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Designing Stress-Relieving Small Inner-City Park Environments for Teenagers

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Abstract: All over the world, teenagers suffer from stress-related mental illness, and research shows that being in natural environments can bring about recovery. However, centrally located areas in cities where teenagers like to hang out are being densified at the expense of green spaces. The health-promoting function of small, centrally located parks is thus becoming increasingly important. This study examines Iranian teenagers' assessment of the restorative potential of small, centrally located parks. Such parks include attributes typical of city centers, such as trees, lighting, park benches and flowers. A discrete sampling method was used to collect responses from a sample of 265 Iranian teenagers. They were asked to randomly rate the perceived recovery potential of digitally designed models of green spaces. The results show that the teenagers evaluated the presence of water in waterbeds to have a strong positive effect on recovery possibilities. The entire green area should also be screened off from the rest of the city and convey a soft impression. It should have lighting from tall lampposts, contain plant beds and, not least, have distinctive cultural attributes such as crescent arches and fountains. In the discussion of the article, we address the practical and theoretical implications of the findings.

Keywords: restorative environment; stress reduction; attention restoration; evidence-based design; perceived sensory dimensions

Citation: Nosrati, A.; Pazhouhanfar, M.; Chen, C.; Grahn, P. Designing Stress-Relieving Small Inner-City Park Environments for Teenagers. *Land* **2024**, *13*, 1633. https://doi.org/10.3390/land13101633

Academic Editors: Richard Smardon and Maria Ignatieva

Received: 4 September 2024
Revised: 3 October 2024
Accepted: 6 October 2024
Published: 8 October 2024

1. Introduction

The teenage years are a sensitive phase in human development, as they involve a transition from childhood to social, psychological and physical maturity. During adolescence, humans must adapt to peers and learn to understand and function in adult life. At the same time, great demands are placed on them from school, parents, peers, society, influencers and social media about how a teenager should be and look in order to be accepted. Research shows that teenagers often suffer from stress, loneliness, low attention span and depression and feel maladjusted [1,2]. In addition, many are far too sedentary, which might lead to obesity and an increased risk of type 2 diabetes and cardiovascular disease [3,4]. A growing problem which may explain ill health is that teenagers spend more and more time indoors alone, where a lot of time is spent on computers and mobile phones. They need to socialize more with other age groups, as well as with other teenagers [1–5]. Early socially, physically and psychologically stimulating environments, not least in adolescence, seem crucial in avoiding mental and physical ill health in adolescence and later in life [3,5]. Extensive research shows that staying in urban green areas is positive for people's health, showing statistically significant relationships with increased physical activity, increased social togetherness, better mental health, lower stress levels and increased ability to focus

attention [6–10]. In addition, several research studies show that urban parks can be health-promoting assets in terms of offering teenagers opportunities for physical activities [11–14], social stimulation [14–16] and mental recovery [17–21].

1.1. Teenagers' Need for Parks

In order to plan and design health-promoting parks for teenagers, it is important to understand their needs for parks: how they are used, as well as teenagers' preferences for the appearance and content of parks. Three researchers who carried out important early studies in the field are Mats Lieberg, Herb Childress and Patsy Owens. They discovered that teenagers like to seek out centrally located public environments where people like to hang out and where various activities are often taking place. This naturally leads to social relations in public open spaces. The researchers found that the public space acts as a stage for teenagers where they can display their external attributes, such as clothes, music taste and appearance, expressing themselves verbally but also showing off their skills in, for example, skateboarding [22–24]. It is, however, also about teenagers withdrawing from the outside world and the adult world to be with peers and other teenagers. In these latter cases, there is a clear need to avoid other age groups and to be able to meet other teenagers and teenage groups. However, in addition to the need for community, teenagers also need more private and quiet refuges as a counterpoint to the stress and bustle of everyday life [22,23]. Thus, a couple of clear landscape features that support these needs can be identified: places where teenagers can retreat to socialize, places for interaction and confrontation with all age groups, not least with the adult world [22], and retreat sites with natural features, preferably sites that offer clear prospect-refuge sites [25]. But teenagers are often met with annoyance, as they can be loud and lively at times. Thus, the presence of teenagers in a park can lead to other age groups hesitating to visit or even avoiding the park [24]. A solution that has sometimes been implemented is to create specific parks for teenagers. However, designing special places for teenagers does not work at all. Such attempts have been proven to isolate rather than integrate teenagers into the broader community. In addition, they may avoid places designed specifically for teenagers. An alternative approach to design and policy must be to integrate teenagers into existing public spaces by adding certain design attributes, rather than developing places specifically for teens [23,26–29].

Recent years of research have largely confirmed the research results of the three pioneers. Teenagers often choose to visit centrally located public open spaces [15,30,31]. They want to seek out public environments where people like to hang out and where various activities are often taking place [20,21,32] to be able to do sports and play [14,31,33–35], but also to be able to withdraw alone or with friends to de-stress [20,30]. The result of several research studies is that what primarily determines whether teenagers choose to visit parks depends on the distance to and/or accessibility of the parks [14,21,31]. Others claim that it mainly depends on the size of the parks [17,36] or the maintenance of the parks, such as whether they are clean and whether benches and playground equipment are intact and functional [33,37]. However, several other studies claim that it mainly depends on whether the park is judged to be safe and secure to stay in [12,15,20,38].

Rigolon and Németh [39] have summarized requirements for parks for teenagers by introducing a quality index of parks for youth (QUINPY). It contains the parameters of structured play diversity, natural features, park maintenance, park safety and park size. The size is—as e.g., Feda et al. [17] and Costa et al. [36] state, an important characteristic of parks. If the park is large enough, it provides space to do more physical activities [31], to be able to get away from noise [34,38], to be able to withdraw from the hustle and bustle of the city [17] or to be able to feel that you are left alone and at peace—with friends or by yourself [20,30]. If the park is large enough, it can also become multifunctional [36].

Research covering all age groups also shows that larger green areas provide space for more physical activities, but also space to get further away from the city's noise, rushing people and traffic, and thus increase the opportunities to reduce high stress levels and restore capacity regarding directed attention fatigue [40–42]. However, in the endeavor to

achieve sustainable urban planning, the smart, compact and green city has been highlighted as an ideal, characterized by high density, mixed land use and attractive green infrastructure. In the pursuit of an increasingly dense city, many green areas are thus disappearing, while researchers warn of the consequences this will have [43–45]. The restorative value of small urban green areas is thus of great interest within the framework of the smart compact city, where the content, functions and design of green areas are valued for their contribution to urban sustainability [9,46,47].

1.2. Health-Promoting Small and Centrally Located Parks

However, relatively few studies have investigated the health-promoting value of small centrally located parks. They often contain cultural attributes such as sculptures, fountains and flower plantings [48–51]. From a theoretical perspective, small parks with cultural content can be health-promoting. Stephen Kaplan [52] argues that well-designed small parks with cultural content, such as Japanese rock gardens, should be able to provide recovery from attention fatigue. Likewise, Roger Ulrich claims that small health gardens at hospitals can provide recovery from high stress levels [53]. Small urban parks with cultural content should therefore be able to promote health in terms of stress recovery and recovery from attention fatigue. Some studies also show that small urban parks lead to mental recovery [48,54,55] and attract visits, even if people have to walk longer distances [50]. The mental recovery provided by small parks cannot be related to physical activity, but to how the design and content of the parks work restoratively when the visitor is affected by high stress levels and/or attention fatigue [54]. Although the slightly larger pocket parks may provide better opportunities for recovery, the design of the parks seems to be most important, where above all, vegetation is found to be decisive [48,55]. Research shows that the cultural characteristics of urban parks give them identity and contribute to a sense of place, placing attachments to personal as well as community mental health [56–59]. However, studies of young people's demand for qualities in urban environments show that cultural attributes are often missing in larger cities [60,61].

Many researchers claim that more research is needed to find out how parks should be designed to meet the user needs of teenagers, who are considered to be an understudied group [62–66]. Wales et al. [67] argue that there is a great need for research that can identify specific design attributes of outdoor environments that support young people's health and well-being. We find that this particularly applies to centrally located small parks. Consequently, the aim of this study was to investigate design features regarding their attractiveness and ability to provide teenagers with mental recovery. The goal is to present a number of attributes that can be used in the design of small centrally located parks, which can increase the attractiveness of the parks and promote mental recovery.

2. Methods

The main purpose of this study was to investigate and evaluate the effect of design attributes in small centrally located parks regarding mental recovery in teenagers. To achieve this goal, this study used the discrete choice method, which analyzes individuals' preferences based on their choices. Individuals were presented with a set of hypothetical options and asked to select their preferred option based on their priorities and preferences. Each option consisted of a combination of different levels of functionality. This method enables researchers to explore individuals' values and priorities regarding the desired characteristics of a product or service [68]. Unlike most studies that rely on written descriptions of park features [69], this study incorporated visually visible features by providing participants with designed, digital color photographs. Studies show that exposure to realistic natural environments gives participants opportunities to experience their health-promoting properties. In a study where participants were exposed to a digital virtual environment, they experienced significant improvements in vitality, mood and perceived restoration outcomes [70]. This discrete choice method has been widely used in health economics research in high-income countries [71]. In addition, it has been used in various other

research domains, including tourism, transportation, economics, health, architecture and sports activities [33,72–74]. All images in figures and tables in the article were made by the authors.

2.1. Participants

The respondents voluntarily participated in this research. Only individuals between the ages of 13 and 19 were eligible to participate in the survey, as this aligned with the research subject [75]. Questionnaires were distributed among educational groups, and participants were asked to complete a consent form to participate in the study. For those participants who were under 18 years of age, i.e., underaged, consent was also required from the guardian. No sensitive information was collected, all data were anonymized and all aggregations of responses were at the group level. All study participants—together with their parents/guardians if underaged—gave their written informed consent to participate in the study, which was in accordance with our professional regulations, the Code of Ethics of the World Medical Association and the Declaration of Helsinki [76], obtaining ethical approval for this study. When they expressed their consent, the questionnaire was activated.

2.2. Primary Outcome

Perceived restorative potential (PRP) is a global, valid and reliable measure of how participants assess an area's capacity to help them recover from being overwhelmed, stressed and exhausted. It has come to be used more and more frequently and has been used in several studies similar to this one [77,78]. Perceived restorative potential is measured by instructing subjects to do the following: recall a time when you felt overwhelmed, stressed, tired and anxious. Reflect on how you felt in that moment and put yourself in that mind set. Continue to reflect on this mind set as you view the pictures and imagine yourself in each environment. For each of the images presented, rate the degree to which you think being in that environment would be good for you to take a break and make you feel less stressed and anxious, using a scale from 0 (not a good place for a break at all) to 100 (very much a good place for a break).

In this study, the instructions were modified dependent on the participants being students and read as follows: "Imagine it is the middle of the day, the weather is relatively pleasant. Your class has just finished and you are leaving the school premises. You are walking home alone and feel mentally tired due to concentrated effort during the lessons. Therefore, you need a short break for maximum recovery before returning home and continuing academic pursuits." Based on this question, the participants chose the park that they believed could best provide them with rest and recovery.

2.3. Identification of Design Attributes and Levels

In the development of evidence-based health design, knowledge is needed about how both overall qualities and the design of individual attributes and details can work in a health-promoting way [9,79]. A large number of attributes with different designs have been highlighted in various research studies, and there has been a need to bring some order to this—some kind of hierarchy of superior and specific characteristics. Not least, it is important to be able to use the results in practical design and planning [79]. An increasingly used way of describing the overall spatial characteristics is the eight Perceived Sensory Dimensions (PSDs) [80]. These have been shown to be valid and reliable when it comes to describing the overall characteristics of green areas [60,81,82]. Knowledge of the unique characteristics of these eight PSDs and their attributes needs to increase in order to better plan and design attractive and health-promoting parks [83–85].

Dense inner-city environments often have small parks, and if well-designed, people may experience one or more PSDs in these environments. The PSD that visitors most often experience in inner-city environments is PSD Cultural, which often co-occurs with and is enhanced and supported by PSD Social, PSD Diverse and PSD Sheltered [86]. PSD

Cultural consists of attributes such as fountains, sculptures, planting beds, trees, flowers, exotic plants and water elements such as canals and ponds [80,87,88]. PSD Social is about social meeting places, with features such as paths, lighting, benches and tables [88]. PSD Diverse is about a variation in shape and color in the park, for example, regarding trees and flowers, while PSD Sheltered contains functions that allow the visitor to be protected and have control over the environment, which can be facilitated by bushes, small hills and fences [80,87,88]. Several other studies also mentioned these attributes being important in green areas with a cultural character, but also added arches and garden streams [89–91]. Several studies of small, centrally located parks suggest a number of important levels or variations of these attributes, which we chose to include in this study (below and Table 1).

Table 1. Attributes and their related levels.

Attributes	Levels	Description		
Water features	**Pond** **Garden stream** **Fountain**			
Seating	**Wooden** **Concrete** **Metal**			
Arch	**Square arch** **Crescent arch** **Not present**			
Pavement	**Paving stone** **Natural flagstone** **Paving stone–grass**			
Lighting pole	**High-base** **Medium** **Short-base**			
Sculpture	**Present** **Not present**			

Table 1. *Cont.*

Attributes	Levels	Description		
Fence	**Wooden** **Concrete** **Metal**			
Raised planting bed	**Present** **Not present**			

Based on our literature review, the following attributes and levels were finally selected. We chose three levels of water features, namely ponds, fountains and garden stream [69,92–94]. Moreover, we chose three types of seating: wooden, concrete and metal park benches [95–98]. In addition, we chose two levels of arches in this study: square and crescent [90,91,99]. Based on our reviewed studies on pavement, we chose paving stone, natural asymmetric flagstone and paving stone–grass surfaces as suitable levels for pathway paving [33,48,92,100,101]. We chose to investigate the design of lighting poles at three different levels—long-base, medium-base and short-base [89,100,102,103]. Based on the reviewed literature, we chose a colorful symbol of traditional Iranian windows and decorations, which was presented in the form of a sculpture in the park, which can attract young visitors [66,96,104,105]. The levels of the sculpture attribute were present or not present. We chose three types of material regarding fences in our study: wooden, concrete and metal [48,100,103,106]. The last attribute we chose to examine was raised planting beds, where we examined environments with or without raised planting beds [66,69,103].

Table 1 shows all selected attributes and their respective levels in this study. These were inserted into images with different scenarios where grass, trees and flowers were included as fixed elements.

2.4. Scenarios and Choice Sets

In the experimental design process, a combination of six three-level factors and two two-level factors was used to generate a diverse range of colored digital scenarios that participants might encounter. While the full factorial design would have resulted in 2916 (2^2*3^6) possibilities, this approach was deemed impractical due to the sheer number of choices and the potential complexity of the questionnaire. Instead, a fractional factorial design utilized to identify a subset of optimal choices. Not only did this method reduce the number of tests required, it also facilitated the optimization of both the selection process and questionnaire content. Using SAS version 9.2, the attribute and level evaluation yielded 72 options (or 36 selection sets) for park design [107]. Subsequently, digital simulations were conducted in SketchUp software version 2020, producing 72 distinct digital scenarios that were organized into six blocks, each containing six selection sets. Next, a digital virtual park was created using the selected attributes and levels listed in Table 1, with the aid of the fractional factorial design. The initial park design encompassed a compact local park spanning around 6500 square meters, modeled after an Iranian garden and situated amidst residential areas, roads and mountains. The design incorporated various desired features conceived by the researchers, along with some design attributes that were adapted and modified from pre-existing SketchUp digital models obtained from the 3D Warehouse repository. In the final design, the garden stream was changed from a curved basin to a rectangular pool, and the boundaries of the raised planting bed were made significantly lower than in the original design (Table 1). A random classification procedure was applied to the collection of alternatives, ensuring that each block contained six sets of selections.

Each block presented 12 digital model views in the same size and position. The design of the assessed digital view was deliberately curated to guarantee that all relevant attributes and levels corresponding to the block classification were clearly visible to the respondents (Table 2 and Figure 1). Ultimately, the digital designs were exported as high-quality mpg files using V-Ray software version Next v5.10.02, ready to present in the survey.

Table 2. An example of block classification extracted with SAS version 9.2.

Alt	Water Features	Bench	Lighting Pole	Pavement	Raised Planting Bed	Fence	Sculpture	Arch
alt 1	fountain	wooden	high-base	paving stone	present	metal	present	crescent arch
alt 2	garden stream	metal	medium-base	concrete–grass	present	wooden	not present	not present

Figure 1. Shows an example of a digital model of the visual questionnaire design based on block classification in Table 2.

Table 2 shows an example of block classification extracted with SAS version 9.2.

2.5. Online Survey Design

Thirty-six choice sets were prepared to evaluate the environments, using SAS software as described previously. However, answering 36 choice sets per participant can lead to fatigue. To address this, the choice sets were divided into six blocks, each consisting of six choice sets of digital color models. Participants were randomly assigned to answer questions from a single block, consisting of six choice sets from a digital view. The survey had two sections. Demographic information was collected in the first part, while the second part contained discrete choice questions from digital models that were divided into six blocks. Participants were presented with a scenario, "Imagine it is in the middle of the day. . .", before answering the questions in the second section. They could choose one of the blocks at random. After viewing the design options displayed as digital color landscape models (Figure 2), they were able to select their preferred park according to perceived restorative potential.

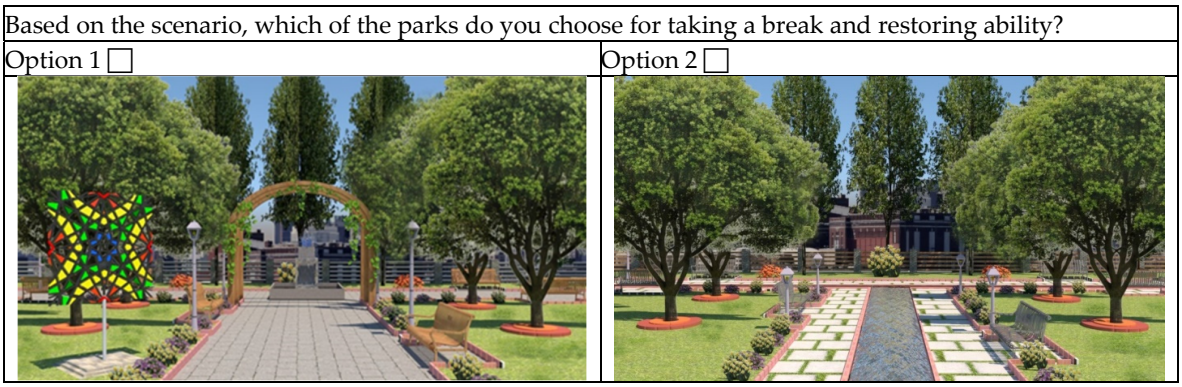

Figure 2. An example of the discrete choice questions with two digital models.

2.6. Data Collection

Considering that the COVID-19 pandemic was ongoing in Iran in July 2021, the data collection was conducted online. First, the digital model options and survey questions were reviewed and approved by experts. To gain access to survey participants, administrators of private educational institutions and schools were asked to add the article's first author to their lists of social information groups. An invitation link to the survey was then disseminated via social media (WhatsApp, Telegram) and email to recruit participants. The data collection was self-administered, where instructions were given and all information was then filled in by the participants themselves. That is, before the survey was sent and started, the first author of the study wanted to make sure that the participants understood the purpose of the study by giving a clear explanation. Instructions on how to proceed with the survey were also provided. Participants were first asked to complete a demographic questionnaire that included questions about their age, gender and level of education and field of study. After completing the demographic questionnaire, participants were shown digital models of different blocks and asked to choose which park they would prefer to visit to alleviate feelings of exhaustion, given the scenario presented to them. To ensure accurate results, participants were made aware of the different attributes present in the digital models. They were asked to carefully evaluate each model when making their decisions, focusing on the potential impact of the selected parks on their recovery. It was also emphasized that the model should be close to home or school. The third part of the survey contained a set of questions for the respondents. These questions were related to park visits, such as the proximity of their residence to the local park, the number of times they usually visited the park, their usual length of stay and their mode of transportation to the park. Two additional questions were asked: whether the urban small park was effective in motivating walking, ball sports and use of sports equipment, and whether the urban small park helped with weight loss and the risk of being obese.

2.7. Modelling Choice Data

The mixed logit model is one of the highly flexible discrete choice models that can provide many interpretations based on different behavioral characteristics by finding heterogeneity in people's behavior and the source of heterogeneity [108]. It is an advanced and improved model of the multiple logit model that solves the limitations in the estimation of utility types by using a variety of random experiments, unlimited substitution patterns and correlation in unobserved factors in time [109].

Notably, unlike standard logit and probit models, this model is not confined to a specific distribution, and it can capture more complex choice patterns, individual heterogeneity in behavior and even the sources of this heterogeneity. The probability of choice by different individuals, individual-specific tastes and sensitivities can all be computed. Moreover, individuals may face uncertainty in their choices, which the mixed logit model takes into account when analyzing the data. In the multinomial logit approach, the odds ratio of choosing one alternative over another is independent of the other alternatives. This assumption is often unrealistic, and the mixed logit model overcomes this limitation, enabling the modeling of more complex dependencies. Therefore, when the assumption is that individuals in a study have varying preferences and the relationships among variables are more complex, the use of the mixed logit model is recommended. This method allows for the modeling of heterogeneity and more intricate relationships using probability distributions for the parameters, leading to results and predictions that are more accurate. Additionally, when the research objective is to gain a deeper understanding of individual behavior and the factors influencing it, and the analysis of how explanatory variables affect individual preferences is crucial, this method is often used.

In the investigation of the mixed logit model, based on research by McFadden and Train [108], it was determined that if appropriate distributions for the properties of the coefficients in a random utility function were considered, the behavior of different random utility models would be expressed in approximately the same way. In addition to the fact

that the normal distribution and the normal logarithm distribution are widely used in mixed logit modeling, providing suitable results, the use of triangular distribution [110] and restricted distributions such as the SB Johnson distribution [111] also provide suitable and significant results. Therefore, it is very important to choose the right type of distribution for the coefficients of the random utility function to obtain accurate results. The main assumption of discrete choice models is that when the decision-maker is faced with a choice set, they choose the option that has the most utility and attractiveness to them. This criterion of utility, which leads to a choice based on the personal preferences of the decision maker, is a function of the options' features and the decision-maker's characteristics. It should also be kept in mind that the decision-maker is faced with a set of independent options that they can only choose one of, and they are not able to choose an amount or part of each. For this reason, this method is called discrete choice [112].

The utility function of option j for person q is expressed as U_{jq}. This utility has two parts: a definite/observable part (V_{jq}) and random/unobservable part (ε_{jq}).

$$U_{jq} = V_{jq} + \varepsilon jq$$

In the mixed logit model, the random part of the utility function (ε_{jq}) consists of two parts: the arbitrary distribution and the distribution of the limit value with the independent and identical distribution. As a result, fewer assumptions are made for the data. In fact, the mixed logit probability is the integral of a multinomial logit selection probability function over a density function (weight) based on different values of β (density of parameters). The probability of person q choosing option j (P_{jq}) is given by the following equation:

$$P_{jq} = \int Ljq\ (\beta)\ f\ (\beta) d\beta$$

Here, P_{jq} is the probability of choosing option j by person q. Also, $Ljq(\beta)$ is the probability of choosing option j by person q, which is a function of parameter β and is expressed as follows:

$$L_{jq}\ (\beta) = \frac{e^{v_{jq}(\beta)}}{\sum e^{v_{mq}(\beta)}}\ m \neq j \subset C_q$$

where $f(\beta)$ is the density function of parameter (β) and $v_{jq}(\beta)$ is the observed component of the utility function of option j by person q, which depends on parameter (β). Finally, the probability function of choosing the combined logit model is defined as the following relationship:

$$P_{jq} = \int \left(\frac{e^{v_{jq}(\beta)}}{\sum e^{v_{mq}(\beta)}} \right) f(\beta) d\beta$$

Therefore, the probability function of choosing the mixed logit model is a weighted average of the probability function of choosing the polynomial logit model over different values (β). To describe the density of β, the mean b and the covariance W can be used normally [109].

The random coefficients model is one of the simplest and most widely used models that can create different interpretations based on the preferences of decision-makers by considering the utility-maximization behavior in different ways in the mixed logit probability analysis. In this model, the defined utility of option i to choose among options I for person q is given by the following equation:

$$U_{iq} = \acute{\beta}_q X_{iq} + \varepsilon_{iq}$$

Here, X_{iq} is the observed characteristics of the decision-maker and the option. $\acute{\beta}_q$ is the vector of coefficients of the observed characteristics for person q, which shows people's preferences. ε_{iq} is also the random part of the utility function, with a limit value distribution with an independent and uniform distribution. The mixed logit model has two sets of

parameters, unlike the standard logit model. In the first set, we have β parameters, which enter the logit formula; the density function $f\ (\beta)$ represents them and is different for decision-makers. The second set is the parameters that define this density, specified by θ. If β is normally distributed with mean b and covariance W, then b and W are parameters describing the density $f(\beta)$. A more appropriate way to represent the parameters of the second category is $f(\beta \mid \theta)$. As a result, the random coefficients model, as an integral of the logit model, is defined on the parameter density function as follows:

$$P_{qi} = \int \frac{e\left(\acute{\beta}_q X_{qi}\right)}{\sum_{j=1}^{J} e\left(\acute{\beta}_q X_{qi}\right)} f(\beta|\theta) d\beta$$

In this definition, the decision maker knows the value of βq and ε_{iq} for all j; if and only if $U_{qi} > U_{qj}\ A_j \neq i$, it chooses alternative i. The researcher observes X_{iq} but not βq or ε_{iq}, so it cannot condition β. If the researcher observes βq, the probability of the selection will be a standard logit [109].

3. Results

A total of 265 adolescents, all of whom were ordinary Iranian citizens, participated in answering the questionnaire, of which 66% (175 individuals) were female and 34% (90 individuals) were male (Table 3). The participants were categorized into two age groups: 13 to 15 years (81%), with 215 people, and 16 to 19 years (19%), with 50 people.

Table 3. Baseline characteristics of study participants regarding demographics and visits to urban parks.

Characteristics		**Number (N = 265)**
Gender		
Male		90
Female		175
Age (years)		
13–15		215
16–19		50
Education		
Primary		131
High school		112
Diploma		22
Distance to the nearest city park	300 m	73
	300 m–1 km	110
	1–5 km	53
	>5 km	29
How to get to the park	Walking	151
	Bicycle	31
	Private vehicles	79
	Public transportation	4
Number of visits to the park during the warm months	Never	60
	A few times during the season	99
	At least once a month	55
	At least once a week	33
	A few times a week	18
Duration of rest in the park	30 min	81
	30 min to 1 h	93
	1 to 2 h	60
	2 to 3 h	19
	More than 3 h	12
Effect of the park in creating motivation for walking, ball sports and use of sports equipment	Poor (0)	16
	(1)	12
	(2)	11
	Moderate (3)	35
	(4)	33
	(5)	46
	Excellent (6)	112

Table 3. *Cont.*

Characteristics		Number (N = 265)
Effect of the park in reducing obesity and weight loss	Poor (0)	14
	(1)	6
	(2)	15
	Moderate (3)	68
	(4)	37
	(5)	44
	Excellent (6)	81
How important is it for you to rest, clear your mind and reduce your stress when visiting a small city park?	Poor (0)	9
	(1)	9
	(2)	7
	Moderate (3)	61
	(4)	24
	(5)	48
	Excellent (6)	107
Based on your experience, how much does spending time in a small city park help you to have peace of mind, clear your mind and reduce stress?	Poor (0)	10
	(1)	11
	(2)	13
	Moderate (3)	52
	(4)	39
	(5)	49
	Excellent (6)	91

The schools included in the study had significantly more younger students than older students, so in that case, our material was fully representative. In contrast, the distribution of men and women was equal in the schools included in the study. All students were invited to participate, but according to ethical approval, participation was voluntary and unfortunately, fewer men participated. To compensate for the bias in the statistical material, weighting was used [113].

The results of the participants' choices were analyzed using the Random Parameter Logit (RPL) model and the PandaBiogene software. This analysis aimed to investigate the level of heterogeneity in the answers, examine the main effects of desired digital view visual features and conduct further analysis. The payment results of the model are presented in Table 4.

Table 4. Evaluation of parameters in 36 digital model based on the mixed logit model.

Attributes and Levels						Interaction Effects		
Random Parameters	**Base Level**	**Value**	**Std err**	**t-Test**	***p*-Value**	**Age**	**Gender**	**Education**
ASC_1	$\beta 0$	0.0816	0.022	3.71	0.000208			
Arch								
Square arch (mean)	$\beta 1$	−0.269	0.0409	−6.57	5.06×10^{-11}	-	-	-
Square arch (St.dev)		0.229	0.0486	4.71	2.45×10^{-6}			
Not present (mean)	$\beta 2$	−0.269	0.0537	−5.02	5.16×10^{-7}	-	-	-
Not present (st.dev)		0.603	0.058	10.4	0			
Lighting pole								
High base (mean)	$\beta 5$	0.314	0.0419	7.51	5.88×10^{-14}	-	-	-
High base (st.dev)		−0.267	0.0497	−5.38	7.29×10^{-8}			
Pavement								
Paving stone–grass (mean)	$\beta 8$	0.169	0.0398	4.24	2.25×10^{-5}	0.00528	-	-
Paving stone–grass (st.dev)		−0.206	0.0564	−3.65	0.000265			
Sculpture								
Not present (mean)	$\beta 11$	0.222	0.0437	5.09	3.62×10^{-7}	-	0.0558	-
Not present (st.dev)		0.492	0.0519	9.49	0			
Water features								
Garden stream (mean)	$\beta 12$	0.490	0.0543	9.03	0	0.00124	0.015	-
Garden stream (st.dev)		−0.599	0.0716	−8.37	0			
Pond (mean)	$\beta 13$	−0.13	0.0391	−3.31	0.000936	0.0356	-	-
Pond (st.dev)		0.124	0.051	2.43	0.0151			

Table 4. *Cont.*

Attributes and Levels						Interaction Effects		
Random Parameters	**Base Level**	**Value**	**Std err**	**t-Test**	***p*-Value**	**Age**	**Gender**	**Education**
Non-Random Parameters								
Fence								
Wooden (mean)	$\beta 3$	−0.152	0.0385	−3.94	8.14×10^{-5}	0.0646	-	-
Wooden (st.dev)		0.0372	0.0498	0.747	0.455			
Metal (mean)	$\beta 4$	−0.0774	0.0388	−1.99	0.0463	-	-	-
Metal (st.dev)		−0.037	0.0471	−0.785	0.433			
Pavement								
Natural flagstone (mean)	$\beta 7$	0.109	0.0383	2.84	0.00451	-	-	-
Natural flagstone (st.dev)		−0.0815	0.0494	−1.65	0.0993			
Bench								
Metal (mean)	$\beta 10$	0.0785	0.0399	1.97	0.0493	-	-	-
Metal (st.dev)		−0.0614	0.0507	−1.21	0.226			
Non-Effect Parameters								
Lighting								
Short base (mean)	$\beta 6$	−0.0554	0.0393	−1.41	0.158	0.0208	-	-
Short base (st.dev)		0.0774	0.0526	1.47	0.141			
Bench								
Concrete (mean)	$\beta 9$	0.0372	0.0386	0.964	0.335	0.0045	-	-
Concrete (st.dev)		−0.0198	0.0505	−0.392	0.695			
Raised planting bed								
Not present (mean)	$\beta 14$	−0.014	0.0321	−0.437	0.662	-	-	-
Not present (st.dev)		0.146	0.0389	3.74	0.000181			
Goodness of Fit Measure								
$\rho_0{}^2 = 0.0844$		LL(0) = −6741.938		LL(ß) = −6173.069		LL(R) = 1137.738		
$\rho_0{}^2 = 1 - \frac{LL(ß)}{LL(0)}$		$\rho_0{}^2 > 0$		$X_{29}{}^2$ (0.95) = 42.557		LL(R) > $X_{15}{}^2$ (0.95)		

According to Table 4, evaluation results of digital models show that the value of $\rho_0{}^2 > 0$, confirming the goodness of fit of the constructed mixed logit model. Additionally, based on LL(R) = 1137.738 and $X_{29}{}^2$ (0.95) = 42.557, the likelihood test demonstrates that LL(R) > $X_{29}{}^2$ (0.95), indicating the model's significance at a 95% confidence level.

3.1. Parameter Values

Upon examination of the variable utilities, it was discovered that water features at the rectangular garden stream (garden stream) level ($\beta 12$ = 0.490) and raised planting beds ($\beta 14$ = 0.014) yielded the highest and lowest utilities, respectively. By categorizing the variables into three groups—high, medium, and low utility—it became apparent that water features at the rectangular garden stream level fell under the high utility category (Figure 3, Table 5). High-base lighting ($\beta 5$ = 0.314), crescent-shaped arches (base level), lack of sculptures ($\beta 11$ = 0.222), paving stone–grass pavements ($\beta 8$ = 0.169), concrete fencing (base level) and fountains (base level) were classified as having moderate utility. Natural flagstone pavements ($\beta 7$ = 0.109), metal benches ($\beta 10$ = 0.0785) and the presence of planting beds at the base level had a low utility (Figure 3, Table 5). The other attributes do not reach any ranking in this study.

Table 5. Key findings.

Utility Ranking	Description	Attributes
High utility	The attribute that has the greatest impact on adolescent recovery in an urban park environment.	Garden stream
Moderate utility	The attributes that have a moderate impact on adolescent recovery in an urban park environment.	Light pole high-base Crescent arch No sculpture Paving stone–grass Concrete fence Fountain
Low utility	The attributes that have a low impact on adolescent recovery in an urban park environment.	Natural flagstone Metal bench Raised planting bed

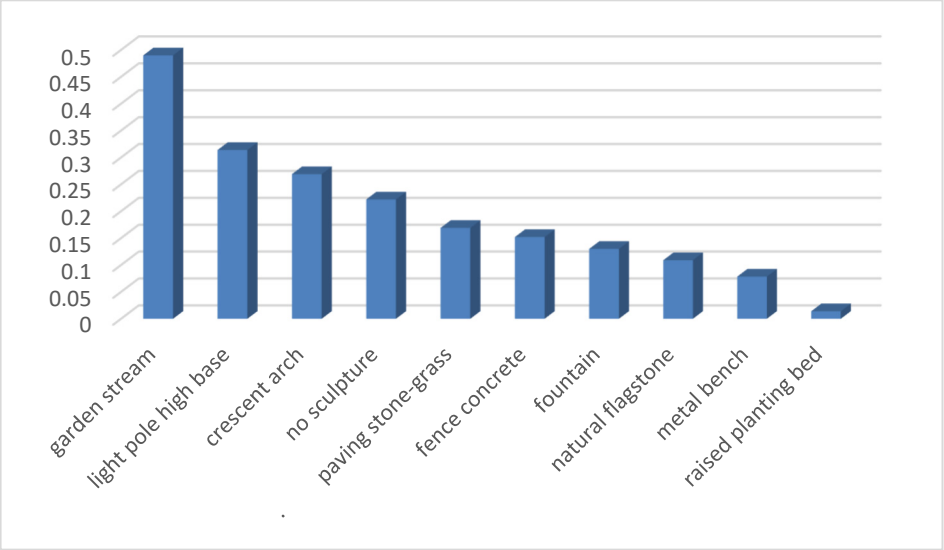

Figure 3. Shows preference of design attributes in 36 digital model based on Table 4.

Participants' preferences were inferred from the sign of the coefficient values. Positive coefficients indicate preferences, while negative coefficients indicate non-preferences. Based on this analysis, it appears that participants preferred the water attribute at the rectangular garden stream level (β12) and the high-base lighting pole (β5) among lighting levels. In cases where negative coefficients were assigned to certain levels, such as the arches (β1 and β2), the base level crescent was preferred by participants. Lastly, when all levels had positive coefficients, as seen in the variable paving (β8 = 0.169 > β7 = 0.109), participants preferred paving stone–grass.

3.2. Random Parameter

Table 4 reports that the mean value was valid for the variables arch and watercourse at all levels, the high lighting, covering with stone–grass material and absence of sculpture (p-value < 0.05). The standard deviation also has an acceptable level of significance (p-value < 0.05). Therefore, there is meaningful heterogeneity between the responses of decision-makers, and the above variables were considered random parameters. However, in the second part of this table, fence at all levels, paving with natural flagstone, and benches with metal material have a significant average effect (p-value < 0.05), but the standard deviation does not have an acceptable level of significance (p-value > 0.05). Therefore, these variables were identified as fixed parameters. Other variables that are presented in Table 4 do not have an acceptable level of significance in terms of mean and standard deviation. Therefore, these variables were determined to be without influence in the experiment.

Additionally, personal characteristics were included as control variables in the mixed logit analysis [51], and socio-demographic factors (age, gender and education) were considered to account for differences in preferences within the study. The model incorporating age and gender significantly influenced heterogeneity among some variables while education did not. The effect of age was significant for the attributes "Paving stone–grass" and "Garden stream". Younger participants (13–15 years) might have different preferences compared to older teenagers (16–19 years). The effect of gender was significant for the attributes "Sculpture" and "Garden stream". This suggests that male and female participants have different preferences for these features.

4. Discussion

The objective of this study was to investigate which design attributes of small, centrally located parks have the ability to create attraction and provide mental recovery to teenagers. Research shows that centrally located parks often have a cultural character. Therefore,

in the selection of attributes and levels, we started from Perceived Sensory Dimensions and PSD Cultural above all. It is defined as containing an essence of human culture—of values of great importance to a people, their values, aspirations, beliefs and hopes [80]. Places that contain this character have proven to be valuable for people in the city because they give people identity and contribute to a sense of place, creating place attachment for personal as well as community mental health [56–59]. Research shows that PSD Cultural is an important health-promoting and restorative characteristic to young people [92,114]. In part, it may be because PSD Cultural gives them an identity and contributes to place attachment [56–59]. In central urban areas, however, PSD Cultural often co-occurs with PSD Social [86], and teenagers have a high need for social activities [56–59]. Stress can be triggered by not having access to social stimulation [115,116]. The results show clear relationships between certain features and the adolescents' estimation of their perceived restorative potential (PRP).

Water features: A clear outcome is that the teenagers prioritize the presence of water in the parks over other attributes. The presence of water features in the digital landscape models indicates the greatest impact on PRP. The rectangular garden stream with flowing water had the greatest impact of the water features, followed by fountains and ponds. It was the only attribute that received a high utility ranking. The rectangular garden stream is a quality closely associated with the Iranian classical garden. It could possibly be that the Iranian background of the participants has influenced this result. It may also be that the Iranian garden's millennia-long history of being a place of relaxation and recuperation [117] has resulted in water having such a prominent place. However, in a study by Wu et al. [118], Chinese youths' recovery from stress, as well as preferences for different attributes, were measured in different urban forests. The results show that water features were a significant predictor of both stress recovery and preferences for specific attributes in urban forests. Dai et al. [38] found in another study that young people rated water elements as being very important in parks. In addition, Rout and Galpern [98] showed that fountains have a positive effect on alleviating the mental fatigue of adolescents.

Several studies on regular park users show that parks and natural areas with moving water are rated as more beautiful than parks and natural areas without moving water. In addition, the moving water is judged to be cleaner and healthier by visitors to urban parks and natural environments [119,120]. According to these researchers, the dynamic and flowing nature of water in rectangular garden streams and fountains creates a greater sense of fascination and visual attraction. According to Professor Richard Coss and colleagues, human interest is easily captured by water, and humans have an excellent ability to judge the quality of water surfaces. This is probably an evolutionarily important trait which has been important for our survival [121,122]. So, perhaps our outcome is not a result attributable to the Iranian nationality of the participants. In addition, numerous studies have highlighted the restorative nature of water in various forms, including ponds, fountains and rectangular water pools [69,101]. Research shows that blue landscapes have a significant impact on improving urban life, promoting peace of mind, improving mental health and promoting social well-being [94,123,124]. Moreover, results show that stays in parks and natural areas with water features are considered to be more psychologically restorative than stays in parks and natural areas without water features. This applies to streams, rivers and lakes, but also artificial ponds and fountains [92,93,117,125].

Lighting: Our results show that young people value lighting on medium-high and above all tall poles. The lighting will, of course, be different depending on the height of the lighting pole in terms of lighting of roads and vegetation, as well as perceived safety [126–128]. In this study, the participants preferred the presence of lighting on high and medium-height lighting poles in the parks, which had a relatively high importance for the recovery potential, in contrast to low lighting poles. This indicates that lighting can have a positive impact on teenagers' recovery and contribute to their overall mental health. Although the study took place in daylight and the question was not about the quality of the lighting—for example, its brightness—this may have influenced the responses.

However, the quality of the lighting is crucial, and the height of the lighting poles plays a big role there. Lyons et al. [20] also found that young people want well-lit parks, which is mentioned in connection with their valuing safety and security. A systematic review by Trop et al. [129] on regular park users showed that lighting in parks has an important and in many cases decisive impact on whether people visit the park or not. It is about perceived safety and it is linked to the quality of the lighting. The lighting must be strong enough for the area to be monitored. If the lighting poles are high enough, surrounding vegetation can also be illuminated. This means that low lighting poles do not provide a sufficient effect. Medium-sized and tall lighting poles are preferable, but not too tall—because then the park is perceived as small and inhospitable. Deng et al. [66] and Rosso et al. [100] have also mentioned tall lighting poles as design attributes, highlighting their positive effects on increased visual comfort, convenience, safety and users' psychological and physiological well-being. Moreover, Peschardt and Stigsdotter [92] confirm the influence of tall lighting poles on perceptions of compatibility, fascination and the feeling of being away. The light pole is a significant physical feature in public spaces, acting as a visual and social component that plays a crucial role in attracting people to the environment and encouraging its use [89]. Users prioritize the presence of high-quality designed lighting poles when choosing and continuously using public spaces [102,103,130]. In addition, lighting poles promote social interaction, sense of fascination and a feeling of being away [92]. The positive effect of lighting as a landscape component to improve people's physical and mental health has also been confirmed [66], and in a study on pocket parks, the design style of light poles was found to be influential in improving comfort and user safety [100].

Arches: The arch, especially the crescent arch, emerged as an important attribute for the teenagers in our study. Dai et al. [38] claim that young people experience parks in a much more multifaceted way than might be expected. Among other things, the sounds and smells in the parks play a big role, as well as the overall structural design and artificial features. Fleckney [21] argues that young people's appraisals of parks, in addition to the expected social and sensory components, also include symbolic and spiritual components. Urban greenways and corridors containing arches are of great interest to regular park users due to their positive impact on recreation, mental well-being and visual aesthetics: they are considered crucial indicators for assessing the quality of life in a city [99]. Wang and Li [83] found that decorative attributes in the form of sculptures, arches, specific works of art and monuments were critical to whether PSD Cultural would have a restorative effect on park visitors. Results by Huai et al. [90] and Huang et al. [91] show that arches especially, as well as sculptures, have a very large impact on whether a park is considered to have good cultural qualities, as well as having good health-promoting, restorative properties. Decorative cultural attributes in the form of arches were also highly appreciated in this study. They emerged as significant attributes, with the presence of this characteristic being preferred over its absence in the park. Specifically, the crescent arch was found to be the most popular among students. This suggests that incorporating an arch, especially a crescent arch, can positively influence teenagers' perceived restorative potential and alleviate mental exhaustion experienced after a long day at school.

Sculptures: The sculpture we added in this study did not work. Researchers indicate that incorporating art features as design attributes has a positive impact on enhancing the landscape's quality on regular park users [102]. When combined with natural features, art features, not least sculptures, increase the restoration potential of the environment [66,96,100,104,105,131–133]. These studies indicate that the presence of sculptures and decorations enhances the attractiveness and coherence of the environment, contributing to both mental and physical restoration and increasing the restoration potential of the environment. Sculptures, as art features and landscape design decorations, play a significant role in the sensory dimensions of the environment and users' preferences. They contribute to improved mental and physical health [92]. Scholars provide evidence of the positive effect of decorations and art features on enhancing adolescent students' health and well-being [134]. In this study, however, the sculpture was more meaningful and effective

when it was absent. The sculpture, as can be seen in Table 2, was a very colorful work of art which stood in stark contrast to the park. The good intention of creating a colorful sculpture that can interest teenagers gives an interesting result here. As it contrasts so harshly with the familiar, it may irritate more than it adds qualities of calm, tranquility and repose. The design aspects chosen here, in terms of shape and color, do not seem to correspond with teenagers' preferences and aesthetics. It may also be the case that exhausted and stressed teenagers cannot bear to face a garish sculpture in an otherwise calm and stress-relieving garden. Another possibility is that the design of the sculpture in a real future scenario, including shape and color, should be brought into dialogue with teenagers to enhance their experiences. Considering students' preferences, culture and aesthetics when choosing sculptures and artworks in a park can significantly influence their preferences and contribute to their well-being and restoration from exhaustion and stress.

Fences: The result shows that the fence is perceived as meaningful and effective for the student's recovery, where the participants preferred the concrete fence. Like Owens [25], several researchers have found that teenagers desire to retreat to more protected places where they can see what is happening in the environment without being seen. They like to retreat somewhat from the city, to something that can function as a shelter [14,15,21,38,135]. Through the ages, a garden has been defined as a piece of fenced land, and the outer wall of the garden is consequently important to how the boundary is shaped. The boundary, which can be a fence or a hedge, helps to demarcate the garden from its surroundings, and if well-designed, it can give the visitor a sense of security [136]. Paradise comes from the old Persian word paridaida, which means walled-around, that is, a walled garden [117]. Fences play a significant role in landscape design. Walls, bushes and trees, commonly utilized as hedges and park fences, have a significant impact on the sense of enclosure and privacy maintenance. They contribute to the feeling of being in a secluded space [48]. A restorative healing garden should be experienced as a place of retreat or haven. An important quality is therefore that it should be possible to experience it as a whole, marked out from the surroundings. In our study, the teenagers felt that the fence must be strong and powerful, made of concrete.

Scholars have emphasized the importance of material selection, color and height of physical elements in parks regarding users' satisfaction levels and ultimately, their restoration [100,103]. The results from Manyani et al.'s [103] studies confirm our results, where they show that fences around visited green areas increase users' preferences for these parks, as well as their feelings of happiness [103]. Nordh's study [48] has also shown that fences and hedges can reinforce the feeling of enclosure and contribute to a feeling of being away. Huang [46] suggests that low-density fences are effective in inviting users and enhancing their enjoyment. Our study and other research therefore suggest that fences and other demarcations of restorative gardens and parks are one of the most influential attributes in promoting health and recovering visitors' mental fatigue and stress. It is also recommended to consider the height and tightness of the fence [46,48,100,103].

Paving: This study showed that all evaluated variants of pavement proved to be both significant and effective. Notably, the teenagers showed a clear preference for paving that contains both paving stones and grass, which gives a softer and possibly more restful impression. Only a couple of studies of teenagers' use of and preferences for urban parks mentioned the paving of the parks, and then, it was not of any decisive importance [35,137]. However, our result is consistent with a couple of studies of regular park users [48,101]. Their results show that the combination of hard surfaces and grass in pavement design improves landscape quality and increases the restorative potential of the environment. As the authors argue, this blend of contrasting attributes provides a harmonious balance and offers visual appeal, capturing students' subconscious attention and promoting increased fascination and restoration. In addition, Peschardt and Stigsdotter [92] emphasized the importance of considering roads as a social aspect of design, given that the choice of pavement material can significantly influence user preferences, thereby increasing fascination and ultimately facilitating the restoration of attention. Consequently, the selection of ap-

propriate pavement materials has great importance to promote environmental harmony and upgrade the physiological and psychological well-being of users [66]. The floor of the restorative garden, which to an important extent consists of paving, is also of great impact regarding the quality of recovery [137]. Several studies have shown that material selection and its design in pavement construction can significantly affect the general well-being of park visitors [100,138].

Bench: Our results regarding the bench design indicate that although users prefer its presence, its effectiveness and significance levels are relatively low. It seems that benches satisfy students' need to take a break, relax and reflect. A number of studies mention that seating is a relatively important feature of urban parks for teenagers in terms of resting, as well as participating in social activities, although it is not mentioned as having decisive importance [14,19,21,137]. In several studies of regular park users, however, park bench design has been considered a priority for park users and has been shown to have a positive effect on overall preferences and stress reduction [33,72]. Manyani et al. [103] argue that attributes such as park benches are directly linked to increasing users' sense of enjoyment, happiness and overall positive experiences in public urban green spaces. Regarding the aesthetic value and restorative properties of park benches, Pals et al. [95] found in a study in the Netherlands that wooden furniture had a higher effect than metal furniture in increasing user preferences, enjoyment and restoration from high stress levels in natural environments. In contrast, our results show that the teenagers prefer metal benches over wooden benches, which may be due to cultural norms and user preferences, which Wang and Yoon [97] suggest should guide the choice of park furniture design. According to Manyani [103], the availability of benches is a key factor in users' choice of parks, contributing to their overall satisfaction and enjoyment. A study also showed that teenage students tend to choose benches near fountains and in sunny areas because of the positive feelings they evoke [98]. Therefore, it would be worthwhile to further explore the design of park benches and their placement in future studies.

Planting bed: Contrary to previous studies, our results suggest that the presence of the raised planting bed attribute did not significantly influence adolescent students' choices. Van Vliet et al. [137] found that the presence of planting beds in particular, especially with a diversity of species of flowers, influenced teenagers' preferences for parks positively. Nordh et al. [69] evaluated the presence and absence of planting beds regarding their restorative effect on regular park users. The results indicate that planting beds have a high value and have good restoration potential in small urban parks. Other studies have confirmed these results [66,103,139]. Although the results of this study indicate limited influence of the planting bed on students' choices, it is possible that this feature contributes to the organization and cohesion of the landscape, thereby influencing its visual appeal and capturing the unconscious attention of teenagers. A fact that can affect the result is that the raised planting beds were designed to be so low that they could most likely be perceived as plant bed edges. Therefore, modifying the design of the shape, material and color of this attribute may increase its effectiveness in terms of perceived restorative potential and its impact on adolescent choices.

Strengths and Limitations

The strength of this study is that it uses discrete choice modeling, which is the most recently applied technique in the health field. The discrete choice method has several advantages, as it allows the estimation of marginal utility. Each option consists of a combination of different function levels. This method allows researchers to explore individuals' values and priorities regarding the desired characteristics of, in this case, small, centrally located parks [140].

In addition, this study incorporates visually visible features by providing participants with digital and designed color photographs. Studies show that exposure to realistic natural environments gives participants opportunities to experience health-promoting

properties [70]. Moreover, the choices offered in the discrete choice method are closer to the traditional individual decision process [140].

However, this study has some limitations: the instructions for perceived restorative potential differ from, e.g., Twedt et al. [77] in this study. While the study by Twedt [77] mentioned "overwhelmed, stressed, tired, and anxious", our instructions mentioned "mentally tired". Our choice was about getting the students to imagine a concrete, everyday situation where a visit to a park can make a difference. If the students can give a well-thought-out choice of a place that is judged to give the most rest, it probably conveys at the same time that the place provides stress relief, calmness, connection and regaining of attention capacity. Consequently, we judge that the recovery should be explainable on the basis of several theories.

Second, the use of image-rated online surveys may not accurately capture user preferences. Because this specific knowledge gap is unexplored, in an initial study, we need to reduce all confounds and interferences. If we were to conduct the study in a real environment, the weather, time of day or year would likely have an influence on the results that would be difficult to control. Several carefully conducted studies show that participants in research studies are good at interpreting images. The result from images with real environments is in good agreement [141,142]. In addition, the objects we wish to study need to be simplified to what is truly typical of what they represent, as a kind of symbol. However, the use of image-rated surveys may not accurately capture user preferences. We suggest that future projects should verify our results through studies in real settings, determining if small centrally located parks with the characteristics proposed in this study have a beneficial effect on teenagers' mental recovery. In these studies, for example, measurement of recovery via salivary cortisol, skin conductance and HRV can be used as a complement to self-rating scales.

Third, in this study, we achieved very good contact with private schools that were happy to participate in the study, while unfortunately, we did not obtain any contact with public schools. In a future study, we will make more of an effort to include public schools. In addition, there were approximately equal numbers of male and female students attending the schools included in our study, but more girls chose to participate. Age, gender and education need more detailed studies. The purpose of this article was not to examine them. Therefore, future studies should investigate this more thoroughly.

5. Conclusions

All over the world, there is a need to improve the mental and physical health of teenagers. Not least, they suffer from stress and mental exhaustion. An increasingly clear amount of research evidence shows that visits to urban parks can lead to recovery from high stress levels and from attention fatigue. Research shows that teenagers do not need special parks and green spaces of their own. On the contrary, urban parks that are visited by all should be developed so that they are also used more and work better for teenagers.

Research shows that teenagers like to visit urban green spaces in the most central parts of cities. This study focused on this type of urban green space, where 250 teenagers evaluated different digital models. The result shows that the biggest impact on the recovery is that the content is characterized by water, where the rectangular garden stream stands out. The area should also be well lit and separated from the surroundings. Moreover, it should include attributes that show it has an important cultural function, such as an arch, fountain and planting beds. The whole area should give a soft impression, such that the pavement consists of paving stones and grass, and the park contains a soft crescent arch. In conclusion, this research highlights the need for requested attributes such as larger flowing garden streams, arches, lighting and planting beds, which require investment and good maintenance but can result in greater benefits and advantages, as they meet the needs of users and contribute to their overall health and well-being.

Similar to some other studies, e.g., [19,98,137], whether presenting digital or natural models, we report that the design of physical facilities such as benches, ponds and paths

together with natural features such as flowers and trees in parks can recover young people from high stress levels or mental exhaustion. If urban environments obtain these qualities, they should have the potential to act as attractive health promoters for teenagers. However, the central parts of cities, where teenagers are often attracted, too often lack green areas with attractive and health-promoting qualities.

To create inclusive and accessible spaces that promote physical and mental well-being, social interaction and community engagement, park designers and urban planners must consider user preferences, culture and aesthetics. The design and maintenance of urban parks is critical to creating a health-promoting and restorative environment that benefits the overall health and well-being of park users. However, to achieve a more precise understanding of this topic, further research is necessary. Future studies should investigate whether small centrally located parks with the characteristics suggested in this study have a good effect on mental recovery in randomized controlled trials. In these studies, e.g., VR equipment, AR technology, eye-tracking and measurement of recovery via salivary cortisol, skin conductance and HRV can be used as a complement to self-rating scales.

Author Contributions: Conceptualization, A.N., M.P., C.C. and P.G.; methodology, M.P., C.C. and P.G.; software, M.P.; validation, M.P. and P.G.; formal analysis, M.P. and C.C.; investigation, A.N.; resources, A.N. and M.P.; data curation, A.N.; writing—original draft preparation, A.N.; writing—review and editing, M.P., C.C. and P.G.; visualization, A.N., M.P. and C.C.; supervision, M.P. and P.G.; project administration, M.P.; funding acquisition, P.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded in part by NordForsk, grant number 95322, "Smart Planning for Healthy and Green Cities", and by the FORMAS research council, grant number D-nr 2019-01916, "Sustainable Outdoor Living Environments—Systematic Interdisciplinary Studies of Health Effects and Impact on Social Inequalities".

Data Availability Statement: The data are unavailable due to ethical restrictions.

Acknowledgments: The article was inspired by the first author's master's thesis in architecture, entitled "Design of a local park with approach of influencing the design of the architectural components in order to increase the mental restoration of teenagers", completed at the Department of Engineering, Faculty of Architecture, Golestan University.

Conflicts of Interest: The authors declare no conflicts of interest.

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