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THE IMPACT OF THYROID HORMONE LEVELS ON CONSUMPTION PROCESSES

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ABSTRACT

Since the inception of humanity, individuals have had various needs. While these were initially fundamental needs such as shelter, food, and warmth, as society advanced toward modern life, additional needs such as seeking greater variety beyond basic necessities, improved comfort, access to information through the internet, communication with others, entertainment, and sports also emerged. Consumption needs have diversified over time, and the resources allocated for these vary for each person. This diversity is influenced by the individual's metabolic rate, energy requirement, and emotional and psychological state. In the present study, the impact of thyroid gland functions on individuals' metabolic rate, energy needs, and emotional and psychological state was investigated to reveal how these are reflected in their consumption processes. For this purpose, the study comparatively examined individuals aged 18-65 with thyroid dysfunction and those with normal thyroid function. Therefore, it was aimed to reveal the impact of the differences in thyroid hormones and their reflections on the body on consumption preferences, purchasing processes, and spending patterns. The study employed a qualitative method, and a semi-structured interview technique was used. Through snowball sampling, patients who had been tested for TSH, free T3, and free T4 values within the last six months and had no chronic diseases other than thyroid dysfunction were included in the study. Findings were obtained as a result of interviews that were finalized upon attaining data saturation, and explanatory assessments were made regarding the relationship between thyroid function and consumption behaviors. The findings of the study revealed that differences in thyroid hormones significantly affected the consumption behaviors of individuals. It was also determined that changes in thyroid hormones affected consumption behaviors via not only physiological but also psychological effects, and that changes in mood also influenced the consumption processes of individuals.

KEYWORDS: Consumption Habits, Thyroid Hormones, TSH, Free T4.

1. INTRODUCTION

Human behavior is influenced by numerous factors. The most significant variables include genetic makeup, excess or deficiency of hormones secreted by endocrine glands, stimuli from internal and external environments, expectations, life experiences, personality traits, and mood (Aktaş, 2000:224). The factors that influence individuals' behavior are reflected in their consumption processes, and it is thought that hormones and mood are highly relevant in this process.

Hormone is a word derived from Latin and is used to refer to the act of invigorating, stimulating, or activating. Hormones are chemical substances secreted by cells/cell groups and endocrine glands, affecting the functions of target tissues and organs to which they are transported via the bloodstream. Hormones are involved in several physiological processes in the body such as growth, development, reproduction, the nervous system, balance of electrolytes, fluids and nutrients, and regulation of cell metabolism and energy balance (Arthur et al. 2006). Hormones are secreted by endocrine glands, which are located in the endocrine system. The endocrine system and the hormones it produces regulate a number of bodily processes and help maintain homeostasis (Ashwell, 2022). The major endocrine glands that form the basis of the endocrine system in humans are; the hypothalamus, pituitary gland, pineal gland, thyroid gland, adrenal gland, pancreas, ovaries, and testes. Additionally, numerous peptide hormones are secreted from the kidneys (erythropoietin), the heart (atrial natriuretic peptide), and the gastrointestinal system (gastrin).

Within the circulatory and nervous systems, hormones are transported to all cells in the body, where they bind to suitable receptors and trigger various reactions. There are receptors specific to each hormone. The cells and tissues housing these receptors are called target cells or tissues. Hormones allow the endocrine system to maintain homeostasis, which requires sufficient hormone secretion (Arthur et al. 2006).

The thyroid gland is a large endocrine gland. It is situated on both sides of the cartilage structure known as the Adam's apple, which is linked to the upper portion of the sternum bone (Emirzeoğlu and Sancak, 2012). Due to their calorigenic impact, thyroid hormones, which are metabolic hormones of the body, effectively promote tissue growth and development, raising body temperature and the basal metabolic rate, and regulating blood pressure.

Thyroid hormone secretion is controlled by centers in the brain. The hypothalamic-pituitary axis regulates the synthesis and release of thyroid hormones. TRH (thyrotropin-releasing hormone) is secreted from the hypothalamus and travels to the pituitary gland in the lower brain, where it triggers the release of TSH (thyroid-stimulating hormone). TSH is a glycoprotein hormone that is released by the anterior pituitary gland. This hormone stimulates the thyroid gland to secrete enough T3 and T4 to meet the body's requirements. When thyroid hormone levels rise, TSH is suppressed by "negative feedback". Triiodothyronine (T3), thyroxine (T4), and calcitonin are the main hormones secreted by the thyroid gland. The primary hormone secreted by the thyroid follicles is T4. The majority of T3 is formed by the conversion of T4 to T3 in target tissues. TSH is stimulated when thyroid hormone blood levels fall, which raises thyroid hormone output. In circulation, thyroid hormones are found in a form that is highly bound to protein (99.8%), and only the free forms are capable of binding to receptors. While the thyroid gland synthesizes all T4, it produces approximately 20% of T3, with the majority being formed by conversion from T4 in peripheral tissues(Candemir & Ersöz Gülçelik https://sbu.edu.tr/uploads/mainsite/tiroidhastaliklari.pdf)

Numerous clinical disorders such as hypothyroidism, hyperthyroidism, or excessive growth and nodule formation might result from an anomaly in normal thyroid physiology. The condition known as hyperthyroidism is caused by the increased production of thyroid hormones by the thyroid gland , with symptoms including unintentional weight loss, muscle weakness, hand tremors, difficulty sleeping, palpitations, increased blood pressure, thinning and loss of hair, skin thinning and moisture, excessive perspiration, increased bowel movements, diarrhea, irritability, exophthalmos (protruding eyes), irregular menstruation, excessive appetite, goiter, and intolerance to heat (Mulder E. J:1998). Hyperthyroidism causes a general acceleration in metabolism.

Hypothyroidism is a condition that arises from thyroid hormone deficiency or, in rare cases, ineffectiveness of the hormone at the tissue level. Its prevalence increases with age and is more common in women than in men in all age groups (Mulder E. J. 1998). The condition causes a general deceleration in metabolism. Consequent fatigue, muscle weakness, sensitivity to cold, sluggish movement and speech, weight gain, impaired cognitive function, constipation, growth retardation, decreased hearing,

muscle pain and numbness, depression, joint pain, infertility, and bradycardia (slow heart rate) may occur. Dry and cold skin may develop due to decreased blood flow to the skin. Accumulation of matrix glycosaminoglycans in the interstitial spaces of numerous tissues may cause coarse hair and skin, facial swelling, tongue enlargement, and hoarseness (Chiovato et al. 1997; Mariotti et al. 1995). In advanced cases, life-threatening coma may ensue.

While thyroid functions affect numerous physiological and psychological functions, in the study conducted by Duran and İnce in 2021, it was reported that thyroid function tests may even affect mortality in COVID-19 patients (Duran & İnce, 2021).

Due to the wide spectrum of its clinical presentation and the non-specificity of its symptoms, the existing methods for the diagnosis of hypo- and hyperthyroidism are predominantly biochemical. Since TSH secretion is closely associated with the amount of thyroid hormones in circulation, there is a logarithmic-linear correlation between free hormone levels and TSH. For example, even the slightest fluctuations in sT4 levels can cause significant changes in TSH. Thus, TSH serves as the earliest indicator of free hormone changes. Free thyroxine (sT4) levels are the most commonly used thyroid function test after serum TSH levels. It is not advised to evaluate thyroid function tests by measuring free triiodothyronine (sT3) levels first. TSH levels are high and free T4 levels are low in clinical or overt primary hypothyroidism. Primary hyperthyroidism is supported when low TSH is accompanied by high sT4 and/or T3/sT3 levels (Biondi & Wartofsky, 2014).

Causes of hyperthyroidism include Graves' disease, thyroid tumors, thyroid nodules, excessive iodine intake, and thyroiditis, which refers to inflammation of the thyroid gland. Depending on the cause, hyperthyroidism can be treated with radioactive iodine, antithyroid medications, or surgery. Hashimoto's thyroiditis, an autoimmune disease, certain medications, iodine deficiency, genetics, pregnancy, and thyroiditis are among the causes of hypothyroidism. Thyroid hormone replacement therapy is used to treat hypothyroidism (Singer et al. 1995).

Variations in thyroid function tests can result in numerous health issues and also lead to lifestyle alterations. Individuals with low heat tolerance are not expected to use more fuel to heat their homes, and those who frequently feel hungry are not expected to eat less. Similarly, people who are lethargic and exhausted are not expected to go out, exercise, or engage in regular social activities frequently. It is anticipated that during the course of treatment, such undesirable situations originating from thyroid diseases may impact the consumption habits of individuals. The present study aims to identify the reflections of serum thyroid test levels on the consumption processes of individuals affected by thyroid diseases.

2. PURPOSE AND METHOD

The present study aims to determine whether the thyroid gland, which is responsible for hormonal regulation functions, affects the consumption behaviors of individuals. It is aimed to demonstrate how variations in thyroid hormone levels impact mood, energy needs, metabolic rate, and, consequently, psychological effects on the consumption process. In this context, the study aims to compare the effects on consumption behaviors between individuals with thyroid dysfunction and a control group consisting of individuals with normal thyroid function. In this way, the variations caused by differences in thyroid hormones and the consequential psychological effects in consumption behaviors can be revealed.

The study employed a qualitative methodology based on the rationale that the effects of the thyroid gland on consumption are a personal experience. Each individual has a distinct thyroid hormone level, and it is thought that people with hyperthyroidism or hypothyroidism in particular have varied experiences with these processes in their lives, as well as various emotions and psychological effects throughout them.

In qualitative studies, detailed face-to-face interviews are typically semi-structured or organized in the form of questions, with in-person interviewees providing thorough responses. This enables a comprehensive examination of the subject being studied (Tekin & Tekin, 2006). The semi-structured interview technique was adopted for the purpose of this study.

Although the researcher can choose the questions beforehand in semi-structured interviews, participants are given the chance to express their own experiences and thoughts in their own words. This adaptability makes it easier to guide the interview and enables the gathering of qualitative data that can be compared and analyzed (Cohen & Crabtree, 2006). The saturation point was taken into account when deciding on the number of interviewees in the study. When the concepts and processes in the participants' answers start to recur, the saturation point is reached (Patton, 2018: 246).

3. STUDY GROUP

The study group consisted of individuals aged 18-65 residing in Erzurum. Individuals with hyperthyroidism or hypothyroidism along with those without thyroid disorders were interviewed during the field study using the snowball sampling method. The participants were asked to indicate their TSH, free T3, and free T4 test results using the e-Nabız system, and care was taken to ensure that these tests had been biochemically examined within the six month. In order to clearly demonstrate the reflections of the participants' hormonal status on their consumption process, it was also aimed to establish that they did not have any other chronic diseases.

3.1. Figures And Tables

Table 1: Participant Information.

	AGE	GENDER	GENERAL HEALTH STATUS	PRESENCE OF THYROID-RELATED DISEASE	TSH	Free T3	Free T4
1	25-34	Female	Very Poor	Yes	10.73	3.20	0.72
2	55+	Female	Poor	Yes	8.43	3.00	0.74
3	35-44	Male	Moderate	No	2.13	2.7	1.2
4	25-34	Male	Good	No	2.34	3.2	0.9
5	25-34	Female	Good	No	2.57	2.1	1.15
6	25-34	Male	Good	No	1.61	3.2	1.6
7	35-44	Female	Good	No	2.03	2.4	1.16
8	25-34	Female	Good	No	1.68	2.2	1.1
9	25-34	Female	Good	No	2.49	2.9	0.9
10	35-44	Female	Moderate	No	1.93	3.03	0.96
11	25-34	Female	Moderate	No	2.16	2.88	1.25
12	45-54	Female	Poor	Yes	8.00	3.09	0.88
13	45-54	Female	Moderate	Yes	6.10	2.60	0.78
14	35-44	Female	Good	Yes	5.84	2.4	0.89
15	35-44	Female	Moderate	Yes	7.54	2.75	0.80
16	35-44	Female	Poor	Yes	119.6	1.69	0.2
17	35-44	Male	Poor	Yes	29.26	1.95	0.68
18	35-44	Female	Moderate	Yes	6.5	2.5	0.81
19	45-54	Male	Very Good	No	1.52	2	1.32
20	55+	Male	Poor	Yes	0.16	2.51	3.50
21	55+	Male	Poor	Yes	<0.008	3.19	3.46
22	25-34	Female	Poor	Yes	<0.008	4.43	2.84

The majority of the participants are in the age groups of 25-34 and 35-44. This indicates that the study sample is predominantly composed of young and middle-aged adults. There are fewer participants

in the age groups of 45-54 and 55+. In the sample, the female participants are distinctly in the majority. While the number of male participants is 7, the number of female participants is 19. The majority of the participants described themselves as being in relatively "Good" or "Moderate" health. However, some participants, particularly those with thyroid disorders, stated that their health status was "Poor" or "Very Poor". The sample was formed in a balanced manner from individuals with and without thyroid disorders: Regarding the presence of thyroid-related disease, those who answered "Yes" constituted approximately half of the sample. Those who answered "No" represented the control group with normal thyroid function.

4. FINDINGS

The study questions were prepared in accordance with the literature to identify the effects of thyroid hormones on the body and how these effects reflect on the consumption process. The participants were asked the questions derived from the literature review in person, and their answers were recorded. The findings obtained from the interviews will be assessed under the specified headings.

4.1. Thyroid Disease and Treatment Processes

The participants were asked whether they had any thyroid-related diseases and details about their treatment processes. 12 of the participants stated that they had a thyroid-related disease, while the others stated that they did not suffer from any thyroid-related problems. The thyroid-related disorders specified by the participants were cancer, hypothyroidism, and hyperthyroidism. While some participants stated that they did not monitor their treatment processes, some stated that they paid close attention to their treatment processes by setting daily reminders. Participant 1 stated, "I have hypothyroidism, but I don't pay attention to my treatment.", while Participant 2 stated, "I am a hypothyroid patient, but taking medication every day is very difficult. Sometimes I forget, sometimes my medication runs out, and I think nothing will happen from missing a few days, so I don't take it.", revealing that they did not prioritize their treatment process. Participant 14 stated, "I have Hashimoto's disease (the cause of hypothyroidism) and when I don't pay attention, I feel very bad. I have weight problems. For this reason, I follow the doctor's instructions exactly and keep my medication by the bedside.", showing a high level of compliance with treatment and an internalized sense of responsibility towards the disease. Participant 16 stated, "I had thyroid cancer, underwent surgery and radioactive iodine therapy. The processes I went through were very difficult, so I pay close attention to my treatment.", indicating that they are trying to increase their sense of control over their illness. Hypothyroid Participant 17 expressed that their fear persists and that they are very meticulous regarding their treatment as a reflection of this fear, stating: "I learned I had thyroid cancer when I had no complaints, and the term scared me a lot. I had surgery and my thyroid was removed. They are trying to regulate my hormone levels with medication, but I feel very bad and take great care in my treatment in order to regain my former health. I even go to doctor's appointments a week early.". It is apparent that individuals facing a serious illness such as cancer take their treatment more seriously than other thyroid patients. Essentially, this shows that the more individuals take their illness seriously, the more carefully they follow their treatment process. Therefore, the patients' level of seriousness also affects their medication consumption, and it is notable that individuals who are meticulous about their treatment processes consume medication differently than others.

4.2. Energy Levels, Socializing, Nutrition

Thyroid hormones not only ensure normal growth and development but also increase the sensitivity of tissues, particularly heart tissue, to catecholamines; thereby playing a role in regulating various homeostatic processes, including energy and heat production (Gharib H et al. 2010)). Thyroid hormones have been shown to have a significant impact on energy levels, and individuals with TSH, free T3, and free T4 levels outside the specified ranges may also experience dietary changes. The participants were asked whether they felt lethargic and whether their energy levels affected their daily frequency of meals and social interaction. The majority of participants with normal thyroid function (euthyroid) reported varying levels of energy throughout the day. Euthyroid Participant 9 stated, "My energy level certainly affects my nutrition and socializing. I eat more meals during the day, I'm very active socially, and this affects my spending.". Euthyroid Participant 4, who had recently undergone a general health screening, stated, "My energy levels are good overall. When I have low energy, my eating frequency can change, I might even go to bed hungry. But when I have high energy, I have much more appetite and can be more social. Being more social causes me to go out more and spend more money.", indicating that their energy

level greatly affects their daily routine. Hypothyroid Participant 11 stated, "My energy is generally high and my appetite is fine. It decreases a lot when I am tired or sad, but I rarely feel that way. Because I have high energy, I don't want to stay home much, I go out, walk around, spend time outside with my friends and family, and this causes my spending to be very high.", emphasizing that increased social participation leads to increased economic spending, which indicates that physical well-being can indirectly affect an individual's consumption behaviors and daily practices. Similarly, Participant 19, who is euthyroid and reports high energy levels, stated, "My energy level doesn't affect my dietary habits, but it can sometimes affect my social life because when it is low, I just want to stay home and rest. My social life doesn't affect my spending much, meaning if I am going to spend money, I will spend it anyway.".

All of the patients with hyperthyroidism reported high energy levels. Participant 22 stated, "My hormones are always regulated with medication because I don't have a thyroid gland. When I take too much medication, I get palpitations, and when I take too little, I feel extremely tired. Currently, they are trying to suppress my TSH level due to my treatment, and I am in a hyperthyroid phase. I have a lot of energy, so I tend to make unnecessary purchases. For example, I go for a walk outside and buy things I don't need. My expenses have also increased due to my hair loss. I buy many hair care products and vitamins. This increases my expenses and causes me to consume products I don't normally consume.", associating increased consumption with their energy levels rather than personal preference.

Participant 12, who has hypothyroidism, stated, "I wake up so exhausted every day that I struggle to carry out my daily routines. I try to socialize, but only a little, so my spending is also low.". When asked about their energy levels, Participant 16 stated, "I feel that it is extremely low. I take vitamins, but it does not help. This also affects my mood. I feel depressed, I don't feel like socializing, I just want to lie down, which naturally reduces my spending.". These statements reveal that significant decreases in energy levels are not merely a physical problem but also negatively affect the individual's mental state, participation in social life, and economic behavior. Furthermore, based on the participants' responses, it was observed that the individuals tended to adopt a more active lifestyle when their energy levels were high, their frequency of socializing and participation in outdoor activities increased.

4.3. Thyroid Hormones, Shopping, and Spending

By regulating the energy balance of critical metabolic pathways, the thyroid hormone plays a significant role in the body's energy storage (Liu and Brent, 2010). Changes in the process and quantity of consumption may be seen as a result of this role's impact on the body's physiological and psychological states. The participants were asked whether their energy levels had caused any changes in their shopping frequency and spending, and the responses of euthyroid and non-euthyroid individuals were compared. Hyperthyroid Participant 19, who reported generally high energy levels, expressed changes in their shopping and spending as follows: "I generally have high energy, I prefer to sleep less and move more, which increases my shopping and, naturally, my spending.". Despite being euthyroid, Participant 10 reported that their energy levels varied, stating, "My energy level also changes my perspective on shopping. When my energy is high, I invest in myself and my environment more, both materially and emotionally. Because of this, my amount of shopping increases.", indicating that fluctuations in energy levels affect consumption behavior. According to this participant, individuals' purchasing tendencies are influenced by their increased energy levels, which also affect how much they invest materially and spiritually on themselves and their social environment. Participant 4, another hyperthyroid individual, stated, "I generally have high energy, so I shop more often when that is the case. Also, even though my spending increases when my energy level is high, I think the spending I do makes me happier.", offering a different perspective and revealing that increased energy levels not only boost consumption frequency but also enhance the subjective happiness attributed to spending. Hypothyroid Participant 15 stated, "My energy level is always low, and my thyroid-related levels are off the charts. I do not go shopping as much now because my energy is low compared to when I was healthy, sometimes I even ask my siblings to buy the things I need. I can say that I spend less because I don't have the energy to go out and shop myself.". This suggests that persistent low energy levels restrict shopping behavior and that the perception of physical inadequacy reduces the frequency and amount of consumption. Hyperthyroid Participant 20 emphasized that even temporary drops in energy levels can negatively affect motivation for shopping and consumption behavior, stating, "Right now, my energy level is high, so my spending is high, but when my energy is low, I cannot even be bothered to go out for the groceries, so my spending decreases,

even if only slightly.".

4.4. Online Shopping

When asked if they tended to buy online more or less depending on their energy levels, the participants' answers revealed that those with hypothyroidism, in particular, had a tendency to shop online excessively. Specifically, hypothyroid Participant 1 stated, "I cannot be bothered to go out, so I turn to online shopping. I've even downloaded all the grocery store apps and haven't gone grocery shopping in person for months.", indicating that the low energy and motivation levels caused by hypothyroidism changed their shopping behavior channel preference, leading them to prefer online shopping over in-person shopping, which requires physical effort. Hypothyroid Participant 13 expressed their attitude towards online shopping, stating, "I shop online, sometimes I even order bread from the grocery store apps because it can be difficult to buy bread on my way home from work.". Euthyroid Participant 7 stated, "I shop online, but I do so particularly when I cannot find the products I'm looking for by browsing in-person.".

4.5. Energy-Boosting Dietary Supplements (Vitamins)

The participants were asked whether they sought energy-boosting supplements such as vitamins when they felt low on energy, and whether their consumption of these vitamins was related to their thyroid conditions. The statements obtained in this context were used to try to assess whether the participants' use of supplements was based solely on a general feeling of fatigue or on low energy levels caused by thyroid problems. Participant 15, who had hypothyroidism, specifically stated that they felt very low in energy after this disease, saying, "I didn't know anything about vitamins before, but now I constantly consume vitamins that boost my energy.", directly linking their supplement use to the lack of energy they experienced after hypothyroidism. Participant 1 stated, "My doctor told me that I might feel weak due to my hypothyroidism, so sometimes I take supplements. I don't know if it's related to aging or illness, but I can't keep up with life, probably because of my low energy.". This participant associates low energy with both hypothyroidism and other conditions such as aging and explains that supplement use is a coping method in this uncertainty. Another participant with hypothyroidism (16) stated, "There is not a day when I do not take vitamins. One morning I wake up with pain in my legs, so I immediately take magnesium, or if I feel weak in general, I take vitamin D. I even take fish oil as an extra, and on the days I take these, my energy is much better than on the days I don't.". This participant views dietary supplements as functional tools that directly affect energy levels and alleviate physical symptoms. They also reveal that such supplements have become almost indispensable in their daily life. Participant 14, reporting that they have hypothyroidism due to Hashimoto's disease, stated, "My energy is sometimes low, but I never thought it could be improved with supplements. However, if they are effective, I will definitely not neglect them from now on.", showing that they had not established a relationship between the increase in energy levels and dietary supplements. When the participants who did not have any diseases such as hypothyroidism or hyperthyroidism were asked whether they took dietary supplements, varying answers were received. For example, Participant 10 stated, "I have never used any dietary supplements in my life, and I hope I won't need to in the future.", while Participant 19 stated, "I take them occasionally based on my test results and doctor's advice, like vitamin D, but I don't use them because of a perceived energy deficiency, I base my use on biochemical results and medical necessity.". Participant 5 stated, "I don't feel my energy levels are low, I'm generally fine, so I don't use vitamin supplements.", indicating that they did not need such products. Participant 22, who has hyperthyroidism, pointed out the effects of hyperthyroidism on changes in consumption, stating, "My hair is falling out excessively, so I used supplements more than I ever have before. Also, to avoid falling below my ideal weight, I take certain vitamins like fish oil on my doctor's advice. That is because I lost weight during this process.".

4.5. Thyroid Hormones and Mood

Depression is a mental disorder that is highly prevalent in society. Previous studies show that one in five individuals experience depression at some point in their lives. In screenings conducted at a specific time across the general population, depression is detected in approximately 3 out of every 100 men and 6 out of every 100 women. Furthermore, it is reported that women are approximately twice as likely as men to develop depression or seek professional help for this condition. In some cases, depression develops as a result of illness, while in others, it may be related to the underlying cause of the illness. For example, hormones that cause illness, such as in hyperthyroidism, can also lead to depression (Mete,

2008:4). Thyroid hormones are closely related to brain functions and mental state, and studies have indicated that psychiatric symptoms are encountered in hypothyroidism (Bauer and Whybrow 2001). Pointing out the relationship between depression and thyroid hormones based on a literature review, the participants were asked to describe their moods. Some of the participants stated that they felt depressed, while others described themselves as happy individuals. Participant 1, who has hypothyroidism, described changes in their emotional state, stating, "I am extremely irritable and tense, and my tolerance level is very low.", while Participant 15, who also has hypothyroidism, simply stated, "I am depressed.". Participant 17 expressed their susceptibility to depression, stating, "I am very prone to depression, I often push myself to be happy and energetic.". In this context, the focus was on how the participants' mental states were reflected in their daily life practices and, in particular, their consumption behaviors. In order to understand whether depressive moods affected individuals' consumption preferences, the participants were asked questions about the possible effects of their moods on their consumption behaviors.

4.6. Depression and Consumption

In the related literature, numerous studies examining the relationship between depression and consumption stand out. For example, in the study conducted by Jackson et al., it was investigated whether chocolate consumption and depression were correlated and it was found that individuals who consumed dark chocolate in particular had a significantly lower likelihood of clinical depressive symptoms. The study conducted by Shin et al. revealed that dark chocolate consumption, in particular, reduced negative emotions. Studies examining food consumption in general have investigated the relationship between diet, healthy consumption, and depression. For example, Wang et al. found that individuals who consumed magnesium, vitamin B12, fiber, fruits, vegetables, and fish had fewer depressive symptoms, while Zhu et al. examined the changing consumption habits of individuals with depression and reported that individuals with depression had irregular eating habits, varied their meal times daily, spent more money on dinner, chose less variety in food, ate breakfast less frequently, and generally preferred lunch and dinner. A review of the literature shows that food preferences affect depression and, at the same time, individuals with depression modify their meal frequency and food choices, indicating a reciprocal interaction between consumption and depression. Furthermore, previous studies have found a correlation between TSH levels and depressive symptoms. For example, in the study conducted by Özen et al., depressive symptoms were detected in 51.4% of patients diagnosed with hypothyroidism, and the hypothyroidism treatment administered resulted in TSH levels returning to normal in all cases, while leading to a reduction in depressive symptoms in 75% of patients. In this context, participants with thyroid-related diseases and those with no chronic diseases and no thyroid-related diseases were asked to describe their moods and state whether these affected their consumption. Euthyroid Participant 6 stated, "My mood is quite good, but I sometimes feel tired, and my mood does not affect my consumption much," and euthyroid Participant 20 stated, "I am peaceful and happy, my mood does not really change my consumption," while euthyroid Participant 8 stated, "I generally have a healthy and energetic mood. My mood generally determines my consumption process, meaning it affects my consumption." These statements reveal that while mood does not significantly affect consumption in some individuals, it directly shapes consumption behavior in others. Hypothyroid Participant 5 expressed the relationship between mood and consumption as follows: "Sometimes I feel pessimistic, sometimes happy, and these moods affect my consumption. That is, both my shopping habits and my food consumption. For example, when I am happy and energetic, I shop more, but when I am in a depressive mood, I don't even want to go out." Similarly, Participant 11 answered in line with most other participants and described the relationship between mood and consumption as follows: "Sometimes my mood is bad, sometimes my mood is good. When I am energetic and happy, my consumption increases." Participant 10, who also has hypothyroidism, stated, "My mood is generally balanced. External factors change my mood. The negative things I see have a traumatic effect. These feelings affect my consumption. When my mood is low, I don't want to create or think because my future concerns begin to surface." Hypothyroid Participant 18 stated, "I am very depressed and tense, and of course this is reflected in my consumption process. For example, when I'm nervous and tense, I have less appetite, and I consume less of the things I normally crave." Participant 11, who has the same condition, stated, "I'm depressed at times and sometimes I'm fine, and my consumption is obviously affected by these moods. When a person's mood is low, they don't

want to go out or sit down and eat with appetite." These statements illustrate how hypothyroidism can directly affect individuals' mood swings and consumption patterns. Participant 15, who also has hypothyroidism, stated, "I am generally depressed, I am very rarely happy. When I feel depressed, my consumption changes a lot," indicating that mood causes significant fluctuations in consumption behavior and that changes in mental state directly affect the consumption process. Participant 1 expressed the effects of feeling tense on consumption, stating, "When I'm nervous and tense, I don't want to leave the house, and when I don't leave the house, my consumption and therefore my spending inevitably decrease." Participant 20, who has hyperthyroidism, stated, "I don't think I've ever been depressed in my life, but I think being happy can increase my spending," while another hyperthyroid Participant (21) stated, "I don't get depressed, but I do have moments when I feel restless and unhappy. and even then my eating and drinking habits change. I think if I were depressed, it would affect me a lot.", expressing that they have not experienced depression, but that emotional states such as happiness and sadness can affect their consumption.

4.7. Rationality in Making Economic Decisions

Within the scope of behavioral economics, numerous situations that influence individuals' decision-making processes are encountered. One such concept is System 1 and System 2 thinking. The mutual interaction between these two systems is highly significant in decision-making mechanisms. While fast thinking generally simplifies matters, it can sometimes lead to erroneous decisions and a departure from rationality. On the other hand, slow thinking allows for more careful and attentive evaluations, but it can make the process more laborious and time-consuming (Mola, 2024: 66-68). In order to reveal whether the participants' decision-making processes were affected by biological factors such as thyroid-related variables, they were asked if they acted hastily when making economic decisions. Participant 18 stated, "I think a lot and am careful when making economic decisions," while Participant 7 responded similarly, saying, "No, I never rush." Participant 13 stated, "My haste varies. I don't rush when I'm going to invest, but I usually rush when I'm going to consume," indicating that they adopt different ways of thinking depending on the situation in the decision-making process, acting more carefully and planned in investment decisions while moving faster in daily consumption decisions. Participant 9, who has hypothyroidism, attributed their hastiness to their financial situation, stating, "If I definitely want something and have sufficient funds, I prefer to buy it immediately rather than delaying or exploring other alternatives." Participant 3 stated, "I am also very impulsive sometimes. Even though I know I will regret it later, I don't want to prolong my decision-making process and make a decision immediately," indicating that they prefer quick and intuitive thinking in the decision-making process and avoid taking time to think, despite being aware of possible negative outcomes. Participant 21, who stated that they rush in the economic decision-making process, stated, "I don't act very slowly in my shopping decisions. I generally try to slow down to prioritize economical and logical options, but it's difficult. I also view shopping as an activity that I enjoy, so I want to have a selective shopping experience, but even if I really want to, I can't slow down. I'm quite fast." This statement reveals that they have a conscious, planned, and experience-oriented consumer profile but can sometimes be hasty. Participant 22 stated, "I can actually be hasty while shopping, but it depends more on my mood and needs at that moment. If I need something and want to buy it, I can be hasty. I can place an order immediately, especially when shopping online. I can be hasty at times in general. I can be especially hasty if the product I want to buy is on sale or if there are statements such as 'last item'. It comes from making decisions under emotional and time pressure," indicating that their hastiness stems from constraints.

5. CONCLUSION

In the present study, it was aimed to reveal how thyroid hormones affect consumption behaviors and the economic decision-making process by modifying their physiological and psychological states. Participants with and without thyroid disease participated in detailed in-person interviews, and the findings were evaluated in terms of rational decision-making, energy levels, mood, socialization, shopping behaviors, and expenditures. The findings of the study show that thyroid conditions have a wide range of effects on individuals' daily lives. Participants with conditions such as hypothyroidism and hyperthyroidism showed notable variations in energy levels. Specifically, the extreme decline in energy levels among hypothyroidism patients limited their consumption activities outside the home and decreased their frequency of social interactions. Participants with hypothyroidism and euthyroid individuals who experienced low energy levels were found to be more likely to use vitamins

and other supplements. On the other hand, hyperthyroidism patients with high energy levels were found to have more active lifestyles, which raises their levels of spending and consumption. The study also found that changes in thyroid hormones may have an impact on purchasing decisions. It has been found that individuals with low energy levels prefer to shop online rather than in-person, and that online shopping is particularly helpful for hypothyroid patients. As a result, it was shown that thyroid functions influence both the amount and, indirectly, the channel of consumption. It is notable that euthyroid individuals typically have high energy levels. However, when their energy levels fall, they shop and socialize less, which leads to a decline in consumption, much like hypothyroid individuals do. The present study demonstrates that mood is influenced by thyroid hormones and influences consumption patterns. Participants in depressed moods were shown to have decreased appetite, desire to go out, and willingness to shop, whereas those in happy and enthusiastic moods boosted their food consumption and overall spending. Notably, individuals with hypothyroidism and hyperthyroidism exhibited more apparent mood changes in their consumption processes. Thyroid hormones are therefore thought to influence both psychological and economic behaviors. Significant variations were found when the individuals' economic decision-making processes were investigated. Some individuals stated that they planned their shopping and not acted hurriedly, while others suggested that their hurried behavior was influenced by their emotional state. One notable finding is that impulsivity is more common in hyperthyroid individuals, although it varies significantly among euthyroid individuals. Another finding from participant in-depth interviews is that hypothyroid individuals may feel cold even in non-cold weather, which could result in higher natural gas use. Overall, the study's findings demonstrate that biological, psychological, and emotional factors also significantly influence consumption patterns, therefore, these patterns cannot be fully attributed to classical economic factors such as income, price, and personal preferences. Through mood and energy levels, thyroid hormones appear to have a significant but indirect impact on spending, consumption, and decision-making. In this context, the present study emphasizes the need for a more comprehensive framework for analyzing consumption behaviors and provides a biologically grounded viewpoint to the literature on behavioral economics.

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