and what are its present scenarios with future scope to combat it.

Keywords: *Depression, drugs, posttraumatic stress disorder, psychotic symptoms*

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Introduction

Some physicians claim that because current rapid depression treatment prevents it from being more severe, it is now rare to develop psychotic characteristics. Psychotic depression, in fact, is an ordinary disorder, under-recognized as well as treated defectively. In this analysis, the nuanced methods of complicating mood disorders by psychosis along with the process of changes in their path with reaction to cure are explored.[1,2] Typical characteristics are described which are formally examined and to demonstrate more nuanced or compound presentations with other procedures to treatment, case examples are utilized. Over these years, the theory of the psychotic disorder has changed such that familiarity with earlier diagnosis criteria is difficult to adapt to more recent experience. Psychosis has been described to be as psychologically disabled in the second edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-II), as the patient is not able to adjust with "the ordinary demands of daily life" and only from extreme disability, the psychotic depression was described, with or without the occurrence of delusions and hallucinations that are typical psychosis characteristics. In this elaboration, psychotic de-pressure is not a different condition and is at one end of a continuum of seriousness.[3,4]

Psychotic depression's definition was updated in DSM-III [SJ for including hallucinations, delusions, and suicidal stupor after the description of a distinct therapeutic reaction, which was there for extensive depression with delusions but not for major depression without delusions. Although DSM-III removed extreme disability from the primary psychosis criterion, however in the International Classification of Diseases (ICD) this criterion still persisted, mostly for characteristics of endogenous. Even now, Psychotic depression is listed as a form of extreme extensive depression in ICD-10, the type continuing till 2022. The subsequent edition (ICD-11) includes, as diagnostic criteria, hallucinations and delusions along with severity. Psychotic depression and its definition have taken in a degree of se-truth in other diagnostic systems leading to the opposite of neurotic depression, endogenous depression, melancholic strain, or distortion of reality.[5,6] A significant sub-type of major depressive disorder (MDD) is considered by various classifications to be psychotic illness. Moreover, in place of a distinct therapeutic process provided from a specific disease, an extreme form of MDD might actually need more of the same therapy as other presentations, is one of the

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implications of this idea. Psychotic disorder has become a significant subtype of MDD in DSM-IV, marked by delusions or hallucinations. It is also an MDD subtype in DSM-5 alternative to distinct condition, yet the describer of psychosis severity independent, meaning the pressure does not have to be extreme to warrant a psychotic depression diagnosis. In reality, DSM-5 enables dysthymia and major depression to have psychotic characteristics, accepting the concept that psychotic characteristics are not just a feature of depression severity. This shift represents an awareness that with or without psychosis, multiple depressive symptoms will arise, with varying consequences for prognosis and care. The opinion which says psychosis is inextricably not related to the intensity of depression is supported by literature survey. Rise of the total in psychotically depressed patients was completely due to the delusions or hallucinations subscale, in an examination of 357 hospitalized patients having severe depression, ICD-10, and with psychotic characteristics of their one-third peoples, on the 12-item Health of the Nation Outcome Scales severity rating scale. The extremity in depression was comparable on the condition of characterization of psychosis with the occurrence of hallucinations or delusions in nonpsychotic as well as psychotic classes, and this extremity was weakly associated with the seriousness of psychosis. In an analysis of 288 depressed patients, depression incidence was equal to 45% of psychotic patients and 55% of nonpsychotic depression, while in psychotic patients, functional disability was greater.[7,8]

Patients without psychosis might be having similarities with serious depression, even though psychotic depression is extreme more often and many depression cases excluding hallucinations or delusions are related with higher severity of depression in comparison to instances of depression along with psychosis.[9] At a definite degree of mood disorder severity is required for the initial appearance of a tendency for psychosis as nonpsychotic episodes having a psychotic depression history are mostly shorter, without the severity like the psychotic episodes. Mostly following many episodes of nonpsychotic depression, when it does, insanity, which may not be as severe, appears to return including upcoming episodes.[10] While psychosis immediately does not follow each subsequent depressive episode, it is acting like an independent depression characteristic after arising, which modifies the condition of mood in functional means distinguishing from various depression types. An important duty is the diagnosis of psychosis in depressed patients, especially not responding to antidepressant therapy as anticipated when psychosis tries changing the treatment course and reaction of mood disorders rather than the severity of depression. It can be more apparent in examined patients in clinical trials than in clinical practise.

In psychotic depression, shifting diagnosis standards complicates the evaluation of various research.[11,12] A study's clinical and theoretical effects rely on the characterization of psychosis with delusions or hallucinations, or intensity, melancholia, illness, or uni or bipolar major depressive episodes (MDEs) or if the control group comprised MDD with equivalent psychosis intensity, psychosis lacking depressive or depression against nonmelancholic depression. Different concepts and methods of diagnosis have led to differing estimates of psychotic depression prevalence. The prevalence in the general population was estimated to be 4/1,000 adults and 14–30/1,000 of those over the age of 60. Group studies reported that psychotic symptoms were present in adults of 10–19% with MDE. Studies in specialized settings indicate that 6%–25% of patients with MDD have psychotic characteristics. Psychotic characteristics were confirmed for approximately 24%–53% of geriatric patients and 25%–45% adult MDD patients. The true prevalence of psychotic diseases is probably underestimated as their symptoms in depressed patients are often ignored. Figure 1 explains the development of psychotic symptoms inside the brain.[13,14] Figure 1 shows the formation of psychotic symptoms inside the brain and also explains the features of psychotic symptoms.

Missed Psychotic Depression Diagnosis

Data retrieved from the Pharmacotherapy of Psychotic Depression (STOP-PD) research, of the National Institute of Mental Health suggests that clinicians sometimes struggle to diagnose psychotic depression, primarily because of inadequate knowledge in the characteristics that are psychotic. Out of 130 diagnoses, a total of 27% were initially wrongly diagnosed with psychotic depression research diagnosis in a defined group of sufferers in the STOP-PD report. As patients with drug abuse history in the past 3 months and with comorbid situations or medicinal circumstances that are unbalanced were removed, a traditional estimation in the prevalence of the regular clinical people is likely to be the missed diagnosis rate found in this sample. Without psychopathic characteristics, depression else not defined (NOS), or mood disorder NOS, psychotic depression, most frequently misdiagnosed as a MDD. It was noticeable that none of the diagnosed patients were found to have a psychotic illness. This result shows that the psychosis was absent from the physicians rather than the mood disorder.[15]

Bipolar Disorder and Psychotic Illness

Psychotic depression much presumably has a bipolar effect than nonpsychotic depression, and bipolar depression episodes are more often correlated with the indication of mental illness as compared to unipolar depression events. Indeed, in the course of a personality disorder, a good indicator of insanity is bipolarity.[16] 48.5% of people with psychotic illness in group studies have been diagnosed with bipolar I and 10.5% have been diagnosed with bipolar II mood disorders. In early-onset psychotic depression,

Table 1: Different anti-depressant medicines

Drug	Main mode of action	Adverse effects of sedation	Anticholi-nergic	Nausea/ vomiting	Sexual dysfun-ction	Half life, hours	Toxicity in over-dose	Reference
Sertraline	SRI	Minor	Minor	Major	Major	~26	Low	[46]
Fluoxetine	SRI	Minor	Minor	Major	Major	96-144	Low	[46]
Escitalopram	SRI	Minor	Minor	Major	Major	~30	Low	[46]
Fluvoxamine	SRI	Major	Minor	Major	Major	17-22	Low	[46]
Peroxetine	SRI	Major	Minor	Major	Major	~24	Low	[46]
Citalopram	SRI	Minor	Minor	Major	Major	~30	Moderate	[46]
Agomelatine	M1.2 + 5-HT2C		Minor	Minor	Minor	1-2	Unclear	[46]
Mianserin	5-HT2, alpha 1 and alpha 2	Major	Major	Minor	Minor	8-17	Moderate	[46]
Reboxetine	NRI	Minor	Major	Minor	Minor	~13	Low	[46]
Trazodone	5-HT2, alpha 1 SRI	Major	Major	Minor	Major	5-13	Low	[46]
Venlafaxine	SRI + NRI	Minor	Minor	Major	Major	5-15	Moderate	[46]
Bupropion*	NRI + DRI	Minor	Minor	Major	Major	~20	Moderate	[46]
Duloxetine	SRI + NRI	Minor	Minor	Major	Major	8-17	Moderate	[46]
Mirtazapine	5-HT2, 5-HT3	Major	Minor	Minor	Major	20-40	Low	[46]
Tranylcypromine	Irreversible MAOI	Minor	Major	Major	Major	2.5	High	[46]
Moclobemide	Reversible MAOI	Minor	Minor	Major	Minor	~3	Low	[46]
Phenelzine	Reversible MAOI	Major	Major	Major	Major	1.5	High	[46]
Isocarboxazid	Irreversible	Major	Major	Major	Major		High	[46]
Amitriptyline	SRI + NRI	Major	Major	Minor	Major	9-25	High	[46]
Trimipramine	SRI + NRI	Major	Major	Minor	Major	7-23	High	[46]
Imipramine	SRI + NRI	Major	Major	Minor	Major	~5	Low	[46]
Clomipramine	SRI	Major	Major	Major	Major	12-36	Moderate	[46]
Dosulepin (dothiepin)	SRI + NRI	Major	Major	Major	Major	14-40	High	[46]
Nortriptyline	NRI	Major	Major	Minor	Major	18-96	High	[46]

SRI: Serotonin reuptake inhibitor, NRI: Noradrenaline reuptake inhibitor, DRI: Dopamine reuptake inhibitor, MAOI: Monoamine oxidase inhibitors

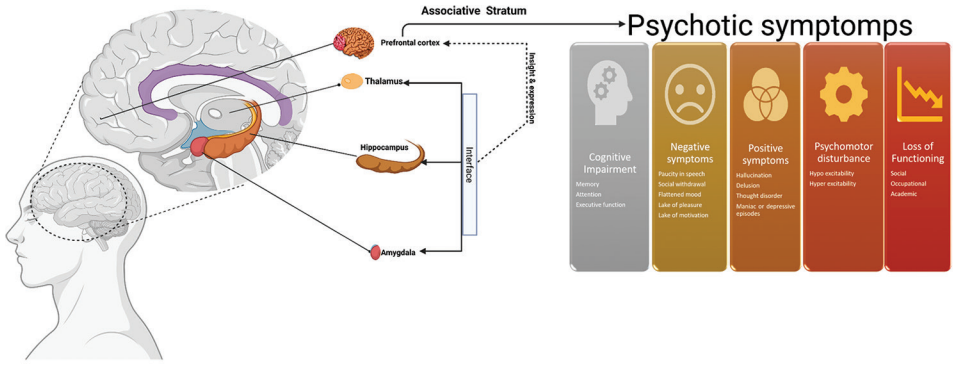

Figure 1: Development of psychotic symptoms inside brain

bipolar disorder's subsequent detection is extremely frequent. The depression (psychotic) patients' relatives consist of common occurrences of bipolar condition apart from nonpsychotic depression patient's relatives, additionally, bipolar disorder patients' relatives that are depressed, have increased chances and presumably have psychotic characteristics as opposed to controlled ones in depression.[17] As in unipolar depression, at the onset of the mood disorder, psychosis associated with bipolar disorder, connected to the older generation, further affective symptomatology along with constancy, more number of entrances, increased comorbidity, extended hospitalizations, in psychiatry with worse prognosis. There is one side in the case of bipolar psychotic disorder where much awareness are not attained, in publications, the level at which combined components of raised energy along wind mental condition may contribute to people who is feeling but does not seem to be depressed, along with functioning

at an elevated degree for patients with psychotic symptoms than the degree of symptomatology would expect.[18] The symptoms of such patients can be rejected as elaborated or suggestive of personality disorder, rendering real diagnosis misunderstood by the clinician. The recurrent incidence of nonauditory hallucinations is another characteristic of bipolar psychotic disorder that is easily ignored. It has been noted that visual hallucinations arise constantly, in bipolar apart from unipolar disorder, however olfactory as well as haptic hallucinations are also not uncommon. Patients who are not inherently affected by them may mitigate dramatic, mood-incongruent hallucinations, requiring patience to expose the psychosis.[19,20]

Posttraumatic Stress Disorder and Psychotic Illness

The history of childhood abuse in psychotic patients is 2–15 times greater than in nonpsychotic patients who are depressed. In a survey of 500 outpatient psychiatric patients, patients with psychotic disorder were four times more likely than those without psychotic depression to have comorbid posttraumatic stress disorder (PTSD) (57.9 vs. 15.7%; $P = 0.0001$). The finding that fight-related PTSD has a 30%–40% prevalence of psychotic symptoms put up the question of whether such individuals have PTSD with comorbid psychotic disorder, whether PTSD with psychosis is a different subtype of PTSD, or whether psychotic symptoms in PTSD have no clear medical or clinical meaning in contrast to depression.[21,22] The trauma may or may not indicate psychotic symptoms in PTSD; cases in which PTSD with comorbid psychotic de-pressure instead of psychotic PTSD may not be cases. Few clinicians question whether "real" or "pseudo" psychosis is represented by psychotic symptoms that epitomise traumatic experiences. Flashbacks or dissociative re-experiencing of elements of trauma are hallucinations and delusions in this formulation, although empirical evidence supporting this formulation is variable. Forty-six percent to ninety-one percent supported hearing voices on one or both of two standardized instruments in 73 women treated for PTSD associated with childhood abuse and neglect. These symptoms are more likely to be present on instruments that asked many questions about them and were considered by the authors to be dissociative experiences that dissociate from "true" psychotic symptoms. Exceptionally, among patients who heard or did not hear voices, there was no difference in the use of antipsychotic drugs. Mixed evidence exists to assess whether antipsychotic drugs in PTSD with psychosis are consistently useful, or whether psychotherapy alone resolves "psychotic-like symptoms" in PTSD.[23-26]

Depression is one of the conventional factors of PTSD, it can be very difficult to distinguish between psychotic depression in a patient with a history of trauma and PTSD with psychotic characteristics. Whether or not there are signs of comorbid PTSD, it is not clear that symptoms of psychotic disorders that specifically shows events in a patient if depressed which are traumatic for them ("trauma congruent" psychotic symptoms) consists various prognostic or clinical effects in contrast to the feature of psychotic behavior which are congruent with mood. It has not been studied to speculate that any of the relative treatment resistance reported with the psychotic disorder could be because of unrecommended PTSD. It is not yet clear if posttraumatic combination therapy is being used. Without a prior history of trauma, signs, psychosis as well as depression may be comparable to psychotic depression treatment.[23,27]

Schizophrenia Complicating Depression

The initial mood disorder, exacerbated by psychosis is referred to as psychotic depression. Far minimum data on primary nonaffective psychosis complicated by depressive episodes is accessible.[28] About 27%–48% schizophrenia depressive chapter acceptance is estimated, whereas 31% of patients aged in one study ranged from 27% to 48%. There were subsyndromal depressive symptoms for >55 years with schizophrenia spectrum disorder. Comorbid de-pressure is related to greater suicidality as well as additional negative, positive features in schizophrenia.[29-32] Suicidality, pessimism, along with despondency, unique towards depression despite significant similarities among negative as well as depressive features, whereas alogia with blunted affect have extra consistently related with signs that are negative. In schizophrenia, the negative sign constitutes recognizable realms, the latter could be intensified by antidepressants, but several research disagrees, hence unclear if patients who replied were also depressed. It may be difficult in schizophrenia patients to determine the expressions that are depressive. Bradykinesia along with affective blunting induced by medications that are antipsychotic may also help to imitate depression, and antipsychotics with more potent D2 blockade may be related to dysphoria. A study has indicated that aripiprazole, clozapine, lurasidone, sulpiride, olanzapine, amisulpride along with quetiapine might be significantly much fruitful in relieving depressive characteristics of schizophrenia than other antipsychotics.[33-35] Both amisulpride and olanzapine decreased indications of depression in patients of schizophrenia in a clinical trial of 8 weeks, with 62%–66% of patients ranking on the Clinical Global Impression Scale as "much" or "very much" Conversely, the above analysis indicated "modest effectiveness" of the addition of an antidepressant for depression following schizophrenia. In an analysis of total patients of schizophrenia with the number 175 along with comorbid MDD, antidepressants decreased results of depression as well as generated 56% of de-pressure remission lacking improvement in the schizophrenia symptoms. No antidepressant seemed more effective than any other, while more extreme paranoia with comorbid drug use problems expected nonresponse. The

antidepressant agomelatine was beneficial in patients with schizophrenia and MDD for the manifestation of negative and depression along with global psychopathology, however not for the indication of positive trait, while pharmacokinetic interactions with antipsychotic medications often occurred obtained from an open-label examination of 12 weeks.[36-38] List of different anti - depressant medicines are in described in form of Table 1.

Relevant Combinations of Medicines for the Acute Treatment of Psychotic Illness

Newer medicines (selective inhibitor of serotonin reuptake or inhibitor of serotonin-norepinephrine reuptake [SNRI] + antipsychotic second generation)

1. Quetiapine plus venlafaxine[39]
2. Olanzapine plus sertraline[40]
3. Olanzapine plus fluoxetine.[41]

Older drugs (tricyclic antidepressant [TCA] + antipsychotic first-generation)

1. Trimipramine plus haloperidol, amitriptyline[42]
2. Perphenazine plus nortriptyline[43]
3. Amoxapine, amitriptyline plus perphenazine[44]
4. Perphenazine plus amitriptyline [Table 1].[45]

Strategies for Augmentation

Lithium augmentation of antidepressants for nonpsychotic depression is the most commonly used technique for partial responders. However, in the treatment of psychotic disorder, lithium augmentation has not been extensively tested.[47] Lithium augmentation of the antidepressant/antipsychotic combination appeared to add additional efficacy in 4 limited, uncontrolled trials, especially in bipolar patients. There has been no analysis of the use of other augmentation methods or the use of lithium augmentation with other antidepressant and antipsychotic drug combinations.[48,49] Of note, when the initial pharmacological regimen fails to enter complete remission, lithium augmentation is recommended by the APA, TMAP, and RANZCP guidelines. In the segment that addresses the treatment of the psychotic disorder, the other recommendations do not address lithium augmentation.[50,51]

Electroconvulsive Therapy

Most recommendations for the treatment of psychotic disorder advocate electroconvulsive therapy (ECT) as being at least just as successful as the proposed first-line pharmacological treatment. Only Good, RANZCP, and DNSC position ECT as a third and final alternative to be used if other therapies have failed or if, due to medical comorbidity or suicidality, an acute response is needed.[52] A lack of prospective, randomised trials limits the literature on the relative effectiveness of ECT compared with pharmacotherapy. Meta-analysis may provide the best opportunity to synthesize the effects of the reported treatment; however, it is difficult to draw large conclusions from these studies since ECT treatment was always compared at different doses and over different periods with many different combinations of medications. In a study of 17 prospective and retrospective trials involving Kroessler's 597 patients with psychotic disorder, 57 response rates were 82% for ECT and 77% for TCA and antipsychotic combinations, with slightly lower response rates of 51% and 34%, respectively, for antidepressant monotherapy or antipsychotic monotherapy.[53,54] A second larger meta-analysis, which included data from 44 prospective and retrospective studies conducted between 1959 and 1988, 58 found that, with effect sizes of 2.30 and 1.16 respectively, ECT was substantially more effective than TCA alone.[55] An intermediate impact size of 1.56 was found to be a mixture of antidepressants and antipsychotics, which was not substantially different from the other two classes. Early initiation of ECT within 5 days of admission has been reported to shorten the duration of stay and minimize the cost of care, while ECT treatment in hospitals is associated with longer stays if treatment is not quickly started. Some findings indicate that for psychotic depression, ECT can be even more effective than for nonpsychotic depression. Far lower ECT remission rates have been reported in clinical practise in the community than in ECT clinical trials.[56,57] The intent-to-treat remission rates of a large cohort of adults treated in community facilities with ECT were in the range of 30%–47%, for instance. Given the poor results of patients that do not remit with ECT, the low remission rates are of particular concern. The low remission rates in community practise may be explained by the fact that patients with comorbid mental and medical disorders correlated with worse ECT outcomes could constitute a greater proportion of the clinical population than patients studied in clinical conditions. Twenty-one percent said they would use ECT as first-line therapy in non-suicidal patients with psychotic depression in a survey of Danish psychiatrists. However, 59% would use ECT as the first-line treatment if the patient was at high risk of suicide.[58-61]

Directions for the Future

It seems like it is reasonably well delineated for definite psychotic unipolar strain's acute treatment. However, various principal affairs are not answered, even after considerable experience over several years. For a full response, first-generation antipsychotic drugs of heavy dose might be required by several patients. However, whether atypical antipsychotics, commonly used in psychotic depression, do the same, is not entirely known. It would be beneficial to remove antipsychotic medications as soon as possible or at least within a year, however, there is insufficient long-term evidence to establish if maintaining antipsychotic medication at the same or lower dosage is appropriate to avoid recurrence, as is the case for antidepressants in nonpsychotic depression. For the treatment of mania, antipsychotic drugs paired with

mood-stabilizing drugs are often essential, although it is not yet clear if the combination of antipsychotic medication and a mood stabilizer is more effective than mood stabilizer monotherapy as an acute or maintenance treatment for psychotic bipolar disorder.

Increasingly, treatments using instrumentation including, repeated transcranial magnetic stimulation, vagus nerve stimulation, and deep brain stimulation were investigated as strategies of refractory depression, categorization eluding a range of psychotic depression cases. Furthermore, the treatment of auditory hallucinations repeated transcranial magnetic stimulation may have such uses. Controlled trials of these therapies for psychotic depression, particularly in psychotic depression cases which are not responding or unable to take other therapy or ECT, will definitely be justified. Another source of confusion is the clinical and diagnostic value of intermittent or mild expressions of disorders having psychotic features. Psychotic symptoms or indications constituting disturbing memories, like thinking of a past offender who has died is under surveillance or catching the sound of a mistreat victim, classify as legitimate unstable mind indications suggesting the requirement of supporting care along with drugs without the mood treatment alteration or an antipsychotic drug.

The total extent of responsibility to insanity demonstrated by past incidents of a family in parts of some mental condition combined with a temper defect is one of the most interesting neurobiological uncertainties to create a particular syndrome that is higher to the addition of its segments. No question arises here that more study elucidates the problems causing further effective remedy of the continuum of psychotic mood disorders.

Conclusion

Psychotic features include hallucination, illusion, delusion, etc., which are not quite common in the case of depression. Sometimes MDD with psychosis might include delusion. In the case of PTSD and bipolar if psychosis arises with depression we use selective serotonin reuptake inhibitor, SNRI, lithium, and anti-psychotic medicine. Still, lots of clinical research needs to be done even diagnosing depression with psychosis is quite hard and very limited cases are reported in which ECT is used most of the time.

Patient informed consent

There is no need for patient informed consent.

Ethics committee approval

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Author contribution subject and rate

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- Sourbh Rankawat (20%-Conducting a literature review)
- Upasana Pathak (10%-Conducting a literature review).

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Original Article

Temperament and Character Relations in Borderline Personality Disorder

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Abstract

Aim: Understanding human behavior is a common struggle among psychology researchers and clinicians. One of the mysteries in psychology is the relation of temperament with a psychiatric disorder. In this study, it is aimed to evaluate this association with other perspectives. **Materials and Methods:** The present study was conducted between 2017 and 2018. Participants consisted of 88 people, who were freely selected and separated as treated and untreated from NP Istanbul Hospital and Polyclinics. There are two groups of paticipants who have borderline personality disorder; 48 untreated patients which are 24 men and 24 women and 40 treated patients which are 20 men and 20. The evaluations were made through the Demographic Information Form, Temperament and Character Inventory, and Borderline Personality Inventory prepared by the researcher. **Results:** People under treatment had different scores than the control group. It could be thought that it is evidence that treatment is effective and it may change the temperamental dimensions for people with borderline personality disorder. Many of the results came significantly different between the groups after temperament and character inventory had been applied. The dimensions had differed between the groups. **Discussion:** People with scores below borderline personality inventory's cutoff value had higher scores with the features that might be helpful for a person to cope with their problems in social and occupational life and to persist in their projects. Patients under treatment had been found to have more features that might negatively affect one's life. It could be thought that people under treatment might have more severe symptoms or might have additional psychiatric problems. **Conclusion:** This study revealed a few contradictions between DSM-5 and Borderline Personality Inventory and between Borderline Personality Inventory and Temperament and Character Inventory. This study may lead practitioners and researchers to further investigate the field.

Keywords: *Borderline, personality, temperament and character features*

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Introduction

One of the major struggles in psychology is to understand and treat personality disorders properly. The treatment modalities are in the process of development. In this study, understanding the personalities of the patients under psychological treatment with the aspect of the uniqueness of a human and improving the treatment techniques have been aimed. Patients with personality disorders commonly have some struggles in their social and occupational lives.[1] This situation is similar during the psychological therapy process. They usually have difficulties continuing the treatment.

Borderline personality disorder is characterized by instability with interpersonal relationships, social life, occupational life, and self-thoughts. The patients diagnosed with borderline personality disorder may have difficulties to identify themselves. Their thoughts about themselves or other people may change and it makes them stabilize their relationship with people and even with themselves is difficult. Suicidal tendency is very common among patients with borderline personality disorder. They also may tend to injure themselves. With psychological therapy, they may improve insight. The remission may have been expected after proper psychological therapy.[1]

Temperament is defined as primary emotions. One may have different

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dimensions of his personality and every dimension may belong to a temperamental diversification. Seeking joy, fear, rage, sexual lust, care, separation distress, and play are primary emotions according to Panksepp's style. Although there is no definite explanation of temperament, this is one of the most accepted approaches. Patients with borderline personality disorder may have difficulties controlling their anger. Their interpersonal relationships are unsteady because of this temperamental tendency. Inappropriate intense anger is one of the temperamental features associated with borderline personality disorder.[2]

Temperament and character inventory is based on the psychobiological theory which is a new and multidisciplinary theory. In literature, temperament and character inventory has been used in many types of research. It helps to categorize and understand human behavior and human nature.[3]

It is known that there is a possibility that a person may have a personality disorder without loss of functionality. In addition, a personality disorder may trigger another psychiatric disorder.[1]

Borderline Personality Inventory is based on the theory which is described by Otto F. Kernberg and is aimed to evaluate borderline personality disorder.[4] Using this inventory, this study aimed to understand if there is a relation between borderline personality inventory score and temperament and character of people who have borderline personality disorder.[5] This relation had been evaluated between the two groups. One group was under treatment for borderline personality disorder and additional psychiatric disorders if they had. With the help of this evaluation about temperament and character of borderline personalities, there may be a chance to help people solve their interpersonal relations and in their social lives. Therefore, this may help people with borderline personality disorder creating insight about themselves.

In this study, it is thought that patients under treatment may improve their temperamental g-features to cope with their problems in their social and occupational lives. They may have an insight into their unresolved personality issues and they may learn to control their emotions and impulsivity. In this research, two groups which are the patients under treatment and the control group had been evaluated to differentiate their temperamental features and to reveal the effect of treatment on them.

Besides, it is expected that patients with borderline personality disorder may have difficulty to persist in their plans, projects or their opinions about people or events around them in this study. Temperament and character inventory is questioning patients' persistence. One of the purposes of this study is to reveal the relation between persistence and borderline personality disorder with the help of the inventory.

Materials and Methods

This study was performed in line with the principles of the declaration of Helsinki. Approval was granted by the Ethics Committee of Üsküdar University noninterventional studies ethics committee on August 14, 2017 with the number B.08 .6.YÖK.2.ÜS.0.05.0.06/2017/199.

Study participants included 88 patients who are followed in the outpatient clinics in NP Istanbul Hospital. Forty patients of 88 are diagnosed with borderline personality disorder by using borderline personality inventory as a diagnostic instrument. The participants of the control group included 48 people under no psychiatric treatment, and they were selected randomly from a group of people with borderline personality disorder. The participants in the treated group were received cognitive behavioral therapy and symptomatic treatment including pharmaceuticals. The data of these participants were collected between August 2017 and January 2018. This study is a cross-sectional research.

The inclusion criteria include voluntary participation. The exclusion criteria include the ability to fill the inventories by having no mental or physical impairment to prevent reading and writing properly.

This research has ethical committee approval from Üsküdar University observational ethical committee with the number of B.08.6.YÖK. 2.ÜS.0.05.0.06/ 2017/199 in the 8 Meeting on August 14, 2017. The study was carried out in accordance with the Helsinki Declaration of Principles. The study was carried out in accordance with the Helsinki Declaration of Principles. Participants were informed, and they signed an informed consent form before they were applied to the sociodemographic form, Temperament and Character Inventory, and Borderline Personality Inventory.

Socidemographic form has been questioning demographic characteristics and such as age, sex, education, occupation, psychiatric treatment status, drug use, and medical comorbidities.

Temperament and Character Inventory is an inventory improved by Cloninger to define the normal and abnormal variations of character and temperament components based on a psychobiological personality dimension. It consists of 240 items that people could answer with "yes" and "no." This inventory is a self-evaluation instrument and is improved to describe the nature and development of personalities.[6] This inventory applied in Turkish to the patients after validity and reliability in Turkish had been established.[3]

Borderline Personality Inventory is based on Kernberg's definition of borderline personality organization. It includes 53 items for a self-evaluation. This inventory is used as a diagnostic method for the differentiation of borderline

personality disorder.[4] This inventory applied in Turkish to the patients after validity and reliability in Turkish had been established.[7]

IBM SPSS Statistics 20.0 (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) was used to analyze the data in this study. The statistical techniques applied after the data had been grouped in two and two categories. Frequency analysis had been done to determine the distribution of demographic data. Inventory scores for both the group under treatment and the control group and their average scores had been evaluated with a *t*-test for independent groups. P scores had been obtained from each test.

Results

The demographic data of participants have been applied to frequency analyses. Fifty percent of 88 participants were women. Nine percent, 2 of them were between 19 and 25 years old where 44%, 8 of them were between 26 and 35, 29%, 9 of them were 36 and 45 and 16%, 1 of them were above 46 years old. Six percent, 9 of the study group graduated from primary school, 20%, 7 of them from high school, 6%, 9 of them from an associate degree program, 56%, 3 of them from university and 9%, 2 of them from a master's degree program. Forty-five percent, 5 of the participants had been under treatment for their psychiatric disorder. Twenty-one percent, 3 of them had other chronic diseases.

T-test scores for independent groups have resulted in the difference of the borderline personality inventory scores between people under psychiatric treatment and people under no treatment was statistically significant while the averages of the scores of people under the treatment is significantly higher.

All items of the Temperament and Character Inventory were analyzed, and the scores were calculated. The statistically significant items and their scores between the group under treatment and the group without treatment are shown in Table 1. Feeling excited by discovery item under novelty-seeking subscale, fear of uncertainty, and shyness with strangers items under harm avoidance subscale, any item of reward dependence subscale, persistence subscale, taking responsibility and self-acceptance items under self-management subscale, social approval, empathy, charitableness and virtuousness under collaboration subscale, and any item of getting over oneself subscale did not show statistically significant differences between the study groups.

Eighty-eight participants took the Borderline Personality Inventory and 59 of them got a score above the cutoff value for borderline personality disorder according to the inventory. In this study, the scores of temperament and character inventory were evaluated and compared between the group of 59 participants who got scores above cutoff value and the group of 29 participants who got scores below cutoff value. Items with statistically significant differences between these two groups are shown in Table 2. Feeling excited by discovery item under novelty-seeking subscale, fear of uncertainty and shyness with strangers items under harm avoidance subscale, any of the 3 items of reward dependence subscale, self-acceptance items under self-management subscale, 3 items other than the self-loss item of getting over oneself subscale did not show statistically significant differences between two groups.

In the group of 48 participants who were under no treatment, this study evaluated 6 participants who got Borderline Personality Inventory scores above the cutoff value and 42 participants who got scores below the cutoff value as subgroups. Between these two subgroups, the items with significantly different scores are shown in Table 3. The items not listed on the table were not significantly different between the subgroups. They were feeling excited by discovery, impulsivity and extravagance item under novelty-seeking subscale, any item of harm avoidance subscale, all items of reward dependence subscale, persistence subscale, taking responsibility, intentionality, skillfulness and self-acceptance items under self-management subscale, empathy and virtuousness under collaboration subscale and any item of getting over oneself subscale did not show statistically significant differences between study groups.

On the other hand, in the group of 40 participants who were under no treatment, this study evaluated 23 participants who got Borderline Personality Inventory scores above the cutoff value and 17 participants who got scores below the cutoff value as subgroups. Between these two subgroups, the items with significantly different scores are shown in Table 4.

Any item of the novelty-seeking subscale, any item of harm avoidance subscale, any item other than commitment item under reward dependence subscale, persistence subscale, self-acceptance under self-management subscale, social approval under collaboration subscale and any item under getting over oneself subscale did not show statistically significant differences between these substudy groups.

Discussion

"Turkey Mental Health Profile Study," which is one of the comprehensive studies in the field, was held in 1998 and it showed that at least 18% of the Turkish population had undergone a mental health disorder.[8] By predicting that a group of these people from 18% of the population could not receive proper psychiatric treatment, this study tried to evaluate people by grouping with their treatment status.

Borderline Personality Inventory was used as a treatment instrument compatible with Diagnostic and Statistical Manual of Mental Disorders.[7] According to Cloninger's psychobiological theory, it could be expected that higher scores with novelty seeking and harm avoidance subscales and lower scores with reward dependence and

Table 1: Temperament and Character Inventory Scores of Group Without Treatment and Group With Treatment

Inventory ıtem	Treatment status	*n*	Average	SD	*t*	*P*
Concern for expectation	WOT	48	5.0	2.2	−2.474	0.015
	WT	40	6.4	2.9		
Impulsivity	WOT	48	3.2	2.3	−3.308	0.001
	WT	40	4.7	2.0		
Extravagance	WOT	48	4.4	1.7	−2.899	0.005
	WT	40	5.6	2.0		
Disorder	WOT	48	3.2	1.6	−4.069	0.000
	WT	40	4.6	1.5		
Overall Novelty Seeking	WOT	48	16.6	4.3	−4.291	0.000
	WT	40	20.9	5.0		
Intentionality	WOT	48	6.4	1.3	4.243	0.000
	WT	40	4.8	2.1		
Skillfulness	WOT	48	3.7	1.1	3.598	0.001
	WT	40	2.7	1.4		
Easy fatigability	WOT	48	3.1	2.0	−4.844	0.000
	WT	40	5.4	2.5		
Overall harm avoidance	WOT	48	15.6	5.1	−2.949	0.004
	WT	40	19.7	7.8		
Sympathy	WOT	48	7.1	1.3	2.503	0.014
	WT	40	6.3	1.8		
Overall collaboration	WOT	48	30.4	5.3	2.401	0.019
	WT	40	27.5	6.3		
Comaptible sec. temperaments	WOT	48	9.3	1.9	2.534	0.013
	WT	40	8.2	2.3		
Overall self-management	WOT	48	30.6	5.8	3.398	0.001
	WT	40	25.9	7.2		

WOT: Group under no treatment, without treatment, WT: Group under treatment, with treatment, *n*: Number of subjects, SD: Standard deviation

self-management subscales in Temperament and Character Inventory may lead practitioners to make a borderline personality disorder diagnosis.

Self-management which is one of the dimensions of a personality could be seen as a common feature between people with Borderline Personality Disorder according to the inventory, although there could not be seen any significant difference with their temperament and character evaluation. This result was not expected considering the previous researches.[1]

When the results were compared between the group under treatment and the other group, it could be concluded that impulsivity, extravagance, disorder, concern of expectation, fear of uncertainty, and easy fatigability could be listed around the common futures of people diagnosed with borderline personality disorder under psychiatric treatment. The group of people with borderline personality disorder who had not been taking any psychiatric treatment could have higher levels of self-management and collaboration skills. This result may be due to the situation that people under treatment might have additional psychiatric disorders such as obsessive-compulsive disorder, depression, and bipolar disease.[9]

It is thought that people with borderline personality disorder had higher levels of reward dependence as a temperamental dimension.[10] Conversely, this study showed no significant difference between the groups in the reward dependence aspect. Similarly to this result, in the group under treatment, there was no significant difference on the dimensions of reward dependence, persistence, harm avoidance and novelty seeking, although in previous studies there could be expected that the levels of these dimensions might be higher in the group under treatment.[11]

However, the self-management dimension of temperament was found to be lower with people who could be diagnosed with borderline personality disorder according to borderline personality inventory.

Persistence scores have been found higher in people who do not meet the criteria for borderline personality disorder. This result is expected in the beginning of the study because of the instability that patients with borderline personality disorder had. Instability affects their actions and thoughts and this makes them have difficulties to persist in their plans.

Temperament and character have different dimensions and it is very difficult to group them for a person or evaluate them as a whole. Some of the features seem to be beneficial for a person to cope with their problems and some of them seem to be a feature that might create stress in one's life.

Table 2: Borderline Personality Inventory Scores of Subgroups

Inventory ıtem	Inventory score	*n*	Average	SD	*t*	*P*
Impulsivity	B	59	3.37	2.24	−3.148	0.002
	A	29	4.93	2.07		
Extravagance	B	59	4.58	1.78	−2.445	0.017
	A	29	5.62	2.08		
Disorder	B	59	3.37	1.52	−3.864	0.000
	A	29	4.76	1.70		
Overall novelty seeking	B	59	17.37	4.37	−3.380	0.001
	A	29	21.07	5.65		
Easy fatigability	B	59	3.51	2.28	−3.830	0.000
	A	29	5.52	2.38		
Concern for expectation	B	59	5.22	2.50	−2.160	0.034
	A	29	6.48	2.73		
Overall harm avoidance	B	59	16.29	6.05	−2.475	0.015
	A	29	19.97	7.48		
Persistence	B	59	5.29	1.58	2.133	0.036
	A	29	4.45	2.03		
Taking responsibility	B	59	5.51	1.78	4.255	0.000
	A	29	3.83	1.65		
Intentionality	B	59	6.22	1.62	4.553	0.000
	A	29	4.45	1.90		
Skillfulness	B	59	3.63	1.02	4.119	0.000
	A	29	2.48	1.57		
Compatible sec. temperaments	B	59	9.54	1.77	5.294	0.000
	A	29	7.28	2.10		
Overall self-management	B	59	31.05	5.77	5.973	0.000
	A	29	23.21	5.83		
Social approval	B	59	6.39	1.63	3.851	0.000
	A	29	4.93	1.75		
Empathy	B	59	4.56	1.48	2.352	0.021
	A	29	3.76	1.55		
Charitableness	B	59	5.14	1.01	3.728	0.000
	A	29	4.24	1.15		
Virtuousness	B	59	7.83	2.34	2.628	0.010
	A	29	6.24	3.25		
Sympathy	B	59	6.98	1.38	2.361	0.020
	A	29	6.17	1.75		
Overall collaboration	B	59	30.90	4.99	4.580	0.000
	A	29	25.34	6.03		
Self-loss	B	59	5.54	2.54	−2.707	0.008
	A	29	7.00	1.98		

B: Group with a score below the cutoff value, A: Group with a score above the cutoff value, *n*: Number of subjects, SD: Standard deviation

Impulsivity, extravagance, and disorder seem to be features that might negatively affect one's life. The patient might have difficulties and might want to control these features. Inventory results showed that people under treatment had higher scores with these dimensions of temperament. It had been thought that the treatment might improve these negative features at the beginning of the study. Conversely, the results showed that the control group had been more successful in controlling their actions. This situation may be affected by the fact that people under treatment might have an additional psychiatric disorder and they might have more severe symptoms that force them to seek treatment.

Conclusion

As can be seen, this study revealed a few contradictions between DSM-5 and Borderline Personality Inventory and between Borderline Personality Inventory and Temperament and Character Inventory. This could have arisen from some reasons such as the size of the study group, incomprehensive demographic features of the group. In addition, Borderline Personality Inventory could be reviewed and revised with future researches. This study may lead practitioners and researchers to further investigate the field.

Table 3: Inventory Scores of Subgroups

Inventory ıtem	Inventory score	*n*	Average	SD	*t*	*P*
Disorder	B	42	3.02	1.54	−2.183	0.034
	A	6	4.50	1.64		
Compatible sec. temperaments	B	42	9.57	1.81	2.666	0.011
	A	6	7.50	1.52		
Overall self-management	B	42	31.31	5.60	2.666	0.011
	A	6	25.67	5.16		
Social approval	B	42	6.48	1.44	2.659	0.011
	A	6	4.67	2.34		
Charitableness	B	42	5.17	0.96	2.275	0.028
	A	6	4.17	1.33		
Overall getting over oneself	B	42	18.69	5.77	−2.067	0.044
	A	6	23.67	2.66		

B: Group with a score below the cutoff value, A: Group with a score above the cutoff value, *n*: Number of subjects, SD: Standard deviation

Table 4: Inventory Scores of Subgroups

Inventory item	Treatment status	*n*	Average	SD	*t*	*P*
Dependence	B	17	4.59	1.37	2.642	0.015
	A	23	3.22	1.78		
Taking responsibility	B	17	5.71	1.76	3.450	0.001
	A	23	3.78	1.73		
Intentionality	B	17	5.71	2.05	2.553	0.015
	A	23	4.09	1.93		
Skillfulness	B	17	3.47	1.07	3.135	0.003
	A	23	2.17	1.44		
Compatible sec. tmperaments	B	17	9.47	1.74	3.432	0.001
	A	23	7.22	2.26		
Overall self-management	B	17	30.41	6.31	4.028	0.000
	A	23	22.57	5.93		
Empathy	B	17	5.12	1.11	3.950	0.000
	A	23	3.43	1.47		
Charitableness	B	17	5.06	1.14	2.189	0.035
	A	23	4.26	1.14		
Virtuousness	B	17	8.06	2.19	2.199	0.034
	A	23	6.09	3.18		
Overall collaboration	B	17	31.00	5.48	3.453	0.001
	A	23	24.83	5.67		

B: Group with a score below the cutoff value, A: Group with a score above the cutoff value, *n*: Number of subjects, SD: Standard deviation

Patient informed consent

Informed consent was obtained.

Ethics committee approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Üsküdar University noninterventional studies ethics committee on 14/08/2017 with the number B. 08.6.YÖK.2.ÜS.0.05.0.06/2017/199.

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Conflicts of interest

There are no conflicts of interest to declare.

Author contribution subject and rate

- Gonca Gül Yılmaz (%25): data acquisition, analysis interpretation
- Meltem Şen (%24): conception/design of the work, data acquisition, analysis interpretation
- Süleyman Dönmezler (%17): involved in refining the conception of the work, the interpretation of data for the work and revising it critically for important intellectual content
- Habib Erensoy (%17): conception/design of the work, data acquisition, analysis interpretation
- Tonguç Demir Berkol (%17): involved in refining the conception of the work, the interpretation of data for the work and revising it critically for important intellectual content.

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Original Article

Uskudar Democratic Leadership Scale Validity and Reliability Studies*

Abstract

Background: The mightiness of the political leader, his strength, his risk-taking leadership, and his emotional contact with society plays an active role in the healthy management of society in many respects. A psychometric "democratic leadership scale" is needed to define the items to determine the limits of authoritarianism and to find the balance between using power and justice. Aims and Objectives: This research aims to conduct a validity and reliability study of a wide range of the Uskudar Democratic Leadership Scale (USDELID). **Materials and Methods:** Sample consists of 1010 people from Turkey. "Uskudar Political Leadership Scale-USPOLID" was used for the validity of the criteria. **Results:** The internal coefficient of consistency (α) of the scale was found to be .97. Analysis revealed that the scale consists of four factors. The first factor "Libertarianism/Pluralism" alone accounts for 71.81% of the variance, the second factor "Justice Orientation" accounts for 3.90% of the variance, the third factor "Participation" accounts for 3.16% of the variance, and the fourth factor "Accountability" accounts for 1.96% of the variance. These four factors, consisting of a total of 25 items, together accounted for 80.85% of the total variance. **Conclusion:** As a result of the studies, it was understood that the scale is valid and reliable. An item on the scale is inversely asked to ensure attention by taking part in the scale for control purposes. There has the scale emerged called the USDELID.

Keywords: *Autocracy, democracy, democratic leader, reliability, validity*

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Introduction

Today, we are going through a period where it is justified to look with suspicion at anyone who does not act openly and transparently or reacts exaggeratedly. Unimaginable events in the human environment have sociological and psychological reflections as well as the formation of political perception. Especially periods of social mobility also raise questions about the political climate in that society and the level of democratism of the political leader.

We can say that the sociopsychological code of social conflicts in Turkey is not the right-left or lifestyle fight, but it is the tackle of classes. Managing the struggle of classes and achieving fair balance are necessary skills for strong management. If it cannot be managed, it can become a crisis and generate a trauma effect in society.

Again, the way to solve the trauma healthily is to be able to proceed with the crisis analysis and the crisis management fine. The first condition of crisis management is self-analysis; the second condition is to correct the acute situation. Third, it is to be able to analyze the root causes of the events after the acute situation has passed and then to manage the crisis. In the case of the diagnosis is wrong, so it is not possible to proceed a healthy way in treatment, so secondary traumas and crises will emerge.[1] At this point, to manage the crises in the society, it is vital for the political leader to have some administrative skills and attitude toward society.

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*The Scale of Validity and Reliability in this Study has been Generated from the Questions of "The Test of Mightiness in Leadership and the Dictatorship" Existing in Tarhan's Book (2017a) "Mom, What is a 'Coup?' The Psychology of the Coup"

The mightiness of the political leader, his strength, his risk-taking leadership, and his emotional connection with the society play an active role in the healthy management of many social events. According to Tarhan, the mightiness of politics, the courage of soldiers, the justice of the jurisdiction, and the sight of the society open up through the talent of the scholars. Here, it is necessary to define the mightiness. The word mightness (tr. dirayet) is a concept that has passed from Arabic to Turkish and means understanding, intelligence, and resourcefulness of subtle things.[2] The limits of autocracy should be known as much as the mightiness in a company's management or politics. Accordingly, four characteristics are mentioned when an individual is handled; (1) obeys to authority, (2) is totalitarian, is singularist, denies questioning, and is unquestionable, (3) is arbitrary. For him, monophonicity is essential. He expects you to obey the single voice without questioning it, and (4) is oppressive. These features are also methods for making quick decisions during war or in times of crisis.

Quick decision-making is also associated with obedience. People are influenced by the guidance of others in isolated environments and reveal what they see, hear, and feel as if they exist through the guidance of others and community psychology that does not exist. Hence, the so-called swarm psychology is emerging. With a sense of human obedience, in herd psychology, one can quickly, easily do things that do not conform to their core values. This automatic movement reflex occurs in uncertain and unclear situations. It is called automatic stereotyping in political psychology.[1] Hence, the person automatically moves rapidly. This is more of a thing for people who want to live life easily. Where individuality decreases and group identity is high, people do not think critically with high ideals, do not make mental inquiries and as a result, they feel safe. According to Tarhan, 80% of people are in mental comfort. Thinking, questioning is a tough task, while obeying the leader is easier and more comfortable.

The fact that leading people are endowed with several virtues is directly proportional to the ability to govern society. It is important for a leader to have charismatic, classical, and wisdom values. Because the state can be governed by a virtuous power, not by military force. That's why he must take his power from justice so that he can be effective in all segments of the population, not the elite. That is called pluralism. In a pluralist, libertarian democracy is the public free, not under fear.[3]

It is also explained by the "Trait Theory" that the leader has some accurate characteristics as well as the use of force.[4,5] According to the trait theory, the characteristics that should be found in a successful leader are as follows: (1) intelligence covering the ability to judge and communicate verbally, (2) past achievements, (3) emotional maturity, (4) reliability, perseverance, and constant motivation for success, (5) ability to join and adapt to diverse groups, and (6) desire for status.[6]

Behavioral leadership theory tries to explain the leadership process. The fact according to the theory is that, what makes leaders successful and effective, is the behavior of the leader when leading, rather than the leadership trait.[7] Behaviors such as the way the leader communicates with his subordinates, whether he delegates authority, the way he plans and controls, the way he sets the objectives, etc., are considered as important factors that determine the effectiveness of the leader.[8]

Various models have been developed within the scope of behavioral leadership theory. One of the most important of these models is the "Ohio State University" studies. In 1945, the Bureau of Business Research at Ohio State University began studying leading behavior on many military and civilian executives, and two dimensions were identified in these studies, called "understanding" and "mobilizing the structure (MtS)."[9]

Concept (A): It is the level of sensitivity of the leader to his subordinates and the degree of mutual trust building. Leaders with a high level of understanding are in a friendly approach. They care about open communication and the welfare of their subordinates.

MtS: It is the degree of mission-orientedness of the leader and the level of guidance of his subordinates toward the achievement of the purpose. Such leaders give orders, spend time for planning, and make precise work-related programs.

According to the model, which is said to be independent of the two dimensions, the leader can display any of the following four types of leadership style:

1. High MtS – Low concept
2. High MtS – High concept
3. Low MtS – Low concept
4. Low MtS – High concept.

The Ohio State University's studies were followed by the University of Michigan studies and tried to establish objective criteria for the effectiveness of the leader, rather than dimensions, in determining leadership behavior.[10] Another model in behavioral leadership theories is a model developed by Robert Blake and Jane Mouton, based on the results of the researches conducted at the University of Ohio and Michigan and called an "Administrative Scale" or "Administrative Diagram." In this model, two basic dimensions were identified that determine the effectiveness of the leader. These two dimensions are "interest in production" and "interest in man." These two dimensions are located on a scale from 1 to 9, and 1 refers to the lowest interest and 9 refers to the highest interest. According to the authors, the combination of these two dimensions results in five types of leadership styles, expressed as poor leadership (1/1), city club leadership (1/9), mission

leadership (9/1), mild-mannered leadership (5/5), and team leadership (9/9). In these styles, the team leadership (9/9) that attaches the highest importance to both production and people is expressed as the most effective leadership style.[9]

One of the most basic approaches that can be used to group the styles of leaders is to define them as authoritarian or democratic leaders. Before defining the authoritarian leader and specifying his characteristics, it would make sense to talk about and define a personality trait, so that is, authoritarianism, which affects the behavior of the leader in this sense. In its simplest definition, authoritarianism is a belief that there should be status differences within the organization and that such differences will contribute to the effective functioning of the organization.[11] Moreover Katz and Robert define authority as a force within the organization.[12]

Adorno and Altemeyer made studies to describe the characteristics of an authoritarian personality. According to the results of these studies, authoritarian people are individuals who need to use a high level of authority, demonstrate strict adherence to traditional behavior patterns, and tend to violently punish actions that are contrary to traditional behavior.[13] Such persons are individuals who obey authority, are strict, prone to the use of force, and are opposed to the use of subjective feelings.[14]

On the other hand, it is a fact that people feel safe only in a fair environment and where peace is ensured. Then again, openness and transparency are spreading rapidly at this point with today's technology. Therefore, injustice will find quickly repercussions and can cause social upheavals. For the continuity of trust, people need to feel that they will be in a fair environment. The way a leader seeks justice is democracy. Universal values of our era are "libertarianism, pluralism, openness, and reconciliation."

There is always been a desire to dominate human psychology. A person or persons who want to retain control try to maintain this by staying within or outside moral boundaries. Being sovereign is a universal feeling, and the path to it again passes through Justice. The number of world leaders who can fairly manage a sense of hegemony is quite less. Authoritarian-prone people perceive freedom and pluralism as a threat. A person who sees himself under threat is always in fear. A person in fear begins not to trust anyone. The feared person wants to punish criminals with violence and tends to see everything as a potential threat. Thus, they increase control and restrict freedom.

They are not liked by society and are not warm. The decrease in love, respect, and trust in a society makes it difficult to organize social relations. The increase of interindividual fighter rises the disruption of social peace, push people to loneliness, and decreases economic mobility.[15]

In contrast, current psychometric scales are needed to identify the boundaries of authoritarianism, to define the items, and to find the balance between power use and justice. To meet this need, it is aimed to build up an "Uskudar Democratic Leadership Scale (USDELID)" by carrying out validity and reliability studies of the Leadership Mightiness and Dictatorship Test developed by Tarhan.[1]

Methods

The ethics committee approval has been obtained from the Uskudar University Noninterventional Research Ethics Committee (61351342/April2021-27).

For the validity and reliability studies of the USDELID, space is made up of people 18 years in age and older. In this context, the sample of the study was generated from 1010 people elder than 18 years old, reached through the Internet throughout Turkey. Since scale development studies will be carried out, various opinions indicated in the literature have been examined for the conformity of the data set to factor analysis. Accordingly, opinions are stated that the sample size should be between 100 and 250, the scale should be at least five times or ten times the number of items.[16,17] Considering that the scale in the study consists of 25 items, the number of 1010 samples is quite sufficient. Of the 1010 people involved in the study, 50.5% were women, 48.8% were male, and seven people have not stated. When the age dispersals are examined, the youngest of the participants was 18, the eldest was 80, and the average age was 35.6.

Measurement instruments

Uskudar Political Leadership Scale (USPOLID)

Uskudar Political Leadership Scale (USPOLID), consisting of 18 items and a single factor, is the Uskudar Political Leadership Scale in Tarhan's (2017b) "Psychological War" book, and its validity and reliability study has been made in Kansu's (2021) doctoral thesis study.[15,18] The variance rate explained by the scale of the 18-item 5 Likert type, which measures the *charismatic, classical, and wisdom values* of the leader, is 73.84%. The internal consistency reliability of the scale was found in the cronbach alpha coefficient of 94. In the criteria validity study of USDELID developed in this study, it was used considering that it may be associated with USDELID.

Uskudar Democratic Leadership Scale

For the USDELID validity and reliability studies, expert opinions were first obtained by generating a pool of items, and then the content validity of the scale, structure validity with factor analysis, the discriminant validity analysis, and internal consistency reliability were made.

The material pool of the scale in this study has been generated from the questions of "The Test of Mightiness in Leadership and the Dictatorship" existing in Tarhan's book "Mom, what is a 'Coup?' The Psychology of the Coup" and its reliability is tested.[1] An expert opinion inventory of

the scale consisting of 25 items has been generated and submitted to the opinion of six experts. To evaluate draft scales, the expert opinion inventory includes the options "The item is appropriate to remain on the scale," "The item may remain on the scale but is unnecessary," and "The item is not appropriate to remain on the scale." To provide an interdisciplinary view, the expert pool was build up with two academics from each of the fields of psychology and psychiatry, and communication with an expert from the Department of International Relations, and inventories were sent by e-mail. After that, the adaptation rates of the items were calculated using the formula proposed by Tavşancıl and Aslan (2001).[19]

Interrater reliability rates are calculated using the ratings contained in the inventory for each item. Accordingly, it was noted that the relevant item does not stay below 70, scoring between 0 and 1. Furthermore, according to the opinions of experts, the items have been revised and arranged in terms of spelling and grammar.

The 25-item draft scale was rated as "I Disagree at All," "I Agree with a Little Bit," "I Moderately Agree," "I Agree Very Much," and "I Fully Agree" without the item being eliminated after expert opinions and was distributed to participants through an online survey in February 2021 according to the principle of volunteerism. After the data obtaining phase, the explanatory factor analysis phase has been started.

The exploratory factor analysis is frequently applied as one of the statistical calculation techniques performed in line with a large number of variables within the scope of the structure validity of scale development. Bartlett test and Kaiser–Meyer–Olkin (KMO) test specified in the literature were applied to test the suitability of the data set for factor analysis before dynamic factor analysis was performed.[20] The fact that the KMO value is 90 and above is considered as "excellent," to be in the range of 80 to 89 as "very good," to be in the range of 70 to 79 as "good," to be in the range of 60 to 69 as "average," to be in the range of, 50 to 59 as "weak," and less than this as "unacceptable."[16,21] Furthermore, is expected that the value of Bartlett Sphericity will be meaningful.

With factor analysis, which is made during the structure validity phase of the scales as the factor, in other words, the number of dimensions can be determined and the eigenvalue statistics are used for this purpose. According to the Eigenvalue statistic, factors whose value is usually ≥1 are taken into account.[22] If the researcher wants to build up his distinction based on the subject, he can also manually determine the number of factors and reveal a structure according to the suitability of the variance ratios described by item loads. It is ideal when the variance rate revealed by factor analysis varies between 40% and 60% in social sciences.[20] On the other hand, in the structure validity studies of the scale, correlation values are looked at in the relationships of factors with each other and with the total. When interpreting correlation values, the relationshi*P* value between 30 and 70 is "average;" values above 70 indicate a "high" relationship, and a "weak" relationship if it is below 30.[20]

Discriminant validity studies are carried out to determine whether the items on the scales of the property to be measured are suitable and the item discriminant index is calculated. Accordingly, the answers given to each question are sorted as points and 27% of the upper group and subgroup are taken and the difference between the two groups is looked at by independent group *t*-test. The results reinforce validity studies by giving an idea of the internal consistency of the scale.[20] Thus, in this study, two separate groups of 272 participants from 1010 participants were taken, and the difference was examined.

Cronbach alpha coefficients were calculated by analyzing the internal consistency of the item according to the item variants during the reliability studies phase. As a result of the studies carried out, the validity and reliability of USDELID were revealed.

Implementation

The data obtaining were carried out according to the principle of volunteerism through an online survey between February 1st and 7th, 2021. The study group consisted of people aged 18 and elder through randomly selected sampling. The USDELID items where their validity and reliability have been made, have been generated from the questions of "The Test of Mightiness in Leadership and the Dictatorship" existing in Tarhan's book "Mom, what is a 'Coup?' The Psychology of the Coup."[1] Attendees were given an online questionnaire consisting of the Uskudar Political Leadership Scale and USDELID questions. An average of 10 min to complete the applied survey was enough.

Data analysis

Explanatory factor analysis was applied in USDELID structure validity studies. Twenty-seven percent slices were taken from the upper group and the lower group in the discrimination validity studies, and the difference between the two groups was looked at with an independent group *t*-test. The reliability coefficient of the scales was determined by the Cronbach alpha value. SPSS 26.0 (SPSS 26.0 statistical program by IBM was used for all validity and reliability analyses)statistical program was used for all validity and reliability analyses.

Results

Validity and Reliability Studies of the Democratic Leadership Scale

In this part of the study, evaluations were made for the USDELID. Content validity of the scale, structure validity, discrimination validity, and reliability studies are contained within.

Content validity

The USDELID item pool was formed from 25 items in the first stage and presented to expert opinions. To include interdisciplinary views, the items were examined by six experts accompanied by an expert opinion inventory. A content validity study was conducted with data provided from opinions received from each expert through the expert opinion inventory, and interrater reliability was calculated. Accordingly, in the study, the compliance rates of 80 were sought and 25 items were found to remain on the draft scale. Thus, explanatory factor analysis was applied to the data obtained by applying the 25-item draft scale to 1010 participants.

Structure validity-explanatory factor analysis

To determine the factor structure of USDELID, explanatory factor analysis was first studied with the KMO coefficient and Bartlett Sphericity Analyses. Accordingly, the KMO coefficient value was found to be 984. As for that, the Bartlett Sphericity Test result was found significance (X^2 = 30,826,009, standard deviation: 300, P = 0.000). The results showed the suitability of the data for factor analysis.[21] In this direction, the factor analysis was started with a 25-item nominated scale obtained after expert opinions. Since in factor building after factor analysis is made, eigenvalues for USDELID >1 are accepted, it is understood that it is a single factor structure in the first stage.[22,23] Accordingly, item loads were found as 810 for 24 items and more, and the highest item load was 899. Item 23 was found to be 323, taking the lowest factor load as the only value. Moreover, the variance rate was found as 71,812, which was to be understood to be quite high.

Then, to obtain a factor-based structure, a pool of items was build up by the researcher, whereas four factors were manually tested to determine the suitability of the four dimensions foreseen. The eigenvalues and variance ratio of the factors in the four-factor structure is given in Table 1.

As shown in Table 1, the explanatory variance rate of a single factor with an equity value of 17,953 is 71.81% and is quite high. The variance rate explained by the second factor with an eigenvalue of 975 is 3.90, the variance rate of the third factor with an eigenvalue of 792 is 3.16, and the variance rate explained by the fourth factor with equity of 492 is 1.96. Moreover, the total explained variance rate increased to 80.85%.

Table 1: Factor structure and explained variance rate

USDELID	Eigenvalue	Variance	Cumulative variance
1st dimension	17.953	71.81	71.81
2nd dimension	0.975	3.90	75.71
3rd dimension	0.792	3.16	78.88
4th dimension	0.492	1.96	80.85

USDELID: Uskudar Democratic Leadership Scale

Another method used to determine the factor structure, the scree pilot test is considered to determine the number of factors, where the slope starts to disappear according to the graph. Although the single-factor structure was initially revealed, the line chart that emerged according to the analyses tested according to four factors is included in Figure 1.

After determining the number of factors, item factor loads were examined, the factor load value of each item was checked according to the subcutting point of 55, and so the factor structure was released. Thus, since item 23 was found to be in a stand-alone dimension, the 5-factor structure was also manually tested. Thus, item 23 scored 975 and generated a dimension alone, and it was thought that it could be positioned where desired on the scale. A four-dimensional (4D) scale structure was obtained from items other than item 23 as well. Accordingly, the item factor load values of the 4D structure are given in Table 2.

When the item factor load values were examined, the item load values of the four-factor structure of the scale received the appropriate values. The item factor load values were found to be highest as of 776, and lowest as of 551. In the next stage, the contents of the items are examined, and the factors are given names.

In naming dimensions, the order of items was taken into account, and the contents of items are distributed in dimensions were examined as meaning and appropriate nomenclature was made. Accordingly, items 1st, 2nd, 3rd, 4th, and 5th constitute the first dimension and are called "Justice Oriented."

6th, 7th, 8th, and 9th items constituted the second dimension, and when the contents were examined, it was seen that it was related to "Accountability."

Articles 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, and 20th constitute the third dimension. When the contents of the articles are examined, it is understood that they are related to "Libertarianism/Pluralism."

Items 21st, 22nd, 24th, and 25th constituted the fourth dimension. These items are evaluated in terms of content and the dimension is called "Participation."

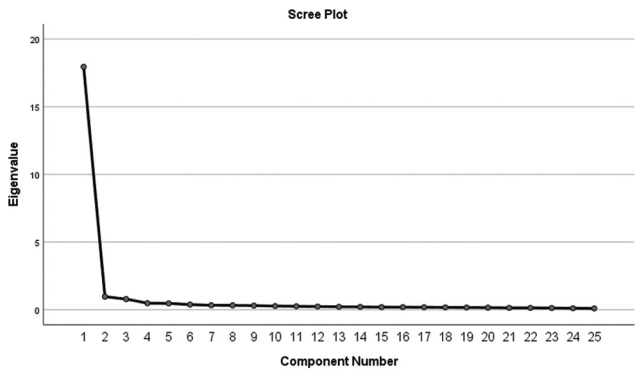

Figure 1: Scree pilot of Uskudar Democratic Leadership Scale

Table 2: Factor Load Values of Uskudar Democratic Leadership Scale items

Items	F1	F2	F3	F4
M17				
A DEMOCRATIC leader accepts defeat, apologies if necessary. An AUTOCRATIC leader tries to change rules by force in case of defeat, or flees or falls into depression	0.731			
M15				
A DEMOCRATIC leader makes policy-oriented decisions, not results-oriented and goal-oriented, in the use of resources such as money. An AUTOCRATIC leader his only principle is success, doesn't care about fair resource use	0.684			
M14				
A DEMOCRATIC leader as a measure separates those who seek solutions from those who seek interests and does not favor those who approach for their interests. The only measure for an AUTOCRATIC leader is, he is supported	0.664			
M13				
A DEMOCRATIC leader doesn't confuse friends with a foe. An AUTOCRATIC leader sees every critic as an enemy	0.633			
M11				
A DEMOCRATIC leader takes a computable risk in case of need. An AUTOCRATIC leader takes a risk without a measure	0.610			
M18				
A DEMOCRATIC leader uses praise and reward furtherly. An AUTOCRATIC leader uses more penalty, oppression, coercion, and threats	0.606			
M16				
A DEMOCRATIC leader accepts defeat, apologies if necessary. An AUTOCRATIC leader tries to change rules by force in case of defeat, or flees or falls into depression	0.603			
M19				
A DEMOCRATIC leader thinks long-term and strategically. An AUTOCRATIC leader is hasty, impatient, thinks more in the short-term and operational	0.597			
M20				
A DEMOCRATIC leader uses positive emotions, such as altruism, love, trust, to mobilize people. An AUTOCRATIC leader uses negative emotions such as patronage, bullying, scaring, and suppression	0.552			
M10				
A DEMOCRATIC leader glorifies his cause, not his personality. An AUTOCRATIC considers his personality identical to his cause	0.529			
M12				
A DEMOCRATIC leader is like a conductor; he defends ideological pluralism. An AUTOCRATIC leader wants monogamy, he is totalitarian, he imposes his ideology	0.508			
M2				
A DEMOCRATIC leader is determined, he is persistent, he stands behind what he believes in, he is focused on justice, if he is wrong, he returns from his mistake. An AUTOCRATIC leader is authoritarian, stubborn, does not step back, goes all the way even if he is wrong, cares about loyalty, power, not organizational justice		0.776		
M3				
A DEMOCRATIC leader is clear, he tries to convince, if he is not convinced, he just puts an attitude, he is not a bully. An AUTOCRATIC leader has a hidden agenda, if he cannot convince, he is a tyrant, oppresses, has no pity		0.744		
M1				
A DEMOCRATIC leader acts in consultation and uses the power of persuasion. An AUTOCRATIC leader is a dictator who loves the use of brutal power		0.723		
M4				
A DEMOCRATIC leader focuses on respect for justice and rules, replaces obstruction rules with ethical sensitivity. An AUTOCRATIC leader is prone to arbitrariness, power-oriented easily breaks the rules		0.626		
M5				
A democrat leader likes to consult, gets someone else to score in football. An AUTOCRATIC leader is commanding, likes to give orders, says I should have the ball, I will score the goal		0.563		

Contd...

Table 2: Contd...

Items	F1	F2	F3	F4
M25				
A DEMOCRATIC leader can sacrifice his interests in the event of a crisis and give up in favor of the institution. An AUTOCRATIC leader prioritizes in the case of a crisis his interests, not the institution			0.699	
M24				
A DEMOCRATIC leader cares about distributing power and authority to the team with colleagues, not himself. An AUTOCRATIC leader is very glorified to keep control by himself			0.689	
M22				
A DEMOCRATIC leader protects competent, merited, and dignified people even if they speak bitterly. An AUTOCRATIC leader does not like criticism and does not listen to it			0.670	
M21				
A DEMOCRATIC leader keeps those who tell the truth by his side, even if he doesn't like it, is focused on corporate benefits. An AUTOCRATIC leader advances with praisers and endorsers, makes individual benefit-driven decisions			0.661	
M8				
A DEMOCRATIC leader is open to criticism, won't mind being held accountable. An AUTOCRATIC leader is closed to criticism, avoids accountability				0.680
M7				
A DEMOCRATIC leader is open and transparent, is a team leader. An AUTOCRATIC leader doesn't talk much, he's the only man				0.679
M6				
A DEMOCRATIC leader is open to criticism, ready to be held accountable. An AUTOCRATIC leader glorifies monophony, never wants accountability				0.597
M9				
A DEMOCRATIC leader does not like those who say yes to everything, those who praise him, his favorite word is "let me investigate!". An AUTOCRATIC leader opens the way for those who praise his personality, his favorite saying is "Yes, Sir!"				0.551
M23*				
A DEMOCRATIC leader is prone to gathering power in his person. An AUTOCRATIC leader shows appropriate behavior and attitude that power is in-laws and rules, not in the hands of individuals				

*M23 alone formed a dimension and the factor load value was found 925. It is written in reverse meaningfully to measure attention on the scale and can be used in the desired order. It must be scored reversely when calculating

Twenty-third item alone has not been under other dimensions due to take the high load value. This item is not named and can be positioned anywhere on the scale to measure attention by writing the meaning in the sentence. This item is inverted and included in the scale total score when evaluating.

In the next stage, the relationship of dimensions with each other and USDELID is examined and given in Table 3.

As Table 3 was examined, it was found that the relationship levels were high compared to the Pearson correlation coefficients applied to the structure after factor analysis based on data obtained from 1010 participants and found in the correlation test to understand the interdimensional relationship and it is concluded that the scale consists of 25 items and four dimensions.

Discriminant validity

At this stage, item discriminant validity studies were carried out to determine whether the items on the scale measured the desired property. Data collected from 272 participants were sorted from large to small and difference tests were applied to data in the upper 27% and subgroups of 27%.

When Table 4 is examined, the results were significant, it was concluded that USDELID is a scale that measures the desired properties. In this respect, the highest score from USDELID is 125, the lowest is 25. The average score obtained with 1010 participants was 100.31.

Convergent validity

At this stage, the relationship between the Uskudar Political Leadership Scale (USPLS) and USDELID, which is thought to be related to the validity of the criteria has been tested. As shown in Table 5, a positively significant relationship was found.

Reliability studies

The Cronbach Alpha internal consistency coefficient of the scale was calculated in the scope of USDELID's *reliability studies* and the Cronbach alpha coefficient of the 25 items, which constitute USDELID, was found to be 976. This resulting value revealed that the scale is highly reliable. Thus, a valid and reliable "USDELID" emerged. Internal consistency analysis of the USDELID based on dimensions and scale sum is given in Table 6.

Table 3: Uskudar Democratic Leadership Scale and its dimensions related to each other

Subscale/Scale	Justice orientedness	Accountability	Libertarianism/pluralism	Attendancyness
Accountability	0.877			
Libertarianism/pluralism	0.874	902		
Attendancyness	0.818	859	911	
USDELID	0.928	946	981	935

USDELID: Uskudar Democratic Leadership Scale

Table 4: Uskudar Democratic Leadership Scale's discrimination validity

Scale/dimensions	Group	*n*	X	SS	SD	*t*	*P*
Justice orientedness	Upper group	272	25.00	00	542	47.17	000
	Lower group	272	13.19	4.12			
Accountability	Upper group	272	19.95	19	542	31.24	000
	Lower group	272	11.36	4.53			
Libertarianism/pluralism	Upper group	272	54.15	2.12	542	33.64	000
	Lower group	272	30.50	11.3			
Attendancyness	Upper group	272	19.69	1.03	542	28.66	000
	Lower group	272	11.35	4.68			
USDELID in total	Upper group	272	122.01	1.68	542	46.34	000
	Lower group	272	67.44	19.3			

SD: Standard deviation, USDELID: Uskudar Democratic Leadership Scale, DF: Degree of freedom

Table 5: Convergent validity of Uskudar Democratic Leadership Scale

Scales	USPOLID
USDELID	
r	61
P	000

USDELID: Uskudar Democratic Leadership Scale, USPLS: Uskudar Political Leadership Scale

Table 6: Uskudar Democratic Leadership Scale and the reliability of dimensions

Scale/dimensions	Item number	Cronbach alpha coefficient
Justice orientedness	5	0.937
Accountability	4	0.942
Libertarianism/pluralism	11	0.972
Attendancyness	4	0.943
USDELID	25	0.976

USDELID: Uskudar Democratic Leadership Scale

As it can be seen from Table 6, the 976 Cronbach alpha value found in the sum of the Democratic Leadership Scale showed a high degree of reliability. When the scale subdivisions were examined, the Cronbach alpha value was found to be lowest as 942 and 972 as for the highest. Thus, the values received by the dimensions also revealed a high level of reliability.

Conclusion

USDELID is a measuring tool buildup with the validity and reliability of the "Test of Mightiness in Leadership and Dictatorship" in Tarhan's book (2017) "Mom, what is a 'Coup?' The Psychology of the Coup." After all validity and reliability studies, it turned out to be a structure consisting of 25 items and four factors. USDELID is a five-type Likert scale rated in the range "I Disagree at All" and "I Fully Agree," and the highest score from the entire scale is 125 and the lowest score is 25. Accordingly, the increase in the score from USDELID means an increase in the acceptance level of the Democratic Leadership [Annexure 1].

To interpret the scores to be taken from USDELID, the highest and lowest score range to be taken from the scale was determined and the range coefficients were calculated according to the Likert five-scale. The score is interpreted as "advanced autocrat and dictator personality" in the range of 25–40, "autocratic personality" in the range of 41–60 points, "risky group is diagnosed as autocrat at any time" in the range of 61–80, "highly democratic personality" in the range of 81–105, and "definitely democratic and fair personality" in the range of 106–125. USDELID is a scale of self-assessment and if it is evaluated with others in mind, it also gives the result of an estimated evaluation of that person, and if it is evaluated bilaterally, confirmation is ensured by perception control.

USDELID disclosure of 80.85% of the total variance is considered as very high in social sciences. Besides, the internal coefficient of consistency of the scale, Cronbach alpha, was found to be 97. Studies have shown that USDELID is a valid and reliable scale.

Patient informed consent

Informed consent was obtained.

Ethics committee approval

The ethics committee approval has been obtained from the Uskudar University Noninterventional Research Ethics Committee (61351342/April2021-27).

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Conflicts of interest

There are no conflicts of interest to declare.

Author contribution subject and rate

- Nevzat Tarhan (%50) contributed with scale items, theoretical background, and data collect
- Aylin Tutgun Unal (%50) designed the research, data analysis and wrote the whole manuscript.

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Annexure 1: The Uskudar Democratic Leadership Scale (USDELID)

	Choose your level of participation in statements on a scale for the leader you are considering in terms of eligibility to be democratic.	**I disagree at all**	**I agree with a bit**	**I agree averagely**	**I agree greatly**	**I agree totally**
1	A DEMOCRATIC leader acts in consultation and uses his powers of convenience. An AUTOCRATIC leader is a dictator who likes the use brutal power.					
2	A DEMOCRATIC leader is determined, he is persistent, he stands behind what he believes in, he is focused on justice, if he is wrong, he returns from his mistake. An AUTOCRATIC leader is authoritarian, stubborn, does not step back, goes all the way even if he is wrong, cares about loyalty, power, not organizational justice.					
3	A DEMOCRATIC leader is clear, he tries to convince, if he is not convinced, he just puts an attitude, he is not a bully. An AUTOCRATIC leader has a hidden agenda, if he cannot convince, he is a tyrant, oppresses, has no pity.					
4	A DEMOCRATIC leader focuses on respect for justice and rules, replaces obstruction rules with ethical sensitivity. An AUTOCRATIC leader is prone to arbitrariness, power-oriented easily breaks the rules.					
5	A DEMOCRAT leader likes to consult, gets someone else to score in football. An AUTOCRATIC leader is commanding, likes to give orders, says I should have the ball, I will score the goal.					
6	A DEMOCRATIC leader is open to criticism, ready to be held accountable. An AUTOCRATIC leader glorifies monophony, never wants accountability.					
7	A DEMOCRATIC leader is open and transparent, is a team leader. An AUTOCRATIC leader doesn't talk much, he's the only man.					
8	A DEMOCRATIC leader is open to criticism, won't mind to be held accountable. An AUTOCRATIC leader is closed to criticism, avoids accountability.					
9	A DEMOCRATIC leader does not like those who say yes to everything, those who praise him, his favorite word is "Let me investigate!". An AUTOCRATIC leader opens the way for those who praise his personality, his favorite saying is "Yes, Sir!".					
10	A DEMOCRATIC leader glorifies his cause, not his personality. An AUTOCRATIC leader considers his personality identical to his cause.					
11	A DEMOCRATIC leader takes a computable risk in case of need. An AUTOCRATIC leader takes a risk without a measure.					
12	A DEMOCRATIC leader is like a conductor; he defends ideological pluralism. An AUTOCRATIC leader wants monogamy, he is totalitarian, he imposes his own ideology.					
13	A DEMOCRATIC leader doesn't confuse friends with a foe. An AUTOCRATIC leader sees every critic as an enemy.					
14	A DEMOCRATIC leader as a measure separates those who seek solutions from those who seek interests and does not favor those who approach for their interests. The only measure for an AUTOCRATIC leader is, he is supported.					
15	A DEMOCRATIC leader makes policy-oriented decisions, not results-oriented and goal-oriented, in the use of resources such as money. An AUTOCRATIC leader his only principle is success, doesn't care about fair resource use.					
16	A DEMOCRATIC leader accepts defeat, apologies if necessary. An AUTOCRATIC leader tries to change rules by force in case of defeat, or flees or falls into depression.					
17	A DEMOCRATIC leader does not show different behavior in the house micro-powered and does not show different behavior in the institution macro-powered. An AUTOCRATIC changes his authoritarian appearance in the interest of his expedience.					
18	A DEMOCRATIC leader uses praise and reward furtherly. An AUTOCRATIC leader uses more penalty, oppression, coercion, and threats.					

Contd...

Annexure 1: Contnd...

	Choose your level of participation in statements on a scale for the leader you are considering in terms of eligibility to be democratic.	I disagree at all	I agree with a bit	I agree averagely	I agree greatly	I agree totally
19	A DEMOCRATIC leader thinks long-term and strategically. An AUTOCRATIC leader is hasty, impatient, thinks more in the short-term and operational.					
20	A DEMOCRATIC leader uses positive emotions, such as altruism, love, trust, to mobilize people. An AUTOCRATIC leader uses negative emotions such as patronage, bullying, scaring, and suppression.					
21	A DEMOCRATIC leader keeps those who tell the truth by his side, even if he doesn't like it, is focused on corporate benefits. An AUTOCRATIC leader advances with praisers and endorsers, makes individual benefit-driven decisions.					
22	A DEMOCRATIC leader protects competent, merited, and dignified people even if they speak bitterly. An AUTOCRATIC leader does not like criticism and does not listen to it.					
23	A DEMOCRATIC leader is prone to gathering power in his person. An AUTOCRATIC leader shows appropriate behavior and attitude that power is in-laws and rules, not in the hands of individuals.					
24	A DEMOCRATIC leader cares about distributing power and authority to the team with colleagues, not himself. An AUTOCRATIC leader is very glorified to keep control by himself.					
25	A DEMOCRATIC leader can sacrifice his interests in the event of a crisis and give up in favor of the institution. An AUTOCRATIC leader prioritizes in the case of a crisis his interests, not the institution.					

1st, 2nd, 3rd, 4th, 5th items are the dimensions of **"Justice Orientedness"**.

6th, 7th, 8th, 9th items are the **"Accountability"** dimensions.

10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th items are the dimensions of **"Libertarianism / Pluralism"**.

21st, 22nd, 24th, 25th items are **"Attendancyness"** size.

NOTICE: The 23rd item alone can be positioned anywhere on the scale to measure attention. This item is inverted and is included in the scale total score when evaluating.

USDELID is a scale of self-assessment and if it is evaluated with others in mind, it also gives the result of an estimated evaluation of that person, and if it is evaluated bilaterally, confirmation is ensured by perception control.

Original Article

The Relationship between Perfectionism and Goal Orientation Types on Sports Continuation

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Abstract

Aim and Objectives: The aim of the study is, to determine the effect of perfectionism levels and goal orientation types on the individuals who played licensed basketball in the past, to continue their basketball life at a professional/amateur level or dropped out basketball. **Methods:** The sample of the study consists of a licensed basketball history, a total of 150 participants who continue at the amateur level (50), professional level (50), and dropped out basketball/continue as a hobby (50). Task and Ego Orientation in Sport Questionnaire developed by Duda *et al*. (1992) to determine types of goal orientation and Multidimensional Perfectionism Questionnaire (Frost *et al*., 1990) to predict perfectionism levels were used to collect data. The data analyzed with SPSS 25.0 program with one-way ANOVA and Pearson correlation analyses. **Results:** As a result of analyses, there were no significant differences between task and ego orientation and perfectionism and sport continuation types of participants. It was also found that according to correlation analysis conducted to determine the relationship between task and ego orientation among the styles of continuing sports; a statistically significant positive moderate relationship between task and ego orientation score of participants who dropped out basketball and continue at an amateur level; on the other hand, a high positive correlation was found between goal orientation and ego orientation of those who continue at professional level. **Conclusion:** Results provide a richer understanding of the effects of goals orientations with perfectionism and their relationship to performance and have implications on sport continuation.

Keywords: *Goal orientation, perfectionism, sport continuation*

Introduction

Research in the sports psychology literature has started to focus on the participation of individuals in sports since the 1970s. It is known that there are various factors on sport participation, sports continuity, and dropout. It is seen that these factors are examined in categories such as sports-related, nonsports-related, or psychosocial factors.[1-3] Psychological conditions of individuals affect their sports performance as well as their way of continuing their sports life.[4] The subject of this study was created to determine the effects of some psychological factors on individuals' continuing their basketball life.

Basketball is a popular sport with more than 200 federations and 450 million male and female participants, who are actively played or watched by many people of all ages and physiological characteristics in different cultures in the world. Participation in basketball is increasing day by day with organizations such as the Olympic Games, World Championships, European Championships all over the world.[5] Today, in Turkey, it is defined as the most popular sport after football. A large number of individuals participate basketball at the infrastructure, professional, and amateur levels.[6]

The aim of the study is, to determine the effect of perfectionism level and goal orientation types on the individuals who played licensed basketball in the past, to continue their basketball life at a professional/amateur level or drop out basketball.

Perfectionism is an important construct in the study of personality. In literature, the

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concept of perfectionism is defined differently; "demanding of oneself or others a higher quality of performance than is required by the situation,"[7] "setting difficult goals and strive to achieve them."[8] In addition, perfectionist personality traits are often described as setting difficult goals, rigid way of thinking, being too future-oriented, overstating the goals to be achieved, and devaluating after achievement.[9]

While perfectionism was considered as a unidimensional and negative concept before, it is thought that it is insufficient to define it in one dimension, it does not have only negative dimensions but also have positive dimensions. Therefore, two different dimensions described normal (adaptive) and abnormal (maladaptive) perfectionism. Perfectionist strives are defined adaptive perfectionism, while perfectionist concerns are defined maladaptive perfectionism. Perfectionist strives are associated with positive characteristics such as extraversion, resilience, positive affect, high life satisfaction, active coping methods, and the need for success, while perfectionist concerns are associated with negative features such as depressive affect, defensive personality, interpersonal problems, and somatic complaints.[10]

Frost *et al*. (1990) considered perfectionism as multidimensional and defined perfectionism as "having high level of self-criticism and setting extremely high standards."[11] They examined perfectionism in 6 dimensions: overly concerned with mistakes, parental expectation, parental criticism, suspicion of behavior, and personal standards and order. They examined perfectionism in 6 dimensions: personal standards, concern over mistakes, doubts about actions, parental expectations, parental criticism, and organization. Frost *et al*. (1990) in their study examined which subdimensions are related to adaptive or maladaptive perfectionism; they define the dimension of "concern over mistakes" as the concept most related to psychopathology, while high "personal standards" and "order" are related to positive personality traits. In addition, personal standards subscale was found to be positively associated with striving for success. Therefore, athletes achieving high success in sports are expected to have high personal standards. In addition, it was found that athletes who pay excessive attention to mistakes; perceive the mistake as a negative situation and react more negatively to the it.[11]

In literature, it is seen that adaptive perfectionism positively affects sports performance, while maladaptive perfectionism affects performance negatively by increasing anxiety.[12] Furthermore, it has been observed that perfectionist concerns increase the level of burnout by increasing stress in athletes, but perfectionist strives are associated with a lower burnout level.[13] Research results show that perfectionist strives contribute positively to sports performance as opposed to perfectionist concerns.[14,15] It has also been concluded that perfectionist strives are associated with the participation of young athletes in sports-oriented activities, so they should be evaluated as one of the factors that increase performance.[16]

There are studies in the literature that examine the relationship between perfectionism and continuing sport life. Joweth *et al*. examined the relationship between perfectionism levels of young people and their sport participation and burnout levels. According to results, they concluded that perfectionist strives are positively correlated with participation in sports and negatively correlated with burnout, so perfectionist strives are an important factor in maintaining sports participation.[17] Nam and Han, in their studies with 486 professional and 233 amateur golfers, concluded that professional golfers have significantly lower levels of perfectionism than amateurs.[18]

It is seen that, motivation is investigated in researches examining the factors related to participating, maintaining, and dropping out sport. Motivation is defined as a concept that underlies human behavior and has the function of initiating, maintaining, and ending behaviors. In the literature, need achievement theory, attribution theory, competence motivation theory, and achievement goal theory have been developed to explain the motivation sources.[19-21]

In this study, achievement goal theory which is defined as what individuals' what success means to them and how they are evaluated[22,23] is discussed to explain the motivational factors that are thought to have an effect on sports participation and continuation. Nicholls *et al*. (1989) developed the concepts of task orientation and ego orientation. According to the theory, task-oriented athletes take themselves as a reference and focus their energy and motivation on learning a new skill, mastering, self-development, and hard work.[24] Ego-oriented athletes, on the other hand, use their motivation to show their superiority in their skills, and Success for theese athletes means, defeating their opponent with less effort during the competition.[25] Nicholls *et al*., stated that both ego and task orientation characteristics, which are two dimensions of goal orientation, are present in every athlete at certain levels. And both orientations can be seen in athletes at the same time.[22]

The studies related to goal orientation and sports continuation are examined; Ötkan *et al*. determine the relationship between group cohesion and goal orientation with 243 basketball players from the Turkish Basketball Federation, they concluded that age and ego orientation scores had a moderate negative relationship.[26] Toros *et al*., in their study examining the goal orientation, motivation climate, and life satisfaction of elite and nonelite male basketball players, concluded that there is no significant difference in the goal orientation levels of elite and nonelite basketball players.[27]

Treasure *et al*., in their research with 73 professional and 106 amateur rugby players, found that professional rugby

players had significantly higher scores for both task and ego orientation compared to amateur rugby players, also stated that there was no significant difference between task and ego dimensions.[28] Carpenter and Yates, in their study examining the goal orientation levels of semi-professional and amateur football players, concluded that semi-professional football players have higher ego orientation, compared to their task orientation scores than amateur football players.[29] Koumpoula *et al*. in their study examining goal orientation and sport motivation of 98 professional and recreational rhythmic gymnasts found that recreational gymnasts had lower ego orientation scores compared to professionals, while the task orientation scores of gymnasts in both groups were higher than their goal orientation scores.[30]

In this study, the relationship between multidimensional perfectionism and goal orientation types in the way of sport continuation of individuals who have played basketball at a licensed level in the past was examined.

Methods

The ethics committee approval has been obtained from the Marmara University Health Sciences Institute Ethics Committee (18.02.2019/32).

Participants

Data were collected from a total of 150 participants (65 female, 85 male), whom 50 were professional basketball player, 50 were amateur player, 50 were dropped out basketball with having licenced basketball background. The participants age ranged between 18 and 64 (M = 32.55; standard deviation = 11.2). The participants in the study were informed about the research and their written consent was obtained by researchers. The sample of the study consisted of people selected on the basis of volunteering. Having psychiatric disorder, not competence to understand reading were exclusion criteria of the research.

Measures

Sociodemographic and Basketball-Related Information Form, Multidimensional Perfectionism Scale, and Task and Ego Orientation in Sport Questionnaire were administered to the participants.

Sociodemographic and basketball-related information form

The 13-item form was prepared by researchers to tap information on both sociodemographic characteristics and basketball-related information of participants. Informations such as gender, age, marital status, basketball background were questioned.

Multidimensional Perfectionism Scale

ASQ was developed by Frost *et al*. (1990) to determine levels of perfectionism and 6 subscales. The scale consists of 35 items. Each of those 35 items is scored according to a scale of 0–5. The total score of perfectionism may range from 35–175, with higher scores indicating higher perfectionism levels. The scale included six subscales; organization, concern over mistakes, doubts about actions, personal standards, parental criticism, and parental expectations. According to literature, organization and personal standards are associated with adaptive perfectionism in contrast concern over mistakes, high parental expectations, and parental criticism doubts about actions are associated with maladaptive perfectionism. The validity and reliability study of the scale's Turkish version was performed by Kağan in 2011.[31]

Task and ego orientation in sport questionnaire

Task and ego orientation in sport questionnaire was developed by Duda and Nicholls to determine task and ego orientation levels of individuals in the sport area. Each item is scored according to a scale of 1–5. The scale has 13 items and two subscales – ego orientation and task orientation. The score for each task and ego orientation subscales was used as the unit of measurement. The validity and reliability study of the scale's Turkish version was performed by Toros in 2004.[32]

Data analyses

IBM SPSS Statistics for Windows, Version 25.0 (Armonk, NY: IBM Corp) was used for the analysis of the data obtained in the study. To assess the sociodemographic characteristics of the participants, descriptive statistical methods such as percentage, mean, and standard deviation were used. Data were tested for normality with Kolmogorov–Smirnov test. Skewness and kurtosis values ranging between −2 and +2 are considered acceptable with respect to the data being normally distribute. According to values to examine the relationship between sociodemographic variables and perfectionism, goal orientation, independent samples *t*-test, and one way-ANOVA were performed, also Chi-square analysis was applied for categorical data.

Results

Descriptive statistics of the sociodemographic variables related to the participants are given in Table 1.

Descriptive statistics of the data on the basketball histories of the participants are given in Table 2.

As a result of the one-way ANOVA analysis between the sport continuation and the task/ego orientation dimensions, no statistically significant difference was found between the task orientation (F[2.147] = 1.50, $P > 0.05$) and ego orientation (F[2.147] = 0.85, $P > 0.05$) subdimensions and the styles of sport continuation.

According to the results of the Pearson correlation analysis conducted to evaluate the relationship between the sport continuation and task and ego orientation dimensions, it is revealed that, dropping out basketball ($r = 0.375$, $P < 0.05$)

Table 1: Sociodemographic characteristics of participants

Variable	*n* (%)	Mean	SD	*R*
Age		32.55	11.20	18-64
Gender				
Female	65 (43.5)			
Male	85 (56.7)			
Education level				
High school	27 (18.0)			
Graduate	91 (60.7)			
Undergraduate	32 (1.3)			
Marital status				
Single	76 (50.7)			
Married	65 (43.3)			
Divorced	9 (6.0)			
Working status				
Unemployed	21 (14.0)			
Part time	11 (7.3)			
Employee	118 (78.8)			
Incoming level (TL)				
<3000	24 (16.0)			
3000-7000	48 (32.0)			
7000 and more	75 (52.0)			

SD: Standard deviation

and playing at amateur level ($r = 0.341$, $P < 0.05$) were statistically positive and moderately significant whereas playing at professional level was statistically positive and highly significant with task and ego orientations. In other words, task and ego orientation were found to be related to each other in all three sample groups. While the ego orientation scores of the participants with high task orientation also increased, the ego orientation scores of the participants with low task orientation also decreased.

According to the results of the one-way ANOVA analysis conducted to evaluate the relationship between perfectionism and sport continuation, no statistically significant difference was found between sport continuation and organization (F [2.147] = 0.56, $P > 0.05$), concern over mistakes (F [2.147] = 0.62, $P > 0.05$), doubts about actions (F [2.147] = 1.22, $P > 0.05$], parental expectations (F [2.147] = 0.27, $P > 0.05$), parental criticism (F [2.147] = 2.54, $P > 0.05$), personal standards (F [2.147] = 0.47, $P > 0.05$), subtypes and total score of perfectionism (F [2.147] = 0.99, $P > 0.05$).

On the other hand, considering that the score that can be obtained from the scale is between 0 and 175, the average score obtained from the scale (100) shows that the participants have more than moderate level of perfectionism.

The relationship between perfectionism and goal orientation according to the sport continuation

The results of the Pearson correlation analysis conducted to determine the relationship between task and ego orientation levels and subtypes of multidimensional perfectionism scale according to the sport continuation are given in Table 3.

As seen in table, statistically significant positive weak correlation was found between the task orientation and concern over mistakes, parental expectations, personal standards subdimensions of perfectionism on participants who dropped out basketball ($r = 0.33$, $P < 0.05$; $r = 0.29$, $P < 0.05$; $r = 0.34$, $P < 0.05$). In other words, among the quiting basketball participants with task oriented ones; had higher perfectionist traits in concern over mistakes, parental expectation, and personal standards. No statistically significant correlation was found between task orientation and order, doubts about action, parental criticism scores ($P = 0.79$, $P = 0.32$, $P = 0.59$). Statistically significant negative weak relationship ($r = -0.33$, $P < 0.05$) was found between the ego orientation and order subtypes. In other words, it was concluded that among the participants who dropped out basketball, ego-oriented ones had a less perfectionist structure in order dimension. Statistically significant positive moderate correlation was found between the ego orientation and concern over the mistakes and parental expectation scores ($r = 0.43$, $P < 0.05$; $r = 0.53$, $P < 0.001$). In other words, it was concluded that the ego-oriented participants who dropped out basketball are more perfectionist in the dimensions of concern over mistakes and parental expectation.

Statistically significant positive weak relationship was found between the ego orientation scale score of the amateur level participants and the personal standards subdimensions score ($r = 0.33$, $P < 0.05$). In other words, it was concluded that among the participants at an amateur level with ego oriented ones, had more perfectionist characteristics in the dimension of personal standards.

In professional basketball players, statistically significant positive weak relationship was found between task orientation scale score and concern over the mistakes, doubts about the actions, parental expectation, and personal standards subdimensions scores ($r = 0.37$, $P < 0.05$; $r = 0.33$, $P < 0.05$; $r = 0.35$, $P < 0.05$; $r = 0.46$, $P < 0.05$). In other words, it was concluded that professional basketball players with high task orientation have more perfectionist characteristics in the dimensions of concern over the mistakes, doubts about the actions, parental expectation, and personal standards. In professional basketball players, there was a statistically significant positive weak correlation between the ego orientation and the parental criticism scale score ($r = 0.31$, $P < 0.05$), and there was statistically significant positive moderate correlation between concern over the mistakes, doubts about the actions, parental expectation, and personal standards scale scores ($r = 0.54$, $P < 0.05$; $r = 0.44$, $P < 0.05$; $r = 0.47$, $P < 0.05$; $r = 0.48$, $P < 0.05$). In other words, it was concluded that professional basketball players with high ego orientation have more perfectionist characteristics in the dimensions of

Table 2: Data on the basketball life of participants

Variable	*n* (%)	Mean	SD	*R*
Basketbol continuation				
Drop	50 (33.3)			
Amateur level	50 (33.3)			
Professional level	50 (33.3)			
Other sport				
Yes	52 (34.7)			
No	98 (65.3)			
Licensed basketball (years)				
<3	8 (5.3)			
3-5	18 (12)			
>5	71 (47.3)			
Still	53 (35.3)			
Starting to play basketball				
Myself	40 (26.7)			
Teacher	37 (24.7)			
Family	38 (25.3)			
Friend	24 (16.0)			
Media	4 (2.7)			
Other	7 (4.7)			
Effect of drop bask				
Don't drop	69 (46.0)			
Myself	55 (36.7)			
Coach	5 (3.3)			
Friend-family	10 (6.7)			
Sport ınjury	11 (7.3)			
Time of drop				
Don't drop	67 (44.7)			
High school	23 (15.3)			
Graduate	29 (19.3)			
After graduate	31 (20.7)			
Playing basketball (now), years				
I don't play	40 (26.7)			
<1	3 (2.0)			
1-2	6 (4.0)			
2-3	4 (2.7)			
>3	97 (64.7)			

SD: Standard deviation

parental criticism, concern over the mistakes, doubts about the actions, parental expectation, and personal standards. Furthermore, no significant relationship was found with the order dimension ($P = 0.29$).

Discussion

When the perfectionism level and goal orientation of the participants were examined, it was found that among the participants who dropped out basketball, task-oriented ones, it was concluded that they had higher perfectionist traits in the dimensions of concern over the mistakes, parental expectation, and personal standards, and ego-oriented ones had more perfectionist structure in the dimensions of concern over the mistakes and parental expectation, and a less perfectionist traits in the dimension of order.

Briefly, in participants who dropped out basketball, both positive and negative perfectionism were positively correlated with task orientation, while negative perfectionism was found to be positively correlated with ego orientation. Duda and Nicholls emphasized that high task orientation athletes are more satisfied with the sports activities; they were involved in, therefore they continued to do sports for a longer time. In contrast, high ego-oriented athletes tend to drop out sports more, task-oriented athletes continue to do sports for a longer time for recreational purposes.[25] Furthermore, the findings obtained from our study that negative perfectionism is associated with ego orientation supports the findings above.

Conclusion

It was concluded that high ego-oriented amateur level participants have more perfectionist characteristics in the dimension of personal standards. In other words, the ego orientation levels of the amateur level participants were positively correlated with adaptive perfectionism. Theoretical explanations about goal orientation in the literature also support this finding. Ego-oriented athletes are expected to choose competitors and goals that are guaranteed to achieve and defeat to protect their self-worth.[25]

Another finding of the study is professional basketball players with high level of ego, and task orientation had more perfectionist characteristics in the dimensions of concern over mistakes, doubts about actions, parental expectation, and personal standards. Briefly, task and ego orientation were found to be positively correlated with both adaptive and maladaptive perfectionism in professional basketball players. The literature findings also support these results; it was concluded that perfectionist strives were generally positively associated with both ego and task orientation, but perfectionist concerns did not have a significant effect on goal orientation, except for a few studies.[10] The relationship between perfectionism and goal orientation in athletes has been discussed in different studies in the literature. Dunn *et al*. investigated the relationship between multidimensional perfectionism and goal orientation with 174 Canadian football players and concluded that task orientation levels of football players are associated with adaptive perfectionism, and ego orientation levels are associated with maladaptive perfectionism.[33] In addition, Kurudirek (2017) investigates the relationship between perfectionism and goal orientation in 133 professional ice hockey players, found a positive relationship between the personal standards subdimension of perfectionism and goal orientation.[34]

When the findings obtained from the study are evaluated, the fact that ego orientation is associated with maladaptive perfectionism, especially in the athletes who drop out basketball, suggests that supporting the task orientation dimension of the children and adolescent athletes, be one

Table 3: The relationship between perfectionism and goal orientation according to the sport continuation

	Organization	Concern over mistakes	Doubts about actions	Parental expectations	Parental criticism	Personal standards
Dropped basketball						
Task orientation						
r	0.04	0.33*	0.15	0.28*	0.08	0.34*
P*	0.79	0.02	0.32	0.04	0.59	0.02
Ego orientation						
r	−0.28*	0.48**	0.21	0.57**	0.26	0.31*
P*	0.04	0.00	0.15	0.00	0.06	0.03
Amateur level						
Task orientation						
r	−0.03	0.04	−0.05	0.13	0.27	0.14
P*	0.83	0.80	0.73	0.39	0.06	0.33
Ego orientation						
r	−0.26	0.24	0.07	0.18	−0.06	0.33*
P*	0.07	0.09	0.62	0.21	0.67	0.02
Professional level						
Task orientation						
r	0.19	0.37**	0.33*	0.35*	0.17	0.46**
P*	0.19	0.001	0.02	0.01	0.22	0.001
Ego orientation						
r	−0.15	0.54**	0.44**	0.47**	0.31*	0.48**
P*	0.29	0.001	0.001	0.001	0.02	0.001

*P<0.05, **P<0.001

of the important factors that can prevent them from quitting sports. It is thought that coaches, sport psychologists, and managers in this sense will play an important role in the acquisition of adolescent athletes. In addition, the fact that high ego-oriented professional-level athletes are mostly related to maladaptive perfectionism dimensions suggests that it may be important to support the task-oriented features to benefit from the adaptive perfectionism in professional-level athletes.

Patient informed consent

There is no need for patient informed consent.

Ethics committee approval

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Conflicts of interest

There are no conflicts of interest to declare.

Author contribution subject and rate

Hazal Ayas (60%): Design the research, data collection, and analyses and wrote the whole manuscript.

Turgay Biçer (40%): Contributed with on research design and data collection, supervised the article write-up.

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Original Article

An In-Depth Examination of Visuospatial Functions in a Group of Turkish Children with Dyslexia

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Abstract

Aim: Developmental dyslexia is basically defined as a learning disorder characterized by reading, writing, spelling, and word comprehension difficulties. Phonological deficits in dyslexia are well established in literature, yet, research also indicates some visuospatial difficulties. The aim of this study was to examine the visuospatial functions in Turkish children with dyslexia and to show the interrelationship of visuospatial perception, visual memory, and executive functions. **Methods:** The sample of this study was composed of 20 children (9 female and 11 male) with developmental dyslexia and 20 age-matched controls (11 female and 9 male). The children in dyslexia group were previously diagnosed as dyslexic according to Diagnostic and Statistical Manual of Mental Disorder-IV criteria in a private rehabilitation center. Rey-Osterreich complex figure test (ROCF), Clock Drawing Test (CDT), and Judgment of Line Orientation test (JLOT) were used to evaluate visuospatial functions of the children. **Results:** Comparison analyses showed that dyslexia group significantly differed from the control group in all visuospatial test scores ($P < 0.05$ for all). In addition, a positive correlation was present between JLOT score and ROCF direct copying score, ROCF immediate memory score, ROCF delayed memory score, and CDT score for the dyslexic group ($P < 0.05$ for all). **Conclusion:** Our findings confirm the presence of visuospatial problems in dyslexia and highlight the importance of interaction between perceptual and executive processes indicating a more fundamental cognitive deficit.

Keywords: *Developmental dyslexia, executive functions, Turkish population, visuospatial functions*

Introduction

As being one of the most common neurodevelopmental disorders, developmental dyslexia is defined as a specific learning disability showing itself with difficulty in fluent and accurate reading, writing, spelling, and word comprehension abilities.[1] In addition to language-related deficits, children with dyslexia have problems in a wide range of cognitive domains, such as perception, attention, memory, right-left discrimination, orientation, and motor coordination.[2]

Although developmental dyslexia is primarily characterized by phonological difficulties, research suggests that dyslexic children also suffer from visuospatial deficits.[3] For example, Lipowska *et al*.[4] reported that dyslexic children had significantly decreased performance on visuospatial functions. Studies investigating attentional processes in dyslexia further revealed the limited sustained attention capacity and difficulties in orienting selective attention.[5] Plenty of studies also demonstrated decreased performance on executive functions in dyslexic children as compared to their age-matched controls.[6] Owing to the fact that executive functions comprise various high-level cognitive abilities as working memory, planning, and reasoning all of which have both verbal and nonverbal components; it would not be surprising to see that a wide range of cognitive domains can be impaired in dyslexia. In fact, many cognitive models have been developed aiming to explain the inseparable pattern of those domains.[7]

Contrary to the good evidence for the impaired visual functions, as mentioned above, it has been also reported that dyslexia may be accompanied by superior visuospatial skills.[8,9] According to a

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neurological model, it is hypothesized that dyslexic people have an exceptional brain with a greater symmetry between two hemispheres. Namely, Geschwind-Galaburda hypothesis suggests that dyslexic people tend to overuse their right hemisphere which is thought to be associated with enhanced visuospatial skills.[10] Consistent with this argument, supporting evidence was provided by several studies. According to the general pattern of these findings, individuals with dyslexia perform better in activities that require nonverbal reasoning skills and visuospatial thinking strategies.[11-13] As a different approach, a recent meta-analysis revealed lower mean scores but greater variability in visuospatial functions in dyslexia.

Given that reading and writing involve a range of visuoperceptual skills such as eye movement control, focusing, and orienting visual attention, it is reasonable to see visual dysfunctions in children with dyslexia. In this study, the primary aim was to make an in-depth investigation for visuospatial functions of children with dyslexia in Turkish population and to shed more light into the conflicting literature.

Methods

The ethics committee approval has been obtained from the Uskudar University non-interventional research ethics committee (2019-400).

Sample

Twenty dyslexic (9 female and 11 male) and 20 age-matched control children (11 female and 9 male) were included in the study. The dyslexic children were recruited from a special education and rehabilitation center who were previously diagnosed as having Specific Learning Disability according to Diagnostic and Statistical Manual of Mental Disorder-IV criteria. All children were native Turkish speakers. To validate the presence/absence of dyslexia, all children's reading and writing skills were assessed by the researcher through a validated learning test included reading, comprehension, writing, copying basic figures, and right-left distinction tasks (2 points for each part, a total of 10 points). Exclusion criteria were determined as any history of a neuropsychiatric disease other than specific learning disability, head trauma, and any sensory deficit. An informed consent was taken from all parents of the participants. The study was approved by the Local Ethical Committee of Uskudar University.

Measurement instruments

Rey–Osterrieth complex figure test

The Rey–Osterrieth complex figure test (ROCF) is a well-known neuropsychological test to measure visuospatial construction and visual memory processes. However, since it requires intact organization, planning, and problem-solving abilities, it has been also regarded as one of most useful methods to evaluate executive functions. ROCF is firstly developed by Rey in 1941 and scoring is standardized by Osterrieth in 1944. The administration of the test basically includes a complex figure to be copied by the participants and followed by an immediate recall, delayed recall, and delayed recognition parts. The original Meyers and Meyers scoring system was used.[14]

Clock drawing test

Clock Drawing Test (CDT) is a widely used cognitive screening test firstly developed for measuring constructional apraxia.[15] In today's clinical settings, however, it is a reliable measure to evaluate visuospatial and executive functions. Although multiple versions and scoring systems of CDT are present in literature, the general application is followed as instructing participants to draw a cycle to be a clock, then to add the numbers in and then set the time to 11.10. In this study, clocks were scored using the Shulman method as being one of the most commonly used scoring systems of CDT. In this method, the score ranges between 0 and 5 where the highest score is 5. Zero point is given if there is no representation of a clock, 1 point is given for a severe disorganization of numbers, 2 point is given for moderate disorganization, 3 point is given for acceptable organization with inaccurate hands, 4 point is given for minor organizational errors, and 5 point is given for well-organized numbers with accurate hands.

Judgment of line orientation test

Judgment of Line Orientation test (JLOT) was developed by Benton *et al*.[16] to measure the visuospatial abilities. The test includes a spiral booklet consisting of 35 pages with an array of 11 lines, each drawn by 18° of angles. The participants are instructed to match the pair of lines on each page with those 11 lines, by visually estimating their angles. Following the first 5 practice trials, the test consists of 30 trials and the maximum score can be taken from the test is 30.

Data analysis

All statistical analyses were performed using IBM SPSS Statistics (21). Normality of data was assessed using skewness and kurtosis of the distribution. Since all test scores fall within the normal range of distribution (−1.5–+1.5), parametric analyses were selected. Group differences were examined using independent sample *t*-tests. A Pearson correlation analysis was performed to assess the relationship between ROCF, CDT, and JLOT scores. Effect sizes (Cohen's d or Cramer's V) were reported as appropriate.

Results

Descriptive statistics and group differences for demographic variables are presented in Table 1.

Accordingly, no significant difference was present between the groups in terms of age, education, and gender ($P > 0.05$

for all). As expected, the dyslexic group (male: 6.40 ± 1.87) scored significantly lower than the control group (male: 9.65±0.67) on the learning test (t[38]: −7.29, $P < 0.001$).

When the visuospatial test scores of the groups were compared, the following results were found:

First of all, an independent samples *t*-test showed that ROCF direct copying score was significantly different between the groups (t[38]: −3.52, $P < 0.01$). Accordingly, the mean ROCF direct copying score of the dyslexia group (male: 30.42 ± 6.59) was significantly lower than the control group (male: 35.65 ± 0.69). Similarly, ROCF immediate memory score and the ROCF delayed recall score of the dyslexia group were significantly lower than the control group (t[38]: −3.26, $P < 0.01$; t[38]: −2.85, $P < 0.01$, respectively). Finally, the true recognition score was significantly higher for the control group as compared to dyslexia (t[38]: −3,671, $P < 0.001$); and false recognition group was significantly lower (t[38]: 2.087, $P < 0.05$). CDT performance of the children was compared by an independent *t*-test and it was found that dyslexic group had significantly lower score on CDT as compared to the control group (t[38]: −5.17, $P < 0.01$). Finally, JLOT score of the groups was compared. An independent samples *t*-test showed that dyslexic group had significantly lower performance on JLOT as compared to the control participants (t[38]: −3.51, $P < 0.01$).

The visuospatial test scores of the groups are presented in Table 2.

Pearson correlation analyses showed a positive correlation between JLOT score and ROCF direct copying, ROCF immediate memory, ROCF delayed memory, and CDT score for the dyslexic group ($r = 0.58$, $P < 0.05$; $r = 0.46$, $P < 0.05$; $r = 0.48$, $P < 0.05$; $r = 0.61$, $P < 0.05$, respectively). CDT score was not found to be significantly correlated with ROCF scores ($P > 0.05$ for all). For the control group, however, JLOT score was not found to be significantly correlated with ROCF and CDT scores ($P > 0.05$ for all). A positive correlation was present between CDT score and ROCF direct copying ($r = 0.46$, $P < 0.05$).

Discussion

To our knowledge, this was the first study to examine all aspects of visuospatial functions of children with dyslexia in a Turkish sample. The main findings of the present study revealed that children with dyslexia suffered from an overall visuospatial difficulty as compared to healthy children. These findings are consistent with the existing literature, despite the presence of some parsimonious evidence suggesting the opposite. Indeed, numerous studies have discussed the origins of visual deficits in dyslexia. While it is possible to account the deficit for a problem in visual neural networks, strong evidence suggests that central executive domain might be the real responsible. Many studies already reported the altered executive functioning in dyslexia.[17,18]

First of all, the ROCF is one of the most classical and widely accepted visual tasks measuring visuospatial organization as well as visual memory in healthy and clinical populations. As expected, dyslexic children in this study were significantly more impaired than healthy controls on copying, immediate recall, and delayed recall.

Table 1: Demographics of the sample

	Dyslexia group	Control group	*P*	Effect size
Number of patients (female/male)	20 (9/11)	20 (11/9)	>0.05*	0.10 (Cramer's' V)
Hand dominance (left/right)	20 (3/17)	20 (2/18)	>0.05*	0.07 (Cramer's' V)
Age (years), mean±SD	13.35±1.49	13.85±2.23	>0.05*	0.26 (Cohen's d)
Education (years), mean±SD	7.9±1.24	8.45±2.01	>0.05*	0.32 (Cohen's d)
Learning test score, mean±SD	6.4±1.87	9.65±0.67	<0.001**	2.31 (Cohen's d)

*P<0.05, **P<0.001. SD: Standard deviation

Table 2: Visuospatial test scores for groups

	Mean±SD		*P*	Effect size (Cohen's d)
	Dyslexia group	Control group		
ROCF				
Direct copying	30.42±6.59	35.65±0.69	<0.001**	1.11
Immediate memory	19.2±9.55	27.35±5.77	<0.01*	1.03
Delayed recall	19.5±9.81	26.97±6.4	<0.01*	0.90
True recognition	5.8±2.19	8.2±1.93	<0.001**	1.16
False recognition	4.45±1.82	3.15±2.1	<0.05*	0.66
CDT	3.25±1.29	4.85±0.48	<0.001**	1.64
JLOT	16.65±5.59	21.6±2.89	<0.001**	1.1.

*P<0.05, **P<0.001. ROCF: Rey-Osterreich complex figure test, CDT: Clock drawing test, JLOT: Judgment of line orientation test, SD: Standard deviation

Their recognition was also worse. The ROCF findings are in keeping with most of the other studies, while source of the poorer performance is still under discussion. Similar to our study, Lipowska *et al*.[4] used ROCF to assess visual deficits in 129 dyslexic children and reported that they display difficulty in visuospatial processes, tend to miss the details, and either forget or misplace the elements.

Considering the visuospatial skills, the JLOT appears to be one of the most sensitive measurement tools. Indeed, in many studies, a strong association has been shown between right posterior parietal lesions and impaired performance on JLOT.[19] Therefore, our findings support the notion that dyslexia might not be a core phonological deficit. Particularly, considering the working memory as a part of executive functions, missing the details on ROCF, and more failing in the difficult items on JLOT provide evidence for impaired visual attention in dyslexia. A recent fMRI study reported the activation of dorsolateral prefrontal areas in addition to visuospatial areas, especially during performing difficult JLOT items.[20] This finding suggests the involvement of an executive control as visual tasks get complicated. Bacon *et al*.[21] also suggested a central executive deficit by using the Corsi block task. They showed that dyslexic group had difficulty in adapting visual strategies for the reverse order, which points out an executive dysfunction.

Finally, CDT is considered to be one of the most reliable measures for executive control, despite a wide range of cognitive skills is required to perform the task. In our study, the lower performance on CDT in dyslexic children implies for a difficulty in orienting visual attention. Notably, it was observed that the dyslexic group tended to use one side of the circle (right or left) and neglected the other side in drawing the clock. This indicates that children with dyslexia have deficits in their right hemispheres, which play a role in directing attention to space. Similar to our finding, Eden *et al*.[22] reported that children with dyslexia tended to put the numbers toward the right face of the clock.

Our findings are in line with the well-documented relationship between visuospatial perception, visual memory, and executive functions. Given its broad definition, executive functions already include visual attention and constructional processes and in turn have an interrelationship with visual memory. In the previously mentioned study, Lipowska *et al*. reported a strong correlation between CDT and ROCF scores.[4] In this study, we showed a strong correlation between JLOT, ROCF recall, and CDT scores for the dyslexic group indicating a parallel reduction in all visual test performances. Therefore, this finding suggests a more distributed cognitive weakness in dyslexia.

Regarding this discussion, it is worth to underline a recent theory suggesting impaired function of magnocellular visual pathway in dyslexia. As magnocellular pathway is more specialized for directing visual attention, researchers relate the poor reading ability of dyslexic people with the slower information processing of magnocellular cortical pathways leading to reduced visuospatial perceptual speed.[23] Although a wealth of controversies about the magnocellular deficit theory still remains, it is quite reasonable to assume that phonological problems are derived from a fundamental visual perceptual deficit in dyslexia rather than to think the vice versa.

This study had some limitations to be addressed. The first limitation is the relatively small sample size, since it was difficult to recruit children with developmental dyslexia without any other comorbidity. Second, verbal and performance intelligence quotients of the children were not measured.

Therefore, if intellectual abilities could be controlled as a confounding variable, the group effect would be better clarified. Last but not the least, the present study solely provides behavioral evidence. Future research combining neuropsychological tests with functional neuroimaging data as well as the usage of machine learning methods for group classifications would be valuable so as to investigate the activity of related neural networks as well as their interactions.

Conclusion

The findings of this study suggest that in addition to phonological deficits of dyslexia, there is a multifactorial cognitive impairment including visuospatial perception, executive functions, and visual memory. Therefore, cognitive rehabilitation programs for early childhood dyslexia can be planned to enhance their visual functions. Further studies exploring neural networks are also required to shed more light into the emergence of cognitive deficits in dyslexia.

Patient informed consent

Patient informed consent was obtained.

Ethics committee approval

The ethics committee approval has been obtained from the Uskudar University non-interventional research ethics committee (2019-400).

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Conflicts of interest

There are no conflict of interest to declare.

Author contribution subject and rate

- Yeşim Mersin (50%): collected and analyzed the data
- Merve Çebi (50%): designed the research and wrote the whole manuscript.

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Original Article

Examining the Relationship between Attachment, Somatization, and Expressing Emotions

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Abstract

Aim: The baby's special relationship with his caregiver affects his future psychological and physical health. The disruption of the mother-baby bonding can lead to mental difficulties and even psychopathologies in that period and afterward. This study aimed to reveal the relationships between attachment, expressing emotion, and somatization. **Materials and Methods:** A total of 175 volunteer university students, 142 females, 33 males, were included in the study. In the study, data were collected via self-report forms, namely, sociodemographic form, the Parental Bonding Instrument, the Somatization Scale, and the Emotional Expression Questionnaire. **Results:** A low level of negative correlation was found between expressing emotions and attachment to the mother. A weak but statistically significant negative relationship was found between somatization and attachment to mother and father. A weakly significant negative correlation was found between somatization and Overprotection-Father scores. While the somatization scores of the participants increased, the perceived protective, controlling, nonsupporting attitudes of the father also increased significantly. **Conclusion:** Further research needs to be focused on the theoretical and clinical implications of these results. The precise nature of these possible relationships is yet to be interpreted.

Keywords: *Attachment, emotional expression, somatization*

Introduction

Scientists who try to understand human behavior have been focusing on attachment for many years. Attachment theory explores the impact of early experiences with caregivers on subsequent interpersonal behaviors and perceptions.[1] According to the attachment theory, a baby's special relationship with his caregiver affects his future psychological and physical health. Forming and sustaining social ties that are safe and satisfying seems to be a fundamental human desire. Deprivation of this need, particularly in early childhood, can affect how people function in relations in their adult life and can contribute to building adult insecure attachment patterns.[2] The disruption of mother-infant bonding can lead to mental challenges and even psychopathologies both in that period and after.[3] Hence, it is essential to understand this relationship with the caregiver. The attachment theory is a practical conceptual framework for understanding the development of somatization in adults.[4]

Somatization is described as a tendency to encounter and communicate somatic distress and symptoms unaccounted for by pathological findings, attribute them to physical illness, and seek medical help.[5] Expressing emotion, on the other hand, is verbal or nonverbal behaviors that can be seen from the outside after the emotions are experienced. They may be actions that follow an emotion such as shedding, crying, laughing.[6] Studies have revealed a relationship between attachment and somatization. Other studies have shown that there is a relationship between expressing emotions and psychological and physiological well-being.

On the other hand, emotional processing has an essential place in attachment theory. All sorts of attachment are formed by the pattern of parent-child interaction. In communicating with caregivers, the infant

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internalizes specific cognitive and emotional responses named the internal working model. The attachment type has a critical role in processing emotional situations and acquiring emotional responses.[7]

Although recent research reported that secure attachment could be considered as a protective factor against deficits in emotional processing and somatization of negative emotions,[8] relatively few studies focused on relationships between somatization and attachment. This study aims to reveal the relationships between attachment, expressing emotion, and somatization.

Materials and Methods

Methods

The ethics committee approval has been obtained from the Uskudar University Noninterventional Research Ethics Committee (61351342/2019-10).

In this correlational study, 175 volunteers (142 females and 33 males) students were reached at Üsküdar University. The sampling selection method is sampling according to the group present. The age range of the participants forming the sample was calculated as 22–52 years (mean = 27.15). The education level of the participants varies from undergraduate to doctorate with a mean of 13.4 years.

Materials

Sociodemographic form

To determine the sociodemographic characteristics of the participants and to investigate the factors affecting other scales, they are asked about their age, gender, education, marital status, income level, current chronic illness, whether there is a psychiatric illness in himself or his family, and a medical illness. It is a form consisting of 11 questions, including the medical history.

The parental bonding instrument

The Parental Bonding Instrument (PBI) was developed by Parker, Tupling, and Brown in 1979.[9] Kapçı and Küçüker conducted the Turkish validity and reliability study in 2006. This scale evaluates not attachment styles, but positive or negative attachment to parents.[10] The scale consists of 25 items. Twelve of these items are in the sub-dimension of interest, and 13 of them are in the care-control/overprotection sub-dimensions. The person is asked to respond to the items considering the first 16 years of his life. For each item, there are the options "It was totally like this," "It was partially like this," "Not quite like this," "It was not like this at all" and the person is expected to choose one of them. Scoring is between 0 and 3 for each statement, while the person can get the minimum "0" and the maximum "36" points from the interest dimension, the minimum "0" and the maximum "39" points for the care-control/overprotection dimension.

Somatization scale

The validity and reliability study of the Somatization Scale (SS) was carried out by Dülgerler in 2000.[11] Each expression on the scale has a choice of "true" or "false." A total score is obtained by adding up the scores from correct and incorrect answers. The scores obtained from the scale range between "0 and 33." If the scores get closer to 33, it indicates somatization disorder.

Emotional Expression Questionaire

Emotional Expression Questionaire (EEQ) was developed by King and Emmons in 1990 and adapted to Turkish by Kuzucu.[12] The scale determines at what level "positive," "negative" and "closeness" feelings are expressed in interpersonal relationships and individually, verbally, or nonverbally. It has 15 Likert items. The total score is obtained by adding the score from each item on the scale. A high score means a high expression of emotion.[13]

Statistical analysis

SPSS v. 20.0 package program (software package SPSS® version 20.0, IBM Inc., Chicago, IL, USA) was used to evaluate the data. *t*-test and one-way ANOVA test were used in the analysis of normally distributed data. Pearson's correlation analysis was used to examine the relationship between variables. $P < 0.05$ was accepted as a statistical significance level.

Results

175 subjects ($n = 175$) participated in the study. Women had a rate of 81.1% ($n = 142$) and men had a rate of 18.9% ($n = 33$). The average age of the participants was 27.15. Of the participants, 81.5% ($n = 141$) are single and 18.5% ($n = 32$) are married. While 15.6% ($n = 27$) of the participants stated that they applied to the psychiatry department before, 84.4% ($n = 146$) stated that they did not have such an application. Those with a history of psychiatric illness in their families constituted 22% ($n = 38$) of the participants.

The average score the participants got from the Parental Attachment Scale (PAS)-Mother scales is 44.74; the average of the scores they got from the PAS-Father scales is 44.86. The average of the scores the participants got from the EEQ is 73.35. The average of the scores the participants got from the SS is 7.69. Examination of the relationship between the participants' PBI, EEQ, and SS scores is given in Table 1.

When the PBI, EEQ, and SS scores of the participants were compared according to their gender, PBI and EEQ scores did not show a statistically significant difference between women and men ($P > 0.05$). SS scores were statistically significantly higher in women (8.22 ± 4.50) compared to men (5.28 ± 3.37) with a significance level of $P < 0.001$.

When the PBI, EEQ, and SS scores of the participants were compared according to their marital status, the

Table 1: Examination of the relationship between the participant's parental bonding instrument, emotional expression questionaire, and Somatization Scale scores (Pearson correlation test results)

	PBI		Care: Control mother	Overprotection mother	Care: Control father	Overprotection father	Expressing emotions
	Mother	Father					
PBI mother							
r	1						
P							
n	160						
PBI father							
r	0.654**	1					
P	<0.001						
n	144	158					
Care: Control mother							
r	0.799**	0.608**	1				
P	<0.001	<0.001					
n	160	145	162				
Overprotection mother							
r	0.746**	0.469**	0.194*	1			
P	<0.001	<0.001	0.014				
n	160	155	160	171			
Care: Control father							
r	0.586**	0.894**	0.699**	0.251**	1		
P	<0.001	<0.001	<0.001	0.002			
n	145	158	146	156	159		
Overprotection father							
r	0.490**	0.822**	0.174*	0.626**	0.480**	1	
P	<0.001	<0.001	0.033	<0.001	<0.001		
n	149	158	150	160	158	163	
Expressing emotions							
r	−0.164*	−0.148	−0.133	−0.122	−0.137	−0.104	1
P	0.040	0.068	0.097	0.116	0.089	0.193	
n	156	154	158	167	155	159	171
Somatization							
r	−0.241**	−0.268**	−0.102	−0.249**	−0.210*	−0.297**	0.021
P	0.003	0.001	0.217	0.002	0.010	<0.001	0.793
n	146	147	148	157	148	150	158

*Significance of 0.05, **Significance of 0.01. PBI: Parental bonding instrument

overprotection-Mother scores were found to be statistically significantly higher in married (15.51 ± 3.35) compared to single (13.24 ± 4.96, $P < 0.05$). Overprotection-Father scores were found to be statistically significantly higher in married (16.06 ± 4.11) than singles (14.08 ± 4.79, $P < 0.05$). EEQ scores were found to be statistically significantly higher in married (76.73 ± 7.89) compared to single (72.61 ± 9.38, $P < 0.05$). SS scores did not show a statistically significant difference between married and single individuals ($P > 0.05$).

Care Control-Father scores were found to be statistically significantly higher in those with high-income levels (30.94 ± 6.11) compared to those with medium (30.50 ± 5.51) and low income (25.82 ± 6.68, $P < 0.05$). EEQ scores do not differ statistically significantly according to income level ($P > 0.05$). SS scores were also not statistically significantly different according to income level ($P > 0.05$).

When the PBI, EEQ, and SS scores of the participants were compared according to having or not having a child, the Care Control-Mother scores were found to be statistically significantly higher ($P < 0.05$) in those without a child (31.32 ± 5.27) compared to those with a child (28.65 ± 5.12). Overprotection-Mother scores were found to be significantly higher in those with a child (15.61 ± 3.76) compared to those without a child (13.35 ± 4.89, $P < 0.05$). Overprotection-Father scores were found to be significantly higher in those with children (16.47 ± 3.89) compared to those without children (14.23 ± 4.78) ($P < 0.05$). EEQ scores do not show a statistically significant difference according to whether they have children ($P > 0.05$). SS scores were also not statistically significantly different between those with and without children ($P > 0.05$).

PBI-Father total scores were higher in those with a low somatization level when compared to a high somatization

level and a moderate somatization level ($P < 0.05$). Care-Control Father total scores were higher in those with a low somatization level when compared to a high somatization level and a moderate somatization level ($P < 0.05$). Overprotection Father's total scores were higher in those with a low somatization level when compared to a high somatization level and a moderate somatization level ($P < 0.05$). The statistical effect of variables on somatization is given in Table 2.

In the model, the participant's age, gender, marital status, education level, whether or not they have children, medical illness history, family history of psychiatric illness, PBI Mother and PBI Father total scores, and total score of Emotion Expressing Scale were tested. It was found that being a woman increased the presence of somatization with a coefficient of 1.446 ($P < 0.05$, 95% confidence interval: 1.223–14.753).

Discussion

In this study, the associations between attachment, somatization, and expressing emotions were aimed to be examined. As a result of the study, it was determined that there was no statistically significant relationship between expressing emotions and somatization. This research supported the hypothesis that there is a relationship between attachment and somatization and attachment with expressing emotion. Besides, the gender factor was found to be the influencing variable in somatization.

The results of this study revealed that somatization differs according to gender. Somatization Scale scores were found to be statistically significantly higher in women compared to men. The literature supports our research results. It has been found that somatization disorder is seen 5–20 times more in women than men.[14,15] Studies show that the prevalence in women ranges between 0.2% and 20%, somatization is lower than 0.2% in men.[16] Somatization is more common in women over the age of 40 than in younger ages.[17] Other studies have shown that bodily complaints are expressed more by women. It has also been stated that physical disorders not based on an organic cause are more common in women.[18] First-degree female relatives of women diagnosed with somatization disorder may also have an increased risk for somatization disorder.[15]

In this study, a slightly significant negative correlation was noticed between mother attachment and somatization. Although it is a mild relationship, the degree of somatization decreases as the levels of individuals to find their mothers meet their psychological and physical needs increase. Furthermore as the father's positive evaluation increases, the somatization scores of the participants decreased. The literature also presents results compatible with this study. Stuart and Noyes found in their study that the attachment of patients experiencing somatization was anxious, and this attachment arises from their childhood experiences with their caregivers.[19] A study on people who took part in the war found that people who had traumatic experiences in their childhood had more depression, anxiety, and somatization symptoms, whereas the group with fewer stress symptoms than those with a secure attachment style.[20] According to the present study results, a low level of significant negative correlation was found between the participants' expressing their emotions and their attachment to the mother. In other words, as individuals' expressions of emotions increase, their positive evaluation of their mothers and finding their mothers as relevant decreases. A longitudinal study found that securely attached individuals had more emotional experiences with their partners during adulthood and expressed less negative emotions.[21] Another study points to a mild-to-strong relationship between mother's interest in childhood and alexithymia, the difficulty in recognizing and expressing emotions. A slight correlation was found between parental overprotection and alexithymia and between parental overprotection and difficulty expressing emotions.[22] In our study, no relationship was found between attachment to father and expressing emotion. Contrary to our findings, a study found a positive relationship between alexithymia scores and childhood maternal neglect and paternal indifference.[23]

Table 2: Statistical effect of variables on somatization

	B	SE	Significance	Exp (B)	95.0% CI for EXP (B), minimum-maximum
Age	0.055	0.061	0.366	1.057	0.938-1.191
Sex (woman)	1.446	0.635	0.023	4.247	1.223-14.753
Marital status (married)	0.263	0.750	0.726	1.300	0.299-5.652
Having children	−0.956	1.302	0.462	0.384	0.030-4.927
Education status (university)	1.184	0.598	0.048	3.269	1.012-10.560
Working status	0.479	0.471	0.309	1.614	0.641-4.065
Having medical disease	0.507	0.710	0.475	1.660	0.413-6.681
Psychiatric disease in family	0.666	0.582	0.253	1.946	0.622-6.093
PBI total mother	−0.103	0.069	0.131	0.902	0.788-1.031
PBI total father	−0.059	0.068	0.386	0.943	0.826-1.077
EEQ total	0.004	0.024	0.875	1.004	0.957-1.052

PBI: Parental bonding instrument, EEQ: Emotional expression questionnaire, SE: Standard error, CI: Confidence interval

Another hypothesis of the present study was that there is a relationship between somatization and expressing emotions. Research findings revealed that there was no relationship between EEQ and SS scores. Research findings from the literature on the subject do not seem compatible with this study. It has been thought that chronic pain and depression may be related to difficulties in communication with others, disruption in processing intense emotions, and immune system problems.[24] A study conducted on oncologists found a positive correlation between participants' levels of burnout and their negative attitude in expressing emotions.[25] There found to be a negative correlation between the prevalence of eating disorders, different somatic disorders, and substance addiction, and the levels of perception and expression of emotion.[26] A recent study provides strong support for the assumption that attachment avoidance and attachment anxiety distinctively predict health outcomes, and emotion dysregulation can be one of the mechanisms explaining attachment–health relationships.[27]

This research has some limitations. The most important limitation of this study is its cross-sectional character. This type of research certainly cannot be an ideal way to establish causality between different variables. Furthermore, the data in this study are based on self-report measures. Due to the use of questionnaires that can only check for symptoms, not whether these symptoms are medically explained or not, it is, however, not possible to conclude somatization adequately defined.

Conclusion

In this study, the possible relationships between attachment, somatization, and expressing emotion were investigated. A low level of negative correlation was found between expressing emotions and attachment to the mother. A weak but statistically significant negative relationship was found between somatization and attachment to mother and father. A weakly significant negative correlation was found between somatization and overprotection-father scores. While the somatization scores of the participants increased, the perceived protective, controlling, nonsupporting attitudes of the father also increased significantly.

Further research needs to be focused on the theoretical and clinical implications of these results. The precise nature of these possible relationships is yet to be interpreted.

Patient informed consent

Informed consent was obtained.

Ethics committee approval

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Conflicts of interest

There are no conflicts of interest to declare.

Author contribution subject and rate

- Hatice Yeşil (50%): Design the research, data collection, and analyses and wrote the whole manuscript
- Büşra Özdoğan (15%): Contributed with on research design and analyses
- Hüseyin Ünübol (10%): Supervised the article write-up
- Gökben Hızlı Sayar (25%): Supervised the research, contributed with comments on research design and manuscript.

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Original Article

The Adaptation of Gender Identity / Gender Dysphoria Questionnaire for Adults: Turkish Validity and Reliability Studies

Abstract

Background: The fact that the concepts of sexual identity and gender dysphoria have become more important all over the world and in Turkey has led clinicians to need powerful measuring tools to evaluate and comment on this structure. Aims and Objectives: The aim of this study is to investigate language equivalence, validity, and reliability studies of the Turkish version of the Gender Identity / Gender Dysphoria Questionnaire for Adult (GIDQ), which was developed by Deogracias et al. (2007). **Materials and Methods:** The scale was applied to 368 individuals (heterosexual and nonheterosexual) consisting of university students and trans-oriented individuals. Pearson's correlation coefficients revealed positive and significant values in the consistency analysis between the English and Turkish forms for linguistic equivalence studies of the GIDQ Adult Form for ages 18 and over. **Results:** The factor analysis performed to determine the construct validity of the 5-item Likert type scale, the original of which has a single factor and 27 items, a single factor, and 25-item structure were obtained which accounted for 51.8% of the total variance. When the internal consistency of the scale was calculated, the Cronbach Alpha value was found to be 0.89. **Conclusion:** According to the comparison of three groups (heterosexual, nonheterosexual, and those with gender dysphoria), average calculations, and effect size (d) analyses in the discrimination validity studies, it was observed that the gender dissatisfaction of university students was at a low level. It was found to be close to the intermediate level in the nonheterosexual male group. The results show that the Turkish form of the scale is valid and reliable.

Keywords: *Gender dysphoria, heterosexuality, scale, sexual identity, transsexuality*

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Introduction

Gender dysphoria is a phenomenon that is visible in different cultures and history with a long history. It is a problematic that must be handled carefully due to its spiritual, social, and legal consequences, and that the treatment process should be well managed with multidisciplinary teamwork. The increasing number of people applying for the trans conversion process over the years suggests that physicians working in both psychiatric clinics and other fields of medicine will encounter transgender people more frequently in the coming years.[1]

Biological gender is the concept of sex-linked to chromosomes, sexual hormones, internal and external sex organs, reproductive cells, the basis of which is based on the process of fertilization and birth. Psychologically and socially, the perception and acceptance of a person to be a man or a woman, their sexual orientation and sexual behavior in line with this perception and acceptance are the determinants of sexual identity. Biological, genetic, familial, social, and cultural factors are thought to play a role in the development of sexual identity. However, our knowledge of the complex interaction of all these etiological factors is limited.[2]

Gender dysphoria is a concept that indicates a mismatch between one's biological sex and gender identity, dissatisfaction with one's body, a strong desire to have the body characteristics of the opposite sex, and a desire to be treated as the opposite sex.[1] This disorder, which begins from childhood, can accompany other psychopathologies, as well as be limited to a level that does not restrict a person's life in many areas.[3]

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Retrospective studies of transgender adult patients in the 1960s indicated that their dissatisfaction with their gender began in early childhood, and found that they showed opposite sex behaviors in childhood. Therefore, the thought has occurred that children with gender dysphoria in childhood would be transgender in their adulthood.[4] In the first systematic study on this issue, 44 children with gender dysphoria and 34 children who were not, have been reassessed for the first time at an average age of 7, then at an average age of 19. They reported that 75% of these children had transgender, homosexual, and bisexual behaviors during adolescence or young adulthood, and 80% had fantasy levels of transgender, homosexual and bisexual tendencies. Only one child (2.2%) had continued gender dysphoria. There was no significant difference between those treated and those who were not treated within the group.[5] In a study conducted by Drummond *et al*., 25 girls with gender dysphoria were first evaluated when they were 9 years old on average and were monitored until the average age of 23. Only 3 (12%) of these 25 girls continued to experience gender dysphoria. At the level of behavior and fantasy, 24%–32% were found to be bisexual or homosexual, and 44%–60% were found to have heterosexual sexual orientations.[6] In summary, it is observed that the majority of children with gender dysphoria in childhood do not have gender dysphoria in adolescence or adulthood. In terms of sexual orientation, it is seen that there is a strong relationship between gender dysphoria in childhood and homosexual orientation or bisexuality in later years.

According to the ICD-10 diagnostic system, this table is called "transsexualism" in "sexual identity disorders." The phrase "sexual identity disorder" was similarly used in the DSM-IV also. In DSM-5 (American Psychiatric Association, 2013), gender dysphoria is expressed as a significant discrepancy between the sex determined at birth and the gender experienced/expressed for at least 6 months, and in its translation into Turkish, the diagnosis is translated as "complaint (dissatisfaction) of sexual identity."[7] Thus, the stigmatizing feature of the word disorder has been eliminated and the problems experienced by these individuals have been emphasized.

This development has also led to the transition from identity-based health care to dysphoria-based health care. Gender dysphoria is thought to be a seldom condition. The less number of studies published in this field prevent the exact degree of prevalence of this diagnosis from being known. The prevalence rating in DSM-5 (American Psychiatric Association, 2013) was between 0.005%–0.014% in adult men and 0.002%–0.003% in adult women. However, it remains unclear whether there has been an increase. The prevalence of this picture cannot be known, because no studies are investigating the epidemiology of gender dysphoria in Turkey.[8]

Individuals experiencing gender dysphoria may experience varying degrees of discrimination and violence due to gender expressions that do not conform to the normative values of society, similar to other sexual minorities, due to cultural differences, differences in basic rights, and understanding of freedom.[9] Individuals with gender dysphoria can experience physical and verbal violence, have high unemployment rates relative to society as a whole, tend to be abandoned by a heterosexual partner when they start the gender transition process and have difficulty finding a new partner among others, all these life experiences can further increase the psychological well-being and life satisfaction quality of gender dysphoria, limiting the psychological functionality of people with gender dysphoria.[10]

A person experiencing this problem seeks to get rid of the primary and/or secondary sex characteristics of their own body due to the conflict, on the one hand, while on the other hand, they also want to have the primary and/or secondary sex characteristics of the other gender. For this reason, a person with "gender dysphoria" or identified as "transsexual" has a desire to receive hormonal and surgical treatment so that their body becomes suitable for their sexual identity.[11] People who constantly feel this distress in all aspects of life may seek medical intervention with the desire to make changes in their body in the direction of the opposite gender.

Recent multidimensional treatments focus on the distress caused by a discrepancy between a person's sexual identity and biological characteristics and aim to reduce gender dysphoria.[12] During the follow-up process, some of the individuals may not want to change their gender or may have a comfortable fit with their own sexual identity. For this reason, the treatment should be individual-specific.[13] In psychotherapy, the goal is not to change a person's sexual identity, but to provide a state of spiritual well-being and improve the quality of life.[14]

Two-dimensional measurements of gender dysphoria are widely used in clinical settings. Generally, it is considered whether or not it meets the symptoms. On the other hand, gender dysphoria questionnaire (GIDQ), argue that dysphoria is a dimensional measurement. On the other hand, GIDQ, argue that dysphoria is a dimensional measurement. At least some of these individuals do not express a desire for a full gender reassignment surgery, that is, both hormone therapy and genital surgery. Therefore, such individuals may have a low threshold value for the diagnosis of "Gender Dysphoria" of the DSM-V. It is clinically useful to assess the degree of gender dysphoria from those who experience mild symptoms to those who experience severe symptoms or to distinguish between those below the threshold.

When the literature is examined, the GIDQ is found which was developed by Deogracias *et al*. 2007.[15] It is stated

that 13 items of this scale, consisting of 27 items, are subjective, 9 are social, 3 are somatic and 2 are formed by taking into account socio-legal indicators. This scale, which has two separate forms for adults and adolescents and whose participation frequency is determined as "Always," "Frequent," "Sometimes," "Rare," "Never," is of the 5-item Likert type and reveals the level of gender dysphoria by applying "female version" to women and "male version" to men according to the biological sex.

The GIDQ is a scale that has been answered by participants over the last 12 months, and its applicability is quite comprehensive as it is developed with heterosexual and nonheterosexual individuals, with individuals who have not been diagnosed with Gender Dysphoria, and individuals with homosexual orientation, heterosexual and bisexual orientation who have been diagnosed with Gender Dysphoria. In the original studies of this scale, the internal consistency coefficient Cronbach Alpha value was found to be. 97. Accordingly, it is thought that this scale, which researchers suggest best explains the extent of the problems experienced by transgender people, to contribute to clinical studies by bringing it to the national literature. Biological Sex, Sexual Identity, and Sexual Orientation are predicted to be three separate parameters.[16] Given that biological sex is the genetic equivalent, and sexual identity and sexual orientation are not genetically confirmed, we should point out that this scale only measures sexual identity dysphoria. Therefore, it does not cover the definition of homosexuality since homosexuality can also be "native" regardless of sexual identity.

The fact that the concepts of sexual identity and gender dysphoria have become more important all over the world and in Turkey has led clinicians to need powerful measuring tools to evaluate and comment on this structure. Although there are validity and reliability studies on the concepts of sexual identity and gender dysphoria in foreign literature.[17] there is no scale of this feature in Turkey yet. In line with these general evaluations, the research aimed to adapt the adult form (AF) of the GIDQ developed by Deogracias *et al*. to Turkish by conducting validity and reliability analyses and linguistic equivalence studies.

Methods

The ethics committee approval has been obtained from the Uskudar University Noninterventional Research Ethics Committee (61351342/2020/459).

GIDQ AF validity and reliability studies were carried out with a working group of three groups, taking the sample of the original study into account. Accordingly, the first group consists of 315 university students who are selected regardless of their sexual identity and orientation. The second group consisted of 53 transgender-oriented participants who were undiagnosed, whose sexual identity and orientation were heterosexual, homosexual, and bisexual. Thus, 368 people participated in the study. The third group was formed by individuals with a tendency towards Gender Dysphoria. Accordingly, the first form of the scale after linguistic equivalence studies were carried out was applied to 315 people, and 33 people with an average score of >2.5 points were selected from the scale and taken into the third group.

When creating the study group, the participant characteristics of the Deogracias *et al*. study were taken into account and the participants' sexual orientation and dysphoria levels were considered decisive in groupings.[15] The workgroup is given in Table 1.

When Table 1 is examined, 315 university students participated in the study. 276 reported their sexual orientation and 39 did not. In the trans-oriented group, 53 participants stated their sexual orientation in full. A total of 58 nonheterosexual individuals participated in the study.

When the biological sex of the participants is examined, 81.5% are female and 18.5% are male and their age varies between 18 and 62. The average age of the participants was 29.34.

Measurement Instrument

The research data required for validity studies were collected with the "Gender Identity / Gender Dysphoria Questionnaire (GIDQ)" developed by Deogracias *et al.* 2007.[15] The scale consists of 27 items. There is a male and female version of the AF of the scale, which is reported to consist of 13 subjective items, 9 social, 3 somatic, and 2 socio-legal indicators. Accordingly, the appropriate scale form is applied according to the biological gender. Items in the range of 1–2, 5–10, 16, and 24–27 are subjective determinants of gender dysphoria; social determinants of items in the range of 3–4, 11, 13–15, and 17–19; somatic determinants of items in the range of 20–22; items 12 and 23 have taken their place as socio-legal determinants. In the evaluation of the scale, items 1, 13, and 27 must be scored in reversely.

Items concerning subjective determinants of Gender Dysphoria express one's thoughts about gender dissatisfaction. The items that measure social determinants express the opinions of others about the person and relate to the pressure of others' thoughts on the person. Somatic determinants express the degree to which the person is prone to the changes he/she

Table 1: Participants and their features

Sexual orientation	University students		Trans oriented group	
	Woman, *n* (%)	Man, *n* (%)	Woman, *n* (%)	Man, *n* (%)
Heterosexual	261 (94.8)	36 (92.3)	9 (36)	4 (14.3)
Nonheterosexual	15 (5.6)	3 (7.7)	16 (64)	24 (85.7)

wants to make in his/her body. Socio-legal determinants are related to the law and measure the dissatisfaction of gender practices in official institutions or structures.

Responses to the GIDQ range from 1 (Never) to 5 (Always), with the lowest score being 27 and the highest score being 135. Accordingly, as if the score from the sum of GIDQ increases, it is evaluated that the trend of Gender Dysphoria increases. In a study by Deogracias *et al*., the Cronbach Alpha value was 0.97 as the internal consistency coefficient of the scale developed with 462 participants.[15]

Implementation

Before the stage of translating and applying the scale into Turkish, permission was obtained by mail from researchers who developed the original scale. Later the process was started.

Translation study

To obtain the Turkish form of GDS-AF, the items of the original scale were translated into Turkish primarily by an expert who is proficient in Turkish and English. It was then checked by two field experts who knew both languages well.

Implementation of scale

GIDQ's research patterns and content approval is given for ethical compliance by the Ethics Committee of Uskudar University Noninterventional Researches with the issue 61351342/2020/459. Data collection took place in November in the group of university students in 2020 and in December in transgender individuals. The data were obtained by people aged 18 and over, filling out surveys online on their own, according to the volunteer principle. The questions in the survey form were formed using scale items following a translation study with experts together.

After the approval of the ethics committee, the forms prepared were applied in print out to 12 people who spoke English and Turkish in two languages 3 weeks apart, a linguistic equivalence study was carried out and the comprehensibility of the questions was tested. The informed consent form and survey questions were transferred to the Google Forms program, after which candidates with the appropriate characteristics were called to participate via social media, E-mail, and phone messages. Surveys remained available for about a month after they were shared. Participants' answers were saved simultaneously by the Google Forms program to the Excel file. The quality of the data is evaluated according to consistency, missing data, excess data, invalid data criteria. Via this method, a valid database is obtained for the analysis process. The data of a total of 315 people were subjected to validity and reliability analyses. An average of 12 min was enough for the survey to be completed by the participants.

Data analysis

In GIDQ's linguistic equivalence studies, consistency between Turkish and English form applications was tested by using the Pearson correlation coefficient. Factor analysis was applied to test the structure validity of GIDQ. The stages specified in the literature were followed in factor analysis applications.[18,19] In reliability studies, the Cronbach Alpha internal consistency coefficient was tested. In addition, internal consistency reliability was examined with item-total correlation coefficients, mean, standard deviation (SD) values in line with the literature.[20,21] SPSS 26 program was used to analyze the data.

Results

Linguistic equivalence studies of gender dysphoria scales-adult form

English and Turkish form of GIDQ consistency was found after applications to adult individuals by calculating the Pearson correlation coefficient. Accordingly, several information suggested about the time interval between the two applications is contained in the literature. According to Özgüven, the time interval of two to four weeks is sufficient.[22] Ergin argues that it should be between 3 and 6 weeks.[23] English and Turkish speaking university students with 3 weeks between the applications were found to be sufficient. First, the original form of the scale was applied to 12 students, followed by a Turkish translation after 3 weeks. Relationships have been determined with Pearson Correlation coefficients between the two applications. The relationship coefficient of each item varies between 0.57 and 0.88.

Turkish and English forms between the total scores of the relationship coefficient found as (r: 0.67; $P < 0.001$) is also positive and significant. In addition, based on the results of the dependent Group *t*-test (t: 1.44; df: 6; $P > 0.05$), it was also determined that there were no significant differences between both applications. The results were interpreted as that the amount between the two applications of the scale was acceptable and language equivalence was achieved in the forms.

Validity and reliability studies of gender dysphoria scales-adult form

Kaiser Meyer Olkin's (KMO) sample coefficient and the Bartlett test were examined primarily for the appropriateness of the data for factor analysis when starting validity and reliability studies. Accordingly, the sample coefficient KMO value was found to be 0.93. The Bartlett test result was also found to be significant ($X^2 = 8123.315$, SD: 300, $P = 0.000$). In line with these values, it was decided that the data set was suitable for exploratory factor analysis (EFA), and EFA was applied.

As a result of the EFA, it was seen that the items were collected in one factor. Item factor loads were taken > 0.30

Table 2: Factor load values and total correlation values of items

	Items	Factor load	Total correlation
M19	Presenting oneself as the opposite sex at work or school	.742	.862
M18	Presenting oneself as the opposite sex at parties or social gatherings	.707	.841
M21	Wanting to be treated for hormones	.671	.819
M22	Considering gender reassignment surgery	.669	.818
M14	Foreigners acting as opposite sex	.663	.814
M26	Considering oneself as the opposite sex	.659	.812
M10	Feeling more like the opposite sex	.648	.805
M25	Thinking oneself as a "Transgender person"	.639	.799
M16	To have the desire and desire to be the opposite sex	.609	.780
M15	Friends or relatives acting as opposite sex	.593	.770
M12	Being uncomfortable by stating current gender on official forms	.577	.759
M17	Dress like the opposite sex at home	.575	.758
M7	Dreaming of being the opposite sex	.567	.753
M20	Dislike own body	.547	.740
M23	Effort to change the legal gender	.532	.730
M1	Being satisfied with existing sex	.508	.713
M5	Feeling not to be from the existing gender	.496	.704
M8	Being unhappy with the existing gender	.404	.635
M3	Feeling pressure from others	.381	.618
M6	Thinking it would be better to live as the opposite sex	.351	.592
M24	To think of oneself as "hermaphrodite" or "intersex"	.345	.587
M9	Feeling uncertainty about oneself	.330	.575
M11	To think that to have nothing in common with both sexes	.328	.527
M2	Feel uncertainty about existing gender	.310	.480
M4	Feeling to strive to be the existing gender	.300	.480

on the original scale, so the single-factor structure emerged, and 27 items with a self-value (eigenvalue) of 16.54 built up 61.3% of the total variance. In the Turkish version, 25 items with a self-value of 12.951 explained 51.80% of the total variance. The factor load of the 2 items on the scale remained below. Accordingly, the EFA result of the sequencing of items 13 and 27 concluded that the items were compatible with the original scale. Item factor loads are given in Table 2.

As a result of the carried out EFA, the scale form consisting of 25 items is rated as "never," "rare," "sometimes," "often," and "always" in the 5-item Likert type. The first item on the scale is scored in reversely. Thus, the application form "GIDQ" is included in Appendix 1. In addition, the line chart (scree plot) test, which is often used to determine the number of factors, is as in Figure 1.

In calculations to test the reliability of GIDQ, the Cronbach Alpha internal consistency coefficient was found to be. 89. Thus, it is understood that the scale consisting of 25 items is reliable. Items 1st, 2nd, 5th, 6th, 7th, 8th, 9th, 10th, 16th, 24th, 25th, 26th as the subject determinants, 3rd, 4th, 11th, 14th, 15th, 17th, 18th, 19th items as the social determinants, 20th, 21st, 22nd items as the somatic determinants, and 12th, 23rd items as the socio-juridical determinants of gender dysphoria took their place within the scale. Item 1 on the scale must be scored in reverse, as in the original. The factor load

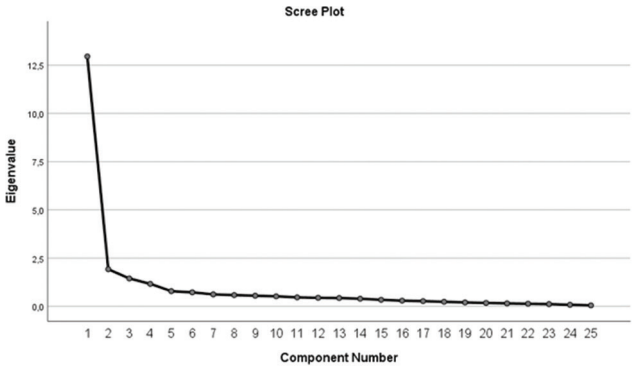

Figure 1: Single-factor gender dysphoria scale-adult form line chart

values of items 13 and 27 on the original scale were not measured because they were found to be low in the Turkish adaptation studies (<0.30). Thus, the GIDQ in 5-item Likert type consisting of 25 items, and one factor has emerged. Two separate scale forms have been built up for men and women in the implementation of the scale [Appendix 1].

As a result of validity and reliability studies, the average scores of the participants from the scale were calculated by collecting each item and dividing it by 25. Accordingly, the average scores of three groups of heterosexual orientations, nonheterosexuals and those prone to Gender Dysphoria were obtained, and the size of the groups was revealed as

Table 3: Average Scale scores of groups

Groups	X	SD	D
Heterosexual woman (*n*=270)	1.31	.35	
Nonheterosexual woman (*n*=30)	1.78	.72	0.88[a]
Heterosexual male (*n*=40)	1.42	.53	
Nonheterosexual male (*n*=28)	2.15	.67	1.31[b]
Gender dysphoria-prone nonheterosexual group (*n*=24)	2.80	.47	
Gender dysphoria-prone heterosexual group (*n*=9)	3.32	.67	0.89[a,b]

[a]Reference group is calculated as heterosexual women X_1-X_2/$SD_{Heterosexual\ woman}$, [b]Reference group is calculated as heterosexual men X_1-X_2/$SD_{Heterosexual\ man}$, The range of points that can be received is between 1 and 5. SD: Standard deviation

in Table 3 using the *effect size (d) calculation developed by Cohen* (1988).[24]

During the analyzes, heterosexual male group, nonheterosexual group of men, heterosexual group of women, nonheterosexual group of women, a heterosexual group prone to gender dysphoria, and nonheterosexual group prone to gender dysphoria were referenced.

The results of the variance analysis with three gender-oriented groups (heterosexual ones, nonheterosexual ones, gender dysphoria-prone ones) were significant (F = 639,741; $P < 0.001$). This difference was determined in accordance with Cohen's (d) effect size calculation and scale scores, taking into account the biological gender. Independent Group *t*-test was applied between the groups and the significance was looked at by referring to heterosexual women and heterosexual men in the groups.

Accordingly, nonheterosexuals in the female group have a high effect in terms of gender dysphoria compared to heterosexual ones (d = 0.88; >0.8). The group with the propensity for gender dysphoria and nonheterosexual women were found to have a higher impact than heterosexual women [Figure 2].

As a result of variance analysis of three groups by gender, men's sexual orientation built up a difference [Figure 3]. As a result of variance analysis of three groups by gender, men's sexual orientation built up a difference (d = 1.31; >8).

Looking at the average scores of all three groups, the average score of the third group (Gender Dysphoria-Prone Group) was 2.94, with those with the scale scores above 2.5 (midpoint). The score of 9 heterosexual people in the group of 33 people was 3.32. The average score of 24 transgender and bisexual-oriented people was 2.80. In this group, some individuals reported identification as trans, and the scale score (average score) of 16 trans-oriented people was 3.18. 8 people did not specify identification.

Discussion

In this study, the "GIDQ" developed by Deogracias *et al*. with 462 participants has been adapted to Turkish. Further verification of the same scale by Singh *et al*. found that it detected gender dysphoria in both adolescents and adults with excellent sensitivity and accuracy rates compared to the control groups.[25]

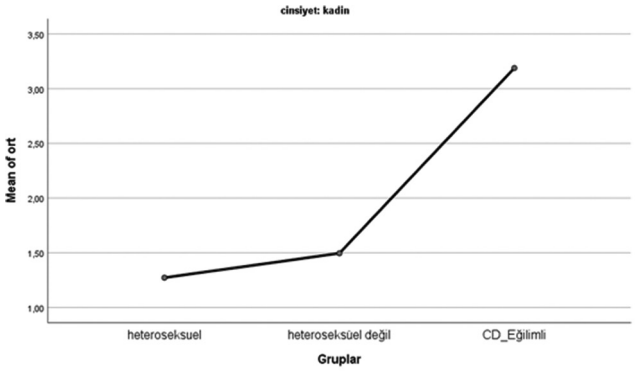

Figure 2: Frequency distributions of women's scores. When evaluating points in horizontal lines, the breakpoint is considered as a medium value of 2.5

Within the scope of validity and reliability studies, EFA was carried out taking into account the original scale stages and it was seen that the single-factor structure provided the appropriateness in terms of factor loads in the Turkish version also. Thus, the 27-item single-factor structure of the original scale explained 61.3% of the total variance, while the scale adapted to Turkish consisted of 25 items and a single factor, accounting for 51.8% of the total variance. Cronbach alpha internal consistency coefficient value and 0.89 indicates that the scale adapted to Turkish is reliable.

In the group of university students who built up the study, the measurement of gender dysphoria without separating men or women shows a low level as expected (X = 1.29). Considering that the minimum average score to be taken from the scale is 1 and the maximum is 5, the value of 1.29 indicates a low level. The average score of 53 transgender individuals was 2.26 when calculated. When the full mid-point value of the scale is 2.5, it is seen that transgender people have close to moderate gender dissatisfaction.

On the other hand, a sample of 368 people from the trans-oriented group (*n* = 53) tested for signability between university students (*n* = 315) and groups that were "heterosexual," "nonheterosexual" and "prone to gender dysphoria," which were built up taking biological sex and sexual orientation into account. Accordingly, the significant variance analysis results ($P < 0.001$) by including three groups according to the average scores of the GIDQ revealed the difference between the groups. The results of

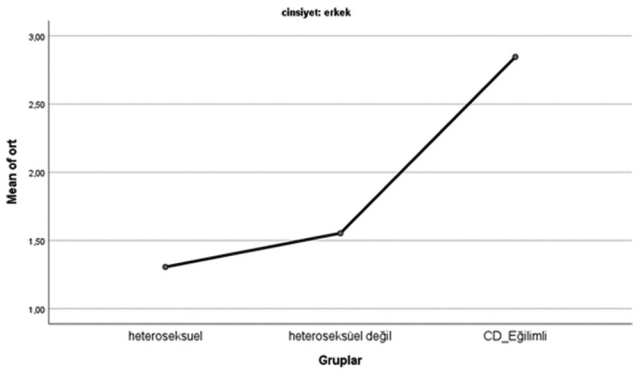

Figure 3: Frequency Distributions of Men's Scores. When evaluating points in horizontal lines, the breakpoint is considered as a medium value of 2.5

the independent group *t*-test, which were divided by gender and grouped in pairs (heterosexual, nonheterosexual), had a high effect when the effect size calculations developed by Cohen (d) were performed.

Nonheterosexual women (n = 30) were found to have higher gender dissatisfaction than heterosexual women. Although average scores generally show low levels of gender dissatisfaction with women, independent group *t*-test and impact size (d) analyses revealed a high impact in nonheterosexual women (d > 0.8).

Comparison of men found that nonheterosexual men, including transgender-oriented individuals, had higher gender dissatisfaction. The average scale score for heterosexual men was 1.42, while transgender men had a score of 2.15. Difference test and impact magnitude analyses revealed that transgender men tended to be highly dissatisfied with gender dissatisfaction (d = 1.31; >0.8).

On the other hand, people with an average score of >2.5 in the study who were prone to gender dysphoria made up the third group. The average score of this group was found to be high in heterosexuals. However, considering that only 9 people make up the heterosexual group, it turns out that this number is limited for the difference test. When we evaluate this group together as heterosexual and homosexual (n = 33), the average score is 2.94. We can state that this value is above the mid-point value of the scale of 2.5.

In a study of the psychometric characteristics of GIDQ on a group of high school students living in Iran, factor analysis of the scale was conducted using both descriptive and validating factor analyses, and explanatory factor analysis results showed that the four factors on the scale accounted for 63.44% of the total variance. The validation factor analysis has shown that four factors have good compatibility. Test-retest and internal consistency reliability were determined as 0.93 and 0.92, respectively.[26] A study of validity and reliability of the GIDQ conducted in Italy found that the scale showed a single factor structure as a result of applying it to those with sexual identity disorders and volunteers, and it was reported that it can be used to evaluate gender dysphoria.[27]

As a result, in our research, the single-factor structure of the GIDQ adapted to Turkish by conducting validity and reliability studies ended well by eliminating 2 items, the Cronbach Alpha internal consistency coefficient value to be, 89, showed that the 25-item GIDQ is reliable. However, recommendations may be given to future research in accordance with several limitations found in the study. First, validity and reliability can be looked at again in future studies, including a group of patients diagnosed with gender dysphoria, and compared with the values here. Second, more individuals can be reached based on biological gender assigned by birth in trans-oriented individuals. In this way, the difference between men and women in this group can be looked at again. In this study, "GIDQ," which was first translated into Turkish, was included in the literature as a valid and reliable scale.

GIDQ's participation in the literature will enable many new studies on gender dysphoria. Researches were carried out on cases with gender dysphoria in foreign literature. Fisher *et al*. evaluated the body dissatisfaction, self-esteem risk, and psychological functionality of two groups of adolescents with and without gender dysphoria on scales including GIDQ, and found that the group with gender dysphoria experienced significantly higher levels of body dissatisfaction, worse psychological functionality, higher levels of depression and anxiety, and social problems. Worse, the group with gender dysphoria reportedly found significant the death more attractive and hated life.[28]

In another study, functional magnetic resonance imaging was applied and brain activation patterns were evaluated by giving "gender face separation" to two trans-traited and nontransgender groups whose psychometric characteristics were detected using GIDQ, Body Dissatisfaction Questionnaire, and Symptom Checklist-90-R. With the results here, it was first thought that there may be a possible specific relationship between gender dysphoria and neural pathways.[29]

GIDQ can be used in research related to the neurological, psychological, or biological characteristics of cases with gender dysphoria, as well as to investigate gender dysphoria in many neurodevelopmental disorders. In a study comparing 309 patients with autism spectrum disorder (ASD) with 261 patients without ASD diagnosis using GIDQ, it was reported that gender dysphoria was significantly higher in the group diagnosed with ASD, so clinicians working with ASD-diagnosed cases should be vigilant about gender diversity in this group.[30] Another study of 100 women with Borderline personality disorder with GIDQ found no gender dysphoria in any of the cases.[31]

At the end of the research, the GIDQ developed by Deogracias *et al*. was adapted into Turkish. It is thought that it would be appropriate for clinicians and researchers working in this field to be used in the evaluation and follow-up stages.

Patient informed consent

Informed consent was obtained.

Ethics committee approval

The ethics committee approval has been obtained from the Uskudar University Noninterventional Research Ethics Committee (61351342/2020/459).

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Conflicts of interest

There are no conflicts of interest to declare.

Author contribution subject and rate

Nevzat Tarhan (%20): Contributed with theoretical background and control whole manuscript.

Emel Sarı Gökten (%20): Contributed with theoretical background and wrote the Introduction and Conclusion.

Aylin Tutgun Unal (%40): Design the research, data analysis and wrote the method and analysis manuscript.

Ayşe Şahin (%20): Contributed with data collect and wrote the Introduction.

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Appendix 1: Gender Identity/ Gender Dysphoria Questionnaire for Adults

Female Version

1. In the past 12 months, have you felt satisfied being a woman?
2. In the past 12 months, have you felt uncertain about your gender, that is, feeling somewhere in between a woman and a man?
3. In the past 12 months, have you felt pressured by others to be a woman, although you don't really feel like one?
4. In the past 12 months, have you felt, unlike most women, that you have to work at being a woman?
5. In the past 12 months, have you felt that you were not a real woman?
6. In the past 12 months, have you felt, given who you really are (e.g., what you like to do, how you act with other people), that it would be better for you to live as a man rather than as a woman?
7. Have you had dreams in which you were a man?
8. In the past 12 months, have you felt unhappy about being a woman?
9. In the past 12 months, have you felt uncertain about yourself, at times feeling more like a man and at times feeling more like a woman?
10. In the past 12 months, have you felt more like a man than like a woman?
11. In the past 12 months, have you felt that you did not have anything in common with either men or women?
12. In the past 12 months, have you been bothered by seeing yourself identified as female or having to check the box ''F'' for female on official forms (e.g., employment applications, driver's license, passport)?
13. In the past 12 months, have strangers treated you as a man?
14. In the past 12 months, at home, have people you know, such as friends or relatives, treated you as a man?
15. In the past 12 months, have you had the wish or desire to be a man?
16. In the past 12 months, at home, have you dressed and acted as a man?
17. In the past 12 months, at parties or at other social gatherings, have you presented yourself as a man?
18. In the past 12 months, at work or at school, have you presented yourself as a man?
19. In the past 12 months, have you disliked your body because it is female (e.g., having breasts or having a vagina)?
20. In the past 12 months, have you wished to have hormone treatment to change your body into a man's?
21. In the past 12 months, have you wished to have an operation to change your body into a man's e.g., to have your breasts removed or to have a penis made)?
22. In the past 12 months, have you made an effort to change your legal sex (e.g., on a driver's licence or credit card)?
23. In the past 12 months, have you thought of yourself as a ''hermaphrodite'' or an ''intersex'' rather than as a man or woman?
24. In the past 12 months, have you thought of yourself as a ''transgendered person''?
25. In the past 12 months, have you thought of yourself as a man?

	Male Version
1.	In the past 12 months, have you felt satisfied being a man?
2.	In the past 12 months, have you felt uncertain about your gender, that is, feeling somewhere in between a man and a woman?
3.	In the past 12 months, have you felt pressured by others to be a man, although you don't really feel like one?
4.	In the past 12 months, have you felt, unlike most men, that you have to work at being a man?
5.	In the past 12 months, have you felt that you were not a real man?
6.	In the past 12 months, have you felt, given who you really are (e.g., what you like to do, how you act with other people), that it would be better for you to live as a woman rather than as a man?
7.	Have you had dreams in which you were a woman?
8.	In the past 12 months, have you felt unhappy about being a man?
9.	In the past 12 months, have you felt uncertain about yourself, at times feeling more like a woman and at times feeling more like a man?
10.	In the past 12 months, have you felt more like a woman than like a man?
11.	In the past 12 months, have you felt that you did not have anything in common with either women or men?
12.	In the past 12 months, have you been bothered by seeing yourself identified as male or having to check the box ''M'' for male on official forms (e.g., employment applications, driver's license, passport)?
13.	In the past 12 months, have strangers treated you as a woman?
14.	In the past 12 months, at home, have people you know, such as friends or relatives, treated you as a woman?
15.	In the past 12 months, have you had the wish or desire to be a woman?
16.	In the past 12 months, at home, have you dressed and acted as a woman?
17.	In the past 12 months, at parties or at other social gatherings, have you presented yourself as a woman?
18.	In the past 12 months, at work or at school, have you presented yourself as a woman?
19.	In the past 12 months, have you disliked your body because it is male (e.g., having a penis or having hair on your chest, arms, and legs)?
20.	In the past 12 months, have you wished to have hormone treatment to change your body into a woman's?
21.	In the past 12 months, have you wished to have an operation to change your body into a woman's (e.g., to have your penis removed or to have a vagina made)?
22.	In the past 12 months, have you made an effort to change your legal sex (e.g., on a driver's licence or credit card)?
23.	In the past 12 months, have you thought of yourself as a ''hermaphrodite'' or an ''intersex'' rather than as a man or woman?
24.	In the past 12 months, have you thought of yourself as a ''transgendered person''?
25.	In the past 12 months, have you thought of yourself as a woman?

Item number 1 should be scored in reverse. Scale can be applied to individuals elder than the age 18, Items 1st, 2nd, 5th, 6th, 7th, 8th, 9th, 10th, 15th, 23rd, 24th, 25th are the subject determinants, 3rd, 4th, 11th, 13th, 14th, 16th, 17th, 18th items are the social determinants, 19th, 20th, 21st items are the somatic determinants, and 12th, 22nd items are the socio-juridical determinants of gender dysphoria within the scale

Original Article

Night Eating Syndrome and Sleep Quality among Turkish University Students in COVID-19 Pandemic

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Abstract

Backround: There is a positive relationship between night eating syndrome (NES) and sleep quality. However, it is not known how this situation changes among students during the COVID-19 pandemic. **Aims and Objectives:** This study aimed to reveal the relationship between anthropometric measurements, NES, and sleep quality in university students during the COVID-19 pandemic. **Materials and Methods:** Data were obtained through an online survey from March to June 2020 during pandemic in Turkey from university students (n = 100). They completed an online Pittsburgh Sleep Quality Index and Night Eating Questionnaire, also anthropometric measurements were taken. **Results:** University students had sleep disturbance. The sleep disturbance had an effect on NES ($P < 0.001$, rho = 0.386). A positive relation was found between sleeping pill use and NES ($Z = -2.218$, $P = 0.027$) and appetizing drugs and sleep ($Z = -2.410$, $P = 0.016$). **Conlusion:** The occurrence of sleep disturbances in students may increase the incidence of NES during COVID-19 pandemic. This study achieved a short-term result in a limited sample, and we suggest conducting large-scale studies on student health. University students should be considered and public health policies should be implemented in terms of eating disorders and sleep quality.

Keywords: *COVID-19, health, lockdown, night eating syndrome, sleep disturbance, students*

Introduction

The coronavirus (COVID-19) pandemic has had a universal impact on night eating syndrome (NES) and sleep disorders. NES may occur as an independent syndrome or accompany other comorbidities such as depression.[1] The risk of developing NES in the young population is higher than in other age groups. Students can face NES due to high level of stress accompanied by insomnia and irregular meal timings.[2] In a cross-sectional study among 1017/1132 students, 13.9% were at risk of eating disorders.[3] Amount and quality of sleep among university students vary in related studies. There is a high suspicion of sleep disorders among young people. NES can be observed more on students who sleep <6 h, smoke, consume more tea or coffee, and have a physician-diagnosed disease.[4] In addition, students are going to different cities to study, changing their sleeping and eating patterns, and spending long hours on studying those conditions tends them to NES.[5] Globally, 1.5 billion students were affected by COVID-19 and receiving distance education using digital platforms which led students to tend more on mental disorders, sleep problems, and weight gain due to inactivity.[6] Some surveys provide the evidence of sleep patterns impaired in students and the online education can create serious psychological problems in students during the COVID-19 pandemic.[7-11] Marelli *et al*. reported that 307 students and 93 university administration staff workers showed an increase in bedtime hour, sleep latency, and wake-up time during the COVID-19 lockdown.[8] Similarly, Romero-Blanco *et al*. reported that sleep quality of 207 nursing students was worsened during the lockdown.[9] In

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addition, the incidence of insomnia symptoms increased by 23.2%. among 11,835 adolescents and young adults during the COVID-19 epidemic.[10] Students were trying to cope with negative effects of the current pandemic to get away from boredom and depressive thoughts.[11] Therefore, during the pandemic, psychological and sleep impairment may effect on a sleep-related NES.[12] Sleep begins 1–4 h after the last meal, depending on the person's lifestyle, psychological state, and duration of sleep. Therefore, the night is characterized by a long fasting period typically associated with sleep.[13] Sleep tends to be shorter because the person spends this period by eating. Therefore, disturbed sleep processes can be observed. Low sleep time is also associated with metabolic disorders, obesity, and NES.[14] The variability of psychological states, sleep disturbances, and unhealthy eating habits increased and will increase even more in COVID-19 pandemic, and these processes may have major effects on NES. The aim of this study was to reveal a relationship between sociodemographic information, body composition, sleep quality, and NES among university students receiving lockdown. No previous studies have been reported to measure the relationship between NES and sleep among the students during COVID-19 pandemic. The limitations of this study are sample size and short time results. This study should lead to large-scale studies over a long period of time.

Materials and Methods

Ethics Committee Approval for the study was received from Uskudar University Non-Invasive Research Ethics Committee on 27.02.2020 (No:61351342/2020-93). "Informed Volunteer Consent Form" was obtained from the participants.

Participants

This study was designed to investigate the sleep-related state of NES in online-educated female and male Üsküdar University students aged >18 from March to June 2020. The study was a quantitative study due to anthropometric measurements and two questionnaires were applied.

Due to the online education during the pandemic, the questionnaires was made by the online system and the anthropometric measures was applied in Üsküdar University NP hospital dietitian clinic. Questionnaire consisting of a combination of several questionnaires was developed. All participants provided informed consent before proceeding to the survey questions.

Measures and procedure

The questionnaire used for this study consisted of a total of 6 pages, 4 parts, and 52 questions and was a combination of items from the following: sociodemographic information, age, gender; Pittsburgh Sleep Quality Index (PSQI) for the sleep questionnaire; the Night Eating Questionnaire (NEQ) about NES; and anthropometric measurements. Fourteen questions about demographic characteristics, questions related to sleep and eating patterns, and drug use was screened. Twenty-two questions related to the sleep pattern were screened. The answers were analyzed according to the seven factors of the PSQI.[15,16] These factors are factor 1: subjective sleep quality, factor 2: sleep latency, factor 3: sleep duration, factor 4: habitual sleep efficiency, factor 5: sleep disturbances, factor 6: sleep medication use, and factor 7: provides information about daytime sleep function loss. Each of the factors was evaluated on a score of 0–3. The sum of the points given to the factors gives the PSQI score. The PSQI score ranges from 0 to 21 overall. Sleep quality of those with a PSQI score of 5 and below was evaluated as "good," while those with a PSQI score >5 was evaluated as "bad."[17] Fifteen questions were consisted in NEQ and screened for NES diagnosis. The questions were about how often night meals and snacks are eaten, what period of time they are eaten, what kind of problems eating at night creates in life, the amount of calories people take after dinner, the desire to eat at night, and the presence of eating behaviors and moods. NEQ had five multiple choice options: none (3 points)/very little (2 points)/ some (1 point)/moderate (0 point)/extreme (0 point). In addition, for other questions, always (3 points), often (2 points), usually (1 point), and other options were 0 points. Thirty points were the cutoff point of this scale. If the total score is 30, the result will be considered "susceptible to eating behavior disorder".[18,19] At the last stage of the survey, the participants were screened for their measures as weight (kg), height (cm), body mass index (BMI [kg/m^2]), neck circumference (cm), waist circumference (cm), and arm circumference (cm) by evaluating the anthropometric measurements related to the conclusion of the study.[20] BMI calculation: BMI values of the participants were determined by dividing the weight (weight) obtained with the information form by m^2 (kg/m^2).

Data analysis

Descriptive statistics were made to determine the distribution of sociodemographic variables of the participants. Whether the data conformed to normal distribution was determined by the normality test (Shapiro–Wilk or Kolmogorov–Smirnov values). All tests were selected from nonparametric tests. Spearman correlation analysis was performed to evaluate the relationships between the scales (NEQ, PSQI). Finally, the Mann–Whitney *U*-test and the Kruskal–Wallis test were used to evaluate the significance of demographic variables and scales. Data on students' sociodemographic characteristics were evaluated using numbers and percentages. The mean of students' age, BMI, and waist circumference values were determined by minimum,

maximum, mean, and standard deviation. Statistical analysis was made using the SPSS version 24.0 (IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp). $P < 0.05$ showed significant relations between two variables.

Table 1: Sociodemographic variables (*n*=100)

Demographic variables	*n* (%)
Gender	
Female	84 (84.0)
Male	16 (16.0)
Total	100 (100)
Are there any appetizing drugs that you use?	
Yes	7 (7.0)
No	93 (93.0)
Total	100 (100)
Are there any sleep-inducing drugs you use?	
Yes	10 (10.0)
No	90 (90.0)
Total	100 (100)
Do you exercise regularly? (2 days in a week)	
Yes	37 (37.0)
No	63 (63.0)
Total	100 (100)
Are you skipping meals?	
Yes	32 (32.0)
No	10 (10.0)
Sometimes	58 (58.0)
Total	100 (100)
What meal are you skipping?	
Breakfast	31 (31.0)
Lunch	58 (58.0)
Dinner	11 (11.0)
Total	100 (100)
BMI group	
Underweight	10 (10.0)
Acceptable	12 (12.0)
Normal	49 (49.0)
Overweight	24 (24.0)
Obesity Stage 1	5 (5.0)
Total	100 (100)

BMI: Body mass ındex, *n*: Number of participants

Results

Sociodemographic information

A hundred university students were participated as a 84% (n = 84) female and 16% (n = 16) male. The appetite-stimulating drug use of the participants was examined and it was determined that 7% (n = 7) used drugs and 93% (n = 93) did not use drugs. The sleeping pill use was examined, it was determined that 10% (n = 10) used drugs, and 90% (n = 90) did not use drugs. The regular exercise status was examined, it was determined that 37% (n = 37) did sports, 63% (n = 63) did not do sports. Skipping meals were examined, 32% (n = 32) skipped meals, 10% (n = 10) did not skip meals, and 58% (n = 58) sometimes skipped meals. About 31% (n = 31) skipped morning meals, 58% (n = 58) skipped lunch, and 11% (n = 11) skipped evening meals. BMI group data were examined, 10% (n = 10) were underweight, 12% (n = 12) were acceptable weight, 49.5% (n = 49) were at normal weight, 24% (n = 24) was slightly obese, and 5% (n = 5) was obese Stage 1 [see in Table 1].

Sleep disorders and night eating syndrome

Minimum score obtained from PSQI was 6 (scores >5 described poor sleep quality). Therefore, our entire sample was found to have a sleep disturbance problem. The maximum score for NEQ was 39 so that there were individuals with NES (30 < indicates an eating disorder) [see in Table 2b].

Spearman correlation analysis showed a positive correlation between NEQ and PSQI total scores ($P < 0.001$, rho = 0.386) [Table 3]. NEQ total scores did not show a statistically significant difference between appetizing drug users and nonusers [PSQI showed ($Z = -2.410$, $P = 0.016$)]. There was no statistical difference between the total scores of the PSQI between those using and not using sleeping pills (NES showed [$Z = -2.218$, $P = 0.027$]). PSQI and NEQ total scores did not show a statistical difference between those who exercise regularly and gender [see in Table 4]. No statistical difference was observed between the total score of scales and age, skipping meals, and BMI groups [see in Table 5].

Table 2: Average age, body mass index, waist circumference, and descriptive statistics of scores obtained from Night Eating Questionnaire and Pittsburgh Sleep Quality Index Scales of the participants (*n*=100)

	Minimum	Maximum	Average	SD
a. Average of age, BMI, and waist circumferences (*n*=100)				
Age	18	41	23.52	4.50
BMI weight (kg)/height (m^2)	16.87	34.15	23.07	3.65
Waist circumference (cm)	50	110	78.98	14.09
b. Descriptive statistics of scores obtained from NEQ and PSQI scales (*n*=100)				
NEQ total	6	39	15.95	6.95
PSQI total	6	18	13.45	2.70

BMI: Body mass ındex, SD: Standard deviation, NEQ: Night Eating Questionnaire, PSQI: Pittsburgh Sleep Quality Index, *n*: Number of participants

Discussion

Eating behavior and body weight of individuals may be affected by many factors. Catecholaminergic pathways and physiological reactions in the nervous system play an important role in eating behavior.[21] Serious problems such as nutritional deficiency, overnutrition, depression, substance abuse, and anxiety can occur with the emergence of eating disorders.[22] More than 90% of eating disorders cases were under the age of 25. There was also an increase in the prevalence of eating disorders, especially among high school and university students.[5] Disturbed sleep can lead to eating disorders. Bektaş *et al*. showed an important relationship between sleep and NES was found ($P < 0.001$).[23] Likewise, our study had significant results ($P < 0.001$, rho = 0.386), and the importance of our study was the application that was done during the lockdown (COVID-19 pandemic). Öner *et al*. reported that although NES incidence was found more in women, no significant difference was found between genders among 179 university students.[24] Likewise, in our study, mean scores obtained in women were higher, but no statistical significance was found between NES ($P = 0.597$) and sleep ($P = 0.242$). As in our study ($P = 0.074$), no statistically significant difference was found between age groups and sleep in another study.[25] de Zwaan *et al*. found a positive correlation between the weight and NES.[26] There was no significant relationship between NES ($P = 0.326$), sleep ($P = 0.873$), and BMI classification in our study. There are conflicting results about BMI and weight gain, yet it can have a strong correlation between sleep and

Table 3: Correlation results regarding the scores obtained from the scale and subscales

Q	NES_total	PSQI_total
NES total		
r	1	
P		
PSQI total		
r	0.386**	1
P	<0.001	

*The correlation is significant at the 0.05 level (Spearman correlation test), **The correlation is significant at the 0.01 level (Spearman correlation test). NES: Night eating syndrome, PSQI: Pittsburgh Sleep Quality Index

Table 4: Comparison of the scale and subscale scores of the participants in terms of gender, appetite medication use, sleeping medication use, and regular exercise with Mann-Whitney *U*-test

	Gender	*n*	Average	*Z*	*P*
a. Comparison of the scale and subscale scores in terms of gender					
PSQI total	Female	84	13.58	−0.528	0.597
	Male	16	12.73		
NEQ total	Female	84	16.05	−1.169	0.242
	Male	16	15.33		
b. Comparison of the scale and subscale scores in terms of appetite medication use					
Are there any appetizing drugs that you use?					
PSQI total					
Yes		7	14.67	−2.410	0.016
No		93	13.38		
NEQ total					
Yes		7	21.83	−1.122	0.262
No		93	15.57		
c. Comparison of the scale and subscale scores in terms of sleeping medication use					
Are there any sleep-inducing drugs you use?					
PSQI total					
Yes		10	15.33	−1.707	0.088
No		90	13.27		
NEQ total					
Yes		10	20.00	−2.218	0.027
No		90	15.54		
d. Comparison of the scale and subscale scores in terms of regular exercise					
PSQI total					
Yes		37	13.00	−1.917	0.055
No		63	13.71		
NEQ total					
Yes		37	14.00	−1.710	0.087
No		63	17.06		

Mann-Whitney *U*-test. NEQ: Night Eating Questionnaire, *n*: Number of participants, PSQI: Pittsburgh Sleep Quality Index

Table 5: Comparison of the scale and subscale scores in terms of age groups, skipping meals, and body mass index groups using Kruskal-Wallis

	n	Average	KW	P
a. Comparison of the scale and subscale scores in terms of age group				
Age group				
NEQ total				
18-20	20	16.80	6.13	0.105
21-25	61	15.06		
26-30	8	22.42		
31 and above	11	15.18		
PSQI total				
18-20	20	14.90	6.92	0.074
21-25	61	13.13		
26-30	8	13.14		
31 and above	11	12.81		
b. Comparison of the scale and subscale scores in terms of skipping meals				
Are you skipping meals?				
NEQ total				
Yes	32	18.03	1.398	0.497
No	10	14.22		
Sometimes	58	15.07		
PSQI total				
Yes	32	13.94	2.484	0.289
No	10	12.89		
Sometimes	58	13.28		
c. Comparison of the scale and subscale scores in terms of BMI groups				
BMI				
NEQ total				
Underweight	10	18.20	4.644	0.326
Acceptable	12	15.16		
Normal	49	14.93		
Overweight	24	17.95		
Obesity Stage 1	5	11.75		
PSQI total				
Underweight	10	13.40	4.644	0.873
Acceptable	12	13.91		
Normal	49	13.28		
Overweight	24	13.72		
Obesity Stage 1	5	12.50		

BMI: Body mass index, KW: Kruskal-Wallis test, NEQ: Night Eating Questionnaire, *n*: Number of participants, PSQI: Pittsburgh Sleep Quality Index

NES. The findings of NES and sleep were not related to weight and this result may be due to the insufficient sample size. Similar to our study (P = 0.088), Farhangi found that no significant relationship was found between sleep and sleep-inducing drugs among 107 young individuals.[27] Kaya[28] found a significant relationship between the use of sleep-inducing drugs and the NEQ. In addition, in our study, NEQ scores were found to be higher in patients using sleep-inducing drugs compared to those who did not use appetizing drugs (P = 0.016). Furthermore, no significant relationship (P = 0.262) was found between the NES and appetizing drugs use. Our study was the first to investigate the relationship between NES, sleep, and appetizing medication use. In addition, the use of sleeping pills and the use of NES showed a significant relationship (P = 0.027). It may mean that people with disturbed sleep have a higher risk of NES. Sütçü[29] reported that there was no statistical difference in NES between the groups that exercised regularly and those who did not. Furthermore, Kaya[28] reported that there was no relation between sleep in individuals who exercised regularly and those not. As in our study, no significant difference was found between exercising regularly on sleep (P = 0.087) and NES (P = 0.055). To our knowledge, there is no study describing the relationship between sleep and meal skipping in the literature; hence, our study revealed that there was no significant relationship between this sleep and meal skipping. The importance of our study was in terms of being conducted among lockdown students in COVID-19 pandemic. In a study conducted with 207 nursing students, it was found that sleep quality was worsened during the lockdown.[9] In our results, sleep quality was disturbed. Similarly, Zhou *et al*. found that the prevalence of insomnia symptoms increased to 23.2% more among 11,835 adolescents and young adults during the COVID-19.[10] In a cross-sectional study that was conducted among 1017/1132 students, 13.9% of the university students were at risk of eating disorders.[3] In our study, NES as an eating disorder was seen among students and related to sleep quality. The presence of sleep disturbances in all individuals in this study can be considered as an effect of the COVID-19 pandemic. The prevalence of sleep problems, eating disorders, depression symptoms, and weight gain increased when studies before the pandemic and the studies during the pandemic period were compared. There were serious disturbances in sleep patterns between the students and adults.[3,7-11]

Limitations

This study had some limitations, data obtained from the study were made among 100 online-educated students studying at Üsküdar University during the lockdown in 2019–2020 academic year. A limited number of participants were reached due to the COVID-19 pandemic. It will be more beneficial to repeat this study with larger participants.

Conclusion

As a result, no relationship was found between BMI, waist circumference, skipping meals, demographic characteristics such as gender and age groups, and NES and sleep patterns. A positive relationship was found between sleep quality and NES. The sleep patterns interacted with NES (P < 0.001). In addition, the positive relationship

between sleeping pill use and NES (P = 0.027) can be explained as the need to eat after the use of drugs, also appetite medications were associated with sleep patterns (P = 0.016). Furthermore, our entire sample had sleep disturbance problems. Same, during the COVID-19 lockdown, sleep patterns were found to be impaired in students.[9-12] Despite limitations, the results in our study pose a great risk for online educated students for NES during the COVID-19 pandemic. Therefore, this study is important for educators and public health professionals in implementing policies and interventions for students and prevent their health problems according to sleep and nutrition. Large-scale studies should be conducted to better understand the impact of the pandemic on eating and sleep disorders among students. For this reason, NES risks were increasing day by day before the pandemic. The COVID-19 pandemic and even the various chronic disease risks it may cause can be out of control. These processes should be supported with studies and more studies should be done especially for the young population.

Patient informed consent

Informed consent was obtained.

Ethics committee approval

Ethics Committee Approval for the study was received from Üsküdar University Non-Invasive Research Ethics Committee on 27.02.2020 (No:61351342/2020-93). "Informed Volunteer Consent Form" was obtained from the participants.

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Conflicts of interest

There are no conflicts of interest to declare.

Author contribution subject and rate

- Melike Buse YILDIZ (%8): Data acquisition, interpretation of data for the study.
- Sena Sarikaya (%8): Data acquisition, interpretation of data for the study.
- Şevval Temirçi (%8): Data acquisition, interpretation of data for the study.
- Buse Gül Dener (%8): Data acquisition, interpretation of data for the study.
- Rümeysa Rabia Kocatürk (%8): Collection of review of literature, wrote the manuscript.
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Original Article

Quality of the Life and Depression Levels of Pregnant Women with Suspected/Confirmed Coronavirus Disease 2019 in Turkey

Abstract

Objective: This study was conducted to investigate the effect of depression levels on the quality of life of pregnant women with probable and confirmed coronavirus disease 2019 (COVID-19) diagnosis. **Methods:** This is a cross-sectional study. The sample of the study was composed of thirty pregnant women who were defined as probable and confirmed cases in the COVID-19 Case Tracking module of the Public Health Software System. **Results:** The average age of pregnant women participating in the study was 32.53 ± 3.71 (min: 24, max: 40). The mean Beck Depression Inventory for Primary Care score of the pregnant women participating in the study was 2.2 ± 2.8 (min: 7, max: 20). Only five of the pregnant women had a high probability of depression. Considering the participants' average scores from the Short Form-36 Health Survey subdimensions, it is seen that the highest score of pregnant women is in the mental health category (*x*: 71.37 ± 2 8.8 6). The COVID-19 test result and the parameters of quality of life subscale were compared, and a statistically significant relationship was found between the social life quality of not only pregnant women with positive COVID-19 test results but also that of the women with negative test results (*t*: −2,627, *P*: 0.014). **Conclusion:** It is obvious that people's mental health is negatively affected during the COVID-19 pandemic. For this reason, midwifery care, which will be given to ensure that pregnant women are least affected by the COVID-19 pandemic, to protect their mental health, and to increase their quality of life, is even more important.

Keywords: *Coronavirus disease 2019, depression, pandemic, pregnancy, quality of life*

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Introduction

Infectious diseases threaten immunosuppressive populations, such as the elderly, chronically ill, immunocompromised, and pregnant women more. According to research published to date, coronavirus is more dangerous for pregnant women than normal individuals.[1,2] According to evidence-based studies, coronavirus increases the risk of preterm birth.[3,4] Respiratory diseases can cause negative consequences for pregnant women in obstetric and neonatal terms.[5] Physiological and immunological natural changes in pregnant women can also increase the risk of complications arising from respiratory tract infections. Death rates are also higher due to the fact that pregnant women are more susceptible to diseases in pandemics that have occurred in recent years.[5,6] : In addition to all this during pregnancy, there is an increase in heart rate and oxygen volume. Decreased lung capacity and increased maternal cardiovascular with increased respiratory system due to the need for more oxygen use physiologically, as well as the immunological adaptation process also increase the risk of serious respiratory and infectious diseases.[5,7] According to the data obtained from multiple studies, the morbidity and mortality rates of pregnant women are higher due to influenza compared to women who are not. A similar association was found in pregnant women who had severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS), the other coronaviruses.[5]

There are many literature studies about the

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effects of the new type of coronavirus disease (COVID) in pregnancy. However, in most of the studies conducted, the samples are tiny. Most of the studies undertaken involved women in the last 3 months of pregnancy due to the previous onset of the pandemic. There are still many questions waiting to be answered about the new coronavirus and pregnancy period. Some of the studies in the literature show that pregnant women are more at hazard for COVID-19 infection than normal individuals.[6] In the studies, seven of the pregnant women who were positive in the last 3 months of pregnancy had a fever, four had a cough, three had myalgia and sore throat, and two had signs of weakness.[8,9]

According to a systematic review and meta-analysis investigating the complications of COVID-19 infection during pregnancy, COVID-19 was associated with preeclampsia, cesarean delivery, and perinatal death.[4] Covid-19 symptoms were found to be similar in all women regardless of pregnancy.[2,6,7]

The available data show us that studies on pregnancy and COVID-19 and their comparison with nonpregnant women of the same age are needed. It is unknown whether there is vertical transmission of COVID-19 infection from pregnant women to the fetus.[5,7] Studies have shown no virus in the amniotic fluid, cord blood, breast milk, and newborn throat swab of the COVID-19-infected mother.[7] Although several studies suggested a transmission from the mother after COVID-19 infection in newborns, certain information could not be proven in these studies due to the samples taken from newborns and contact history with other people.[10] However, perinatal complications and first trimester complications are still unknown, and more studies are needed on this.

When pandemics are examined in terms of their psychosocial effects, it is seen that the vulnerable population is intensely affected. Especially, COVID-19-infected patients, the elderly or immunocompromised people, and pregnant women are at increased risk for adverse psychosocial outcomes.[11] Approximately 10% of pregnant women worldwide have experienced a mental disorder, especially depression. This situation is even higher in developing countries.[12] In studies on COVID-19 and mental health status, the risk of depression and anxiety in women, health-care workers, and the elderly population, especially in risk factor groups, is much higher than in the normal population.[12,13] With the emergence of COVID-19 in China on January 20 and the confirmation of the process of human-to-human transmission, levels of social anxiety started to increase in China, and especially, pregnant women were adversely affected at this stage.[14]

Saccone *et al*.[15] examined anxiety conditions of 100 pregnant women throughout the COVID-19 pandemic in Italy and found that the epidemic had moderate and severe psychological effects.

In another study in Canada, Davenport *et al*.[16] examined the relation of depression and pregnancy with 520 pregnant women. It was found that 15% of the pregnant women had depression symptoms before the pandemic, while 40% of them had depression findings during the pandemic period. It has been stated that the COVID-19 pandemic is a factor that increases the risk of depression in pregnant women.[16]

Many countries have taken steps toward the risk group first to protect the mental health of society. Since the beginning of the covid-19 pandemic in our country, the sensitive group; people over 65, pregnant women and people at risk are protected by government policies. Among the steps taken for pregnant women is the administrative leave for all pregnant women from the pandemic onset. In addition to the normalization process (June 2), the administrative leave for pregnant women in over 24 gestational weeks keeps them away from crowded environments.[17]

It is acknowledged that the quality of life decreases and the possibility of depressive symptoms increases during pregnancy compared to the period before pregnancy.[18] This research aims to search the correlation among the quality of life and depression risk of women who are pregnant during the COVID-19 pandemic process.

Study Method

The permission from the Ethics Committee for the study was obtained with the decision of Haydarpasa Numune Training and Research Hospital Clinical Research Ethics Committee numbered HNEAH-KAEK/78.

In the study, it was aimed to investigate depression in the pregnant population, who were probable or approved cases of COVID-19 infection, which is a new concept for the whole world and to investigate the impact of this status on the quality of life. This is a cross-sectional study.

The study was carried out with pregnant women who were registered as probable and confirmed cases by the Ministry of Health's Public Health Software System COVID-19 Case Tracking module. The universe of the research occurs of 43 pregnant women (19–45 ages) who were defined as likely and confirmed cases in the case tracking module system. Since 35 of 43 pregnant women in the system had a mobile phone number, 35 pregnant women were reached and 5 of these pregnant women did not accept to participate in the study. The power analysis for the sample calculation of the research was calculated using the G*Power program. Since the prevalence of new coronavirus on pregnant women is not known, a power analysis was made over a domain of 0.5 and a power over 85%. After this calculation, the sample size consisted of thirty pregnant women with probable and confirmed cases.

The inclusion criteria in the study are:

- Pregnancy

- A probable or confirmed case of COVID-19
- Approval of the study.

The exclusion criteria from the study are:

- Being a nonpregnant woman with COVID-19 infection
- Disapproval of participation in the study.

Data collection tools and data collection

Within the scope of the study, the contact information of the pregnant women with a probable or confirmed infection diagnosed of COVID-19 pandemic was obtained through the Public Health Management System (HSYS) COVID-19 Case Follow-up module and the women were contacted by phone, the study informed consent form was read verbally, and data were collected verbally and online from the pregnant women who agreed to participate in research. A sociodemographic data form (16 questions), obstetric information form (8 questions) and an information form collecting general information about COVID-19 (15 questions), "the Beck Depression Inventory For Primary Care (BDI-PC)" (7 questions), and Short Form-36 (SF-36) Health Survey (36 questions) were prepared in the Google questionnaire format and sent as a message to the phones of pregnant women who accepted to participate in the research.

The Beck Depression Inventory for Primary Care

The validity and reliability study of the scale was made by Aktürk *et al*.[18] The BDI-PC is a screening test that reduces false-positive depression rates. BDI-PC scans for depression down seven headings, handling the indications of sadness, pessimism, past failures, self-dislike, self-criticalness, loss of interest, and suicidal thoughts or wishes. Each title includes a four-digit scoring from 0 to 3; the BDI-PC score is obtained by rallying the top scores in each title. A maximum total of 21 points can be obtained. Although no cutoff score is declared, the possibility of depression is over 90% at scores above 4.

Short Form-36 Health Survey

Its Turkish validity and reliability research was done by Koçyiğit *et al*.[19] SF-36 is a self-assessment scale and includes eight dimensions of health such as physical functionality, sociable functionality, role limitations on account of physical functionality (role functionality-physical), bodily pain, common mental health, role limitations because of emotional functionality (role functioning-emotional), lifely (energy and fatigue), and common health perception through 36 items. Cronbach's alpha coefficients of each subscale were calculated separately in reliability studies and were found between 0.7324 and 0.7612. Item-total score correlations were calculated between 0.4712 and 0.8872. In the validity study, a multitrait-multimethod matrix was used and the correlation coefficients were found between 0.44 and 0.65. The SF-36 scale is scored over 100 points, and the scores obtained vary between 0 and 100 points for each component. High scores on this scale indicate a better level in health, while low scores indicate deterioration in health.

Evaluation of data

SPSS package program was used to evaluate the data. Whether the data had a normal distribution or not were checked with the Kolmogorov–Smirnov test. Chi-square, *t*-test, Fisher's Chi-square test, and Mann–Whitney U-test were used to evaluate the differences and relationships between variables. $P \leq 0.05$ was accepted as statistically significant.

Results

The average age of pregnant women participating in the study was 32.53 ± 3.71 (min: 24, max: 40). The average body mass index was 26; this was thought to be due to the weight gained during pregnancy. The average first gestational age was 29.3 ± 4.48 (min: 18, max: 38). The mean BDI-PC score of the pregnant women participating in the study was 2.2 ± 2.8 (min: 7, max: 20). Only five of the pregnant women had a high probability of depression.

Considering the sociodemographic characteristics of the pregnant women participating in the study, it is seen that 76.7% of them were between the ages of 19–35 and 23.3% were above the age of 36. Regarding their general health status, 86.7% of them did not have any chronic disease and 53.3% did not have any surgery. Considering the obstetric status of the participants in the study, it was understood that the age at first gestation of 86.7% was between 19 and 35, the number of pregnancies of 50% was 2, and 60.9 of them had an interval of above 24 months between pregnancies [Table 1].

When Table 2 is examined, it is seen that 36.7% of the pregnant women had contact with someone diagnosed with COVID-19 and that 66.7% of the people they came into contact with were family members (88.9% were spouses). COVID-19 polymerase chain reaction test result of only 20% of the pregnant women participating in the study was positive. 56.7% of the pregnant women had no symptoms of COVID-19. It is observed that 90% of them were outpatients at home rather than in the hospital, and none (100%) was hospitalized in intensive care. 50% of them stated that they used the drug called hydroxychloroquine used in the treatment of COVID-19. None of the pregnant women lost any relatives due to COVID-19. When the isolation conditions were examined, 53.3% of them stated that the isolation was unnecessary and 43.3% of them stated that they went out without isolation.

Table 3 shows the average score obtained from the subdimensions of the SF-36 Health Survey. When the

Table 1: The sociodemographic and obstetric data of the pregnant women participating in the study

	n (%)
Sociodemographic situation	
Age	
19-35	23 (76.7)
≥36	7 (23.3)
Educational status	
Primary school graduate	2 (.6.7)
High school graduate	2 (.6.7)
Graduate	17 (56.7)
Postgraduate	9 (30.0)
Income status	
My income is less than my expenses	1 (3.3)
My income is equal to my expenses	16 (53.3)
My income is more than my expenses	13 (43.3)
Employment status	
Yes	20 (66.7)
No	10 (33.3)
Social security	
None	1 (3.3)
SSI	17 (56.7)
State retirement fund	7 (23.3)
Private health insurance	5 (16.7)
Chronic disease	
Yes	4 (13.3)
Thyroid	3 (75.0)
Other	1 (25.0)
No	26 (86.7)
Surgery	
Yes	14 (46.7)
No	16 (53.3)
Obstetric condition	
Age at first gestation	
≤18	1 (3.3)
19-35	26 (86.7)
≥36	3 (10.0)
Number of pregnancies	
1	9 (30.0)
2	15 (50.0)
3	6 (20.0)
Interval between pregnancies (months)	
<12	7 (30.4)
12-24	2 (8.7)
24 and above	14 (60.9)
Miscarriage status	
Yes	10 (33.3)
No	20 (66.7)
Abortion status	
Yes	1 (3.3)
No	29 (96.7)
Stillbirth status	
Yes	1 (3.3)
No	29 (96.7)
Previous delivery method	
Spontaneous vaginal delivery	2 (13.3)
Interventional vaginal delivery (artificial pain)	3 (20.0)
Planned cesarean section	5 (33.3)
Emergency cesarean section	5 (33.3)
Planned pregnancy status	
Yes	29 (96.7)
No	1 (3.3)
Total	30 (100.0)

SSI: Social Security Institution

quality of life of pregnant women is evaluated in eight sections, it is seen that the mental health category has the highest score ($\bar{x}$: 71.37 ± 28.86). It is seen that physical functioning ($\bar{x}$: 68.3 ± 33.01) and emotional role difficulty ($\bar{x}$: 67.66 ± 43) score is above the average.

It is understood that the lowest score is in the general health perception with an average of 32.5 ± 9.3. Social functioning ($\bar{x}$: 40.0 ± 35.26), energy/vitality ($\bar{x}$: 45.0 ± 22.25), and pain perception ($\bar{x}$: 47.5 ± 33.37) also seem to be perceived lower than average [Table 3].

The COVID-19 test result and the subdimension parameters of the health survey are compared in Table 4, and a statistically significant relationship was found between the social quality of life of not only pregnant women with positive COVID-19 test results but also those with negative results (t: −2,627, P: 0.014). A statistically significant relationship was not found between the COVID-19 test result and the other subdimensions of the scale.

Table 5 shows the relationship between the average scores of BDI-PC and the subdimensions of the SF-36 Health Survey Inventory, and a statistically significant relationship was found with emotional role difficulties and energy/vitality subdimensions. No significant difference was found in other parameters. It is observed that as the probability of depression increases in pregnant women, the energy/vitality quality of life and emotional quality of life deteriorate.

Discussion

According to our study, the mean scores of the pregnant women in the BDI-PC were found to be 2.2 ± 2.8, and only five of them had a high probability of depression. The fact that the mean inventory scores of the pregnant women participating in our study are below 4 indicates that the probability of depression is low. In a systematic review examining the effects of maternal depression, anxiety, and perceived stress on pregnancy, it was found that depression during pregnancy differs between races and ethnic groups, women who have socioeconomic difficulties and a lack of social support have high depression, and the pregnant

Table 2: Coronavirus disease 2019 data of the pregnant women participating in the study

	n (%)
COVID-19 contact status	
Yes	11 (36.7)
None	19 (63.3)
Contact type	
A family member	8 (66.7)
A relative	1 (8.3)
A Colleague	3 (25.0)
Person contacted	
Spouse	8 (88.9)
Father	1 (11.1)
COVID-19 test result	
Negative	24 (80.0)
Positive	6 (20.0)
COVID-19 symptoms	
No symptoms	17 (56.7)
Fever	2 (.6.7)
Respiratory distress	1 (3.3)
Cough	2 (.6.7)
Inability to smell	3 (10.0)
Weakness	2 (6.7)
Sore throat	3 (10.0)
Follow-up status	
Inpatient at hospital	3 (10.0)
Outpatient at home	27 (90.0)
Status of intensive care stay	
Yes	0
No	30 (100.0)
Drug use status	
Hydroxychloroquine	3 (50.0)
Other	3 (50.0)
Isolation status	
I did not leave the room	3 (10.0)
I walked around at home with a mask	4 (13.3)
I did not isolate myself in the house, I stayed at home	10 (33.3)
I didn't isolate myself, I went out	13 (43.3)
Difficulty complying with Isolation	
Yes	7 (23.3)
No	23 (73.3)
Problems experienced in isolation	
I got bored	3 (20.0)
I had to work	3 (20.0)
I thought isolation was unnecessary	8 (53.3)
Status of losing relatives due to COVID-19	
Yes	0
No	30 (100.0)

COVID-19: Coronavirus disease 2019

women who have negative health behaviors during pregnancy (such as smoking and substance use) have high depression scores.[20]

In a study measuring the depression levels in pregnant women, it was found that the depression rates increased during the pandemic period compared to the prepandemic.[21] When our study data were examined, it was thought that having a good socioeconomic status, 66.7% having a job, and almost all of them having social security were effective on low depression scale scores of the pregnant women.

Table 3: Subdimension mean scores of the Short Form-36 Health Survey of the pregnant women participating in the study

SF-36 Health Survey	Mean±SD
Physical functioning	68.3±33.01
Difficulty in physical role	65.0±41.75
Difficulty in emotional role	67.66±43
Energy/vitality	45.0±22.25
Mental health	71.37±28.86
Social functioning	40.0±35.26
Pain	47.5±33.37
General perception of health	32.5±9.3

SD: Standard deviation, SF: Short Form

It was determined that 20% of the pregnant women in our study were positive for COVID-19, and 90% of them received outpatient treatment. In a study examining pregnant women diagnosed with COVID-19 during pregnancy and the postpartum period in Brazil, 978 pregnant and postpartum women were treated for COVID-19 between February 26 and June 20, 2020, and 124 cases were reported and resulted in death. This stated mortality rate was 3, four times the general world average.[22] It is reported that the number of pregnant women diagnosed with COVID-19 during the obstetric period in Brazil is 12.7% compared to the average population, but this rate is actually higher.[23-25] A study of 82 pregnant women with a suspected and positive COVID-19 infection in Spain found that only 4 pregnant women showed serious symptoms. In addition, one of these pregnant women was diagnosed with preeclampsia; four pregnant women gave birth by cesarean section and were transferred to the intensive care unit.[26]

When the results of SF-36 Health Survey scores were examined in our study, it was found that the mental health category had the highest score ($\bar{x}$: 71, 37 ± 28.86). Furthermore, in a study in which the normative data of the SF-36 Health Survey in Turkey's population were examined, it was found that the score obtained for the female population in the mental health category was found to be x: 70.1 ± 11.4, which is similar to our study, and that the social functioning category had the highest score. When we compared other parameters, it was seen that the physical functioning was $\bar{x}$: 68.3 ± 33.01 in our study while this value was $\bar{x}$: 80.6 ± 21.7 in the female group of the Turkish population and that emotional role difficulty in our study was $\bar{x}$: 67.66 ± 43 while this score was $\bar{x}$: 89.0 ± 22.5 in the female group of the Turkish population.[27] It was thought that all these data were found to be lower than the normative data of Turkey due to the COVID-19 pandemic.

Table 4: Comparison of the pregnant women who have had coronavirus disease 2019 test in terms of the means of health survey subdimensions

	COVID-19 test result				*T*-test for equality of means		
	Positive		Negative				
	n	Mean±SD	*n*	Mean±SD	*t*	Df	*P*
General health	24	191.62±60.41	6	209.50±35.82	−0.689	28	0.496
Physical functioning	24	725.00±329.36	6	516.66±302.76	1.405	28	0.171
Difficulty in physical role	24	287.50±159.65	6	150.00±164.31	1.877	28	0.071
Difficulty in emotional role	24	204.16±133.44	6	200.00±126.49	0.069	28	0.945
Energy/vitality	24	170.83±92.56	6	220.83±71.44	−1.229	28	0.229
Mental health	24	345.04±144.52	6	404.16±146.13	−0.895	28	0.379
Social functioning	24	64.58±64.23	6	141.66±64.54	−2.627	28	0.014
Pain	24	88.54±70.70	6	120.83±43.06	−1.062	28	0.297

COVID-19: Coronavirus disease 2019, SD: Standard deviation

Table 5: Comparison of the relationship between average Beck Depression Inventory for Primary Care and Short Form-36 Health Survey subdimensions of pregnant women participating in the study

	ANOVA			
	Sum of squares	df	*F*	*P*
General health				
Between groups	5.170	7	0.799	0.597
Within groups	20.350	22		
Physical functioning				
Between groups	384.070	7	2.443	0.052
Within groups	494.176	22		
Difficulty in physical role				
Between groups	78.510	7	1.678	0.166
Within groups	147.030	22		
Difficulty in emotional role				
Between groups	49.250	7	1.784	0.141
Within groups	86.750	22		
Energy/vitality				
Between groups	32.540	7	3.134	0.019
Within groups	32.620	22		
Mental health				
Between groups	93.630	7	3.970	0.006
Within groups	74.129	22		
Social functioning				
Between groups	13.760	7	1.645	0.175
Within groups	26.300	22		
Pain				
Between groups	8.740	7	1.012	0.450
Within groups	27.150	22		

In our study, the lowest score obtained from the inventory was found to be in the general health perception with an average of 32.5 ± 9.3. In the data obtained from the female group for Turkish society, it was observed that the lowest score was in the energy/vitality category, with an average of 63.4 ± 13.7.[27] When the inventory scores in our study and the COVID-19 test results were compared, a significant relationship was found between the social quality of life of not only pregnant women with positive COVID-19 results but also those with negative ones. This was thought to result from being in isolation for 14 days due to suspicion of COVID-19.

The mean age of pregnant women participating in the study was found to be 32.53 ± 3.71. When similar studies were examined, Sheeba et al. in the study, the average age was 23,[28] while Davenport et al. and in their study, Micellia et al.found that the average age was 33.[16,29] In another study conducted in Italy, it was found that the mean age of the women planning to become parents during the COVID-19 pandemic process was 30 and over.[30] When the studies about pregnancy are examined, it is seen that the average age is 30 and above mostly.[16,29,30]

In our study, the BDI-PC and the subdimensions of the SF-36 Health Survey were compared, and a statistically significant relationship was found between the BDI-PC and the subdimensions of emotional role difficulties and energy/vitality. In studies examining anxiety and depression in the COVID-19 pandemic, it is stated that the pandemic negatively affects psychology, and the diagnosis of depression increases in this process.[31,32] The leading causes of the psychological effects of the COVID-19 pandemic are pandemic and government response, physical distancing measures, isolation, and quarantine processes.[33,34] In a population-based comparison study examining pregnant women with and without depression during pregnancy, it was reported that depression is affected by the quality of life and this process experienced during pregnancy may also affect the flow of delivery, cause dystocia, and increase the risk of cesarean delivery.[35] In a study conducted with 280 pregnant women, it was stated that 35.7% of them were under the risk of depression and that age, education, occupation, and socioeconomic status were effective factors on depression.[16] In a systematic review and meta-analysis examining the psychiatric and neuropsychiatric consequences of the COVID-19 pandemic, studies on the MERS and SARS pandemics were examined, and emotional changes were found to be associated with depression.[12,21,32,34] In our study, it was found that there is a relationship between the

susceptibility of pregnant women to depression and their energy/vitality quality of life and emotional quality of life. When the literature was reviewed, no other similar study questioning the relationship between the quality of life of pregnant women and depression in the COVID-19 pandemic was found.

As a result, it is obvious that people's mental health is being negatively affected during the COVID-19 pandemic process. In this process, once again, the vulnerable populations (e.g. children and pregnant women) are being affected more. For this reason, midwifery care, which will be given to pregnant women to protect their mental health, to increase their quality of life, and to ensure that they are least affected by the COVID-19 pandemic, is even more important. It is possible to prevent pregnant women from depression by supporting them emotionally and increasing their energy. For this reason, obstetric care which will help to minimize the negative effects of the pandemic should not only focus on the physical well-being of pregnant women but also on providing emotional and mental well-being. Besides, it is seen that different studies examining the effects of the COVID-19 pandemic on pregnant women, especially on mental health, are needed. It is also very important to ensure the continuity of care of the pregnant women diagnosed with COVID-19 and to continue online midwifery care during the quarantine period in order to ensure that pregnant women are supported at this stage. Today, when a new era has begun with the COVID-19 pandemic, the integration of obstetric care and health-care professionals into this process and ensuring the continuity of service is an important step for our future.

Study limitations

This study is based which can be considered a geographical limitation. The fact that pregnant women have good socio-economic status is thought to have an effect on low Depression Scale scores.

Patient informed consent

Informed consent was obtained.

Ethics committee approval

The permission from the Ethics Committee for the study was obtained with the decision of Haydarpasa Numune Training and Research Hospital Clinical Research Ethics Committee numbered HNEAH-KAEK/78.

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Conflicts of interest

There are no conflicts of interest to declare.

Author contribution subject and rate

Ayça Demir Yıldırım (50%): Designed the research, data collection, and analyses and wrote the whole manuscript.

Feyza Nur Erdem (20%): Organized the research and supervised the article write-up.

Tuğba Yılmaz Esencan (15%): Contributed with comments on manuscript organization and write-up.

Binnur Erdem (15%): Contributed with comments on research design.

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Review Article

Collectivity as a Basic Instinct for Survival: Mechanisms and Clinical Reflections

Abstract

Collectivity, referred as the drive to be and stay together with the other beings, serves as a basic tool for survival and reproduction. Thus, it should be considered a basic instinct. In the first part of this article, we are describing the basic mechanisms of collectivity: (1) the collectivity instinct, (2) social trust, (3) inter- and intragroup dynamics, and (4) the ability to recognise the facial expression of others. In the second part, we will give some clinical examples (such as autism and narcissistic and paranoid personality disorders) as the disorders of collectivity. The ideas presented here may be the basis for the modification of new psychotherapy techniques for the disorders of collectivity in future.

Keywords: *Autism, collectivity, facial expression, instinct, personality disorders, social groups*

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Introduction

Human beings are parts, not wholes. We are all the parts of wholeness. The world is wholeness, a family is wholeness, a city is wholeness, but we, as individual human beings, are just a part of these wholenesses. Our ancestors survived because they were the parts of some kind of wholeness. Forming and maintaining social bonds can have both survival and reproductive advantages.[1,2] Groups can share their food, provide mates, and help care for the offspring (including orphans as well). Some tasks that are important for survival, such as hunting large animals or maintaining watchful vigilance against predatory enemies, are best carried-out by group cooperation. Cues that imply possible harm, such as illness, danger, nightfall, and disaster, seem to increase the need to be with others.[3] Because of these benefits, the drive for collectivity, and even sometimes for unity, is a characteristic and genetically transferred feature of all human beings. A hand continues with a hand, a shoulder continues with a shoulder, a brain continues with a brain. In fact, the human brain includes a million, not just two hemispheres. Even our fights are born from the drive for collectivity; most of our fights derive from the frustration of our need to become a whole; we fight with our partner if our relationship is about to end. We also sometimes fight for our groups, community, country, etc., in order to protect our collectivity with that wholeness.

The drive for collectivity is as strong as the drives for our basic needs (hunger, thirst, etc.). We need some mechanisms to connect with others. These mechanisms must have helped for the survival of our species, thus must have been coded in our genes. The main purpose of this article is to describe the mechanisms of collectivity. We will group the mechanisms of collectivity under four main headings: (1) the collectivity instinct, (2) social trust, (3) inter- and intragroup dynamics, and (4) the ability to recognize the facial expression of others. In the first part of this article, we will explain each of these four mechanisms of collectivity. In the second part, we will give some clinical examples (such as autism and narcissistic and paranoid personality disorders) as the disorders of collectivity.

The Collectivity Instinct

This instinct is inborn, as all instincts are. Every human being needs a partner to connect with to complete their inner world. For human beings, the main partner is, as expected, another human being.

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Sometimes, however, this partner may also be an animal. This is why humans have domesticated animals. Here, we are not referring to occupational partners; instead, we are referring to partnerships that are formed because of the need to complete the inner world and because of the need to complete someone else's inner world. According to us, this inner world includes the needs to love and be loved, to care and be cared for, to understand and to feel understood, to value and to be valued and to belong. When this partnership is formed, the life energy and functionality of the person increase in every daily activity. If this instinct is not met, the life energy decreases in almost every area.

The hypothesis that people are motivated to form and maintain interpersonal bonds is not new. Baumeister and Leary[4] proposed that the need to belong shapes our emotional patterns and cognitive processes and may have behavioral consequences, thus it should be stated as one of the fundamental human motivations. More recently, it has been argued that the need to belong may also effect personality expression; such as social exclusion may increase aggression.[5]

There is considerable evidence that, from early in the development, infants take pleasure in social interactions, and they are born with behavioral skills that serve to form positive engagements with others.[6] For example, by 8 weeks of age, infants smile in response to their social partners,[7,8] and by 12 weeks of age, they rarely smile outside of positive face-to-face exchanges with others.[9] Around 12 weeks of age, infants start engaging in protoconversations.[10] What is important is, these social exchanges also occur with relative strangers in the laboratory settings and they are not restricted to the infants' caregivers.[11] Therefore, they are not simply a reflection of the bond between the infant and the caregiver but suggestive of a common gratification from social interaction. Later in the development, children engage in affiliative behaviors actively. The two examples are joint attention and imitation, in which infants seek to share attention and interest with others.[12,13] Further evidence in favor of the claim that young children, from as early as 14 months, seek to engage in positive social interactions comes from research on prosocial behavior.[14-16] The instinct for collectivity includes not just starting a social contact but also forming and maintaining long-lasting bonds with others. There is also evidence that, from early in the development, children form long-lasting bonds with their group members. Naturalistic research has demonstrated that even infants have preferences for particular peers, spending more time in the company of some individuals than others.[17,18] During the preschool period, children start to form stable patterns of friendship that endure over time.

The evidence from the last few decades supports the idea that the infant is endowed with an innate capacity of subject-subject engagements from very early stages of development.[11,19] Rather than Freud's and Piaget's auto-and egocentric baby assumptions, this capacity enables the baby to engage in a game of bi-directional communication of direct alteroception[20] or even, as Braten[21] defines it, of "alter-centered participation." In other words, the human infant is both ready and hungry for collectivity from the very beginning.

The human newborn is totally dependent on the caregiver for nursing, so belongingness is a "must" for the inborn. As the baby grows, this "must" turns into a "need" to belong, and the baby begins to seek some other people to belong to. This seeking process does not necessarily mean that the baby will leave the caregiver and find another; the baby needs to build more and more social bonds as he grows, but he still keeps the older bonds. However, this bond is reciprocal; as the baby needs to feel to belong to the caregiver, the caregiver also needs to belong to the baby. Postpartum depression is a good example to show how, in pathological conditions, this need to belong is affected. The melancholy of women who cannot have children may be related to the irrational thought that "*no baby needed or wanted to belong to me.*" A psychologically healthy individual has both abilities: (1) To feel the need to belong and (2) to meet the needs of others who want to belong to them.

Here, we will differentiate between the two forms of belongingness: Collectivity and unity. By unity, we are referring to a more intense form of collectivity, such as the first few months of a human inborn when there is total dependence on mother for nursing. During the development, this unity turns into collectivity between the baby and the mother. Thus, collectivity is a loosened form of unity. This bidirectional relation between unity and collectivity continues throughout the life. We build families that are the exact examples of a unity-collectivity model. When we meet our partner, at first, there is collectivity between us. After we are married, this collectivity turns into unity as we begin to share more sections of our lives. When a child is born into a family, the direction of the bond between the husband and the wife turns toward collectivity since the wife has a unity with the newborn. This goes on and on all through life. The social bond sometimes comes nearer to the unity end of the spectrum and sometimes comes nearer to the collectivity end of the spectrum. The absolute unity is the bond between a newborn and the mother. The ones who cannot create a healthy unity cannot create a healthy collectivity either, and vice versa. For example, a man with a healthy marriage unity most likely has healthy occupational collectivities. A teenager who succeeded to pass from absolute unity to a healthy collectivity with his mother would most likely have a healthy marriage unity too.

An individual feels the need to belong mostly when he loses this collectivity. We often feel depressed when we

lose a significant other, by death or by separation. In this point of view, depression can be seen as a withdrawal syndrome caused by unmet needs for collectivity.

Social Trust

By social trust, we are referring to the trust between the members of collectivity. This trust includes the belief that the particular member will serve the collectivity (or social adhesion) of the group. Social trust is mostly dependent on the time spent being a member of that group but also depends on sharing a common point (such as the same ideology, same blood, same benefit, etc.). Reduction in social trust may cause an ending of collectivity (or social rupture); thus, social trust is one of the main mechanisms of collectivity.

When we are talking about collectivity, social trust is similar to the collaboration between two organs of the body; there is no doubt between them. When the liver is producing bile, it is sure that the gall bladder will carry this bile to the intestine. If there is a stone in the bladder, the liver becomes full with bile and cannot function properly. All the organs in our body work collaboratively, in a biorhythm, as a perfect example of collectivity. In a similar manner, social groups can become collective or noncollective, depending on the social trust between its members. The social trust is based on the give-and-take between members, providing help whenever needed, and collaboration.

All brain functions are based on the conservation laws of neural energy, and the free energy principle says that any adaptive change in the brain will minimize free energy. For example, attention and goal-directed behavior are an emergent property of prediction, where high-precision prediction errors appear to greater gain.[22] Pattern completion facilitates the retrieval of a complete pattern from a perceived incomplete pattern. It is involved in memory retrieval and is another example of the brain's conservation law of neural energy.[23] When there is vague and incomplete auditory or visual stimulus, the mind refers to its formerly memorized auditory or visual patterns to match the current stimulus with the complete pattern most closely correlated with it. Then, that pattern is locked, and the person will perceive the vague pattern as the originally locked complete pattern.[24] When we meet a new person, his similarities with the information in our memory, through the mechanism of pattern completion and conservation law determines whether we choose either an approach or avoid behavior.

Social trust in a community implies that social structures within that community are clear and strong, and the information flow between community members is transparent. This is necessary for the development of benevolence, and through benevolence, social trust grows. People need to believe that their benevolent behavior is valued in the community, and if, despite their benevolence, they are faced with injustice, their benefits will be protected. Transparency provides that. In communities in which members' trust to social structures is strong, benevolence behavior increases, and that further increases the social trust and social bond. If the information flow between the members of a community is not transparent, members begin to fear that their benevolent behavior will not be valued. On that occasion, instead of being benevolent, they will begin to act in a way to protect themselves against badness. The badness in such communities is high because malignant social networks may behave more malignantly when they believe that their malignant behavior will not be punished. That decreases the social trust and weakens the social bond. The collectivity in that community is destined to vanish.

Being similar, recognizable, and predictable play an important role in social trust. Experimental evidence supports that facial resemblance is a potential cue of kinship for humans and increases prosocial behavior and positive attributions.[25] The neuropeptide oxytocin plays an important role in social trust as well[26] by improving the ability to read others' emotions,[27-30] increasing perceived attractiveness and trustworthiness of faces with neutral emotional expressions,[31] and enhancing social attention.[32,33] Physical touch, which is important for building social trust, has been found to be associated with peripheral oxytocin release in both animals[34,35] and humans.[36,37] If people are given a massage, they become more trustful in a subsequent social interaction (trust game). This effect covaries with plasma oxytocin levels.[38]

Inter- and Intragroup Interactions

Groups are the basic units of collectivity, and small groups are the parts of larger groups. Each member of the group is also a member of another group. There is also collectivity between the groups. Thus, there are intra- and intergroup social bonds. If intergroup interactions are weak, then intragroup interactions become stronger. For example; intragroup bonds of a refugee family may be strong since the intergroup bonds with the foreign community they are living in may be weak. Members' financial incomes are shared by other family members, without "you-I" differentiation. The first connection of the members with an outsider is usually faced with suspicion, and the intragroup bonds of the members other than the member who connected with the outsider become stronger. As time passes, other members begin to form social bonds with the outsiders, and as other intergroup bonds become stronger, intragroup bonds become weaker. If the intragroup bonds in new groups become stronger than the intragroup bonds of the old group, then the old group begins to dissolve. If the members are disappointed by the new group they are in, they would want to form the intragroup bonds of the old group, but usually, those bonds are residual and dysfunctional.

Some people are better at starting new collectivities than other people. From now on, we will name those people as "converters," since they act as converters of Lego pieces. They help the formation of new bonds between and within the groups. The main character features of these converters are being reliable, flexible, and emphatic. They are good at understanding people's needs and fulfilling them. They may postpone their needs if someone else's need is more urgent. They give comfort to others, so the others usually do not want to lose them. They can easily predict the others' reactions. Converters may even keep two "difficult" members together in the same group by neutralizing the opposite poles. For example, they may keep two narcissistic people, two paranoids, one obsessive compulsive and one borderline person together in the same group. It is difficult for these personality disorders to be in the same group. Converters play the major role when new groups are forming. Converters are similar to carpal bones and wrist joints in the way they can face hits from different angles, and shoulder joints in the way they may move toward many different angles. They can face most kinds of traumas. They may even turn a malignant social network into a benign social network. Some mothers are the perfect examples of a good converter; they are complementary, supplementary, nurturing, and good at problem-solving.

Here, we would like to present a new concept that we will name the "human attraction law." It is based on Granovetter's *threshold model of collective behavior*.[39] Here, the "threshold" refers to the number or proportion of others who must make one decision before a given actor does so; this is the point where the perceived benefits to an individual of doing the thing in question exceed the perceived costs. Thresholds are situation-and person-specific. A radical will have a low threshold, while a conservative will have a high threshold. Inevitably, some situations will engage an actor more ideologically than others; one will seem more dangerous and one more exciting. Most of us would prefer to eat in a restaurant with a number of people already sitting in it than a completely empty restaurant. The restaurant with a number of people already sitting inside feels more comfortable, warm, and attractive. This is what we call "human attraction law." We feel more socially secure in a place with people in it. People attract people. When we see someone in the street looking up, we also feel the urge to look up. If we see a crowd of people looking up, we look up too. Therefore, we may say that the attraction force increases as the number of people doing that thing increases. However, there is a threshold, like Granovetter's threshold.[39] If there are too many people sitting and waiting in a restaurant, we may prefer to choose another restaurant. Thus, the human attraction law turns into the "human aversion law" when there are too many people. Because the collectivity instinct parallels the survival instinct; the likelihood of survival decreases when there is too much competition around. A number of people are needed for collectivity, yet if there are too many people, the collectivity is ruined too. An optimal number of people are needed for collectivity to form.

Other important concepts for intra-and intergroup dynamics are *absolute self-value* and *relative self-value* for the members of the collectivity. Absolute self-value refers to the value that the individual gives himself as a member of that collectivity. It is determined by many factors such as the role, character, and position of that individual in that collectivity. Relative self-value is the value that the other members of that collectivity give to that particular individual. If the absolute and relative self-values of a particular individual are close to each other, then the possibility of that collectivity increases. If there is a great difference between these self-values (e.g. the individual thinks that he is more valuable to the other members than he actually is), then there is a good possibility that the collectivity for that individual is about to end. Of course, the similarity or the difference between absolute and relative self-values may change over time and situations.

When we talk about collectivity and how it effects group dynamics, we must also refer to personal variations. Variation can be defined as the difference between general characteristic features of most members of that collectivity and characteristic features of an individual in that collectivity. Thus, variation is similar to the concept of "standard deviation" in the statistics. Too much variation may cause the exclusion of that individual from that collectivity, since there will be a great difference between the absolute and relative self-value of that individual. However, if the number of excluded members from the collectivity increases because the variation becomes frequent, then there is a great chance that the relative self-value of those individuals will begin to change, and this may cause a sudden shift in shared beliefs, ideas, idols, interests, and social values of that collectivity. The 68 zone is a good example of that shift.

Recognition of Facial Expressions

Recognition of facial expressions and more importantly, recognition of changes in facial expressions of other member of the group is an important mechanism of collectivity. This is important to predict the next behavior of the other. By predicting the other's next behavior, we may also behave in a way that will strengthen the social bond between us (or loosen the bond, if we prefer). Thus, recognition of facial expression of others is important for collectivity.

The ability to recognize a caregiver's face is essential in mammalian infants for their survival. Human babies have an inborn interest in faces.[40] They are able to recognize their mother's face within a few months after birth or even shortly after birth under certain conditions,[41,42] and infants share similar neural mechanisms with their mothers in

regulating and encoding the affect in social and emotional attachment systems.[43] The infant-mother attachment is mostly based on their experience of mutual interaction where the infants learn to recognize the emotional state of the mother or other people. Reciprocal behaviors between an infant and the mother are considered to be the primary means by which infants prepare for human social activities.[44]

The mothers can even change the facial expression of the child by her own facial expression. The same is true for every relationship. A mother who can easily read the facial expression of her husband can even change the negative affect of the husband by using her facial expressions. The changing of someone else's facial expression by using your own facial expression is similar to the "laughing game" between a mother and an infant. A play of mutual exchange takes place between the mother and the infant which might take the form of timing each others' behaviors, such as the onset of facial expressions, or of anticipating other's intentions.

It has been well-established that the face-to-face interactions of parents and infants occur quite early and are bidirectional.[45] Facial mirroring between the mother and infant helps to create the sense of "we," and an emotional contagion as defined by the neurobiologists Singer and Hein[46] occurs. We understand other's actions through a mechanism of *resonance*, in which the motor system of the observer "resonates" whenever an appropriate visual and/or acoustic input is presented, although it does not necessarily imply the production of an overt movement. Stern[47] points out an interesting issue: "*To resonate with someone, you may have to be unconsciously in synch with that person. You could move in synchrony, as lovers may do when they sit across a coffee table and trace a dance as they simultaneously approach and withdraw their faces from one another or move their hands together at the same instant.*"

The possible neural mechanism underlying this resonance is the mirror neurons.[48] Rizzolatti *et al*. discovered a new class of premotor visuomotor neurons, called *mirror neurons*, that discharge both when the monkey executes goal-related actions like grasping objects and also when the monkey observes other individuals (monkeys or humans) execute similar actions.[49-51] Later on, so-called prefrontal mirror neurons with similar properties were discovered in a part of the posterior parietal cortex reciprocally connected with area F5.[52] Existence of a mirror neuron system at premotor and parietal areas in the human brain has been demonstrated in different studies.[53-55] The findings on the infant-mother relationship clearly suggest that the human nervous system is formed in such a way to enable us to capture others' living experiences just by watching them. Thus, mirror neurons are the possible neural mechanisms underlying the resonance between the mother and infant.

In the case of collectivity, a similar kind of resonance must be taking place between the members of that collectivity. Understanding the facial expression of the others and even changing someone else's facial expression by using your own facial expression can be therapeutic in social groups and helps to develop social trust and cohesions in social groups. Thus, recognition of facial expressions is important for collectivity.

Clinical Reflections– Disorders of Collectivity

In this section, we will explain how the concept of collectivity is affected in some psychiatric disorders. As we have described above, the collectivity instinct includes two abilities: (1) To feel the need to belong and (2) to meet the needs of others who want to belong to them. In schizoid personality disorder, neither of these two abilities exist. Schizoid personality disorder is characterized by a pervasive pattern of detachment from social relationships.[55] These individuals neither desire nor enjoy close relationships, including being part of a family. Thus, the collectivity instinct is very low or even, in some cases, does not exist in schizoid personality disorder. This is just the opposite in dependent personality disorder, in which there is a pervasive and excessive need to be taken care of that leads to submissive and clinging behavior and fears of separation.[55] These individuals constantly seek support and reassurance from others and lack self-confidence in judgment or abilities. Thus, the degree of collectivity instinct is very high in dependent personality disorder. In addition to this, these individuals have difficulty passing from intragroup interactions to intergroup interactions, since they tend to cling to group members rather than forming new bounds with other people. Their motivation to form new bounds only increases in times of separation from close others, since they urgently seeks another relationship as a source of care and support. The need to belong is very high in dependent personality disorders.

Problems with social trust can be seen in paranoid and obsessive-compulsive personality disorders. In paranoid personality disorder, there is a pervasive distrust and suspiciousness of others such that their motives are interpreted as malevolent.[55] These individuals have little or no social trust, so they cannot form healthy collectivities. They are preoccupied with unjustified doubts about the loyalty or trustworthiness of friends and associates. Individuals with obsessive-compulsive personality disorder are very rigid and inflexible in many aspects of life including relationships. They want and force others to do things exactly in their own way.[55] It is hard for them to end partnerships once they are established, so we may say they have a seldom but excessive social trust, since the amount of effort to build a trustful collectivity is high for them.

In Cluster B personality disorders, as described by the American Psychiatric Association,[55] there are many

problems in terms of collectivity. Antisocial personality disorder is characterized by a pervasive pattern of disregard for and violation of the rights of others.[55] Thus, the reason for a possible collectivity instinct in these individuals is conning others for personal profit. They cannot form social trust in others. In borderline personality disorder, there is a pattern of unstable and intense interpersonal relationships with frantic efforts to avoid real or imagined abandonment.[55] Thus, we may assume that the need to belong is high, while the ability to meet the needs of others who want to belong to them is low, and social trust is unstable in borderline personality disorder. This is just the opposite in narcissistic personality disorder, in which there is a pervasive pattern of grandiosity, need for admiration, and lack of empathy;[55] their need to belong is low, while their need for others who want to belong to them is high.

Other than personality disorders, autism disorder, which is characterized by persistent difficulties in the social use of verbal and nonverbal communication that results in effective communication, social participation, social relationships, etc.,[55] show deficits of collectivity in many areas. The deficits with regard to collectivity instinct and social trust depends on the degree of autism; high functional autistics may have a small degree of collectivity instinct and social trust, while a full-blown syndrome of autism lacks both of them. The main problem of collectivity is the failure to recognize facial expressions in autism disorder. Some evidence for this comes from eye-tracking, electrophysiological, and brain imaging studies. These studies often report abnormal eye gaze patterns, delayed event-related potential components in response to facial stimuli, and anomalous activity in emotion-processing circuitry in autism spectrum disorder.[56]

Conclusion

In this article, we focused on the importance of the collectivity concept on personal and interpersonal development. We have proposed that collectivity is a natural born instinct, is important for survival, and affects the motivation to build the relationships from early on. We have discussed the importance of social trust, and the intra-and intergroup dynamics on the development of collectivity. We have stated recognition of facial expressions of others as one of the main mechanisms for the development of collectivity. We have presented how collectivity is affected on some of the clinical conditions. We hope that the ideas presented here will be the basis for the modification of psychotherapeutic techniques that will be useful for abnormalities of collectivity in future.

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Original Article

On Emergent Quantities, Mental Perceptions and Constructs, and Agencies: A Holistic View of Existence

Abstract

There is general agreement that physical entities exist, but there is widespread disagreement on whether nonphysical entities such as emergent quantities, mental constructs, and agencies qualify as existence and the nature of those quantities. At the core of this disagreement lie subjective worldviews and ideological convictions rather than objective reasoning based on observations. Further, there is a growing tendency to view all nonphysical quantities as properties of organization and label them *emergent qualities* which appear out of nothing and disappear into nothingness. In this paper we present plausible arguments that emergent qualities are not limited to large assemblies of matter and that they are encountered even at subatomic level. We also make a distinction among different kinds of nonphysical entities such as mental constructs *invented* by the mind and entities *discovered* by inference, such as the laws of nature. Finally, we present a novel view of the notion of *agency*, such as the agency of physics which is comprised of the laws and forces of physics, characterized by causal power with the capacity to subjugate and manipulate physical entities made of matter–energy. Once the emergent quantities, mental constructs, and agencies are properly characterized and their concealed interconnections revealed, we can develop a better understanding of reality and envisage how physical and nonphysical entities interplay and how they can be manipulated.

Keywords: *Agencies, emergent quantities, mental constructs, nonphysical existence, ontology, physical realm*

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Introduction

The enterprise of objective scientific inquiry is an attempt to unveil the subjective invisible mechanisms behind the inner workings of the observable natural world. The enterprise of science is the pursuit to understand the natural world and build a factual model of it collectively by inference based on objective observations. Science is coding and transposing actual structures of *physical realm* perceivable by the five senses into representative abstract or nonphysical structures of *phenomenological realm* perceivable by the mind. The new insights gained by the manipulation of these abstract structures, including the mathematical representations, are then decoded back into the physical realm.

The appearance of *emergent qualities* is contingent upon the existence of the physical entities on which they emerge since, otherwise, we cannot perceive the emergent qualities. This sets the stage for the *perfect illusion* that emergent qualities originate from the physical entity, especially when considering the tendency of the mind to be conditioned when it sees two things that always appear and disappear together. The absence of a tangible source for emergent qualities reinforces this notion. However, *intimacy* should not be confused with *causality*. Sustained intimacy is not a valid reason for causality. Unless a *causal mechanism* is identified and replicated, the claim that emergent qualities originate from physical entities themselves remains an unsubstantiated hypothesis.

Anderson,[1] in the visionary article *More is Different*, published in *Science* calls for serious attention to the emergence phenomenon at different levels, with a new set of laws, concepts, and principles at each level – such as during transition from chemistry to biology: "*At each stage, entirely new laws, concepts, and generalizations are necessary, requiring inspiration and creativity to just as great a*

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degree as in the previous one. Psychology is not applied biology, nor is biology applied chemistry.[…] In this case, we can see how the whole becomes not only more than but very different from the sum of its parts.[…] Thus, with increasing complication at each stage, we go on up the hierarchy of the sciences. We expect to encounter fascinating and, I believe, very fundamental questions at each stage in fitting together less complicated pieces into the more complicated system and understanding the basically new types of behavior which can result."

The *laws of nature* are expressions of *order*, *regularity,* and *organization* in the fast-changing dynamic environment of the universe. The laws of nature act globally without any discrimination or preferential treatment. They firmly control physical existence via the forces of nature, which are recognized as pull–push effects. Newton, for example, noticed that things fall when dropped; they do not go up or remain suspended in midair. He reasoned that this can only happen if there is a downward acting force or influence on physical objects, and from there, he inferred the existence of the invisible *force of gravity*. He then noticed that the force is everywhere, acting consistently in a repeatable and predictable way, which led him to infer the invisible *law of gravity* which is perhaps the most familiar universal law of physics. The set of the laws and forces of physics qualifies as an *agent* with causal power, as discussed later, since they govern the behavior of all physical existence in the entire universe, rendering the behavior of terrestrial and extraterrestrial objects predictable.

Even in social life, order, regularity, and organization are associated with the laws and regulations and the implementation of them. Good laws and effective enforcement indicate good governance. When we visit a city or country for the first time and notice an orderly flow of life and conduct of business, we praise their laws and the enforcement agencies, even if we do not have the faintest idea of what those laws are and which agencies are enforcing them.

The *force of gravity* is a global phenomenon since any mass anywhere in the universe influences that force of attraction acting on any other mass anywhere in the universe regardless of the distance. Furthermore, electrically charged particles *repel* each other if they are of the same charge and *attract* each other if they are of the opposite kind, with a force inversely proportional to the square of the distance between them. Therefore, two electrons repel each other, but an electron and a proton attract each other. Fluid at a higher pressure flows toward a region of low pressure (as in the case of wind), heat at a higher temperature flows in the direction of decreasing temperature; and charged particles flow from a region of higher electric potential toward a region of lower one. All of these are *physical influences* since they can be observed, sensed, and measured. These influences act the same way everywhere in the universe albeit at different strength. We have no idea why matter attracts matter and where that influence originates from.

With a constricted view of existence, and resistance to change, the most profound and fascinating phenomena in the existence go unnoticed. There is a need to think out of the box and reassess the status quo. As the microbiologist, Woese[2] points out, "*Science is an endless search for truth. Any representation of reality we develop can be only partial. There is no finality, sometimes no single best representation. There is only deeper understanding, more revealing and enveloping representations. Scientific advance, then, is a succession of newer representations superseding older ones, either because an older one has run its course and is no longer a reliable guide for a field or because the newer one is more powerful, encompassing, and productive than its predecessor (s)*."

There is an abundance of literature on existence, notably by Goldstein,[3] Corning,[4] and O'Connor and Wong[5] on emergence as well as Davidson[6] and Schlosser[7] on agency. There are considerable differences in the definitions and descriptions of different forms of existence and inconsistencies abound. For example, agencies are commonly treated as emergent quantities and thus properties of assemblies of matter. With the systematic and logical ontological framework presented here, we are bringing coherence among emergent qualities, mental constructs, and agencies. We are not adding anything new to our inventory of existence; we are simply putting all existence into their rightful places and logically interconnecting, realigning, and recataloging them.

In addition, we are not redefining the physical realm, which is the premise of sciences; we are simply removing the centuries-old contention that limits existence to the physical realm. We are granting nonphysical entities, including emergent qualities and mental constructs, the status of existence, though not necessarily *external* existence – existence of its own right out there, not confined by the bounds of the human mind, yet discoverable by the mind. In short, we are democratizing existence by adapting an inclusive approach and bringing it in line with our felt experience of existence, as argued by Feyerabend.[8] As Woermann[9] puts it, "*To my mind, the hallmark of a successful philosophy is thus related to the degree to which it resonates with our views on, and experiences in, the world*."

Physical and Nonphysical Existence

We are all familiar with matter and energy since, from sunlight to our bodies, all physical things that we can see or feel are made of matter and/or energy or matter–energy for short. Physical entities are comprised of a slew of fundamental particles made of mass and/or energy, such as electrons and photons, listed in the standard model of

particle physics, constituting the basic building blocks of the physical existence. Therefore, anything made of fundamental particles, such as a chair or the radio waves, is a *physical* being, which is also called an *objective, material, visible,* or *tangible* thing. Everything else is a *nonphysical* being, also called a *subjective, immaterial, invisible, virtual, abstract,* or *intangible* thing. The phrases *being, entity, thing*, and *quantity* mean basically the same thing and are used interchangeably.

Things made of matter–energy, together with the laws and forces of physics, constitute the *physical realm*. Everything else – such as meaning, life, intelligence, consciousness, perceptions (sensations of sight, sound, smell, touch, taste, pain, pleasure, etc.), beauty, dreams, images in mirrors, shapes, the laws of nature, entropy, quantum fields, mental constructs, and conceptions such as space, time, mathematics, thoughts, imaginations, knowledge, and ideas – comprises the *nonphysical realm*, as shown in Figure 1. The *physical realm* is also called loosely the *visible realm* or the *physical world*, while the nonphysical realm is also called the *subjective realm, the invisible world, the phenomenal world, the abstract realm,* or *the realm of abstractions*. The physical and nonphysical realms together constitute the *entire realm of existence* since we cannot think of any other forms of existence.[10] That is,

Realm of existence = Physical realm + Nonphysical (or subjective) realm.

Physical existence is subject to the laws of physics such as the conservation of mass and energy, but the nonphysical existence is not. Physical existence is bound by space and time, but nonphysical existence is not. As such, nonphysical existence can appear out of nothing and disappear into nothingness and can be everywhere without being anywhere. Immaterial things such as light, heat, and radiobroadcasts are also physical existence since they can easily be sensed by instruments and quantified, although they do not have a sturdy physical body made of matter, which is simply a pocket of energy with the acquired property of mass. Physical and nonphysical existence may or may not interact with each other, and the existence of one may or may not depend on the other.

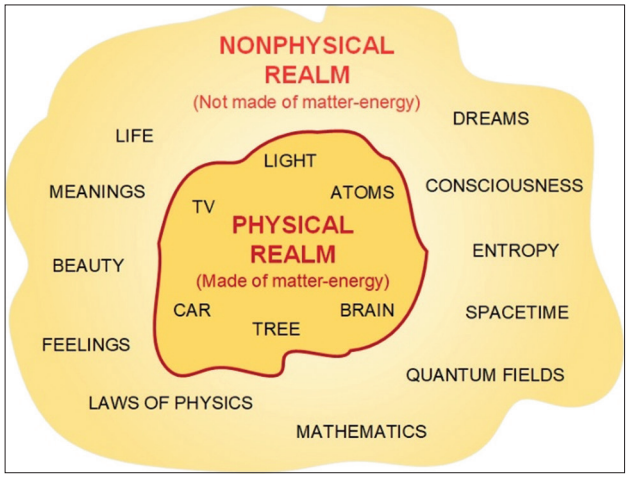

Figure 1: The physical realm comprising entities made of matter–energy and the nonphysical realm comprising entities not made of matter–energy together constitute the entire realm of existence. An entity that contains even a single elemental particle of physics with mass or energy in its composition is a physical entity; everything else is a nonphysical entity

Most *physical properties* such as shape, color, hardness, conductivity, smell, taste, and sound are also nonphysical, as explained below. However, we commonly view them as being physical since they are intertwined with physical things and change when the physical thing undergoes a change. Even distance, heights, angles, and coordinate systems are subjective entities since they are mental constructs and *not* physical entities made of matter–energy. Of course, under nonphysical or subjective realm, which is the complement of the physical realm, everything goes, including sensations such as pain and pleasure.

Some label certain subjective qualities such as consciousness and free will as illusions.[11] However, this does not matter at all: Even illusions, hallucinations, imaginations, and conceptions are all nonphysical entities by definition since they are not made of matter–energy. Physical existence is conserved giving rise to the *conservation of mass and energy principle*. Nonphysical things, however, are not conserved. As philosopher Emerson[12] puts it, "*So of cheerfulness, or a good temper—the more it is spent, the more of it remains*." Therefore, energy cannot be created out of nothing, but entropy, beauty, and melody can. Physical existence can be positively confirmed. However, nonphysical existence can only be logically reasoned and inferred. There is universal agreement on confirmed physical existence, but disagreements abound about nonphysical existence. Prejudices deeply rooted in worldviews and ideological convictions often prevail and influence judgments.

Forces, such as the force of gravity and the force of repulsion between electrons, are not physical entities *per se* in a strict sense since forces are not made of matter–energy and they can be created and destroyed. Therefore, there is no such thing as "conservation of force." Forces are characterized as *physical influences* since forces affect physical entities and the strength of the exerted influence can be measured. The passage of electric current in a wire generates electromotive force out of nowhere, for example, and we can lift a heavy object like a car with one hand by using a lever or a carjack. Further, when an electron and a proton combine into a neutron, the forces associated with the proton and the electron disappear. When a neutron is split into a proton and electron, the forces associated with these massive particles reappear. Therefore, at the fundamental level, the forces of physics appear to emerge on the building blocks of matter. The attractive force of gravity, for example, emerges on mass

out of nowhere, and thus, it can be viewed as an emergent property of mass. Likewise, the attractive and repulsive forces emerge on charged particles such as electron, protons, and quarks, but not on neutrons or neutrinos.

The physical realm is the domain of inquiry of sciences, but limiting existence to the physical realm is a philosophical thought or worldview known as materialism or physicalism and not science. It is odd that as we probe deeper into the solid matter, we end up with nonmatter. In the book *The Matter Myth*, Davies and Gribbin[13] depict it as "*Then came quantum theory, which totally transformed our image of matter. The old assumption that the microscopic world of atoms was simply a scaled-down version of the everyday world had to be abandoned. Newton's deterministic machine was replaced by a shadowy and paradoxical conjunction of waves and particles, governed by the laws of chance rather than the rigid rules of causality. An extension of the quantum theory, known as quantum field theory, goes beyond even this; it paints a picture in which solid matter dissolves away, to be replaced by weird excitations and vibrations of invisible field energy. In this theory, little distinction remains between material substance and apparent empty space, which itself seethes with ephemeral quantum activity.*"

The predominant reality of physical realm continues to be questioned: "*One begins to wonder whether there is something fundamentally flawed in the idea of a world built up out of matter.[…] One has the sense that, at the end of the day, the speculation of the philosophers and the data of scientists are pointing in the same surprising direction. At the root of all physical reality is not 'primary matter' or little atoms of 'stuff'*."[14]

All considered, the visible physical realm might just be the tip of the iceberg of existence, with a rich invisible ontology concealed lurking underneath. The physical and nonphysical realms are intertwined, and they influence or interact with each other. The nonphysical realm is outside the domain of the direct inquiry of sciences, but scientific inquiries may have profound ramifications on the nonphysical realm, such as emergent properties, because of the interconnectedness of the physical and nonphysical realms. As such, we have considerable leverage to manipulate nonphysical existence through physical tools.

In addition, many properties or features of physical entities are *subjective* since they are emergent properties and are not reducible to matter–energy. Therefore, all physical beings come packaged with some intrinsic subjective qualities that cannot be traced back to the properties of their parts. As such, all physical existence is in fact a combination of the physical and nonphysical realms, giving rise to the phrase "*the whole is not only more than but very different from the sum of its parts*."[1]

Properties of the physical things as well as the *laws of physics* are nonphysical existence since they are not made of matter–energy. The forces of physics such as the force of gravity are not made of matter–energy either, as stated before. Even temperature, pressure, and density are conceptual representations of the levels of molecular activity and compactness of physical beings and are not physical entities themselves. However, they are considered part of the physical realm since the properties qualify and the laws and forces govern the physical beings. Therefore, the physical entities and the overarching physical realm can be expressed as follows:

Physical entities = Matter and Energy + Properties

Physical realm = Physical entities + Laws and forces of physics

or

Physical realm = Matter and Energy + Properties + Laws and forces of physics.

By definition, an entity that contains even a single elemental particle of physics with mass or energy in its composition (such as an electron or a photon) is a physical being and is therefore a constituent of the physical realm. Obviously, life does not qualify as a physical entity, but living beings do since they have physical bodies made of mass–energy. Besides, all physical beings are comprised of a physical carcass made of matter–energy and a set of nonphysical qualities that they exhibit. In addition, physical entities, especially large complex assemblies, can temporarily acquire additional qualities at certain combinations on top of their intrinsic qualities, which always accompany them. Therefore, distinction should be made between inherent *intrinsic* qualities of physical beings such as the amounts of mass and energy and acquired *extrinsic* qualities such as color, length, shape, volume, life, and consciousness. Note that the description and thus the characterization of physical things are phenomenological and thus nonphysical.

The *physical realm* is comprised of the *animate* and *inanimate* realms, with life serving as the distinguishing quality between the two. The *nonphysical realm* can be considered at least in three categories, depending on the origin, character, and association of the nonphysical beings with the physical realm, as shown in Figure 2.

1. *Emergent qualities* that emerge out of nowhere on physical beings made of matter–energy and qualify them in a deterministic repeatable and predictable way and disappear when the physical being is decomposed into its constituents
2. *Mental constructs* that are the mental renderings of the perceptions, discoveries, and inventions of the mind in the nonphysical realm
3. *Agencies* that are virtual mechanisms or active agents with the ability to control and manipulate matter.

That is,

Physical realm = Animate realm + Inanimate realm

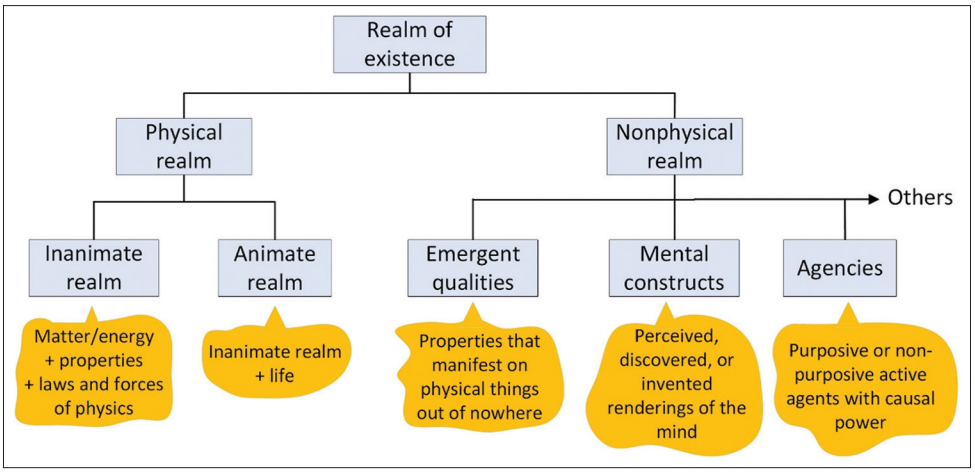

Figure 2: The physical and nonphysical realms together constitute the entire realm of existence. All physical existence, including elemental particles, possesses some *qualities* that are emergent and thus nonphysical, and therefore, any physical existence is actually a *combination* of physical and nonphysical existence

Nonphysical realm = Emergent quantities + Mental constructs + Agencies + Others.

Note that the emergent qualities manifest on physical entities and the mental constructs emanate from a mind as the renderings of the mind. In addition, emergent qualities and agencies are perceived by the mind, but they are not created by the mind. Therefore, *mental renderings* of perceptions should not be confused with *mental creations* such as imaginations, dreams, plans, thoughts, and designs. The *images* that appear in mirrors are nonphysical existence as well since, unlike the images on LCD TVs, they are not made of light.

Meaning, which is the essence of information and represented by symbols such as words, shapes, and 0's and 1's, is also another form of nonphysical existence. Meaning is not a quality that emerges on the symbols of information; it is ascribed by a conscious mind to the symbols. This is evident from the same meaning being represented by different symbols in different languages or the same words meaning different things. The *names* that we use in languages are symbols of representation for physical or nonphysical entities. However, *adjectives* are symbols of representation for nonphysical qualities that qualify entities.

A familiar entity that qualifies as agency is the set of *universal laws and forces of physics*, which governs the physical realm, and the other is *life* which comes with a particular set of laws and influences of its own and controls the bodies of living beings, as discussed later. The *mind* also qualifies as an agency, but it is considered as part of the all-inclusive *agency of life* since the mind is an aspect of the more comprehensive life. When life disappears, so does the mind.

There are many scientists and philosophers who call nonphysical or subjective realm an "illusion." However, there are also those who label the physical realm the same, like the Danish author of popular science T. Nørretranders, "*The visual world, what we see, is an illusion, but then a very sophisticated one. There are no colours, no tones, no constancy in the 'real' world, it is all something we make up.*"[15] This assessment can be justified on the premise that the physical realm is just the *matrix* in which the things that we cherish such as colorful sceneries, music, tastes, and smells, as well as thoughts and emotions manifest. Without such rich forms of existence, the all-material world would be a miserably boring place in which to live.

There are widely different views of subjective qualities. Some think that matter creates them – such as the material brain creating the subjective mind with traits such as consciousness, and then the brain tricking us into believing that mind exists. For them, this is all there is to it, and this is all the understanding we need. However, we cannot claim to understand subjective qualities fully unless we can *build* something that produces subjective qualities. Brain is simply a chunk of organic matter like the other bodily organs, and treating organic matter as a causal agent is not tenable since no artificial organic matter has ever produced subjective qualities such as consciousness and life. Propositions such as "consciousness is the product of brain activity" are mere opinions, not scientific facts. They will remain so until neuroscientists build an *artificial brain* from scratch using lifeless matter that produces its own consciousness. Nothing else will constitute credible scientific proof.

Emergent Quantities

It is common observation that many properties of the assemblies of matter *emerge out of nowhere* since they cannot be reduced to the constituents of the assembly. Most properties of water, for example, cannot be tracked back and related to the properties of hydrogen and oxygen gases. The emergence phenomenon of appearing out of nothing is at work at all levels of existence – from the

quarks that comprise protons and neutrons to chemical elements, molecules, compounds, living organisms, and sentient conscious beings. Emergent quantities do not have a distinctive stand-alone existence of their own; their existence depends on the existence of a *suitable physical entity* to manifest on. Emergent quantities are commonly called *emergent qualities* since they simply qualify physical entities. They vanish when the physical entity no longer is. The qualities of water, for example, disappear when water is split back into hydrogen and oxygen during electrolysis. The emergent qualities are pinned on the physical things that they appear on in a deterministic fashion.

The core concept of the emergence phenomenon is the properties exhibited by the whole are *not foreseeable* from the nature, structure, or behavior of the individual parts that comprise it. The behaviors of its individual constituents at the micro level do not reveal much about the behavior of the whole at the macro level. For example, some properties of *water* like the molar mass and specific heat can be traced to the properties of its constituent hydrogen and oxygen atoms. However, many properties of water such as color, taste, viscosity, and conductivity are emergent and cannot be predicted from the corresponding properties of hydrogen and oxygen.

Emergent qualities manifest on physical beings made of matter–energy and qualify them consistently and continually in a repeatable and predictable manner. From subatomic elemental particles such as electrons, photons, and quarks to the atoms, molecules, mixtures, alloys, and complex structures made of matter–energy, all physical beings come with a set of subjective properties at each organizational stage that uniquely qualify them as we move on the hierarchy of complexity. The subjective properties of a physical being do not originate from its constituents and cannot be traced back to them since the constituents themselves do not have those properties.

Emergence is described as the phenomenon of a property or quality appearing out of nothing on a physical entity when it is assembled from its parts and disappearing into nothingness when the entity is disassembled into its parts. Therefore, *emergent qualities* are the properties of physical beings that just appear out of nowhere and disappear into nothingness when the physical thing is taken apart into its constituents. That is, emergent qualities do not originate from the physical constituents of an entity, assembly, or organization. As such, emergent existence is a subcategory of nonphysical existence which is *intimately associated* with physical existence. An emergent quality is subjective disembodied existence that becomes embodied when it manifests on physical existence.

The emergence phenomenon is often expressed as the whole being more than the sum of its parts, and it is characterized by the observation that the whole exhibits features not found in the constituents – the individual parts that comprise the whole. Emergent qualities are so intertwined with the physical entity that they are considered the *intrinsic properties* of it and are listed under its physical properties of that entity.

It is important to note that emergent properties *passively qualify* physical beings and not actively govern them. They do not exert an influence on physical beings, such as forcing them to act in a certain way. That is, emergent properties are just qualifiers or qualities and *not* agencies with causal power. In contrast, the laws and forces of physics *govern* the physical universe as an active agent and keep all existence made of matter–energy in strict order, as discussed below, rather than merely qualifying the physical entities. As such, the laws and forces of physics are distinctly different in nature, and they are more properly categorized as an *agency* rather than emergent quantities.

Emergent qualities are *not* mental creations since they are *intimately tied* to physical entities they appear on in a certain way, and they are not the inventions of a mind – they are merely noticed and inferred by the minds. Emergent quantities existed long before the minds did. When hydrogen and oxygen chemically combine to form water, for example, we know from past experience precisely what properties water will acquire. Properties associated with a conservation principle – such as the conservation of mass, energy, and charge – are *conserved* or *additive* properties and they are *reducible* to their constituents. The mass of a chemical compound such as water, for example, is simply the sum of the masses of its constituent atoms. Some properties are *operational* – like density being the ratio of the mass of a physical entity to the volume it occupies. All other properties of physical beings such as color, hardness, taste, and smell are *emergent* – they are not-conserved and are not reducible to the constituents.

The carcasses of all physical entities are built of matter–energy, and thus, they are *tangible* or *objective* entities. However, the properties of the physical entities are *intangible* or *subjective* entities since they are not made of matter–energy; they simply *qualify* or *characterize* the physical entity made of matter–energy. We do not "build" properties. As sentient conscious beings, we simply *observe, perceive*, *conceptualize*, *categorize, ascribe meaning*, and *name* properties. Moreover, as learned conscious and intelligent beings, we assemble matter in such a way that it will have certain properties based on experience.

Therefore, properties such as *shape, dimensions, volume, temperature, pressure, density, entropy, enthalpy, amount of matter, amount of energy, taste, smell, hardness, thermal conductivity, electrical resistivity, absorptivity, transparency, molecular structure,* and *wavelength* – everything other than the elemental particles of physics themselves and their assemblies – exist as abstract entities in conscious minds. That is, all properties are *abstractions* or *conceptualizations*.

Matter is a physical entity that can be seen and felt directly by the five senses; however, the *amount of matter* that quantifies its massive magnitude mathematically is a mental abstraction. We can see and touch matter itself, but not its amount.

Emergent properties strongly depend on how the physical body is structured, and thus, they are said to be properties of *organization*. Yet, there is order in the emergence of the emergent properties, and there are no surprises: Each time, the constituents are organized in a certain way the same properties emerge on the organization. After the initial trial-and-error phase, these repeatability and predictability of emergent properties enable engineers to *engineer materials* with the desired properties.

Although emergent properties of a physical entity do not originate from its constituents, those qualities are still properties of that entity and qualify it. Therefore, emergent qualities are *intangible* in nature. In addition, there appears to be hierarchical levels of order at different stages of organization. For example, a hydrogen atom is basically one proton, and a helium atom is made of two protons in its nucleus. That is, the nuclei of both hydrogen and helium are comprised of the same building blocks of protons – except in different numbers. Yet, the properties of helium are very different than those of hydrogen which, when ionized, is just a proton.

Emergent qualities are not merely properties associated with *large assemblies* of organized matter, as commonly thought. The whole does not have to be a complex system with a great number of interconnected or interacting parts to acquire and exhibit emergent qualities at the macro level. That is, the emergence phenomenon is not limited to the large assemblies of matter organized in a particular way. The emergence phenomenon is observed even in the subatomic realm, and some properties of the fundamental particles are also emergent.

For example, the number of protons in the nucleus of the atoms of an element, called the *atomic number*, is the defining characteristic of the physical properties of that element. The number of protons in the nuclei of hydrogen, carbon, iron, and gold atoms are 1, 6, 26, and 79, respectively. All protons are the same, similar to the fact that all the grains of rice in a package we buy from a grocery store are essentially the same. Yet, the properties of the protons tightly held together by the same strong force vary greatly, depending on the number of protons in the stack. When we tightly wrap the rice grains in stacks of 6, 26, or 79, each rice stack still has essentially the properties of a single rice grain, except for the amount of mass, the volume occupied, the overall shape, etc., If, when tightly wrapped, 6 grains of rice become a *bean* instead of a 6-grain rice stack, 26 grains become a *corn*, and 79 grains become a *hazelnut*, there is something peculiar going on, and an enigmatic phenomenon is at work. Obviously, many properties such as texture, hardness, color, and taste of bean, corn, and hazelnut are very different and have no resemblance to the properties of rice.

In short, the intrinsic properties of hydrogen, carbon, iron, and gold are very different from each other. It is clear that these properties do not originate from the protons themselves since there is hardly any resemblance to the properties of protons. The protons possess neither the character of carbon, nor iron, nor gold. Therefore, most physical properties of carbon, iron, and gold must be *emergent* (appearing out of nowhere) since they do not originate from the protons and they cannot be reduced to the properties of the protons. It also appears that it is quite possible to convert carbon or iron into *gold* – all we need to do is to split the nucleus of the carbon or iron atoms as we split uranium atoms in nuclear power plants and recombine the released protons into groups of 79. Once we do that, the color, hardness, electrical conductivity, and many other properties of gold will emerge out of nowhere.

If we were to make a new element with 200 protons by fusion, for example, no one can predict the physical properties of that newly invented element, except for additive properties such as atomic mass. Further, the raw material or the basic fabric of the fundamental particles such as quarks, electrons, and photons is *quanta of vibrational energy*, but the fundamental particles are a lot more than packets of energy. The characteristic properties of the fundamental particles such as charge and spin appear to be emergent since they do not originate from the quantized excitations of the underlying elusive fields. Therefore, emergence should be recognized as a *fundamental phenomenon*, and the nonphysical emergent existence should be regarded as an essential constituent of the realm of existence.

Images that appear out of nowhere in a mirror are not emergent qualities since they do not qualify or characterize the mirror. Images are not mental creations either since, unlike imaginations, they are not created by a mind out of nothing. Therefore, images that appear in mirrors as an after-effect of reflected light constitute a different category of nonphysical existence than the emergent qualities, mental constructs, and agencies. Although we all can vouch for their existence, mirror images do not have an independent external existence of their own; they are simply the reflections or manifestations of a physical existence. Mirrors appear to be gateways from physical realm to nonphysical world of imagery, like the state of sleep being the gateway to the realm of dreams. It is interesting that if no images formed in mirrors and no dreams occurred during sleep, we would never question it and no one would feel like something is missing. Same can be said about imagination and the things imagined.

We emphasize that emergent quantities are *not* mental constructs created by the mind. This is because they

appear out of nothing on the physical entity consistently and predictably and disappear when the physical entity is taken apart. The conscious mind plays no role in it, other than being aware of it as an external observer. That is, the mind only *notices* or *perceives* emergent qualities and conceptualizes them as *percepts*. It then tags them with names as physical symbols of representation and categorizes them. The mind also establishes the cause–effect relations based on observations, measurements, and reason. Emergent qualities would go unnoticed if no mind paid any attention to them. However, they would still exist out there independent of the minds. The mind only renders a factual description and mental image of emergent qualities during scientific inquiry.

Discovered and Invented Mental Constructs

As the name implies, mental constructs are the nonphysical (or subjective) constructs of the mind, such as *fiction* and *fictitious characters* that we mentally create, and anything we think of or imagine. Unlike emergent qualities, mental constructs are not the *properties* of the mind; they are the *renderings* of the mind. They do not transpire on the mind out of nowhere and qualify it in a certain way; but rather, they display the innate abilities of the mind as an active agent with constructive power. As such, mental constructs differ fundamentally from emergent quantities, and they need to be classified as a separate category.

Mental constructs owe their existence to a mind. That is, mental constructs exist *relative to* or *in reference to* a mind or minds. If a mind vanishes, so do the mental constructs associated with that mind. Our ability to *represent* the mental constructs by physical symbols such as sketches and written or spoken words does not change the fact that all mental constructs are nonphysical entities with no external existence.

It appears that *mental constructs* or *mental renderings* constitute a major part of the nonphysical realm of existence. All abstract mental constructs such as mathematics, languages, literature, philosophy, thoughts, beliefs, plans, imaginations, and dreams are part of the nonphysical realm. Even the sensations such as sight, sound, and smell as well as emotions such as pain, pleasure, excitement, and happiness are mental constructs – some controlled, but most uncontrolled.

Some mental constructs such as sights, sounds, smells, tastes, and touch are weaved out of the *electrochemical signals* triggered by stimuli from the physical realm out there via the five senses. Such mental constructs constitute *physical perception* – our experience and depiction of the physical world. There seems to be an enigmatic virtual mechanism in the mind with access to memory that does this depiction or rendering as a built-in function.

Some mental constructs such as the laws of physics and mathematics are *discovered*. That is, they already exist out there unnoticed, until a conscious mind becomes aware of them and expresses them using physical symbols of representations such as words and numbers. Other intentional mental constructs such as imaginations, plans, conceptions, thoughts, and designs are *creations* or *inventions* of the human mind. The *invented* mental constructs do not exist out there for other minds to discover, and thus, they do not have an external existence. They are simply created or conceived by the will of a mind out of nowhere. That is, invention is a *willful act*. The mind has full control and authority over its authorship and inventions. Invented mental constructs are unique to a mind, but discovered mental constructs share commonalities and eventually merge into a *common mental representation* of an external entity which already exists. The conceptions of dark matter and dark energy, for example, are discovered mental constructs that are being built collectively by the minds of physicists to render a factual mental representation of them. They will remain as mental existence until their physical existence is confirmed by observations.

Properties of physical things are associated with the physical things themselves and qualify them, and thus, properties can be said to stem from the *physical realm* as emergent quantities. Properties and other emergent quantities intimately connected with physical entities are perceived by sentient conscious minds via the five senses and thus constitute *rendered physical perceptions* or just *percepts*. They constitute *discovered* mental constructs. In contrast, *invented* mental constructs such as a new story or a new design stem from the *subjective realm* of ideas, thoughts, imaginations, etc., The laws of physics and mathematics are also discovered by inference based on the observations of the physical realm and are part of *discovered* mental constructs.

Physical perceptions via the five senses together with the emotions and the nonphysical perceptions such as *consciousness, intuition*, and *inspiration* comprise the *unintentional* mental constructs. These unintentional automated renderings of the human mind that are beyond our control together with the *intentional* mental creations such as thoughts and imaginations constitute the *virtual world* that we live in. Such mental constructs can be viewed as interactions of the mind with some virtual worlds or realms such as the realms of sights, sounds, smells, tastes, touch, ideas, and information.

Physical Sensations as Mental Renderings

We learn about the external world through *physical perception* via the five senses. Yet, our sensory organs which are at the forefront of gathering information are playing a very clever trick on us: we intuitively feel that our eyes reflect the true images of lit objects into our head, just like a mirror does, via the optic nerves which transmit sensory signals from the eyes to the brain. However, the

notion of "what you see is what it is" is a deep illusion. Everything we think we are sensing directly from the external world, including the sights, sounds, smells, tastes, and touch, is actively reconstructed in the mind from scratch as *virtual reality*, against the backdrop of our preconceptions, prejudices, beliefs, and opinions, and with the interventions of our temperament and expectations.

The mysterious mind continually replots three-dimensional (3D) images of the external physical world by processing the sensory electric signals that are transmitted from the eyes to the brain via the millions of optic nerves, constructing the *virtual reality* that we live in, portraying it as the physical reality out there. Even *sound* is a subjective phenomenon – it is the nonphysical sound that throbs our head, not the physical vibrations in the air; there are no physical vibrating diaphragms or cones in the brain as there are in the speakers to convert electrical signal waveforms into mechanical sound waves.

A similar account can be given about the subjective sensations of pain and pleasure. Yet, we tend to close our eyes to the subjective world that we live in denial because the notion of immaterial virtual reality is not compatible with the presupposed notion of an all-material universe. Obviously, we need to broaden our horizon of existence to include our subjective experiences to make it truly compatible with the observed reality that exists out there. As Burtt[16] stated decades ago: "*The world that people had thought themselves living in – a world rich with colour and sound, redolent with fragrance, filled with gladness, love, and beauty, speaking everywhere of purposive harmony and creative ideals – was crowded now into minute corners in the brains of scattered organic beings. The really important world outside was a world hard, cold, colourless, silent, and dead; a world of quantity, a world of mathematically computable motions in mechanical regularity*."

Perceiving electric signals as *smell* is a striking example of *rendered* mental construct.[10] The molecular mass of the scent molecule of a fragrance is the sum of the masses of the atoms that constitute the molecule, and thus, it is a physical property reducible to its constituents. However, the smell of a scent molecule is an emergent property. Smell is a mental construct since it owes its existence to sentient minds without which there would be no such thing as smell.

When a *new molecule* is formulated and composed, we can accurately predict its reducible properties, such as the molecular mass, but not the irreducible properties, such as smell and taste. On the visible objective physical side, the scent molecules chemically stimulate the millions of olfactory receptor cells in the nasal cavity, triggering electric signals that are transmitted along the olfactory nerves to the brain, causing some neurons to fire and set off a pattern of electric activity in the brain. This is the end of the visible and traceable physical reality associated with the perception of smell. The rest of the reality is *invisible subjective mental construct* inferred by reason and logic.

The inquiry of propositions regarding the subjective mechanism of the experience of smell is not science since those propositions cannot be taken to the laboratory for a test. Here, the challenge is to conceive and construct a *plausible mental mechanism* for the conscious sensation of smell that is fully compatible with the interface of input provided by neuroscience and the output of experienced sensation. In the end, the propositions for the subjective mental mechanism will be judged on the basis of being *sensible, logical, consistent,* and *conforming* with the innate sense of reality.

For example, it is natural to think that the source of the pleasure of *eating an apple* is the apple itself, since, when there is no apple, there is no pleasure of eating an apple. However, this is a delusion, and dreams are sufficient to burst this bubble of deeply entrenched notion. The virtual apple that we eat in our dreams with our eyes and mouth closed is as colorful and pleasurable as the physical apple. It looks like we are doing just fine even when our physical body is almost completely shut off, without any sensory signal input to the brain from the taste buds.

The sense of taste is produced when the chemicals in the food that we eat react with the thousands of taste receptor cells located on taste buds on the tongue and in the mouth. The taste receptors sense the five distinct tastes of sweet, sour, salty, bitter, and savory and generate appropriate electric signals and transmit them via the taste nerves to the brain for processing and perception. The waveform of the electric signal produced and transmitted determines the taste that we perceive. That is, there is a one-to-one correspondence between perceived taste sensation and the aggregate electric signals sent from the tongue and the mouth (there is no such interconnection when we eat a virtual apple in our dreams).

This observation suggests that we can create a virtual apple by measuring the intensity and waveform of the electric current generated while eating an apple and duplicating that current artificially. It means, if we apply the artificially generated electric current associated with eating an apple to our tongue and transmitting it to the brain, we will experience the same sensation of enjoying an apple without eating the apple. When this theory was put to test in a laboratory, it worked as predicted. Once the technology is perfected, we will be able to lick a battery-operated electronic ice cream bar instead of eating an actual one and satisfy our ice cream craving without consuming any calories. It appears that the web of nerves tightly knit throughout the body serves as the signal transmission lines for the *mind*, which is a major segment of the agency of life, to perceive and experience the physical realm.

We seem to be living in a fast-changing dynamic, vivid, rich, mentally constructed, and subjective *virtual reality world* at all times. That is, what we see, hear, and feel are merely voluntary or involuntary mental constructs or hallucinations weaved by the enigmatic mind. When we look out of the window, for example, what we see are not the actual physical trees outside, but a *rendered 3D simulation* of those trees somehow constructed in our permanently locked dark and silent skull. As Seth[17] put it: "*We don't just passively perceive the world, we actively generate it. The world we experience comes as much, if not more, from the inside out as from the outside in.*"

Mathematics and the Laws of Physics as *Discovered* Mental Constructs

As an abstract field of learning and a systematic body of knowledge, *mathematics* is rooted in physics and logical reasoning and is developed from the need to count, quantify, and describe physical beings and nonphysical quantities in a concise and systematic manner. It is an essential tool for all sciences, but math itself is not a science since it is not based on the observations of the physical universe and cannot be disproved experimentally (failing the falsifiability criterion of the scientific method). Sciences are concerned with the investigation of the physical universe and everything in it, but mathematics is not. Instead, mathematics is generally regarded as the *common language of sciences* since physical phenomena are best described and the results of scientific studies are best communicated by mathematics. Mathematics is an *operational language* with precise definitions, well-laid out rules, logical deductions, and the ability to evolve. Proofs of mathematical theorems are decisive, but the scientific theories are always open to falsification by the presentation of a violation as evidence.

Math and sciences have developed in close interaction throughout the history in a partnership that benefited both. Preparing realistic *mathematical models* for physical problems, solving the problems using mathematical methods, and then physically interpreting the results are commonly done in sciences and engineering. The need to obtain a solution for the mathematical model of a complicated physical problem often inspires new mathematics.

The *robustness* of the inner structure of the mathematical world, the *firmness* of the logic and the generality associated with it, and the *mysteries* involved pave the way for exciting and enjoyable exploration in this well-structured virtual universe. Using simulations, mathematics enables scientists to predict the type and extent of change that physical phenomena will impose on physical entities before the change actually occurs. As such, mathematics makes virtual time travel to the past as well as the future possible. Of course, this does not mean that *time travel* in the physical realm is possible.

As a nonphysical entity, mathematics is beyond the limitations of space and time, but the physical entities are bound by the constraints of space and time. Therefore, the mathematical existence of something is no guarantee for the physical existence of that thing. Those who think of traveling to the past and the future in the physical realm should think again. In engineering, we commonly discard some legitimate mathematical solutions of differential equations that are mathematical representations of physical phenomena when they are deemed physically impossible.

Events in the *physical world* proceed along a path interwoven by the *laws of physics* as a template. The actual physical path can be observed by carefully monitoring the motions of matter during physical experiments in real time. Events in the *virtual mathematical world* proceed along a path interwoven by the same laws of physics, and the virtual path is rendered using numbers or graphics which portray the same information.

Some mental constructs are completely independent of the signals triggered by physical beings out there, such as a new design of a house we *imagine* or an idea we are exploring. Their construction – such as planning an activity, developing a theory, or just daydreaming – is initiated by the subjective mind itself. Therefore, they are *invented* mental constructs. Literature, poetry, and art can also be included in this category since they do not require making any inferences from observations of physical realm, and they do not attempt to build a factual mental representation of the observed phenomena. *Invented* mental constructs differ from *perceived* mental constructs (or mental perceptions) in that the former are not associated with any direct physical perception via the five senses, but the latter are.

Whether mathematics is *discovered* or *invented* by the human mind is hotly debated even today. Mathematics as well as science is mental rendering of perceived physical realm, and there would be no mathematics and sciences as branches of learning if people did not exist. However, this does not mean that science and mathematics are inventions of the human mind. Both mathematics and sciences existed out there in the physical realm as virtual templates or "rule books" long before humanity, waiting to be noticed and discovered. The rules of mathematics and the laws of physics are already interwoven into the basic fabric of the physical world. The *virtual particles* commonly used in physics are best categorized as *discovered* mental constructs such as the laws of physics since virtual particles exist and interact out there, waiting to be envisaged by the inquiring minds.

There is only *one* mathematics and *one* science, characterized by a set of rules and laws, and thus, both must have been *discovered*. Inferred mental constructs such as mathematics and the mental picture of the physical realm

depicted by sciences are distilled out of careful observations of the visible realm by many minds. If they were invented, there would be different inventions of mathematics and science developed by different minds, competing with each other. As Glattfelder[18] puts it, "*Platonism is the notion that a realm of perfect abstractions exists where all mathematical entities reside. In other words, mathematics has its own reality. In this sense, mathematics is discovered and not invented by the human mind*."

Technologies, on the one hand, are *invented* by scientists and engineers as products of creative minds. That is why we have different technologies as intellectual properties and we apply for patents to protect the ownership of those inventions. There are no patent applications for discoveries since discovered things already exist, and thus, no claim of ownership can be made for what is already out there waiting to be discovered. Therefore, mathematics, science, and technology are all mental constructs, but of different kinds.

Scientists and engineers are grateful that the abstract world of mathematics works beautifully to *encode* observable natural phenomena into a concise and compact form by *translating* the physical essence into abstract formal representations. They use mathematics as a powerful tool in their work but stay away from getting into the subjective nature of mathematics, giving rise to the pragmatic advice "shut up and calculate!"

If the current trend of mathematics reigning supreme continues, soon we will establish the subjective realm of mathematics as the *primary existence* and the physical realm as its *secondary materialized manifestation*. This will create a perplexing dilemma for those who subscribe to the worldview that the physical realm is the sole existence. As Markie[19] puts it, "*Intuition and deduction can provide us with knowledge of necessary truths such as those found in mathematics and logic, but such knowledge is not substantive knowledge of the external world. It is only knowledge of the relations of our own ideas*."

Invented mental constructs such as new stories and new designs do not have an *external tangible existence* of their own, and thus, they cannot be perceived by others. Their presence is dependent on the existence of a mind, and as such, they have no assurance of continuity. All mental constructs owe their existence to the *sentient conscious minds*. If all humanity were to disappear today, so would all mental constructs. Mathematics and the laws of physics are *discovered mental constructs*, and thus, they do have an external existence out there, though unbounded. The laws of physics are *mental renderings of a template* that provide order in the physical realm. The forces of physics appear to have an extensive external existence since they are observed everywhere by the influence they exert on physical things. After all, the forces of physics interact with physical things and subjugate the entire physical existence in accordance with the template of the laws of physics.

Active Agents: Enigmatic Agencies with Causal Power

The phrases *agent*, *active agent*, and *agency* are commonly used in a variety of fields from chemistry to philosophy in a wide range of settings within the context of causation. Agents or agencies are characterized by *causal power*, and thus, the capacity to cause changes. An agency has the capacity to act as an active agent. An agency is said to be *purposive* or *goal oriented* if its activity is aimed at realizing an objective or a goal. The enigmatic life, for example, qualifies as a *purposive agency* since, from cells and plants to animals and humans, all living beings are goal oriented and act as distinct entities. The laws and forces of physics, on the other hand, qualify as a *nonpurposive agency* since they exert the same pull or push effect of certain magnitude on all physical existence in the entire universe without being selective.

An observed *influence* indicates the existence of an *influencer*. The discovery of dark matter and dark energy is simply the inferred result of the observed new influences. A consistent observable *influence* is a credible evidence for the *external existence* of a phenomenon or an aggregate of phenomena, and the regularity of the influence is indicative of the existence of the *underpinning laws*. The set of rules, principles, and laws associated with the physical sciences such as physics, chemistry, and astronomy and thus govern the inanimate realm is called the *laws of physics*. We recognize the existence of the laws and forces of physics as orderly influences of attraction and repulsion (the push–pull effect) on physical entities.

Influences constitute a *higher level of existence* than matter and energy since influences fully govern physical entities in a repeatable and predictable manner. The laws of physics act globally without being selective and firmly control physical existence via the associated forces of physics. That is, these laws are imposed on all physical existence and tightly control it. As such, the laws and forces of physics constitute a *higher hierarchy* in the ladder of existence relative to the physical existence comprised of matter and energy, and the laws of physics cannot be reduced to matter and energy. Life is such an influence commonly observed and easily distinguished from nonlife in ways unpredictable by the laws of physics, which are a subset of the laws of nature.

Agencies are noticed and recognized as *virtual mechanisms* or *agents* with the ability to manipulate physical entities made of matter–energy. Agencies, also called *active agents*, are subjective entities that exert noticeable influence on physical existence and actively control them. Agencies are *not* inventions of the mind; they are *discovered* by inference. Like the force of gravity, agencies are noticed and discovered by the mind but are not brought into existence by the mind. Agencies differ from invented mental constructs in that they exist out there on their own,

independent of the mind. That is, agencies have *external existence* which may be spread out with no boundaries like the laws of physics or distinct in a confined space as in the case of life. They also differ from emergent properties in those agencies more than *passively qualify* matter; they *actively control* matter.

Several agencies can be identified and described in nature. The most familiar existence that qualifies as agency is probably the enigmatic life. A more general example is the *agency of physics*, which is comprised of the universal laws and forces of physics. Here, we briefly present the agencies associated with (1) the inanimate realm (the *agency of physics*), (2) the animate realm (the *agency of life*), and (3) the quantum realm via the creation and annihilation of the fundamental particles (the *quantum field agency*). Although the agencies govern all natural phenomena and thus qualify as the government of the universe, they are invisible virtual entities inferred by conscious minds.

Agencies are not made of matter–energy, and thus, they are not physical entities. Therefore, they cannot be decomposed into the fundamental building blocks of physics or any other physical existence. Agencies are visible to the *mental eye*, but not to the *biological eye*. Despite being subjective entities, agencies do have external existence since their influence on matter is evident. The force of gravity, for example, exerts a pulling effect on all material things in accordance with Newton's law of universal gravitation. Life also subjugates matter within its domain of influence in accordance with its set of laws and influences.

Agencies resemble *virtual* machines, mechanisms, or operators. They operate on matter, and thus, they *reign supreme* over matter. The term "agency" is used here to characterize the virtual mechanism that appears to be performing certain acts in a repeatable and predictable manner, just like the virtual mechanisms of quantum fields that convert bundles of energy into fundamental particles with a distinct set of properties in a consistent manner.[20] The agency of physics, for example, governs the physical realm and subjugates it with its laws and forces. Life does the same within the bodies of living beings.

Agencies act as invisible *causal mechanisms* while fully complying with the laws of nature, which is the constitution of the universe. The existence of agencies cannot be verified by direct observations or measurements but must be inferred mentally via inductive thinking and reasoning of observed influences on physical things. The notion of agency can be scrutinized by subjecting it to the tests of logical consistency, plausibility, reasonableness, and compliance with observations. The discovery of an agency is indicated by the apparent void created in explaining a natural phenomenon when the propositioned agency is disregarded.

Agencies are entities that exist out there of their own and are perceived mentally since their existence is noticed and their influence is modeled (usually mathematically) by a mind. The existence of agencies does not depend on the existence of the physical realm or the existence of a mind since agencies do not originate from either. However, the discovery of agencies requires the existence of a conscious mind, without which nothing would be known. Agencies are *not invented* by the mind, like conceiving a new car design. They are *discovered* by noticing their influence on physical existence. Therefore, agencies are *natural* entities, just like the laws and forces of physics, and they existed long before the humans did. Unlike the artificial agents such as robots or autonomous cars, (natural) agencies cannot be annihilated by humans, and they will continue to exist long after the human race goes extinct.

Agencies are often incorrectly portrayed as *emergent qualities*, which are properties of assemblies of matter. When matter organizes in a certain way, it is observed to acquire certain qualities that qualify the organized matter. When the assembly is dispersed, the emergent qualities that appeared out of nothing during organization simply disappear into nothingness, as discussed before. Agencies do not fit into this description of emergent qualities.

Strictly speaking, agencies – such as the agency of physics comprised the laws and forces of physics – are not emergent entities since they do not appear out of nowhere and disappear into nothingness. They are always there, with no acts of disappearance, remaining unchanged regardless of how the organization of the physical existence changes. Of course, the earth's gravitational pull on a physical object can be eliminated by sending the object to space, and a living being can be rendered lifeless by making the body inhabitable for life. However, the law of gravity continues to prevail and life continues to flourish.

The universal laws and forces of physics qualify as an *agency* with causal power since, collectively, they govern the behavior of all physical existence in the entire universe. Alfred Montapert has expressed this eloquently as "*Nature's laws are the invisible government of the earth*." Einstein[21] put it as "*Everyone who is seriously involved in the pursuit of science becomes convinced that a spirit is manifest in the laws of the Universe – a spirit vastly superior to that of man, and one in the face of which we with our modest powers must feel humble*."[21] The notion of existing above and beyond the visible universe and fully governing the entire physical existence is a peculiar characterization of the laws of nature that have no mass or energy.

The laws of physics are inferred as the rulebook or template that governs the behavior of physical things under the perceived influences of physics such as the pulling force of gravity. Once the laws of physics are recognized as nonphysical entities since they are not made of

matter–energy and that they are beyond time and space, the questions "where do the laws of physics exist?" and "since when do the laws of physics exist?" become meaningless. Observations are consistent with the notion that the laws of physics exist everywhere throughout the universe at all times without being anywhere. That is, the laws of physics must be omnipresent and timeless. Obviously, the law of the conservation of mass–energy was at work during the big bang.

Observations on the repeatability and predictability of the behavior of the physical entities affirm that there is an indubitable unity of the laws of physics, portraying a unified rule under a unified influence. That is, the laws of physics are integrated in a coherent and harmonious fashion, acting like a virtual universal ghost. A set of incoherent laws of physics would have caused physical things to behave erratically in an unstable way under disparate influences.

All internal changes and external behaviors of existence and thus all occurrences on the *moon*, for example, are governed completely by the purposeless *agency of physics* since there is no life there. On earth, however, the occurrences in the inanimate realm are governed by the agency of physics alone, while the occurrences in the animate realm are governed by the purposive *agency of life* superimposed on the agency of physics.

When a ball is thrown into a river, for example, the laws and forces of physics control its motion and determine its trajectory, which can be predicted by a scientific analysis. However, if a live dog is dropped into a river, the laws and forces of physics alone will not determine what the dog will do. The dog may just decide to swim and get out of the water from anywhere it sees fit or even swim upstream. This is because the dog is alive but the ball is not. Apparently, the dog has *another set of laws and influences* that comes with life *superimposed* on the laws and forces of physics to govern its behavior, but the ball does not. The quality that sets animate beings apart from the inanimate ones is the enigmatic phenomenon of life and the set of attributes and influences that come with life which qualifies as an agency.

Closure

The physical and nonphysical realms together constitute the entire *realm of existence*. An existence that contains even a single elemental particle of physics with mass or energy in its composition is a *physical* existence; everything else is a *nonphysical* or *subjective* existence. Phenomena such as life, consciousness, beauty, meaning, space time, quantum fields, laws of physics, and even entropy are nonphysical since they cannot be reduced to matter–energy and they cannot be constructed out of the fundamental building blocks of physics. They simply manifest in the mind as mental renderings when triggered by some intentional or unintentional means.

When ideologies or worldviews turn to dogmas, *objectivity* becomes the first victim. The notion "all is matter and matter is all" is a dogmatic worldview, not a scientific fact. Treating this ideological notion as an indisputable fact in scientific inquiries is a prejudice, not a zealotry or guardianship of science. Nobel Laureate Max Planck[22] warns his contemporaries against the pitfalls of prejudice: "*A new scientific truth does not triumph by convincing its opponents and making them see the light; but rather, because its opponents eventually die, and a new generation grows up that is familiar with it.*"

We should face the challenge and adopt a new view of existence as a fabric woven out of the threads of matter and meaning, thus unifying the subjective with the objective, as the true representation of the observed reality out there. Then, we can dwell on understanding the intricacies of how the physical and nonphysical realms interact so harmoniously.

All agencies owe their existence to the observed *regularity* in the universe. Sciences are simply the compilations of the *general rules* behind this regularity. Scientific inquiry is the quest for the discovery and description of these general rules, and expressing them in the mathematical language, with the ability to make predictions. The rules and the accompanying influences are made apparent by the repeatability of the observed occurrences in the natural world. These rules and influences constitute the set of the laws and forces of nature, which constitute the agencies of nature. Then, the *enterprise of science* can be described as the pursuit of the discovery, description, and formulation of these invisible agencies working behind the scenes.

It is recognized that we do not fully understand the natures of emergent qualities, mental constructs, and agencies, and making the physical and nonphysical realms that work together cohesively presents challenges. However, the inability to understand the nature of something is not a valid reason to deny its existence. Not understanding, the invisible dark matter and dark energy did not keep the scientific community from accepting their existence since the observed phenomena of universal gravitation and the accelerated expansion of galaxies cannot be explained by the visible realm. Science and philosophy exist to unearth the mysteries of such apparently insurmountable challenges using observations and logic-based inductive reasoning. In the end, our picture of reality must coincide with the observed external world.

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Review Article

A Review of the Mental Health Effects of the COVID-19 Pandemic

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Abstract

COVID-19 virus emerged in Wuhan, China, in December 2019 and spread rapidly all over the world. Its rapid spread was declared as a "pandemic" by the World Health Organization in March 2020. COVID-19 causes many physical, psychological, and social problems. This study aims to reveal the psychological and behavioral effects of the COVID-19 pandemic on different groups with a literature review. It has been observed that the COVID-19 pandemic caused an increase in fear, anxiety, and anger, anxiety disorders in the general population; however, increased stress and life changes caused an increase in posttraumatic stress disorder, depression, insomnia, and even suicidal thoughts. In the studies carried out in this period, it was understood that some special groups such as individuals with previous psychiatric diseases, children and adolescents, the elderly and those with chronic diseases, and healthcare workers who struggled with the disease were more affected. It is necessary to ensure that sensitive groups, especially healthcare workers, who are at risk in terms of the adverse mental effects of the epidemic, are effectively screened, and appropriate evaluation methods and forms should be developed for this purpose.

Keywords: *Coronavirus, mental health, pandemic, psychological effects*

Introduction

The new coronavirus COVID-19 emerged in Wuhan, China, in December 2019 and spread rapidly worldwide. Its prevalence was declared "epidemic" by the World Health Organization in March 2020.[1]

The COVID-19 pandemic causes many physical problems, having a death risk of up to 3%, trying to improve the diagnosis and treatment possibilities of the virus simultaneously with the epidemic, not knowing the danger and risks precisely, as the situation could not be controlled and the pandemic brought many unknowns, it soon turned into a global trauma. The COVID-19 pandemic caused by the new coronavirus has affected the physical health of individuals and had a profound and diverse psychosocial impact on communities and people at international levels, as in past infectious disease outbreaks.[2,3]

The need to develop effective psychological interventions to protect, control, and treating mental health, which can minimize the anxiety, depression, and stress brought about by negative situations such as the changing lifestyle with the pandemic, the fear of getting sick and death, despair, and stigmatization, is apparent.[4] It is essential to reveal the psychosocial problems caused by the pandemic to find solutions. This review aims to reveal the psychological and behavioral effects of the COVID-19 pandemic on different groups with a literature review. At the same time, it is aimed to evaluate what needs to be done about treatment and prevention.

Coronaviruses

Coronaviruses (CoV), which are the disease agents, are single-stranded RNA viruses with protein protrusions on their surface. Although these viruses belonging to the coronavirus family are usually self-limiting mild respiratory diseases, they are more severe and even more severe such as "Middle East Respiratory Syndrome (MERS)" and "Severe Acute Respiratory Syndrome (SARS)." It can cause fatal infections.[5]

This new outbreak was noticed due to an increase in pneumonia cases of unknown cause in Wuhan, China, and was first reported by the World Health Organization

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China Country Office on December 31, 2019.[5] Although this epidemic was defined as an "international public health emergency" on January 30, 2020, as a result of the rapid spread of the disease with its severity and high transmission ability, a global epidemic was reported by the World Health Organization on March 11, 2020, with cases in many countries, including the European continent. It has been declared as a "pandemic."[6]

Approximately 145 million COVID-19 confirmed cases and 3 million deaths were reported in April 2021, when all-world data, especially the United States, Brazil, Russia, India, and European countries, were most affected by the pandemic. In Turkey, 4.5 million confirmed cases, deaths due to COVID-19 were reported in 37,500 people.[1]

The Clinical Course of COVID-19

When we look at the clinical course of the disease, the symptoms are often in respiratory tract diseases. In symptomatic patients, fever, cough, shortness of breath (dyspnea), weakness, sore throat, runny nose, muscle pain, inability to taste smell, and diarrhea can be seen most. Although most patients exposed to the virus can experience asymptomatic disease, it can be fatal with severe system disorders such as pneumonia and renal failure in patients with more severe disease. The clinical course may be different in patients with symptoms. In mild cases, the symptoms are milder, and no pathology is detected in imaging studies. In moderate cases, imaging findings that will diagnose pneumonia and respiratory tract infection symptoms such as fever and cough, and sputum are positive. In cases with severe disease, increased respiratory rate, or decreased oxygen saturation (≤%93) or the radiological image deteriorates within 1–2 days.[7,8]

Data obtained to date show that 80% of the infections have a mild or asymptomatic course. Studies show that 15% of those with the disease experience serious infections that require oxygen, and 5% experience critical processes requiring respiratory support. To prevent the spread of the disease in sick or suspected infected people, an isolation process called "quarantine" is applied. In addition to physical symptoms, intense anxiety, depression, sleep disorders, helplessness, feelings of anger, and suicidal ideation are also observed in these individuals. Symptoms of infection such as fever, cough, and shortness of breath also aggravate the mental effects of this period. This situation can similarly be seen in healthcare workers.[9,10]

Prolonged Symptoms and Psychiatric Morbidity after COVID-19

It is essential to know the psychiatric and neuropsychiatric effects of COVID-19 infection to regulate the diagnosis and treatment of patients with infection. Although studies on the effects of the COVID-19 pandemic on neuropsychiatric complications and psychopathologies have started to be published, the long-term effects are not yet known. Symptoms in patients with severe disease; manifest as headaches, imbalance, shaky, confusion, balance difficulty, epilepsy, ischemic stroke, neuropathic pain, and myopathy.[11]

In studies examining psychiatric symptoms in patients who recovered after COVID-19; it has been reported that these individuals show high rates of insomnia, posttraumatic stress disorder (PTSD), depression, and anxiety symptoms in the 1 month after infection.[12,13]

These initial findings and previous studies conducted after the coronavirus epidemics of MERS and SARS indicate that psychiatric illness will be seen after COVID-19 infection no small measure.[14-16]

Recently, prolonged findings are emerging in patients recovering from acute COVID-19 infection, which may result in significant inadequacy such as chronic fatigue, widespread muscle aches, shortness of breath, headache, and difficulty concentrating.[17,18]

The Effects of the COVID-19 Pandemic on Mental Health

In addition to all these physiological effects of the COVID-19 pandemic, the effects such as the anxiety of getting sick and dying, the uncertainties regarding the process, the inability to find an effective treatment method, the limitation of social interactions, and the sudden and rapid change in the philosophy of life affected individuals psychosocially. With the rapid spread and fatal course of the disease, it was perceived as a life-threatening threat and became a trauma with intense distressing emotions. The impact of trauma will vary according to the cultural and social characteristics of the society, economic well-being, and the physical and mental well-being of the individual. The difference in psychological reactions in this period may vary from person to person and in different social classes. Some people can adapt to the traumatic situation during this period. However, some may show different reactions to this life-threatening, such as extreme fear reaction or fatalism, negligence.[19,20]

In the COVID-19 Turkey Study conducted by Hızlı Sayar *et al*., individuals' anxieties, fears, and maturity levels were investigated. The research was carried out with 6318 people from 81 provinces. According to the study results, 57% of women and 37% of men stated that they were afraid when watching the news about coronavirus or seeing news on social media. Being uncomfortable when thinking about COVID is 51% for women, while this rate is 37% for men. While those who express that they are terrified of coronavirus are 41% for women, this rate is 35% for men. When looking at the level of fear of losing his life due to COVID, this rate is 42% for women and 29% for men.[21]

When looking at possible concerns about the pandemic or post-process, individuals; 49.6% due to the uncertainty of the process, 40.9% from staying away from social relations, 35.3% about the future of family members in case of death, 31.3% due to not getting adequate health care, 31.1% not having access to protective equipment, 30.8% due to economic problems, 28.4% due to disruption of their own or their child's education, from home 28.8% worry about not being able to leave when they want, and 27.6% worry about the mental status of family members.[21]

The pandemic has not only caused adverse consequences for individuals' psychology. Within the scope of the study, the participants were also directed to suggestions about psychological maturation, and the participants were asked how long they lived these propositions during the pandemic process. According to the results of the research, the most frequently reported psychological maturation proposition in both women (77%) and men (66%) was "I better understood the value of what I have during the pandemic process." Later, the statement "The things that I care about in life have changed" became the second-most frequently reported proposition, with 61% of women and 50% of men. In general, these two propositions are followed by the statement "I understand that I can face the difficulties" and "I can accept the events as they are" with a ratio of 56%. The frequency of all items related to psychological maturation was higher in women than in men.[21]

When we look at the psychological effects seen in the process; fear of getting sick and dying, not applying to hospitals and health institutions even when necessary, experiencing economic concerns such as losing their job, being in quarantine for suspicion of illness, and being separated from loved ones due to quarantine, fear of not being able to protect loved ones and losing relatives due to the epidemic and social isolation We come across situations such as feeling depressed, remedy and lonely due to.[22]

The new living conditions caused by the pandemic may prepare an environment for some psychological disorders in healthy individuals and cause an increase in preexisting pathologies. It has been shown that the epidemic does not only cause illness, fear of death, feelings of inadequacy in individuals in the general society, and freedom-restrictive measures such as social isolation can have psychological effects.[23]

It has been reported that quarantine applied to sick people and federal restrictions applied to prevent the spread of the disease cause acute panic, anxiety, fear, paranoia, obsessive behavior, depression, and PTSD with somatic symptoms.[24]

During this period, many studies have been conducted to examine the psychological, behavioral, and social effects of COVID-19, which is caused by the new coronavirus. It has been revealed that the disease causes many changes in societies' living conditions and habits, and this situation leads to some negative psychological consequences. For example, in a study conducted with 1200 participants in China during the COVID-19 epidemic process, 53.8% of the participants expressed the negative effect on the psychology of this epidemic as severe or average. Again, in the same study, it was found that 17% of the participants had moderate to severe depression symptoms, and 29% had moderate-to-severe anxiety symptoms.[4]

In a meta-analysis study that examines the prevalence of stress, anxiety, and depression in the period following the COVID-19 pandemic and evaluates research studies prepared using appropriate methods in the general population as a result of the pandemic; It was found that 29.6% of stress disorders, 31.9% anxiety, and 33.7% depression.[25]

In a study conducted in Turkey, an evaluation was made regarding anxiety, depression, obsessive-compulsive disorder, and anger symptoms before and after the epidemic. A high difference was found in favor of postcoronavirus symptom scores in all participants. When this change was evaluated in terms of the gender variable, it was found that this difference was much more pronounced in women. In this process, it has been observed that individuals who cannot apply a functional coping style with stress, have negative perceptions and attitudes about the epidemic, and have low psychological resilience, are more vulnerable and need psychological assistance. It has been observed that adults cope with stress more functionally than young people.[26]

The pandemic has not only paved the way for new psychological problems to emerge. It also led to an increase in existing psychopathologies. The importance of hand hygiene in combating the high contagiousness of the virus and pandemic can be added as an additional ritualistic pattern to the behavior of patients with obsessive-compulsive disorder. Patients with some obsessive-compulsive disorder may be more affected by this process, as they have contamination obsessions, cleaning compulsions, or experience suspicious obsessions and control compulsions. Because of the epidemic conditions, patients with obsessive-compulsive disorder increase their anxiety symptoms.[27]

Physically separating people is the first thing to do to prevent the COVID-19 epidemic from spreading to large masses.[28]

This practice, which is very effective and necessary in combating the epidemic, can create an unfavorable environment for the psychological health of individuals and become a significant risk factor for mental health by weakening the social ties while protecting the physical health of people. Social relations and psychological well-being are also crucial for maintaining a healthy

life, such as the suitability of physical conditions and meeting biological needs. As a result, the absence of social relationships during isolation causes an unfavorable environment for mental health.[29]

Studies conducted with individuals who remain in the quarantine process due to COVID-19 reveal that staying at home increases health and financial concerns, depressive symptoms, and stress more, and brings a feeling of loneliness.[30]

When the quarantine processes of the epidemic diseases experienced in the past were examined, various predisposing factors were identified that caused mental problems. In this period, individuals primarily have concerns about their health, but at the same time, they experience a feeling of isolation along with the fear of making others sick, intense boredom. The inadequacy in providing basic needs such as shelter, food, water, inadequate and accurate information, lack of economic and social support, and concerns on this issue is essential to stress factors. In the meta-analysis made specific to the quarantine period and evaluating the quarantine effect, it has been stated that adverse psychological effects cause PTSD symptoms, confusion, and anger. The stressors of these are long quarantine period, fear of infection, disappointment, distress, insufficient information and inadequate support, economic loss, and stigma. Some researchers point out the long-term effects of this condition. People should not be kept in quarantine for longer than necessary; practical, understandable information should be provided to these people, and adequate support should be provided.[31-33]

Another critical issue that needs to be studied is stigmatization. Disease-related stigmatization is a problem that should be considered in this epidemic, considering the experiences in previous epidemics such as SARS, which affects the lives of individuals who have experienced difficulties for a long time. All healthcare professionals, including those who test positive for COVID-19 themselves, their family members, acquaintances, and general practitioners, face more discrimination and stigma. The adverse psychological effects of this situation continue for a long time, even if people exposed to stigmatization such as corona-positive people or individuals who are not sick with symptoms similar to their symptoms, contacts, healthcare workers recover physically. In societies prone to stigmatizing behavior, people with symptoms of illness tend to delay receiving health care or hide health information in critical situations such as travel. Unfortunately, this situation increases the spread of the disease in society. It has been reported that anxiety and depressive symptoms increase in patients with the stigma.[24,31,34]

During the epidemic period, all of the psychological reactions expected after trauma were observed step by step in the risk groups related to the disease and the society, especially healthcare workers. Along with the feeling of uncertainty brought about by the epidemic, emotions such as fear of getting sick, helplessness, hopelessness, and unhappiness have become almost epidemic.[2,3]

The Effects of the Pandemic on the Elderly and the Groups with Chronic Diseases

Due to advances in technology and their positive reflections on healthcare, and the controllability of infectious diseases, the proportion of the elderly population is increasing worldwide. In parallel with this, a similar change is happening in Turkey, and the proportion of the elderly population has been increasing gradually over the years. For example, while the proportion of the elderly population in the total population was 8.2% in 2015, this rate was 9.5% in 2020.[35]

There is a relationship between aging and increased mortality in COVID-19 infection. In a report prepared by the Chinese Center for Disease Control and Prevention, this rate was reported as 8% in the age group 70–79 and 15% in people aged 80 and over, versus 2.3% in the general population.[36] Similar data are also valid for Turkey.

In a study by Wang *et al*., the adverse psychological effects of the epidemic were more pronounced in people with chronic diseases who were in poor general physical condition before the epidemic. It has been reported that these people experience more intense depression, stress, and anxiety.[4]

COVID-19 pandemic prevention measures, leading to social distance rules, maintaining a distance of two meters during social contact, avoiding social contact with family and friends, and decreasing the social environment, which causes more loneliness, especially in the elderly population. This isolation situation can lead to mental and physical dysfunction in the elderly. Social relations; is very important because it helps people regulate their emotions, manage stress, and increase their mental endurance. Increased stress, inactivity, etc., in the process of loneliness and social isolation. It also brings risks such as adverse mental effects and cardiovascular system diseases. Therefore, the elderly need to reach the correct information about how they should follow to protect their mental and physical health. In addition, some barriers such as hearing loss caused by old age should be evaluated well, and strategies should be developed in this direction. For example, considering that those with hearing difficulties may not maintain physical distance, their needs such as necessary equipment and protective masks should be provided.[37-39]

Effects of the Pandemic on the Group with Psychiatric Illness

Due to the living conditions of the people in the group with psychiatric illness, they are at a higher risk for SARS-CoV-2 infection than individuals without any mental problems. There is a relationship between SARS-CoV-2

infection and the severe course of the disease and the risk factors comorbid to psychological illness, such as the state of the person's current mental illness, alcohol, substance use, etc., poor living conditions.[40]

It is possible to say that the most neglected population during the COVID-19 outbreak is individuals with mental disorders. Stress causes the emergence and development of the symptoms of mental health disorders and an increase in the severity of existing psychiatric diseases. On the other hand, due to the restrictions imposed by the COVID-19 pandemic, there have been some disruptions in the access of individuals with existing psychiatric diseases to treatment and health services since the beginning of the pandemic. Due to the conditions, these people may have difficulties continuing their routine examination, interview, and drug treatment or reaching an appropriate health institution in cases where hospitalization is required.[41-43]

In many studies conducted in different societies, it has been concluded that individuals with a psychiatric disease have a higher risk of encountering and transmitting infection and that the prognosis of the disease is worse, they are more hospitalized, and the risk of death is higher. Considering the reasons for this situation, it was found that the patients who received psychiatric treatment could not comply with the rules due to personal hygiene and self-care inadequacy, disorders in sleep and eating habits, and impulse behavior control. In addition, many reasons such as cognitive disorders, difficulties in accessing treatment, metabolic diseases due to adverse effects of psychiatric drugs take their place as risk factors. At the same time, this patient group's economic and social levels may be lower than the general population, and the living conditions may be generally worse.[44-46]

Effects of the Pandemic on Healthcare Professionals

During this vast global epidemic, which carries many unknowns and the course of the disease, inadequacies in diagnosis, and treatment opportunities, many changes have occurred in countries health systems. The effects of the pandemic were more pronounced in healthcare workers who were trying to produce the right job by responding quickly to all these changes compared to many other groups.[47]

In parallel with the increasing need for healthcare services, the workload of healthcare workers has increased. Since they are at risk for the patient group they work with, they are concerned about transmitting the disease to themselves and their loved ones. Physical fatigue due to long working hours, insufficient quality of suitable protective equipment, loneliness, and being separated from loved ones are the main reasons for healthcare professionals to be negatively affected by this epidemic. In addition, among healthcare workers directly dealing with infected patients, emergency room workers, intensive care, and infectious diseases, clinic staff are more affected psychologically than other groups. Secondary traumas can develop in healthcare workers who witness serious traumatic events under pandemic conditions.[48,49]

Liang *et al*., found that female and middle-senior health workers had higher stress, anxiety, and depression rates. No significant difference was found between the depression score of healthcare workers under the age of 30 and the depression scores of healthcare workers over the age of 30.[50]

Being in the middle age group, working in risky secondary and tertiary hospitals such as infectious diseases services where the risk of contact with infected patients is higher, performing practices such as injections that require close contact with patients such as nurses, and close relationships such as divorce or loss of a spouse, family It has been determined that the probability of experiencing mental problems increases in cases where the support is decreased.[51] In a study in which 1563 health workers participated in this period in China, the prevalence of traumatic stress symptoms among healthcare workers was 73.4%, depressive symptoms 50.7%, anxiety 44.7%, and sleep disorders 36.1%.[52]

Discrimination and stigmatization are essential factors that strain individuals with their adverse psychological effects during the pandemic process. In addition to individuals diagnosed with the disease in themselves and their families, healthcare workers also face this stigmatization behavior.[53]

Similar reactions were reflected in public opinion in Turkey. In previous years, Bai *et al*.'s study investigated the responses of healthcare workers shortly after 330 health workers were quarantined due to the SARS outbreak. Twenty percent of the healthcare personnel participating in the study stated that they felt stigmatized and rejected in their neighborhood because they worked in the hospital, and 9% stated that they were unwilling to work or thought to resign.[54]

The most important way to effectively combat this serious health problem and prevent the spread of the disease is to take the necessary precautions by implementing appropriate strategies to break the transmission and infection chain. In the COVID-19 pandemic, it is necessary to create a mental health team that can act with a multidisciplinary approach, together with psychiatrists, clinical psychologists, and nurses, and plan the practical work of these teams established at a regional or regional national level. In addition, to control the fear and anxiety that may be experienced, it should be ensured that regular and truthful information about the COVID-19 outbreak is shared with the public openly by adopting a correct and calm attitude. For this purpose, all kinds of communication channels

should be used, and when people need mental support, they should be provided with spiritual support via telephone and the Internet under telemedicine conditions.[38,55]

Healthcare workers working in more specific health centers, such as hospitals or infectious diseases services, where the treatment of cases related to this disease continues, are at higher risk of mental health problems and infection risk. In addition to the fear of transmitting the disease to themselves, healthcare professionals also have anxiety about infecting their families and loved ones. Due to these conditions, it is important to screen patients and healthcare professionals regarding depression, anxiety, and suicide risk, primarily and regularly.[56-58]

It is essential to make the necessary arrangements for the uninterrupted continuation of specific treatments of people diagnosed with psychiatric diseases before the epidemic. However, it should be ensured that people who show severe mental illness symptoms during the epidemic reach treatment as quickly as possible.[59]

Supporting all individuals affected by the pandemic in terms of mental health with timely and effective interventions by applying the right strategies will be an essential control mechanism in preventing the adverse psychological effects of the pandemic.

Conclusion

This review aimed to understand the effects of the COVID-19 pandemic on mental health in light of literature findings. It has been observed that the COVID-19 pandemic caused an increase in fear, anxiety, and anger, anxiety disorders in the general population; however, increased stress and life changes caused an increase in PTSD, depression, insomnia, and even suicidal thoughts. In the studies carried out in this period, it was understood that some special groups such as individuals with previous psychiatric diseases, children and adolescents, the elderly and those with chronic diseases, and healthcare workers who struggled with the disease were more affected.

This research focused on 2019–2020 and Turkey-China. The COVID-19 virus has undergone many mutations since the first day it emerged. The mental effects at the beginning of the pandemic and today are likely to be different, as the virus mutates repeatedly and its physical symptoms change.

Psychological outputs such as denial, anger, anxiety, and stress are experienced more intensely with the emerging pandemic. High-risk groups such as children and adolescents, the elderly, healthcare professionals, and people with existing psychiatric disorders should be given priority.

It is necessary to ensure that sensitive groups, especially healthcare workers, who are at risk in terms of the adverse mental effects of the epidemic, are effectively screened, and appropriate evaluation methods and forms should be developed for this purpose. Awareness training and psychoeducation that can reach large communities should be planned for these conservation efforts. In addition, when professional assistance is required, it is essential to provide systems that will ensure correct and timely intervention, meet the need for telephone, internet, and similar infrastructure, and develop suitable algorithms. Considering that the psychological effects of the epidemic may continue for years, even after the epidemic is taken under control and the biological danger situation has passed, it is essential to invest the necessary resources and follow the correct policies.

Patient informed consent

There is no need for patient informed consent.

Ethics committee approval

There is no need for ethics committee approval

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Author contribution subject and rate

- Leman Atasever Varolan (50%) Data collection and wrote the manuscript
- Büşra Özdoğan (25%) Designed the review, data collection and supervised the article write up. Wrote the manuscript
- Gökben Hızlı Sayar (25%) Designed the review, data collection and supervised the article write up. Wrote the manuscript.

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