

APPLICATION OF GRAPH LABELLING IN PSYCHOTHERAPY FOR GLOSSOPHOBIA

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Abstract

Glossophobia, derived from the Greek word “glosso”(meaning tongue) is a common fear of public speaking found among students. In this paper, we apply graph labelling techniques to address the issue of glossophobia. The complicative cognitive mapping which is commonly used in psychotherapy is now replaced by bi-star graph. A survey was undertaken among school students of age group 10 years to 18 years. Shrub graph is used to represent the collected data for symptoms found among students while speaking in a competition. The link for the summary of results of the google survey done is also given in this paper.

Keywords – Glossophobia, Cognitive mapping, shrub

Introduction

Graph labelling is assigning of labels represented by integers to vertices [2][5][7][9][17], edges [1][18][21][22][23], faces [19] and blocks[12][13][15][16][26][27] of a graph. Graph theory finds its applications in many fields like medical [24], astronomy [12], data science [14], image segmentation [6] etc. Network analysis for a network disorder, the emerging role of graph theory in the study of epilepsy can be referred in [3][4]. A study on graph theory in the analysis of arithmophobia was done in 2019[20]and labelled graphs were used in the treatment of arithmophobia. In this paper, a study on glossophobia is undertaken. Currently, speaking in public or in front of a group of people has become necessary to project the individual’s skills. Studies have proved that around 75 percent of individuals suffer from glossophobia. A survey was carried out. In this paper, the messy and complicative cognitive mapping currently used in psychotherapy is replaced by the bi- star graph. Also, shrub graph is used to represent the collected data for symptoms of glossophobia seen among students. This eases the process of psychotherapy.

Definition 1[10]: Undirected graphs is a set of vertices (nodes) connected by edges that do not have a direction. Every edge indicates two - way relationship.

Definition 2[10]: Directed graphs is a set of vertices (nodes) connected by edges that have direction. Every edge indicates a relation between the vertices.

Definition 3[10]: A weighted graph is a graph with vertices and edges, and every edge is associated with a weight. The value or weight of the weighted graph is the sum of the weights of the edges crossing it.

Definition 4[10]: The degree of a node in the undirected graph is the number of connections or edges a node has to other nodes.

About glossophobia

A strong fear of public speaking is referred as glossophobia. It is an excessive fear or anxiety disorder experienced by certain people when they face a gathering or speak in public. The person who has glossophobia normally evade being in public to avoid the embarrassing situation. But it has become more than sufficient to speak in a meeting, speak in public or face a gathering to express the potential or skill. In the long run, the patients may experience adverse impacts on mental health or success in whichever field they are in. An analysis says that female is affected more by glossophobia than the men. Around 75 percent of people are diagnosed with this phobia. The psychologists treat these patients by giving them relaxation techniques, suggesting life style modifications and some medications.

Symptoms of glossophobia

The person with glossophobia experiences high level of anxiety and fear. Sometimes this stress even leads to panic attack. The following are the symptoms of glossophobia.

The following are the symptoms in children

1. Crying
2. Throwing tantrums
3. Freezing

The following are the symptoms in adults

1. Avoid public speaking /crowd /gathering
2. Excessive sweating
3. Nausea
4. Elevated heart rate
5. Increased blood pressure
6. Stiffening of muscles
7. Stammering
8. Dry mouth
9. Trembling in the body
10. Reasons for glossophobia

A combination of genetic, environmental, demographic, biological and psychological factors may be a cause for glossophobia. This mental illness might be due to prior bitter experiences of being embarrassed during a performance. The parental influence, person's education, his/her

upbringing also contributes to glossophobia. Lack of preparation, short notice of the speech, a topic chosen by force can also be a reason for glossophobia.

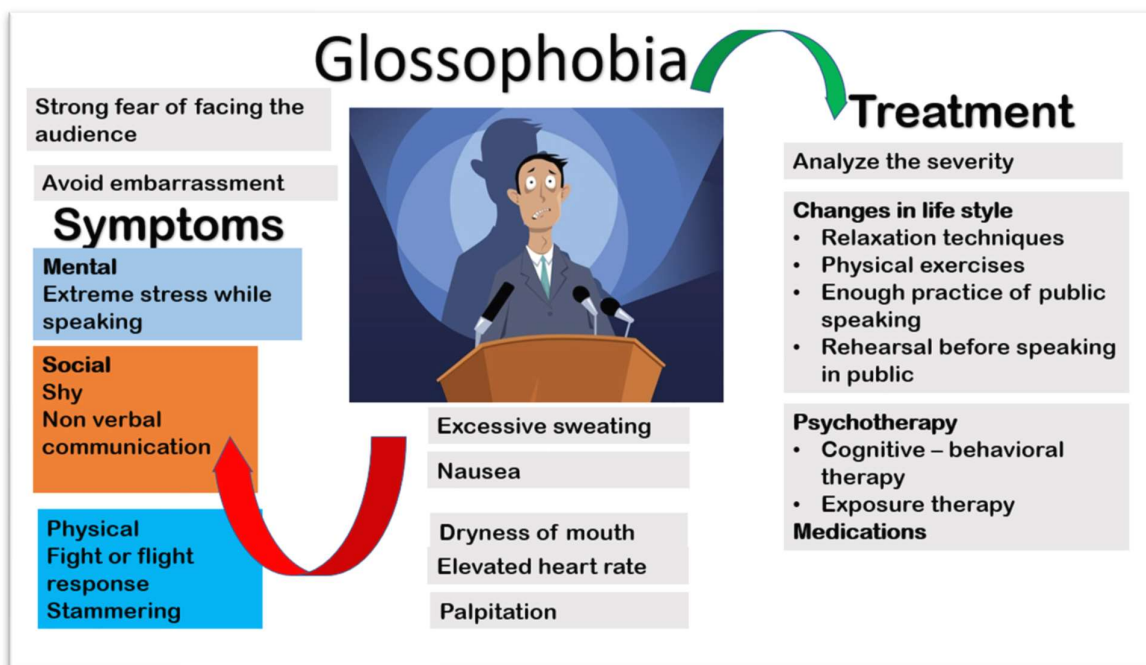


Fig 1 Reasons for glossophobia

Treatment for glossophobia

It is the affected individual's willingness, patience and commitment required for overcoming glossophobia. Severity of the problem and the medical history is first assessed by the psychotherapist. Some cases may require biological tests. The treatment involves life style modifications like increasing physical exercises, some relaxation techniques like transcendental meditation, breathing exercises etc.

The psychotherapeutic treatment has two options. One is exposure therapy (ET) and another is cognitive – behavioral therapy. In exposure therapy, the patients are exposed to situations which trigger glossophobia, so that they adapt to such triggers and also learn to manage their fears. Secondly the cognitive behavioral therapy is nothing but life style modifications. This focusses on changing the mental, behavioral and emotional processing of situations that can stimulate strong fear while speaking in public. Considering the individual's past treatment, certain anti - anxiety medications are also used.

This phobia can also be reduced if the individual focuses on the following before delivering the speech.

- ❖ Choosing a topic of interest.
- ❖ Knowing the audience.

- ❖ A well-prepared speech with objectives.
- ❖ Tailor the content to the audience.
- ❖ Add humor in the speech to seek attention of the audience.
- ❖ Rehearse as much as possible before the day.
- ❖ Ensure a comfortable attire.

How graph theory replaces Cognitive mapping in Psychotherapy

Psychotherapists use mind mapping to treat patients with phobia. These mind maps help to summarize the reasons behind the phobia, and also evades overlooking of essential features of the case. A well - structured planning of the treatment is enabled. But mind mapping has its own drawbacks of being messy and complicated at times.

We can use a bistar graph to record the symptoms and causes. Each vertex representing a symptom / cause. Weightages can be included to know the intensity and treat accordingly.

The following picture is a mind mapping for glossophobia in psychotherapy to help patients come out of their problems.

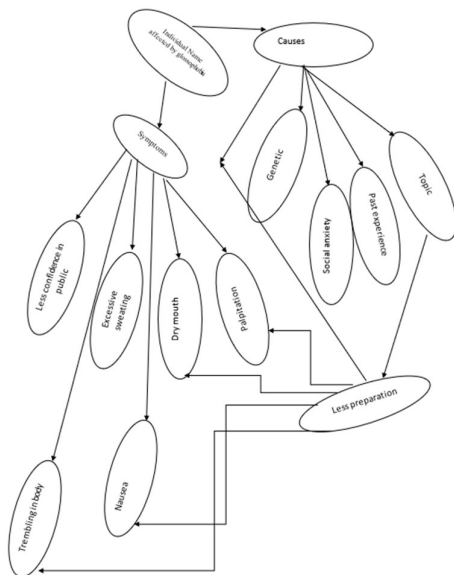


Fig 2 Mind mapping for glossophobia

The above mapping is too complicated and messy. In this paper, we introduce a labelled graph instead of mind mapping to record the reasons of any psychological problem. This gives a clear picture of the severity of the problem in an individual and increases the therapist’s focus while treating the patient.

Labelled graph replacing mind mapping in psychotherapy

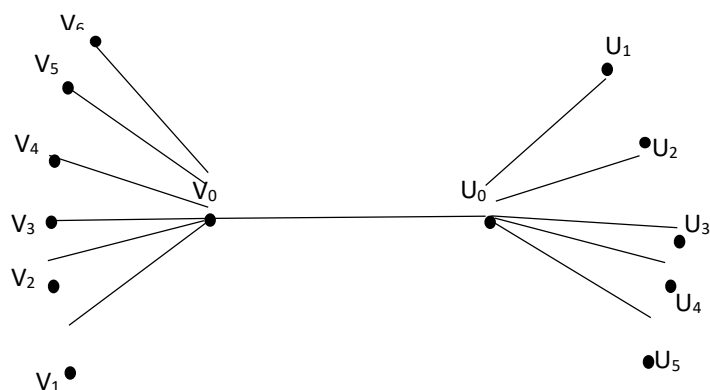


Table 1

Mapping	Graph
Causes	Vertices
Frequency of occurrence	Edges
Severity	Weightage

Table 2

Vertices	Mapping	Vertices	Mapping
V ₀	symptoms	U ₀	Causes
V ₁	Less confidence in public	U ₁	Genetic
V ₂	Excessive sweating	U ₂	Social anxiety
V ₃	Trembling of body	U ₃	Less preparation
V ₄	Nausea	U ₄	Topic
V ₅	Dry mouth	U ₅	Past experience
V ₆	Palpitation		

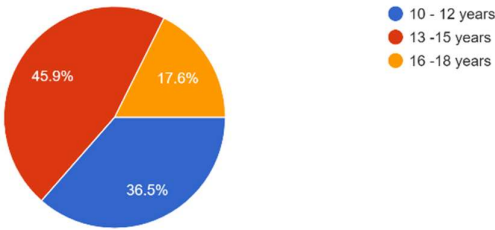
Graph theory in data Analysis

Graph theory, a branch in mathematics is nothing but a well-structured mathematical model to represent the pairwise relationship between objects. Pictograms, cartograms, pie diagrams and bar diagrams are usually used to represent the collected data in an appealing way. In this paper, we introduce a labelled graph to represent the data. A survey was done among students age ranging from 10 years to 18 years to find the causes of glossophobia. The data is represented as a labelled graph for further analysis.

The summary of the questionnaire for the analysis of glossophobia is as follows.

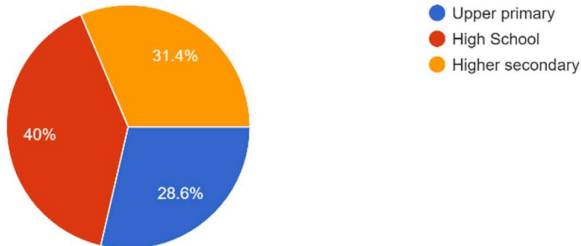
Age

255 responses



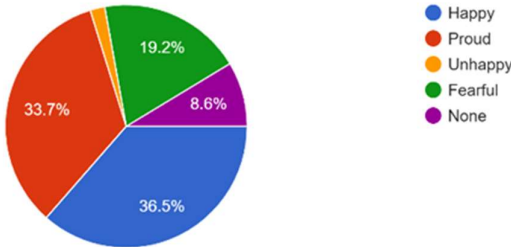
4.What is the level of your education?

255 responses



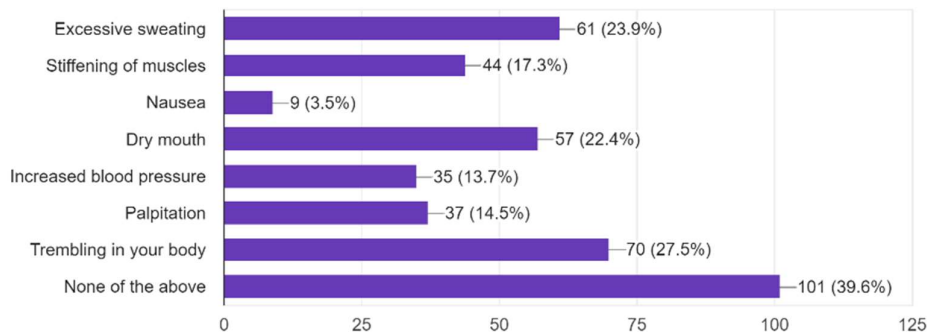
5.How do you feel while answering in class?

255 responses



6. Do you experience any of these when you answer in class or participate in competitions? (you are allowed to tick more than one)

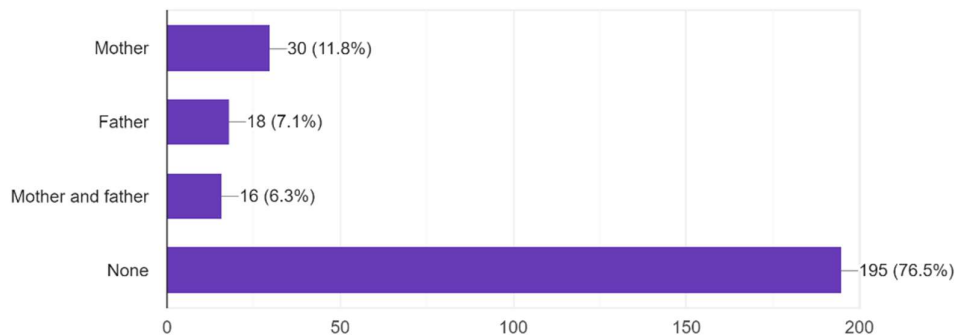
255 responses



CAUSES OF GLOSSOPHOBIA

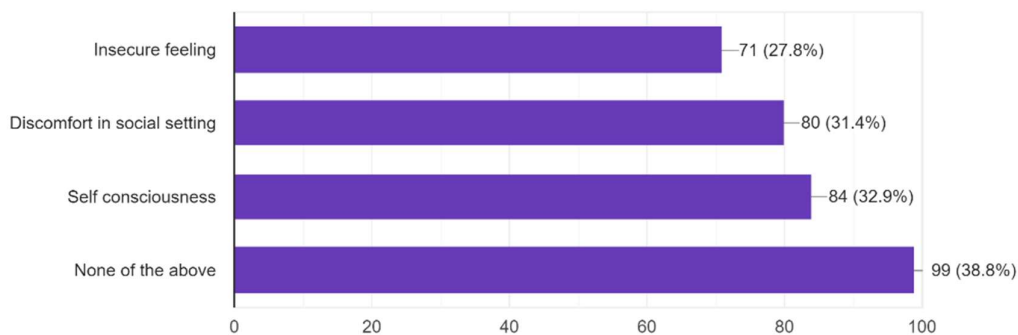
7. Genetic factors - Who in your family have glossophobia? (you are allowed to tick more than one)

255 responses



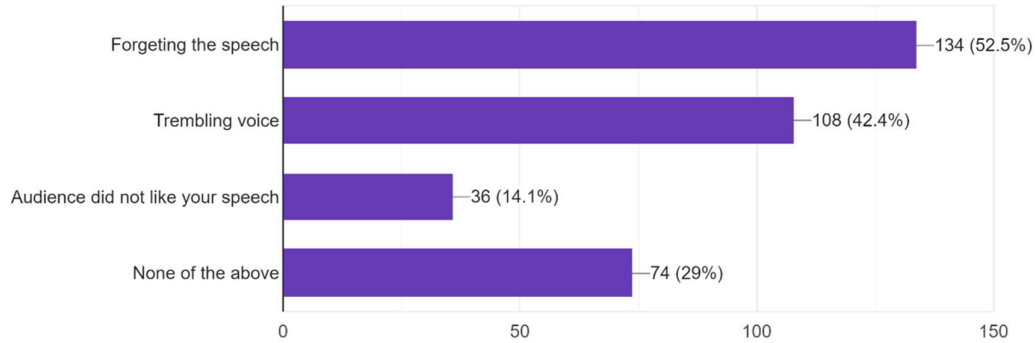
8. Social anxiety - Do you experience the following in public? (you are allowed to tick more than one)

255 responses



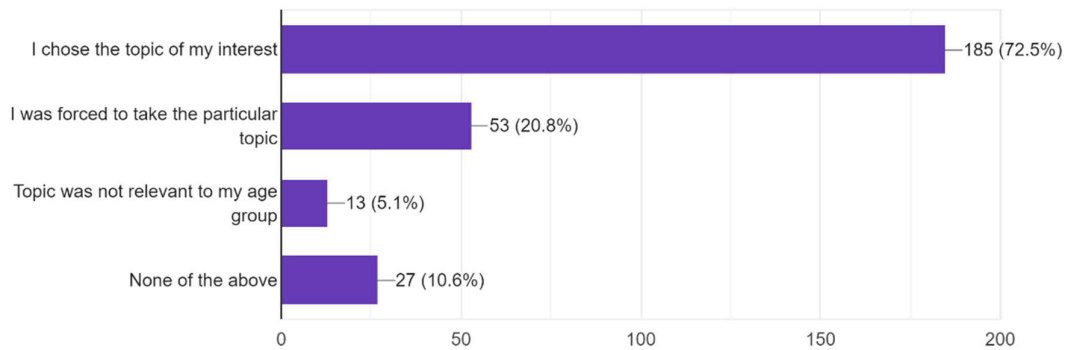
9. Past experience - Have you experienced the following? (you are allowed to tick more than one)

255 responses



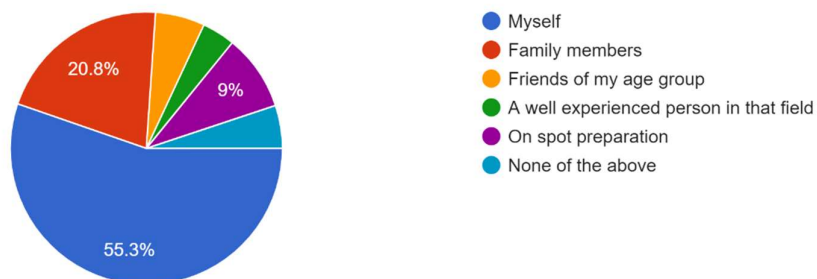
10. How was the topic ? (you are allowed to tick more than one)

255 responses



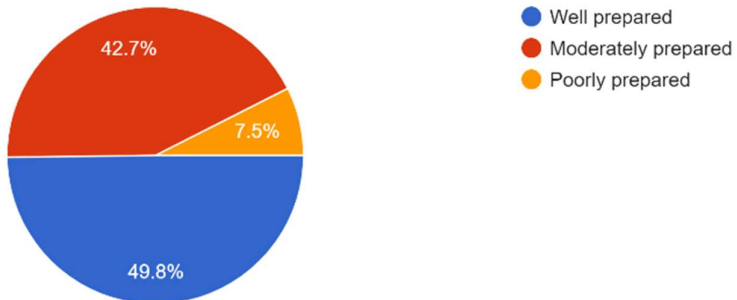
11. Who prepared the speech ?

255 responses



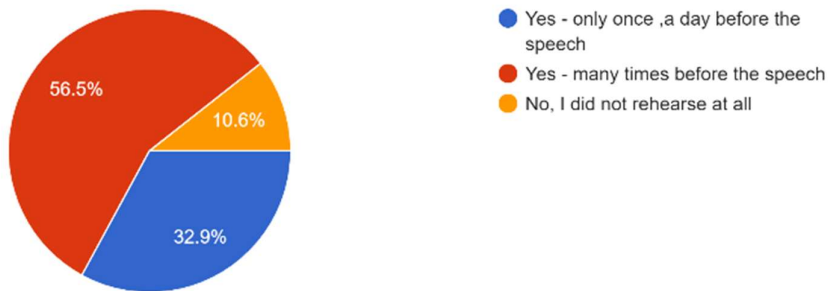
12. How was the preparation for the speech ?

255 responses



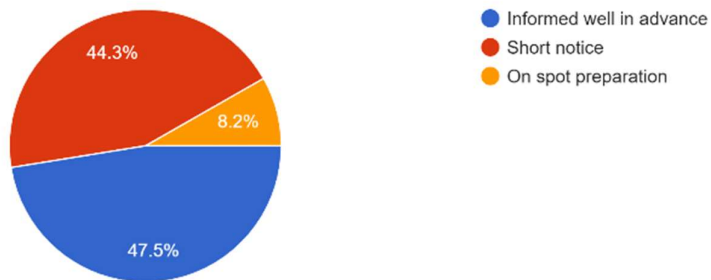
13. Did you rehearse for the speech?

255 responses



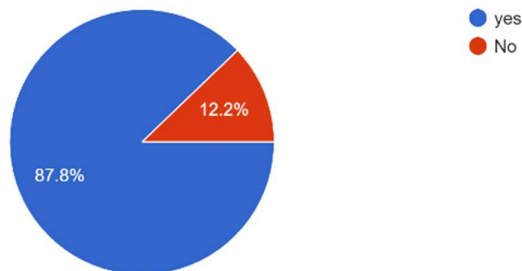
14. When were you informed about the speech?

255 responses



15. Were you comfortable with your attire (dress)?

255 responses



Link for the data sheet

https://docs.google.com/spreadsheets/d/13igoDQuM7VA68jknWPWUerzi1z9r5ttLBoepStGR_xM/edit?usp=sharing

Graphical representation of the data

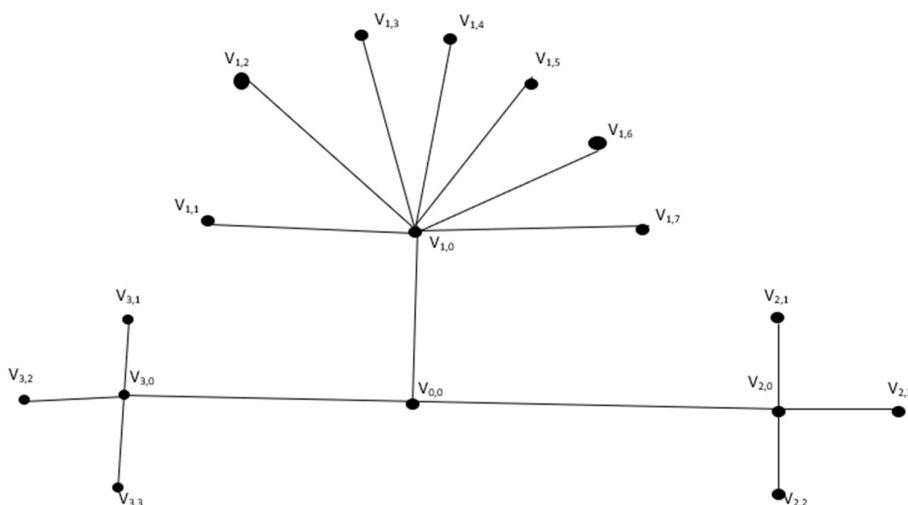


Fig: Shrubs graph to represent the symptoms

Table 3

The following table gives the results of the survey

Mapping	Graph
Symptoms	Vertices
Duration of elimination	Edges
Percentage	Weightage

Table 4 -

Vertices	Mapping
V _{0,0}	Student
V _{1,0}	Excessive sweating
V _{1,2}	Stiffening of muscles
V _{1,3}	Nausea
V _{1,4}	Dry mouth
V _{1,5}	Increased blood pressure
V _{1,6}	Palpitation
V _{1,7}	Trembling in body
V _{1,8}	None of the above
V _{2,0}	Insecure feeling
V _{2,1}	Discomfort in social setting
V _{2,2}	Self consciousness
V _{2,3}	None
V _{3,0}	Forgetting the speech
V _{3,1}	Trembling voice
V _{3,2}	Audience did not like the speech
V _{3,3}	None

Thus, Table 1 shows the mapping of vertices of the bi -star graph with the causes of glossophobia, edges with frequency of occurrence and severity of glossophobia with the weightage of the vertices.

Table 2 shows what each vertex of the bi star graph represents.

Table 3 shows the mapping of vertices and edges of shrub graph with the symptoms of glossophobia.

Table 4 shows what each vertex of the shrub graph represents.

The shrub graph representing the symptoms of glossophobia is clearer and more expressive.

Conclusion of the survey

From the survey undertaken among the school students, it is obvious that around 60 percent of school students experience the symptoms of glossophobia. Genetic factors affect 15 percent of the students. Past experience of forgetting the speech is found among 50 (approx.) percent of students.

Similar techniques can be applied to other psychological disorders.

Conclusion

In this paper, the bi- star graph is used in psychotherapy for glossophobia. The undertaken survey results for symptoms seen among students are represented as shrub graph to ease the process of psychotherapy. There is further scope of representing data required for treatment of

many other psychological disorders by labelled graphs.

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