

Spiritual anatomy and vernacular spatial autonomy - the case of Ghantasala village, Andhra Pradesh

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Spirituality is about being conscious of the vital force or breath (prana) which is considered essential in traditional Indian thought. It is said that a joyful heart attracts grace. Since ancient times, there has been a long-standing connection between spirituality and building. Many societies have thought of architecture as a way to represent their spiritual practices and beliefs throughout history. In this way, architecture establishes a symbolic space for introspection and cultural expression. Hence, the study has been conducted in Ghantasala village of Krishna district, Andhra Pradesh. The village is considered to be one of the settlements having vernacular houses of more than hundred years of age. The aim of the study is to assess the relation between vernacular architecture and spirituality. This paper attempts to appreciate spiritual anatomy and spatial autonomy in parallel wherever relevant. For the same, qualitative research methodology has been deployed consisting of comparison of the quality of spaces in a vernacular house vis-a-vis a non-vernacular house, through a physical, questionnaire and perception survey of the users of vernacular houses. Quantitative analysis is also done through statistical analysis, to assess happiness of the users of a vernacular house in comparison with the happiness of the same users in case of a non-vernacular house. It was found that the journey of vernacular architecture from design to execution represents an evolution of the user's happiness and wellbeing from thinking to feeling to being to becoming. Findings of the study further show that the users of a vernacular house expressed acceptance of and happiness with a vernacular house than a non-vernacular house. However, the users of vernacular houses expressed certain compelling reasons for transforming the vernacular houses to non-vernacular houses owing to issues related to cost, availability of workers skilled in vernacular methods, etc. There is a scope for further research to check relevance of the same for settlements of this kind in other geographical areas of India and assess the level of replicability.

Keywords: Occupants' happiness, Perception feedback, Spiritual anatomy, Spatial quality, Vernacular dwellings

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The word 'spiritual' refers to concerns for peoples' thoughts, feelings, beliefs, and emotions rather than to their bodies and physical surroundings¹; the word 'anatomy' means the identification and description of the structures of living things². Hence, spiritual anatomy refers to the systematic study about the functioning of inner body, mind and soul of people contributing to their sense of happiness and wellbeing. This requires pause, meditation, introspection and evolution of consciousness by the people³⁻⁵. Researchers⁶⁻⁸ have also done studies to understand the functioning of inner body which is responsible for taking many decisions and giving responses to the surrounding built environments based on their socio-cultural values⁹. Walker¹⁰ has observed that *modernity* has contributed towards a moderated,

more ecologically responsible direction in the delivery of material benefits, post modernity has contributed towards increased consideration to social responsibility, and the traditional world view has contributed majorly towards alignment and direction through innermost growth and a sense of individual meaning. Researchers¹¹ have also studied the scientific construct of spirituality through measurement of socio-cultural variables and statistical analysis to assess its validity for legitimisation since day-by-day spirituality is occupying a greater space of human life in physical and meta-physical level. Their findings suggest that more people-centric sensitive and contextual solution considering their socio-cultural aspects will yield better result in the design and development of the theory and inquiry.

Architecture is at the one hand science of the building which is a machine to dwell in and also the

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art of the building on other hand integrating aesthetic and symbolic quality, aiming to ensure sustainability, happiness, wellbeing and harmony¹². Different parts or spaces of a vernacular house have different levels of importance and sanity, all of which contribute to the health and happiness of the user / occupant. A house is a reflection of its users' persona, social standing and thus it is a personal expression within a given community, more so in rural areas where the community is inward-looking and of outward-thinking at the same time. A house is built as per the perception of the users irrespective of the extent of inspiration vested in development of the said perception¹³. Individual and group identity seem fundamentally linked to architecture. As they identify with the location where they have developed, this is especially true for communities¹². It is a matter of wisdom that the eventual users are consulted for their participation in the aforesaid processes so as to work towards the most appropriate and a feasible solution¹².

Vernacular architecture and spirituality

According to researchers¹⁴, people's perceptions are connected to both individual and cultural behaviour, which leads to shared social behaviour through inspiration and conformity. Rural Indian homes provide as instances of local planning and building methods that have occasionally changed¹². Spiritual ideologies have traditionally emphasised the world's existence as a combination of physical and spiritual realities, as well as visible and invisible beings. As per belief systems, an omniscient force is thought to govern both visible and invisible realms^{4,5,7}.

An architectural work involves two distinct elements, referred to as high and low³. In the first, the universal principles in art are represented by the cosmic norms that regulate geometry, proportion, and ceremonial activities³. Examples of using the high aspect in architecture include the symbolic shapes of space, axis mundi concept as seen in traditional cosmological frameworks, the association of the earth with the sky vault, and several esoteric techniques¹³. The latter, on the other hand, addresses climate issues, the usage of materials, technologies, and construction processes, as well as physical comfort and demands¹². While the cosmic element is accomplished through extensive esoteric research, the low scheme is based on the cumulative experience of generations, experiences, and laboratory investigations³. The architect is a communicator who transforms the essence of an invisible reality into a tangible shape¹³.

In other words, connecting the two realms creates an object that is both physically meaningful and symbolically significant¹³. In this manner, it will become pro-life¹². For many people, the spiritual experience of being in synchrony with nature can be evoked by natural materials like stone or wood¹⁵. Researchers^{12,16} have highlighted that there are several connections between spirituality and architecture, and these connections can significantly influence the human condition. Architecture may be a potent instrument for establishing spaces fostering reflection or symbolic engagement with cultural values, whether through ritual, geometry, symbolism, or aesthetics¹⁷⁻¹⁹.

Architecture is a result of well-informed choices made by local residents based on geology and geography, occupation, beliefs, available building materials, socio-economic profile as well as the local climate¹². Vernacular architecture of a place is thus a product of the aforementioned factors. Spirituality may undoubtedly be evoked by architecture. Human emotions, thoughts, and experiences can be influenced by the environment that architecture creates. A holy environment that allows individuals to connect with something higher than them can be created when architecture is in line with spiritual principles and beliefs.

Hence, the aim of the present study is to evaluate the relation between vernacular architecture and spirituality. This study attempts to appreciate the spiritual anatomy and spatial autonomy in the context of the vernacular architecture of Ghantasala village of Andhra Pradesh, India. For the same, qualitative research methodology has been deployed consisting of comparison of the quality of spaces in a vernacular house vis-a-vis a non-vernacular house, through a physical, questionnaire' and perception survey of the users of vernacular houses. Quantitative analysis is also done through statistical analysis, like 't'-test to assess happiness of the users of a vernacular house in comparison with the happiness of the same users in case of a non-vernacular house.

Methodology

This research was conducted in a village called Ghantasala of Krishna district, situated in the coastal region of Andhra Pradesh state of India. Users' responses and perceptions were considered through a semi-structured interview, followed by a structured interview questionnaire regarding the common building components of vernacular houses (Table 1). The scores were recorded in the form of a score on Likert scale of 5. The responses were sought on the

Table 1 — Common building components of vernacular houses

S. No.	Vernacular building component	Max. score (125)	Obtained score	%
1	Plan	125	108	86.4
2	Ritual / Sacred Activity Space	125	51	40.8
3	Openings	125	95	76
4	Cattleshed	125	60	48
5	Ventilators	125	66	52.8
6	Skylight	125	70	56
7	Roofing - Flat	125	74	59.2
8	Roofing - one side slope	125	103	82.4
9	Roofing - slope on all sides	125	63	50.4
10	Flooring	125	110	88
11	Columns	125	109	87.2
12	Mouldings – on main Door	125	72	57.6
13	Mouldings	125	113	90.4
14	Store Room	125	49	39.2
15	Roof Tiles (Roofing)	125	65	52
16	Tulasi (Basil Tree) Court	125	73	58.4
17	Arugu / Outside Seating	125	119	95.2
18	Wash areas at front setback	125	67	53.6
19	Slits at roof level	125	35	28
20	Manduva	125	111	88.8
21	Tractor parking space	125	54	43.2
22	Walls	125	99	79.2
23	Open Space	125	98	78.4
24	Separate Kitchen	125	27	21.6
25	Separate Toilets	125	66	52.8

principal building components of both the vernacular house and the transformed vernacular house. For example, users might prioritise a particular component from the vernacular house, and a different component from transformed vernacular house. To ascertain the scenario of vernacular houses and to measure the social acceptance, different surveys were conducted as part of this research which were both qualitative and quantitative in nature. Qualitative survey comprised of a descriptive study (visual and physical) which was done to map the vernacular houses in the study area of Ghantasala village. In the process of undertaking the said survey, it has been observed that all the houses are built with mud, mud blocks or bricks for walling; wooden truss with clay curved tiles atop for pitched roofing; wooden rafters with madras terracing atop for flat roofing (part of the same house which has pitched roof); wood for openings as well as ornamentation; mud, local stone for flooring. Thus, the operational definition was accordingly set for that of vernacular houses, in the context of Ghantasala village which was chosen as study area for research.

Description of the study area

In the Krishna district of Andhra Pradesh, India, Ghantasala is one of 20 villages that make up

Ghantasala mandal. It is located 96 km southeast of Vijayawada city, 11 km east of the River Krishna, and 21 km west of Machilipatnam, the district headquarters. It is located in an area with a hot and muggy environment and a comparatively prolonged summer season. Because it is close to the river Krishna, Machilipatnam, and Vijayawada, it is one of the major transit hubs for regional trade in the area. In and around the area, limestone columns from Buddhist monasteries' hypostyle halls from the second century BCE have been found. One of the key locations for Indo-Roman trade was Ghantasala, besides that being a religious centre. There is a Buddhist Stupa, Chaitya and ancient Hindu temples like Jaladheeswaraswamy temple, which indicate the past glory of Ghantasala village.

As per the oral historic account narrated by an octogenarian, Ghantasala seems to have derived its name from a tree in front of Jaladheeswaraswamy temple. The tree is dedicated to a demi goddess called Gantalamma. Another narration is that Ghantasala was originally known as Kantakasaila (named after the horse of Lord Buddha) which over a period of time became Ghantasala in phonetic terms. A few villagers say that there is a cultural and historical link to traditional spiritual practices in Ghantasala since long, owing to the historic anecdotes related to Hinduism and Buddhism in and around Ghantasala. This has taught them to live with nature / *prakriti* and the plan of their indigenous vernacular houses correspond to such an inner call for coexistence. It thus makes Ghantasala an appropriate place to study the vernacular architecture of its houses, users' happiness with vernacular houses and the spiritual quotient that linked the vernacular spaces and users' happiness.

Questionnaire and perception survey

Quantitative surveys employed include sociometric survey, primary (questionnaire) survey and semi-structured interviews. About 100 persons were interviewed to understand the building components, significant building components and finally, principal vernacular (building) components as part of the sociometric survey. As part of the questionnaire survey, the aspects comprised of information pertaining to plot area, Built-up Area, Orientation, Year of Construction, Age of the House (Years), User profile (Owner/Tenant), Occupation, Education Standard, Household Size, Annual Income, Year in which transformation occurred, etc. Subsequently,

user's perception was recorded to ascertain their preference of the vernacular house against transformed vernacular house in view of the 'principal vernacular components'. Qualitative research methodology has been deployed consisting of comparison of the quality of spaces in a vernacular house vis-a-vis a non-vernacular house, through a physical, questionnaire' and perception survey of the users of vernacular houses.

There are various definitions of vernacular architecture. However, for the purpose of this research, houses which are built with mud, mud blocks or bricks for walls; timber truss and curved clay tiles for pitched roof; timber rafters with madras terracing for flat roof; timber for openings as well as ornamentation; red oxide, adobe, naapa stone (Grey chlorite slate or potstone) for floor, is set as operational definition in the context of Ghantasala village. As per the preliminary case study and interaction with 25 selected families (respondent users) of Ghantasala village, a vernacular house in Ghantasala is characterised by the presence and arrangement of various building components as well as spaces which mattered the most to their happiness. Accordingly, 25 significant vernacular building components were identified. Subsequently and as part of the interview, the respondents were requested to give their relative preference across the above 25 components, on a Likert Scale of 5 so as to understand the sociometric choice at large. The respondents gave their score for the 25 vernacular building components²⁰, based on their happiness and the degree of influence of building components on their spiritual practice and wellbeing. The scores are presented in Table 1.

As per the above table, there are 10 components which received a score of 75% and above. Thus, the Ten selected principal vernacular components of a vernacular house, are as presented in Table 2.

Assessment of user's happiness

About 160 houses of Ghantasala are vernacular houses as on date. Twenty-five representative houses were selected for a detailed study among them. The selected houses were documented and spatial, visual, physical and functional transformations were mapped. Overall transformation as well as transformation with respect to the ten principal vernacular components was identified. Reasons and chronology of transformation were also understood as per the information given by all the users or occupants of the

Table 2 — Principal vernacular components for measuring people's happiness

S.No.	Principal vernacular building component
1	Plan
2	Openings
3	Roofing
4	Flooring
5	Columns / Beams (Structural Supports)
6	Mouldings
7	Outside seating/ Arugu
8	Manduva (covered central portion of a house)
9	Walls
10	Open space

vernacular houses. Resultantly, it was found that vernacular houses of Ghantasala can be categorised based on their roof form, into four broad typologies^{20,21} viz., a) Four side sloped roof with *manduva* (courtyard) at the centre; b) L shaped sloped roof; c) Two side sloped roof; and d) Four side sloped roof.

People's happiness to the house was scored on a Likert scale of 5 through the lens of the ten principal vernacular components (refer Table 2) based on the level of attachment expressed by the users of each selected house. The assessment of social acceptance and people's happiness towards vernacular houses in comparison with non-vernacular houses or transformed vernacular houses was undertaken and scores were analysed through t-test.

Details of a vernacular house of Ghantasala

This house belongs to Typology 'a', i.e., the house having four-side sloped roof with the central portion of the roof dipping towards the centre, giving scope for *manduva*. This was one of the twin houses which were originally built in the year 1918. The property was subdivided in the year 1988. Subsequently, the then owner constructed a separate gate into his portion of the property. A new two storeyed house was built behind the vernacular house in the year 2010. This property was subsequently inherited by the present users during 2020. Major transformation was done to this house in the year 1988 due to subdivision and inheritance. Due to the increasing decay of the trussed roof, the roof was repaired. *Manduva* was also altered to avoid leakage. To periodically maintain the roof and *manduva*, the present user had laid false roof with wood panels in the year 2019. The side open space was also paved and parking shed was constructed by the user using asbestos sheets. Despite the transformation, the users expressed happiness with the vernacular house mainly due to the spatial

organisation and a feeling of divinity in the functional form. The house character and context can be seen in (Fig. 1-3).

The users expressed that they are happy with the vernacular house than the new house. Due to non-availability of skilled labour and other peer pressure, they built the new house in a non-vernacular approach but the old vernacular house and its spatial organisation enabled better spiritual practice due to its



Fig. 1 — Main entrance



Fig. 2 — Backyard of the house



Fig. 3 — Front lobby of the house

alignment with nature, traditional beliefs, etc. The nature of transformation within the vernacular house is presented in (Fig. 4).

Results and Discussion

Happiness, an attribute of spirituality, that applies to a population was tested using a t-test. To ascertain the likelihood of a difference between two sets of data, a t-test considers the degrees of freedom, the t-statistic, and the t-distribution values¹². In the present study, the two sets of data are namely, happiness or attachment of the house owner to the non-vernacular house and happiness or attachment of the house owner to the vernacular house. Hence, null hypothesis is, 'the residents are happy with the transformed vernacular house' and alternative hypothesis is, 'the residents are happy with the vernacular house than the transformed vernacular house'.

A summary of the said 't' test showing the derived critical 't' value of vernacular house as well as derived 'p' value of selected 25 vernacular houses is presented in Table 3. The test helped in assessing difference between two sets of data. The rationale is that the 'p' value derived from the two sets of data should be less than the chosen significance factor *i.e.*, 0.05 which implies that there is a 95% confidence factor on the test result²¹. If so, it can be construed that there is significant difference between the two sets of data. Twenty-five vernacular houses were selected to assess the level of happiness or attachment or social acceptance of the people to the vernacular houses.

The results of the statistical analysis have shown that the null hypothesis that 'the residents are happy with the transformed vernacular house' is not true, since the absolute value of the "t" test statistic is more than the critical "t". Consequently, the alternative hypothesis that 'the residents are happy with the vernacular house than the transformed vernacular house' is proved true. A summary of t-test conducted to assess happiness of twenty-five households living in different vernacular houses of Ghantasala is shown in Table 4.

It is observed from Table 4 that the absolute value of 't' is higher than critical 't' table value of 1.833, except in case of house number 1, 12, 18, 19 where the users were happy with the transformed house in line with their urge to incorporate modern materials for floor, roof and finishes. Alternative hypothesis is proved to be true in case of 21 houses out of the 25 houses studied.

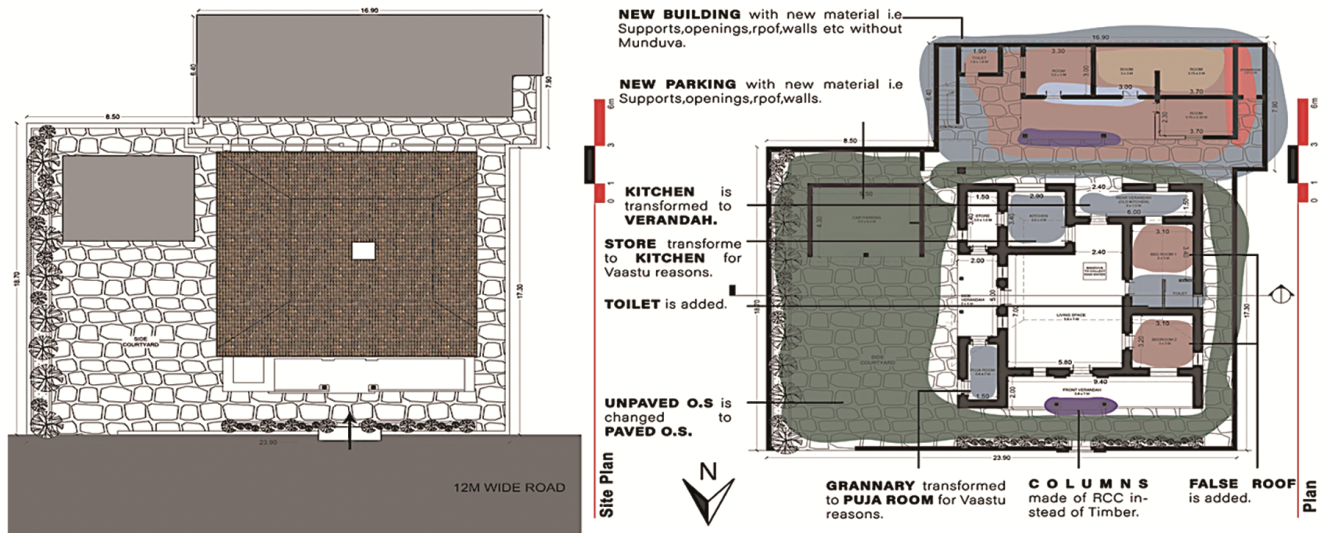


Fig. 4 — Site Plan and Plan of the vernacular house showing the vernacular house (including transformation) and the new non-vernacular house

Table 3 — Sample t-test conducted for a vernacular house of Ghantasala

S. No.	Principal vernacular building component	People's happiness to transformed vernacular house			People's happiness to original vernacular house		
		X	Z = X-X _{bar}	Z ²	X	Z = X-X _{bar}	Z ²
1	Plan / Spatial organisation	4	1.7	2.89	2	-1.3	1.69
2	Openings	3	0.7	0.49	3	-0.3	0.09
3	Roofing	3	0.7	0.49	4	0.7	0.49
4	Flooring	3	0.7	0.49	2	-1.3	1.69
5	Columns and Beams (Struc. supports)	1	-1.3	1.69	4	0.7	0.49
6	Mouldings / Ornamentation	1	-1.3	1.69	4	0.7	0.49
7	Arugu / Outside seating	1	-1.3	1.69	3	-0.3	0.09
8	Manduva	1	-1.3	1.69	4	0.7	0.49
9	Walls	2	-0.3	0.09	4	0.7	0.49
10	Open space	4	1.7	2.89	3	-0.3	0.09
	Total weight age	23		14.1	33		6.1
	mean: X _{bar}	2.3			3.3		
			Sum of Z ² /91.566667				0.67777778
			SD	1.251666			0.823272602
			s-error	0.395811			0.260341656

Absolute value of T-Test statistic = 1.876260119
Critical 't' = 1.833

Notes:

- i. As per t-Distribution Table of Critical Values, critical 't' is 1.833 when the degree of freedom is 9 (number of parameters is 10 min 1) for 1 tailed test, paired data with 0.05 significance factor (95% confidence factor for the result). The table value selected is with reference to. Derived value of 't' is to be seen in its absolute value.
- ii. 'p' value is 0.05, a significance factor indicating 95% confidence for the derived result.

At a fundamental level, vernacular architecture and spiritual anatomy share an intrinsic connection via their influence/effects on human perception, consciousness, and happiness as also observed by other researchers^{3,16-19}. As per the literature review, spiritual anatomy, a concept from traditional belief systems aligning spatial design

with well-being, governs internal balance. On the other hand, vernacular architecture, which is shaped by spatial autonomy, materials, and user perception, attempts to connect the built environment with the surrounding natural environment including plants, soil, water, air, sun, and atmosphere.

Table 4 — Results summary of t-test to assess happiness of people in vernacular houses of Ghantasala

Vernacular House No.	Critical 't' Value with level of significance 0.05	Absolute 't' Value of the selected vernacular house including transformed vernacular houses
1	1.833	-2.0404408
2	1.833	1.8762601
3	1.833	2.6117145
4	1.833	2.1908902
5	1.833	2.1611819
6	1.833	2.6117145
7	1.833	2.1651339
8	1.833	2.2497640
9	1.833	1.9952172
10	1.833	1.9952172
11	1.833	2.3463538
12	1.833	-2.4440912
13	1.833	1.9662480
14	1.833	1.9662480
15	1.833	1.9245009
16	1.833	3.3824071
17	1.833	3.3824071
18	1.833	0.1728253
19	1.833	-1.5554275
20	1.833	2.2247938
21	1.833	3.8146448
22	1.833	2.1081851
23	1.833	2.6097788
24	1.833	2.3688968
25	1.833	3.1615621

Source: Author

Conclusion

An attempt has been made in the present study to enquire about the relationship between vernacular architecture and spirituality through statistical analysis of subjective feedback from the same occupants of vernacular and transformed houses. It is observed from the findings that the users of vernacular houses have expressed more happiness, which is closely associated with well-being in traditional knowledge frameworks and contemplative practices, than for a non-vernacular house. However, the users of vernacular houses expressed that they are compelled to transform the vernacular houses to non-vernacular houses owing to issues related to cost, availability of workers skilled in vernacular methods, etc. The findings of the study also reveal that people really attach physical and emotional values to the different components of their dwellings contributing to their happiness. Hence, present day architects and building professional should design such dwellings with due sensible socio-cultural-economic consideration and in harmony with the natural environment.

Vernacular houses of a place reflect the local, socio-economic, materiel and cultural aspects which vary from place to place. Hence, further research can be undertaken to check replicability of the findings of this work for varied context(s) as aforementioned. While the link between spirituality and vernacular architecture is understood to be of importance, further study can be conducted to evaluate the said relation with reference to the local, socio-economic, materiel and cultural aspects thereof. Resultantly, emulation of spatial character of vernacular houses of a given area in future housing proposals can lead to people's happiness.

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Conflict of Interest

None of the authors of this manuscript have any conflict of interest, financial or non-financial whatsoever.

Author Contributions

S V K K: Conceptualisation, methodology, data collection and analysis, writing, editing. A S: Conceptualisation, methodology, writing, editing. R S: Guidance, supervision, data analysis and content validation. K R M: Guidance and supervision.

Ethics Approval

This article examines and appreciates the relation between contemplative traditional practices and vernacular architecture. It does not generate any economic gain or cause harm to the practitioners of spirituality and users of vernacular houses respectively. Thus, there is no potential for ethical standards to be violated in this research, as its sole purpose is the study of architectural space and its function.

Prior Informed Consent

Prior consent was obtained from all informants / users of the vernacular houses of Ghantasala.

Data Availability

The data used in this study is derived from surveys as part of Author's PhD Thesis titled, Social acceptance of Vernacular houses – The case of Ghantasala, A.P. For any additional information, the corresponding author can be contacted. Authors are responsible for correctness of the statements provided in the manuscript. There are no associated data to declare.

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