

A New Perceived Restorativeness Scale for Children’s Everyday Environment (PRS-ChEE): Evaluating Restorative Potential of Orphanages’ Outdoor Spaces from the Viewpoint of Children

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Abstract

Although the restorative qualities of a setting have a great impact on children’s happiness and development, it has been uncommon to ask children to evaluate the restorative potential of their surroundings. This becomes more important for children who spend a significant part of their life in orphanages. Working on three case studies in Iran, a valid and reliable “Perceived Restorativeness Scale for Children’s Everyday Environment (PRS-ChEE)” was developed based on ART and administered to 118 children (7 to 17 years). The results demonstrated different orphanages’ outdoor spaces were scored differently, due to varying degrees of size, naturalness, and play equipment.

Keywords: Children, Restorative Environment, Perceived Restorativeness Scale (PRS), Children Environment, Orphanage Outdoor Space

Perceived Restorative Qualities of an Environment

According to the Attention Restoration Theory (ART), attention and mental fatigue resulting from enhanced demands, imposed by urban lifestyle, on directed attention can be restored by exposure to natural settings known as restorative environments (Kaplan, 1995; Kaplan & Kaplan, 1989). ART asserts that a restorative environment has four components: “*being away*” which implies an environment that is separate physically or conceptually from the everyday environment, “*extent*” which implies a setting that has sufficient content and structure to occupy the mind for a long enough period to allow directed attention to rest, “*fascination*” which implies settings that can hold one’s attention effortlessly, and “*compatibility*” that signifies a setting with a good fit between one’s inclinations or purpose and the kinds of activities supported, encourage or demanded by the setting. The combination of these components encourages “involuntary” or “indirect attention” and enables individuals to recover and restore their “voluntary” or “directed” attentional capacities (Kaplan, 1995; Staats, 2012) and experience high levels of attention restoration (Berto, 2005; Herzog et al., 1997; Payne & Guastavino, 2018). Restorative environments help to reduce stress, improve mood and general well-being, as well as physical and psychological rehabilitation, in both adults and children (Chen et al., 2020; Karjalainen et al., 2010; Palanica et al., 2019; Ulrich et al., 1991; Velarde et al., 2010).

To create a restorative environment and experience, it is necessary to develop assessment tools that measure the perceived qualities of an environment in terms of the presence of the four above-mentioned theoretical components (Payne & Guastavino, 2018). In this regard, the Perceived Restorativeness Scale (PRS) including 16 items was first developed by Hartig, Korpela, et al. (1996) and its reliability and validity were measured by conducting four studies with different methodological strategies. This tool was slightly revised by Hartig, Kaiser and Bowler (1997) to

remove uncertain selected words and to add value to the PRS. So, they added 15 new items to the previous PRS to provide better target structures to develop that scale. The PRS was utilized in other studies either by using the original scale or amending the scale's items based on the context of their research.

Even though the restorative qualities of a setting have a great impact on children's happiness, satisfaction, and development (Collado & Corraliza, 2015; Rudkowski, 2014; Walshe, Lee, Lloyd, et al., 2019; Walshe, Lee & Smith, 2020), evaluating the restorative potential of different spaces has been dominantly limited to adults, and it has been uncommon to ask children to evaluate the places they use in terms of restoration (Collado & Corraliza, 2017). The initial PRS as well as the scales used in other studies have been developed for adults, and due to the complexity of the items and length of the scales, most of them are too complicated to be understood by children.

To address this concern, Bagot (2004) developed a scale (PRCS-C) that could be easily used by children aged 8 to 11. This scale consists of 15 items and replicates the adults' factor structure and includes five factors (being away physically, being away psychologically, fascination, compatibility, and extent) to assess and compare two familiar everyday environments: school playground and school library. Following that, Bagot et al. (2007) made some improvements to the scale, mainly to strengthen the 'extent' factor, which resulted in a new tool called PRCS-C II.

The current study acknowledges the scarcity of appropriate PRS for children and contributes to the field by designing a new PRS tool based on the properties of ART with evidence of reliability and validity that can be easily and quickly used by children in wider age groups and

enables children to assess their familiar everyday environment like their living space, and applies to contexts other than European and North American languages and cultures.

This becomes more important, especially for children who spend a significant portion of their life separated from their families and in institutions like orphanages, and we know very little about their lived experiences, their social and emotional well-being, and their aspirations for the future (Rogers et al., 2021). Children in such environments are likely to have experienced significant trauma, abuse, or neglect and can suffer from severe psychomotor retardation (McPherson et al., 2018; Taneja et al., 2002). So, the restorative quality of orphanage spaces and the ways they can be psychologically appealing to children is a need and an important issue to support orphans' development and happiness. Although these settings could be more useful if their restorative potential is made clear, there has been surprisingly little research on the psychological benefits of the design of spaces in orphanages and none about the restorative potential of these spaces based on the viewpoint of the orphans.

The present study intends to fill this lacuna of knowledge by proposing a PRS that targets, for the first time, the orphanages' outdoor space taking into account the specificity of place and wider age category and sex differences, and measures the restorative potential that children perceived in their orphanage outdoor space based on first-hand empirical data.

Working on three case studies in the city of Kerman, Iran, the primary purpose of this study is to develop a new PRS tool that can be used to evaluate the restorative potential of familiar and everyday smaller environments by Iranian orphans aged between 7 and 17 years old of both genders; and secondly, to evaluate the restorative potential of the orphanage outdoor space from the viewpoints of orphans, based on the new developed PRS.

Method

To address the aim and objectives of the research and to develop a new scale, nine studies that developed, adopted, or revised the PRS, were reviewed. These were three that formed the original scale (Hartig, Kaiser & Bowler, 1997 and Hartig, Korpela, et al., 1996, 1997) and three (Bodin & Hartig, 2003; Pasini et al., 2014; and Purcell et al., 2001) that used PRS for adults aged over 17. Three more studies that developed PRS for children were also considered (Bagot, 2004; Bagot et al., 2007; and Berto et al., 2015). No study for children aged less than eight years or between 11 and 17 years old was found during the selection of studies and development of the scale for this research.

Process of Developing a New Perceived Restorative Scale

Considering the context of this study, orphanage outdoor spaces, and the subjects who were orphans aged 7 to 17 with different cultures and languages other than European and North American., developing a new PRS that can be easily understandable after translation to Persian and be used in evaluating a single children's everyday environment was a new and innovative aspect of this study.

The development of the new scale was carried out in five phases. First, the PRS items of five studies for adults aged over 17 were put together and compared. Second, a new scale suggested by Hartig based on personal communication and PRS items in the study of Purcell et al. (2001) were compared with the selected items from the first phase. Third, the PRS in three studies developed for children were reviewed and compared to the PRS utilized for adults. Fourth, the best items from both adult and children scales in phases two and three were selected. In the final phase, the most appropriate items were refined and selected based on the research criteria. Decisions in all phases were made step by step with a detailed discussion and consideration of each item by the

research team including a person with expertise in children's outdoor environments and their everyday use of open spaces, a person with expertise in understanding the complex relationship between landscape and humans and the associated perceptions held by users in different contexts and main researcher who worked in the people environment interaction and the restorative environment with a broad knowledge and understanding of the language and culture of Iran. Although through the five phases of developing the new PRS, the researchers eliminated and refined, and subjectively adopted items, it is worth noting that no items were proposed or added to the scale by the researchers themselves. Just the PRS items used for both adults (aged range 17-50) and younger children (age 8-11) were reviewed and considered and it was tried to use the best and 'child-friendly'-format items from both adult and children scales to develop a more appropriate and understandable scale for children aged 7-17. The reliability and validity of the newly developed PRS scale are also tested. Following is the detail of the five phases of the developing process.

Phase 1

Initially, the PRS of five studies (Bodin & Hartig, 2003; Hartig, Kaiser & Bowler, 1997; Hartig, Korpela, et al., 1996, 1997; and Pasini et al., 2014) that were used for adults aged over 17, were put together. Then similar items were selected along with other items that were revised or added by the authors of these studies. Based on the setting and subject of this research, some of the items that were not appropriate for this study were removed right away. For example, some sentences were not suitable for small spaces, some were more suitable to be used by adults, and also the meaning of some sentences was not conveyed correctly and easily after translating into Persian, the Iranian language. This process is shown in Table 1 by removing items in black with a line through them and selecting items in green to be considered in the next phase.

Table 1

Phase one of developing perceived restorative potential measurement

Phase 1: Putting all items together	
Being away	<ol style="list-style-type: none"> 1. Being here is an escape experience. (It is an escape experience) 2. Spending time here gives me a break from my day-to-day routine. (Spending time here gives me a good break from my day-to-day routine) 3. It is a place to get away from it all. 4. Being here helps me to relax my focus on getting things done. 5. Coming here helps me to get relief from unwanted demands on my attention. 6. Places like that are a refuge from nuisances. 7. To get away from things that usually demand my attention I like to go to places like this. 8. To stop thinking about the things that I must get done I like to go to places like this. 9. When I am here I feel no requirement to concentrate.
Fascination	<ol style="list-style-type: none"> 1. This place has fascinating qualities. (The setting is fascinating) (Places like that are fascinating) 2. My attention is drawn to many interesting things (here). (In places like this my attention is drawn to many interesting things) 3. I want to get to know this place better. (I would like to get to know this place better) 4. There is much to explore and discover here. (I want to explore the area) 5. There is much to discover and look at here. 6. I want to spend more time looking at the surroundings. (I would like to spend more time looking at the surroundings) 7. This place is boring. 8. There is nothing worth looking at here. 9. In places like this it is hard to be bored. 10. What happens here really captures my interest.
Extent (Coherence, scope)	<ol style="list-style-type: none"> 1. There is too much going on. (Coherence) 2. It is a confusing place. (Coherence) 3. There is a great deal of distraction. (Coherence) 4. It is chaotic here. (Coherence) 5. There is a clear order in the physical arrangement of places like this (Coherence) 6. In places like this it is easy to see how things are organized. (It is easy to see how things are organized) (Coherence) 7. In places like this everything seems to have its proper place. (everything here seems to have a proper place) (Coherence) 8. That place is large enough to allow exploration in many directions. (Scope) 9. In places like that there are few boundaries to limit my possibility for moving about. (Scope) 10. I experience this place as very large. (Extent)
Compatibility	<ol style="list-style-type: none"> 1. I can do things I like here. 2. I have a sense that I belong here. 3. I have a sense of oneness with this setting. 4. Being here suits my personality. 5. I can find ways to enjoy myself here. (I could find ways to enjoy myself in a place like this) 6. It is easy to find my way around here. 7. I could easily form a mental map of this place. 8. There are landmarks to help me get around. 9. I can easily navigate here. 10. Being here is consistent with my personal desires. 11. Being here fits with my personal inclinations.

Phase 2

In the second phase, a new scale included five items under ‘being away’ and five items under ‘fascination’ suggested by Hartig (T. Hartig 2016, personal communication by email, 3 June). These items were added to the selected items from the first phase for further consideration and comparison. Purcell et al. (2001) also used the PRS that they obtained from Hartig in July 1997. These two scales differed in having ‘extend’ and ‘compatibility’ subscales. Moreover, the ‘being away’ and ‘fascination’ subscales in Purcell’s study, had one and two more items respectively compared to the new items suggested by Hartig in the current study. Since Hartig’s items were exactly repeated in Purcell’s scale, so items from Purcell’s study were kept for further revision.

With an initial overview, the items that were exactly repeated on the adult scale were deleted from Purcell’s scales. Then, some items were eliminated because they were deemed difficult for children to understand after translation into Persian (“*this place is a refuge from unwanted distractions*”) and were irrelevant to the study environment (“*it seems like this place goes on forever*”, “*it is easy to do what I want here*”). Also, items which carried a more positive and understandable meaning for children (e.g. “*this place is fascinating*”) were preferable to negative ones (“*this place is boring*”) derived from the previous phase. Additionally, items that are similar in meaning and only differ in structure from selected items under the same category in phase one, were kept to be considered in the next phase to select the best sentences after comparing all items with different scales.

Phase 3

In this phase, the three studies (Bagot, 2004; Bagot et al., 2007; and Berto et al., 2015) which were developed and utilized the PRS for children, were reviewed. As these studies worked

with children, the sentences in PRS were found to be more suitable, compared to the PRS which was utilized for adults. However, there were still items that were not suitable for children in the current research. Bagot et al. (2007) strengthened the extent factor in the scale of Bagot (2004), so the PRCS-C II of Bagot et al. (2007) was used in this phase.

In the preliminary review, the first three items under ‘being away’ that were used by Bagot et al. (2007) were deleted because these sentences were used to compare two places (school ground and classroom), while in the current study, there was only one single place, the orphanage outdoor space, to be evaluated. Instead of the other three items which were almost identical and conveyed the same concept, the following item from the adults’ PRS in the previous phase was preferred: *“spending time here gives me a break from my day-to-day routine”*.

Under the ‘fascination’, the item *“this place is fascinating”* from the adult’s scale was preferable to *“this place is interesting”* because this term better describes the attractiveness of a place in Persian and had advantages to both *“in this place I don’t get bored”*, and *“the school ground is boring”*. *“This place is big enough to be explored”* was not suitable either due to the size of the outdoor spaces of the orphanages which were not very large to explore. Also, *“there is much to explore and discover here”* from the adults’ scale was a better alternative to *“in this place there are lots of things to discover”* and *“there are lots of things to discover in the school ground”* from the children scale developed by Berto et al. (2015) and Bagot et al. (2007). Hence, these three items were removed in this phase.

Also, all three items under ‘extent’ in the study of Bagot et al. (2007) were not suitable and related to the smaller size of the outdoor spaces, so they were removed. For the last category, ‘compatibility’, both items from the study of Berto et al. (2015) were selected for the next phase. A new sentence of *“this place gives me the opportunity to do activities that I like”* was drawn up

to be used instead of “*the activities that it is possible for me to do here are activities I enjoy*”), as it could imply very similar meanings especially when translated into Persian.

Phase 4

In phase 4, all selected items from both adult and children scales in phases two and three were combined resulting in a total of 35 items. Then inappropriate or similar items were removed, and relevant and appropriate items from both adult and children scales were chosen to be considered in the next phase.

By comparing items for both, adults and children, this study utilized more items from the children’s scales if there were similarities with the adult version. Under ‘being away’, for example, “*in this place I don’t think about things I have to do*” from the PRS of Berto et al. (2015) was a better alternative for both items “*being here helps me to relax my focus on getting things done*” and “*to stop thinking about the things that I must get done I like to go to places like this*” on the adult’s scale. Likewise, under ‘fascination’, the item “*this place awakens my curiosity*” in both adults’ and children’s scales was deemed unsuitable and replaced by “*in this place there are lots of things that awaken my curiosity*” from the PRS scale of Berto et al. (2015), which was related to children. Some items like “*I would like to get to know this place better*” and “*there is much to explore and discover here*” under ‘fascination’, plus “*it is easy to find my way around here*” under ‘compatibility’, were also removed due to not being suitable for the children’s familiar and smaller everyday environment like the orphanages that were considered in the current study. Because the orphanages were residential living places for orphans, so they knew and understood their living environment well. These sentences were deemed more appropriate for studies that evaluated larger spaces, such as urban parks that are used by people occasionally as opposed to living there all the time. In this phase, the number of items was reduced to 22.

Phase 5

In the final process of developing a new version of the PRS, the authors went one step further and looked at the items deeper to refine and select the most appropriate ones. First, the word ‘*yard*’ was used instead of ‘*this place*’ to better present the outdoor space of the orphanages in the current research. The word ‘*yard*’ was deemed more suitable and understandable for children who participated in this study based on its translation to Persian, compared to other words such as ‘*open space*’ or ‘*outdoor environment*’. Iranian people use the word ‘*yard*’ for the open space of their home instead of ‘*garden*’ which is used more commonly in Britain and some other countries. While both words can have the same meaning in some countries, in Iran they have different meanings and they are used to refer to two separate areas.

Another change is that two items, “*in this place I can relax mentally and physically*” and “*in this place nobody tells me what to do or think*”, were divided into two parts. The reasoning was that for instance a child may relax physically but not mentally or vice versa. Similarly to that, one child may want to say that someone may tell him what to do; but nobody tells him what to think. By separating these two items, an option was provided to the children to choose the best scale based on providing clear understanding without confusing them by mixing two different words in one sentence. This could be noted as a possible weakness of the PRS of Berto et al. (2015).

“*Spending time here gives me a break from my day-to-day routine*” under ‘being away’ was a more suitable option compared to “*in this place I don’t think about things I have to do*”. Because it referred to everything in general, not specifically to those certain occurrences that children should do, such as writing homework or an assignment.

By reviewing items “*there are many things in the school ground that I find fascinating*” and “*my attention is drawn to many interesting things here*” under ‘fascination’, the authors decided to revise and use “*there are many objects here that attract my attention*” instead, as it is more comprehensible for children. Additionally, “*in this place I only think about things I like*” was also removed because it was more about the thinking process than fascinating things in the environment.

“*Everything here seems to have a proper place*” under ‘extent’ was a better option compared to “*in this place everything is just where it should be*” and “*it is chaotic here*”. Also “*I have a sense that I belong here*” under ‘compatibility’ was more about place attachment and compatibility, and therefore this item was removed during the final process.

So after careful consideration, a new PRS was formulated for this study with 18 items. The preference items “*I like this place*”, used by Berto et al. (2015), and “*I prefer this yard over all other places I have ever been (such as park, school yard, home’s yard)*” were also used in the current study. The summary of the developing process and the newly developed version of PRS for children to evaluate everyday environment called PRS-ChEE are shown in Figure 1 and Table 2 respectively.

Figure 1

Summary of the process

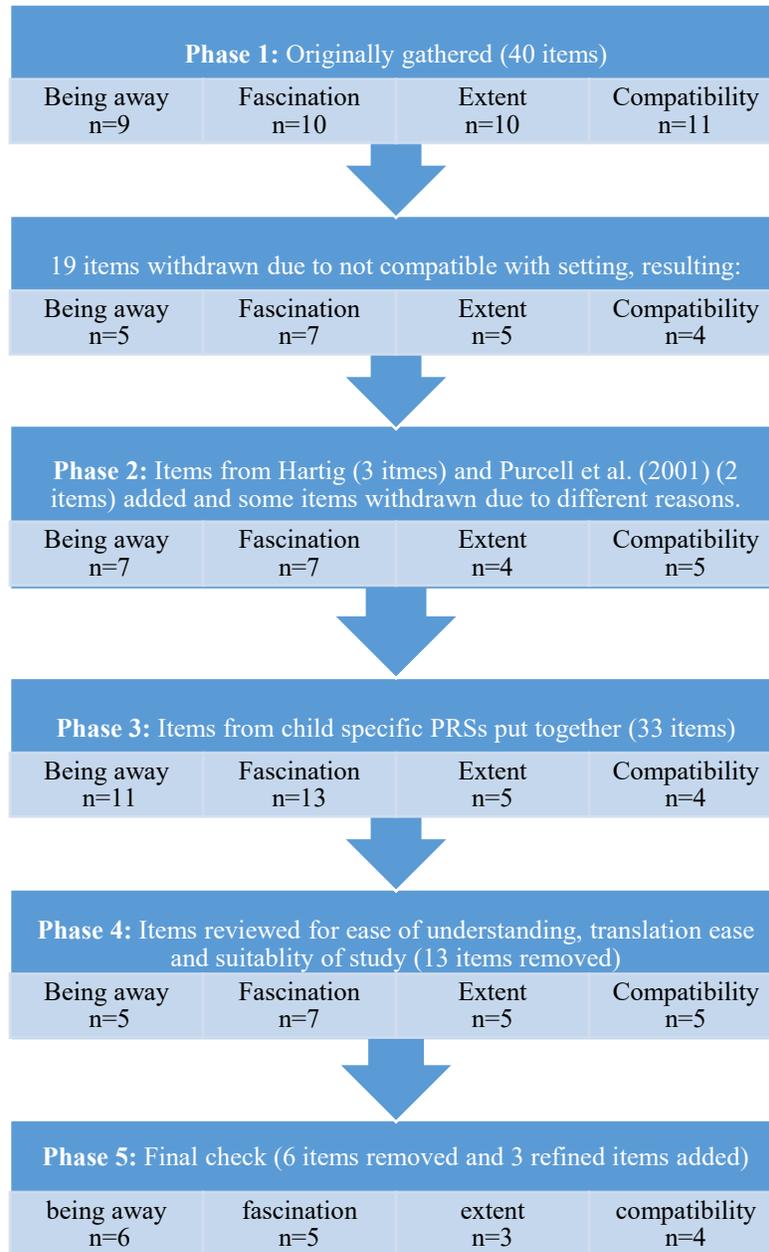


Table 2

New developed PRS for children’s everyday environment (PRS-ChEE)

PRS-ChEE items	
Being away	1. In the yard I can relax mentally. 2. In the yard, nobody tells me what to do. 3. In the yard, I don’t think at my worries. 4. In the yard I can relax physically. 5. In the yard, nobody tells me what to think. 6. Spending time in the yard gives me a break from my day-to-day routine.
Fascination	7. The yard is fascinating. 8. In the yard there are lots of things that awaken my curiosity. 9. There are many objects in the yard that attract my attention. 10. I would like to spend more time in the yard looking at surroundings. 11. In the yards, there is nothing worth looking at.
Extent (Coherence, scope)	12. In the yard everything seems to have a proper place (coherence) 13. The yard is a confusing place (coherence) 14. There are few hard boundaries in the yard to limit my possibilities for moving around (scope)
Compatibility	15. In the yard I am free to play, run, and move. 16. In the yard it is easy to see what’s around me 17. I can find ways to enjoy myself in the yard. 18. The yard gives me the opportunity to do activities that I like.
Preference	19. I like this yard. 20. I prefer this yard over all other places I have ever been. (such as park, school yard, home’s yard)

A 5-point Likert scale was used to indicate the extent to which the given statement describes children’s experience in the orphanage outdoor space. Similar to Wilson and Conroy's study (2001), to help the younger children understand the Likert scales, the PRS response sheet was designed with five faces expressing: strongly disagree 🙄, disagree 😏, not sure 🤔, agree 😊, and strongly agree 🥳 (in both words and emoji symbols) to make it easier for children to pick an answer that best expressed their feelings.

Case Study and Population

To test the validity and reliability of the new PRS-ChEE, 107 out of 118 children aged between 7 and 17 years from three orphanages, called Orphanage ‘1’, ‘2’ and ‘3’ in Kerman, Iran, agreed to participate in this research. The selection of orphanages was based on the agreement of

the orphanages to be involved. As sometimes differences between boys and girls exist in their experience of their surrounding environments (Woolley, 2008), children of both genders were included in the research design.

Orphanage 1 with a population of 53 boys is a complex center that includes a primary school, gym, a college, an orphanage office building, a prayer room, and four dormitory blocks. This orphanage has large, different sections of outdoor spaces with an asphalt surface in different parts of the complex. This orphanage has plenty of small green spaces or gardens (flowerbeds) surrounded by curbs with bushes, flowers, and big trees which creates a shady area, and a small pool.

Orphanage 2 has 16 boys and 21 girls accommodated in separate centers, and the buildings are located in two different parts of the city. The boys' center is a relatively small three-story house. The yard of this center is very small so there is not enough space for children to play. The boys usually are taken to the girls' center at the end of the week (but not every weekend) to play in the outdoor space of the girl's center. The girls' center is a new two-story building and its interior is like a large house. The center has a fairly large yard designed on two levels. In the lower part of the yard, which has recently been renovated, there are a metal swing and slide, with an artificial turf surface. There is a volleyball net in the upper part of the yard and the floor is made of mosaic. Besides the walls, there is a small garden (flowerbed) with a width of about 50 cm surrounded by a curb and planted with flowers, trees, and bushes. As the trees are not tall enough the outdoor space is not a shady area. The two portions of the yard are connected by a ramp and a staircase and separated by a short iron fence with a door.

Orphanage 3 which accommodates 28 girls, is a single-story building with a relatively large interior and an average outdoor space size. The yard of the center is made of mosaic and has several

small gardens (flowerbeds) surrounded by a curb. The gardens are planted with flowers, small bushes, and big trees. The natural elements in this orphanage are more than the two others, which creates a shady area. There is metal playground equipment such as a swing, one slide, and one see-saw, with a small pool close by. This play area is surrounded by small gardens (flowerbeds) and covered by a surface of small stones. There is a large mosaic platform section with a half-meter height, behind the rooms' windows, which is linked to the ground level of the yard by stairs.

Generally, based on the report of the children and their mentors as well as observation in three orphanages, the use of the outdoor space was related to factors such as the children's schedules, mentors' desires and permission, and also weather conditions. Children use the outdoor space not only to play different games and activities but also for 'mental rehabilitation' and 'enjoying the weather, fresh air, and sun'. They are consciously and intentionally, as well as potentially unknowingly, also interacting with the landscape elements like using the shade of a tree or leaning against it; picking fruits from trees; touching flowers or bushes; standing or sitting on a curb around the flowerbeds or standing on it during a group game such as 'High-Tig'; playing with stones, pieces of wood, and pinecones, etc.

Data Collection Procedure

Ethical issues have been reviewed before the data collection process to reduce or eliminate risk for children. To gain the consent, orphanages' managers, mentors, and children were informed about the study and method of data collection beforehand and permission was granted by them. As planned with the orphanage's manager, data collection was conducted separately with different age groups of children based on their schedule and free time.

The PRS-ChEE was translated into Persian and children were asked to think about how much each sentence applies to them and to choose the most appropriate answer. Approval from

mentors was also required to ensure that the child is capable of understanding the scale. However, children were not forced to do that if they were not interested in and those who liked to participate were informed that they feel free to have a break, pause, and say 'let's stop now', at any time. If any of the children had any questions or the sentence seemed vague to them, further explanation was provided about that specific question. Children did not complain about the scale and they were happy to answer the questions, and this may be due to the shortness of the scale and the emoji symbols. Children were given a thank-you gift for their participation.

Methods of Analysis

Descriptive statistics were carried out on all data gathered. To check the dimensionality of the scale, PCA was carried out on 18 items of the PRS-ChEE. Cronbach's alpha was used to assess the consistency of the scale and to remove items that did not contribute to the study. The scale was calculated by summing up the remaining items. One-way ANOVA was utilized to explore the differences between outdoor spaces (yards) at the different orphanages. Kruskal-Wallis was used to assess the differences between the two preference ratings. Finally, Spearman's correlations were used to assess the association between the PRS-ChEE and the two preference ratings both overall and for each yard.

Results

Breakdowns of the sample of 107 children by gender, grade, and age descriptive statistics are provided in Table 3.

Table 3

Demographics of the Sample

		Orphanage 2		Orphanage 3		Orphanage 1		Total	
		Count	%	Count	%	Count	%	Count	%
Gender	Boy	15	42.9%	0	0.0%	52	100.0%	67	62.6%
	Girl	20	57.1%	20	100.0%	0	0.0%	40	37.4%
	Total	35	100.0%	20	100.0%	52	100.0%	107	100.0%
Grade	P1	3	12.5%	0	0.0%	0	0.0%	3	6.4%
	P2	0	0.0%	0	0.0%	1	33.3%	1	2.1%
	P3	4	16.7%	3	15.0%	2	66.7%	9	19.1%
	P4	1	4.2%	3	15.0%	0	0.0%	4	8.5%
	P5	5	20.8%	8	40.0%	0	0.0%	13	27.7%
	P6	0	0.0%	1	5.0%	0	0.0%	1	2.1%
	S1	0	0.0%	1	5.0%	0	0.0%	1	2.1%
	S2	1	4.2%	0	0.0%	0	0.0%	1	2.1%
	S3	2	8.3%	2	10.0%	0	0.0%	4	8.5%
	S4	5	20.8%	0	0.0%	0	0.0%	5	10.6%
	S5	3	12.5%	2	10.0%	0	0.0%	5	10.6%
	S6	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	work	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Total	24	100.0%	20	100.0%	3	100.0%	47	100.0%

	Mean	S.D	N									
Age	13.86	3.16	14	12.00	2.81	20	16.40	1.07	10	13.59	3.13	44

Descriptive and Factor Analysis of Items

The descriptive analysis (Table 4) showed that the scores of the items covered the full range from 1 to 5 with means ranging from 2.16 to 4.55 and standard deviations from 0.85 to 1.52. Item 15 had the highest score and the smallest standard deviation, meaning that it is negatively skewed because many children answered ‘agree’ or ‘strongly agree’.

Table 4

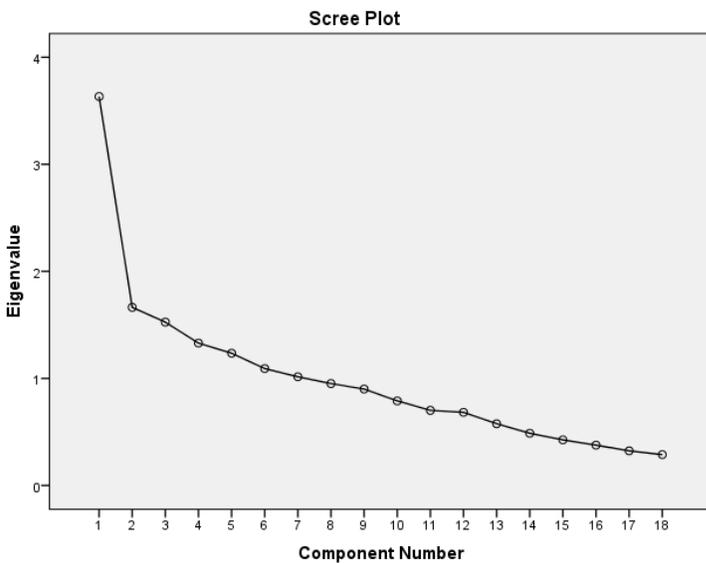
Descriptive Analysis and Component Matrix of the PRS-ChEE items

	N	Min	Max	Mean	Std. Deviation	Component 1
1. In the yard I can relax mentally	107	1.00	5.00	3.9439	1.13961	.600
2. In the yard, nobody tells me what to do	107	1.00	5.00	3.3084	1.33467	.290
3. In the yard, I don't think about my worries	106	1.00	5.00	3.2264	1.39580	.295
4. In the yard I can relax physically	107	1.00	5.00	3.9065	1.16985	.454
5. In the yard, nobody tells me what to think	107	1.00	5.00	4.0280	1.16115	.198
6. Spending time in the yard gives me a break from my day-to-day routine	107	1.00	5.00	3.6355	1.44974	.414
7. The yard is fascinating	106	1.00	5.00	3.9057	1.24616	.663
8. In the yard there are lots of things that awaken my curiosity	107	1.00	5.00	3.1869	1.52421	.597
9. I would like to spend more time in the yard looking at the surroundings	107	1.00	5.00	3.4673	1.32692	.497
10. There are many objects in the yard that attract my attention	107	1.00	5.00	3.2710	1.36375	.528
11. In the yard, there is nothing worth looking at	107	1.00	5.00	2.8879	1.40972	-.369
12. In the yard everything seems to have a proper place	107	1.00	5.00	3.4673	1.28355	.491
13. The yard is a confusing place	107	1.00	5.00	2.1589	1.22974	-.139
14. There are few hard boundaries in the yard which limit my possibilities for moving around	106	1.00	5.00	3.1038	1.33044	.171
15. In the yard I am free to play, run, and move	107	1.00	5.00	4.5514	.84935	.422
16. In the yard it is easy to see what's around me	107	1.00	5.00	4.0467	1.04053	.431
17. I can find ways to enjoy myself in the yard	106	1.00	5.00	3.9717	1.09942	.585
18. The yard gives me the opportunity to do activities that I like	107	1.00	5.00	3.9626	1.14863	.481
Preference items						
I like this yard	107	1.00	5.00	4.1589	1.11719	
I prefer this yard over all other places I have ever been	107	1.00	5.00	2.5234	1.51935	

The principle component scree plot supported a single dimension within the data (Figure 2). This dimension explained 20.2% of the variation in the data but with a wide range of loadings from “*The yard is fascinating*” (0.663) to “*In the yard, there is nothing worth looking at*” (-.369) (Table 4).

Figure 2

The principle component scree plot



Testing the Reliability and Validity of the PRS-ChEE

Cronbach’s alpha was used to check the items on the scale (Table 5). The item “*the yard is a confusing space*” was removed as it increased the alpha from 0.738 to 0.744. Furthermore, the item “*there are few hard boundaries in the yard which limit my possibilities for moving around*” was also removed, due to increasing the alpha to 0.747. All further increases in the alpha made through removing items would have been marginal, therefore 16 variable cases were agreed upon. Based on this result, the number of items on the scale can be reduced to 16 from 18.

Table 5

Selecting items for the PRS-ChEE

	alpha if the item deleted		
	18 item	17 item	16 item
In the yard I can relax mentally	0.715	0.723	0.725
In the yard, nobody tells me what to do	0.733	0.741	0.745
In the yard, I don't think about my worries	0.736	0.743	0.746
In the yard I can relax physically	0.726	0.731	0.735
In the yard, nobody tells me what to think	0.736	0.743	0.748
Spending time in the yard gives me a break from my day-to-day routine	0.728	0.734	0.739
The yard is fascinating	0.706	0.713	0.718
In the yard there are lots of things that awaken my curiosity	0.714	0.719	0.721
I would like to spend more time in the yard looking at the surroundings	0.721	0.727	0.73
There are many objects in the yard that attract my attention	0.723	0.727	0.728
There is something worth seeing in the yard	0.729	0.739	0.74
In the yard everything seems to have a proper place	0.723	0.73	0.733
Not a confusing place	0.744		
There are few hard boundaries in the yard which limit my possibilities for moving around	0.743	0.752	
In the yard I am free to play, run, and move	0.728	0.736	0.743
In the yard it is easy to see what's around me	0.724	0.733	0.735
I can find ways to enjoy myself in the yard	0.717	0.725	0.729
The yard gives me the opportunity to do activities that I like	0.723	0.73	0.734
	overall alpha		
	0.738	0.744	0.747

Restorative Analysis

There were significant differences in the rating of yards by the children for the PRS-ChEE. ($p=0.017$) shows that Orphanage 3 scored significantly higher than Orphanage 2 (mean difference=0.432, s.e.=0.154, $p=0.17$) and Orphanage 1 (mean difference=0.357, s.e.=0.145, $p=0.041$). There was no evidence of different ratings of the yards by children for either “*I like this yard*” or “*I prefer this yard over all other places I have ever been*” (Table 6).

Table 6

Means and Standard Errors for each orphanage

	N	Mean	Std. Error
Orphanage 1	52	3.6447	.07558
Orphanage 2	35	3.5696	.09480
Orphanage 3	20	4.0017	.12283
Total	107	3.6869	.05486

The PRS-ChEE was moderately correlated (0.580, $p < 0.001$) with the statement “*I like this yard*” and a weak correlation (0.310, $p < 0.001$) was seen with “*I prefer this yard over all other places I have ever been*”. The correlations for the individual orphanages are shown in Table 7.

Table 7

Spearman Correlations between PRS-ChEE and the preference scales for the different orphanages

Orphanage				I like this yard	I prefer this yard over all other places I have ever been
Orphanage 2	Spearman's rho	PRS	Correlation Coefficient	.663**	.149
			Sig. (2-tailed)	.000	.394
			N	35	35
Orphanage 3	Spearman's rho	PRS	Correlation Coefficient	.403	-.114
			Sig. (2-tailed)	.078	.632
			N	20	20
Orphanage 1	Spearman's rho	PRS	Correlation Coefficient	.550**	.380**
			Sig. (2-tailed)	.000	.005
			N	52	52

For Orphanage 2, the PRS-ChEE was moderately correlated with their ratings of “*I like this yard*”, however, no correlation was detected with “*I prefer this yard over all other places I have ever been*”. The PRS-ChEE for Orphanage 3 showed that there were signs of a tendency for a weak correlation with “*I like this yard*” but again no correlation with “*I prefer this yard over all other places I have ever been*”. Finally, for Orphanage 1, a moderate correlation was seen with “*I like this yard*” and a weak correlation with “*I prefer this yard over all other places I have ever been*”.

Dealing with the matter of age was made complicated by the fact that the ages of the children at the different orphanages varied. Overall there was a negative correlation with age ($r = -0.529$, $p < 0.001$) but there were also differences in scoring between orphanages. When split by orphanage and gender, slightly lower correlations were recorded (Orphanage 2 = -0.249 , Orphanage 3 = -0.3793 and Orphanage 1 = -0.346). However, only Orphanage 3 was found to be borderline significant ($p = 0.086$). That being said, when age was analyzed as a covariate within an ANOVA, to adjust by the orphanage, we obtained that the age overall $f(1,40) = 4.779$ $p = 0.035$ saw a decrease in PRS of -0.61 per year of age. This indicates that older children are less likely to rate the restorative nature of the environment highly. In Orphanage 2, which includes both genders, there was no significant difference in gender ($t(33) = 1.199$, $p = 0.329$).

Discussion

To evaluate the perceived restorative potential of the orphanages’ outdoor space as familiar everyday environments by children, a new version of the PRS for children called PRS-ChEE has been adopted and developed.

At first, this new measurement consists of 18 items measuring the restorative factors including ‘being away’, ‘fascination’, ‘coherence’, and ‘scope’; plus two items measuring

environmental preference. Items were adopted carefully based on the following criteria. First, the items were representative of Kaplan's restorative components. Second, they were appropriate to children's everyday environments and understandable by children. Third, they loaded onto appropriate factors according to the prior adults' and children's perceived restorative measures.

Factor analysis indicated a single component or uni-dimensionality of the PRS-ChEE. The results did not support the multi-dimensionality of Bagot (2004)'s study however closer inspection of the results suggests that Bagot (2004) has deliberately sought to have a larger number of factors that her analysis supports.

The uni-dimensionality of the PRS-ChEE may have been created by the following criteria: first, a small sample means fewer factors normally; second, cultural difference can result in different factors both in terms of numbers and loadings in different cultures; and third, if the balance between the subsets of questions is not kept then the analysis can lead to fewer factors.

In the next step, Cronbach's alpha was used to reduce the initial 18 items scale which was developed to assess the perceived restorativeness of children's every environment, to 16 items scale that has an acceptable level of alpha, and so high internal consistency. Given the good level of Cronbach's alpha, the PRS-ChEE turned out to be a reliable measurement with 16 items.

In line with the goals of Hartig, Kaiser and Bowler (1997), the PRS-ChEE could also differentiate the environments in their level of restorativeness while capturing the components of ART which is the most substantial result from the PRS. Also, it can detect differences across different groups of children. Both of these principles are vital in restorative environments when concluding the validity of the measure applied.

Moreover, the results of the current study show that the restorative value seemed to decrease with age and older children are less likely to rate the restorative nature of the environment while Bagot (2004) found no differences between younger and older children when comparing factor scores for two environments (the library and the playground). This difference between the result of the two studies in terms of the age of children, as Bagot (2004) noted in her study, can be explained by age range. To expand, children with a limited age range (8-11 years in Bagot (2004)'s study) would experience the environment more similarly compared to those with a larger age range (7-17 years in the current study).

There was also no agreement between the results of this study and Bagot (2004) regarding gender differences when perceiving the restorative potential of an environment. Comparing results between boys and girls across environments in Bagot (2004)'s study showed that the library was more interesting for girls than the playground, and the playground had lower restoration potential for girls than boys. In the current study, the only outdoor space of Orphanage 2 could be used by both genders and there were no significant differences between boys and girls when they were evaluating the restorative potential of the space.

Moreover, the PRS-ChEE was correlated to how much children liked the outdoor space and their preferences regarding that, which are the general indicators of the scale to ensure it conceptually matches. In this regard, the results of the PRS-ChEE for this study show that the outdoor space of all three orphanages is restorative based on the viewpoints of children, regardless of gender. However, children who lived in Orphanage 3 perceived that their outdoor space was more restorative than the other two orphanages. We can thus conclude that the orphanage scoring higher in terms of restorative potential may be due to the facilities available for children such as

playground equipment and its natural components such as trees, stones, shrubs, and greener spaces at that orphanage, as opposed to the gender of the child scoring.

Similar results to this were found in a study by Kelz et al. (2015) which considered the perspectives of 133 students aged 13-15 years old in Austria regarding the redesigning of the schoolyard to enhance children's contact with nature and their physical activities. It was found that adding more green components such as shrubs and pot plants around seating areas, wooden chairs, tables and benches, cotton seating pillows, as well as providing some sports features like tennis tables, volleyball and soccer fields plus a drinking fountain helped the children generate a more restorative potential of the new environment.

Conclusion

Based on the result of the study, it can be concluded that the newly developed PRS-ChEE which is adapted to Iranian children has been proven to be a valid and reliable tool. It can measure the restorative potential of the orphanages' outdoor space as a familiar everyday environment and similar contexts in terms of size and function based on children's perception. Since the outdoor spaces of the three case studies were scored differently, therefore the PRS-ChEE is able to distinguish between the restorative values of different types of environments and register gender and age differences. So its functioning is as expected. Moreover, the smaller number of items on this scale can reduce the time and effort needed by children.

According to the results of this study, while the outdoor spaces of all three orphanages were restorative in nature; having greener environments, no matter how small, not only will help children to benefit more from the restorative characteristics of the natural environment but also have a great impact on children both physically and psychologically, as it will generate more potential for restoration. Generally, it can be concluded that children's perceptions should be taken

into account to have a better view of the ways through which the restorative quality of their surrounding environment can be improved.

Limitations of the study

Due to the government and organizational policy as well as the limited time and resources of this study, it was difficult to involve more orphanages, especially the government-run orphanages. Also, children's responses may be biased due to various reasons such as 'social desirability' and 'context effects'. So, more children with equal distribution in terms of gender in each age group from more orphanages would allow for even better results.

Future Research

Since there has been little research to evaluate the restorative potential of orphanages' outdoor spaces, adding more comparative data relating to the outdoor spaces of the orphanages can potentially support the development of children who live in these environments around the world. As children of different ages and genders tend to use outdoor space in different ways, conducting more research by considering the age and gender of children in evaluating everyday environments is important and needs to take into account. Also, the length of time children are in contact with everyday environments, for example, in the case of orphanages, how long children have lived in orphanages can be an important variable for future study. The researchers also suggest that the proposed PRS-ChEE should be applied to other case studies in different countries to test its validity and generate further informed research in this area.

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