Perceptions of Disorders Among Employers in South Korean Firms with More than Five Employees: A Text Mining-Based Study Applying Multidimensional Scaling and Vignette Techniques

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우리나라의 기업 고용주의 장애인에 대한 인식: 다차원척도법과 Vignette 기법을 적용한 텍스트 마이닝 기반 연구

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Abstract The purpose of this study is to analyze how employers perceive communication disorders. During the study period, an online survey was conducted targeting employers of companies with more than five employees, resulting in 116 responses. The Vignette method was used to present pairs of 37 adjectives to evaluate perceptions. Analysis revealed that positive adjectives (e.g., open, friendly) were mainly used for non-disabled individuals, whereas negative adjectives (e.g., withdrawn, avoidant) were more frequently used for stuttering and voice disorders. This study confirms the prevalence of negative perceptions towards stuttering and voice disorders and emphasizes the need for educational programs to reduce misconceptions and biases among employers.

요 약 이 연구는 5인 이상 근로자가 근무하는 기업의 고용주가 의사소통장애인을 어떻게 인식하고 있는지 분석하고 상담 및 인식 전환 교육 프로그램 개발을 지원할 수 있는 기초 데이터를 제공하였다. 본 연구에서는 다양한 장애에 대한 인식과 태도를 조사하기 위해 Vignette 방법을 이용하여 유사성을 평가하기 위해 37개의 형용사 목록을 쌍으로 제시하였다. 5명 이상의 직원을 기업의 고용주에게 온라인 설문지를 배포한 결과, 총 116개의 응답이 수집되어 분석되었다. 참가자들은 일반적으로 비장애인의 사례에서는 "개방적이다", "친절하다", "유쾌하다"와 같은 긍정적인 형용사를 사용하여 비장애인을 평가하였다. 그러나 말더듬증과 관련된 인식에는 "위축된", "회피하는", "부주의한"과 같은 부정적인 형용사가 더 많이 사용되었다. 음성 장애는 "신경질적이다", "비협조적이다", "회피한다"와 같은 인식을 보였다. 본 연구는 건강한 사람에 대한 일반적인 인식과 비교할 때 말더듬증과 음성 장애에 대한 부정적인 인식이 우세하였으며, 고용주의 의사소통 장애에 대한 오해와 편견을 바로잡아야 할 필요성을 강조한다.

Keywords : Public Perception, Disorders, Awareness, Education, Vignette, Employers

1. Introduction

The perception of individuals with disabilities has evolved significantly over time. In the past, individuals with disabilities were often subjects of rejection and ridicule [1]. In contrast, contemporary society focuses on the potential for education and human dignity, emphasizing

the rehabilitative possibilities for people with disabilities. Communication disorders, as a subset of disabilities, represent complex challenges that cannot be addressed alone, highlighting the need for societal and national engagement.

In South Korea, speech therapy as a field has matured considerably, with extensive studies conducted on the characteristics and treatments of various disorders. There is a growing awareness of the need to improve societal perceptions of language, speech, and communication disorders, with surveys and studies assessing public awareness [2-7]. Individuals with speech disorders often face stereotypes that undermine their perceived intelligence [5], while voice disorders can impede professional opportunities [8]. Moreover, studies have demonstrated that children who stutter experience higher rates of rejection and bullying within educational settings compared to their peers [9]. A survey of 1,362 normal adults in Belgium revealed familiar but limited knowledge about communication disorders, harboring overall negative perceptions [10].

Despite the accumulation of research underscoring the necessity for better understanding and acceptance of individuals with communication disorders [5-7,11,12], perceptions and attitudes remain substantially prejudiced, constituting an ongoing challenge for speech-language therapists [13]. In Korea, communication disorders are among the most common developmental disabilities [14], often co-occurring in young children with developmental issues. Early childhood educators, who spend considerable time with children, are likely to provide objective observations during communication processes.

Previous research on the perceptions of language disorders among preschool teachers and the general public has been relatively limited [7,11,15-17]. The Vignette method, which utilizes concise descriptions of individuals or social situations to explore respondents' decision-making processes and judgments, has been underutilized

in the field of speech therapy in Korea.

This study aims to analyze the image of communication disorders held by the general population, utilizing the Vignette method. By examining 37 multifaceted images of communication disorders held by non-disabled individuals, this research seeks to reveal the intrinsic and subjective attributes influencing perceptions of fluency and voice disorders. The findings will provide foundational data for developing community-based educational programs aimed at improving public awareness of communication disorders.

2. Methods

2.1 Study Subjects

This study conducted an online survey targeting employers of companies with more than five employees in Gwangju and South Gyeongsang from December 18, 2023, to January 6, 2024. The final analysis included these 116 participants. A power analysis was performed using Epi-info 7.2.2.6, setting the effect size (d) at .50, the significance level at .05, and power at .95. The analysis determined that a minimum sample size of 98 was necessary, thus the sample size of this study was deemed sufficient. To address ethical considerations, the survey's introduction detailed the research purpose and methodology, and only those who consented to participate were surveyed. This research Supported by Basic Science Research Program through the National Research Foundation of Korea funded by the Ministry of Education (RS-2023-00237287, NRF-2021S1A5A8062526) and local government-university cooperation-based regional innovation projects (2021RIS-003).

2.2 measurement

Participants' occupations were categorized using the major groups from the 6th Korean Standard Classification of Occupations. To measure

perceptions of communication disorders, 116 participants who employers in South Korean firms with more than five employees were surveyed. To avoid biases associated with the term "disorder," the survey employed the Vignette method, describing hypothetical individuals' characteristics. To investigate similarity in perceptions, a list of 37 pairs of adjectives was used, with respondents rating each pair on a 5-point scale (e.g., 1 for very proactive to 5 for very passive). The adjectives were adapted and refined from those used in the studies by Sim (2000) [5] and Seo (2013) [7], with unreliable items removed, leaving a total of 37 pairs for analysis. Attributes measured included openness, confidence, tension, proactivity, sociability, passivity, stability, physical issues, and employment suitability, achieving a Cronbach's alpha reliability of .82. Participant demographics such as age, gender, economic activity, household income, educational level, residential area, marital status, and child status were also collected.

The survey data collected on fluency disorders, voice disorders, and perceptions of the general public were analyzed using Multidimensional Scaling (MDS). MDS is a method used when a single dimension is insufficient to fully represent a concept, using data on similarities, attributes, and preferences to statistically represent relationships, preferences, and attributes in a space of two or more dimensions [18]. When participants perceive specific images, they set objective dimensions as benchmarks for comparing similarities or evaluating psychological distances [19]. MDS is particularly useful when evaluating intangible emotional factors or when no clear criteria exist for comparing images, allowing complex relationships to be visualized in a lower-dimensional space.

This study utilized the ALSCAL algorithm, a statistics-based model that employs nonmetric data and monotonic transformation to minimize the differences between predicted and actual distances, maintaining the order of data magnitude consistently [20]. The ALSCAL analysis, using adjectives as response variables, proved useful in clustering images by type and identifying key determinants. The fit of the MDS model was assessed using Kruskal's stress index, which reflects the discrepancy between the predicted and actual distances. All analyses were performed using R version 3.5.2 (Eggshell Igloo).

3. Results

3.1 General Characteristics of Participants

The general characteristics of the 116 participants are presented in Table 1 An examination of these characteristics revealed that 26 participants (22.4%) were male and 90 (77.6%) were female. The age distribution was as follows: 46 participants (39.7%) were in their 30s, followed by those in their 40s (31.9%), 20s (19.0%), 50s (6.0%), and over 60s (3.4%). The highest level of education was a university degree, held by 79 participants (68.1%), followed by high school graduates (25.9%) and postgraduate degrees (6.0%). Notably, 67.2% of the participants were economically active, 28.4% had a household income over 5 million KRW, 50.9% resided in metropolitan areas, and 74.0% had more than two children. Additionally, 71.6% reported no acquaintance with speech impairments, pronunciation issues, voice problems, or other communication disorders.

Table 1. Participants' characteristics

Characteristics	N (%)	Characteristics	N (%)
Age		Residence	
20-29	22 (19.0)	Seoul And Gyeonggi	6 (5.2)
30-39	46 (39.7)	Metropolitan City	59 (50.9)
40-49	37 (31.9)	Small City	48 (41.4)
50-59	7 (6.0)	Rural Area	3 (2.6)
60+	4 (3.4)	Mariage Status	
Gender		Single	73 (62.9)

Male	26 (22.4)	Married	43 (37.1)
Female	90 (77.6)	Children	
Economic Activity		No	43 (37.1)
Yes	77 (67.2)	1 Child	14 (12.1)
No	38 (32.8)	2 Children	54 (46.6)
Occupation		More Than 3 Children	5 (4.3)
A Career In Management	5 (6.6)	Experience Of Communication Disorder	
Professional	21 (27.6)	Yes	33 (28.4)
Office	13 (17.1)	No	83 (71.6)
Service	20 (26.3)	The Age Of A Person With Communication Disorder	
Sales	5 (6.6)	Kindergarten Student	11 (31.4)
A Functional Source	2 (2.6)	Elementary School Student	4 (11.4)
Device And Machine Operation	4 (5.3)	Middle/High School Student	2 (5.7)
Labor	5 (6.6)	University Student	18 (51.5)
A Military Man	1 (1.3)	Relationship With The Communication Disordered Person	
Income		Children	5
Less Than 2 Million Won	17 (14.7)	Relative	3
2-3 Million Won	30 (25.9)	An Acquaintance	27
3-4 Million Won	20 (17.2)	A Language Problem For The Communication Disabled	
4-5 Million Won	16 (13.8)	Stuttering	10
Over 5 Million Won	33 (28.4)	Pronunciation	14
Education		Voice	2
High School Graduates	30 (25.9)	Communication	8
College Graduates	79 (68.1)		
More Than Ma	7 (6.0)		

3.2 Comparison of Average Images

Table 2 presents the differences in average scores between images of typical individuals and those with stuttering or voice disorders. The typical individuals scored high on being 'open,' 'friendly,' 'calm,' 'cheerful,' 'indifferent,' 'likable,' 'trustworthy,' and 'having a weak personality.' In

contrast, stuttering was associated with higher scores on 'shy,' 'passive,' 'dull,' 'avoidant,' 'fearful,' 'unstable,' 'self-deprecating,' 'indecisive,' 'emotionally unstable,' 'unsuitable for employment,' and 'unable to emotionally adapt.' Voice disorders were marked by higher scores for being 'sensitive,' 'uncooperative,' 'active,' 'cheerful,' 'avoidant,' 'careless,' 'untrustworthy,' and 'intellectual.' Negative images such as 'closed,' 'sensitive,' 'introverted,' 'unstable,' 'emotionally fluctuating,' 'unlikable,' 'physically abnormal,' 'emotionally unstable,' 'unsuitable for employment,' and 'unable to emotionally adapt' were relatively higher in individuals with stuttering and voice disorders compared to the typical group.

Table 2. Comparison of perceptionss according to type of communication disorder, mean±SD

No	perceptions	Normal	Stuttering	Voice Disorder
1	guarded/open	3.14±0.82	2.64±0.94	2.59±0.76
2	calm/nervous	2.92±0.94	3.37±0.94	3.42±0.74
3	uncooperative /cooperative	3.22±0.85	3.22±0.99	2.97±0.76
4	bold/shy	3.21±0.90	3.84±1.06	3.45±0.85
5	unfriendly/friendly	3.21±0.67	3.19±0.98	2.84±0.67
6	self-conscious /self-assured	2.71±0.95	2.14±1.06	2.43±1.00
7	Tense/relaxed	2.81±0.83	2.04±0.92	2.47±0.84
8	sensitive/insensitive	2.73±0.72	2.48±1.00	2.51±0.78
9	anxious/composed	3.01±0.82	2.31±1.07	2.75±0.88
10	unpleasant/pleasant	3.03±0.77	2.65±0.85	2.64±0.71
11	outgoing/withdrawn	3.28±1.01	3.60±0.95	3.39±0.88
12	quiet/loud	2.67±0.75	2.21±0.99	2.59±0.88
13	intelligent/dull	2.90±0.71	3.09±0.89	3.02±0.64
14	reticent/talkative	2.67±0.72	2.25±0.95	2.42±0.87
15	approaching/ avoiding	3.08±0.85	3.54±1.05	3.43±0.84
16	fearful/fearless	2.72±0.81	2.40±0.93	2.67±0.72
17	passive/agressive	2.73±0.72	2.47±0.82	2.74±0.77
18	confident/afraid	3.29±0.89	3.73±0.86	3.28±0.79
19	introverted/ Extroverted	2.95±0.99	2.25±0.95	2.25±0.79
20	hesitant/daring	2.83±1.11	2.33±1.08	2.47±0.89
21	secure/insecure	3.09±0.84	3.58±1.00	3.38±0.76
22	emotional/bland	3.14±0.68	2.91±0.64	2.83±0.76
23	perfectionistic/ careless	3.00±0.71	3.03±0.79	3.09±0.61

24	bragging/ self-derogatory	3.22±0.59	3.35±0.71	3.28±0.61
25	inflexible/flexible	2.95±0.76	2.87±0.74	2.96±0.63
26	sincere/insincere	2.78±0.72	2.57±0.86	2.95±0.72
27	notlikeable/likable	3.04±0.78	2.70±0.91	2.67±0.83
28	not trustworthy/ trustworthy	3.03±0.76	2.76±0.90	2.96±0.72
29	decisive/indecisive	3.19±0.95	3.40±0.79	3.27±0.83
30	physically normal/ physically abnormal	2.19±1.09	2.74±1.18	2.84±0.96
31	reliable/unreliable	2.72±0.83	2.96±0.97	3.02±0.72
32	poor sense of humor/ good sense of humor	2.91±0.70	2.56±0.86	2.94±0.73
33	mentally stable/ mentally unstable	2.75±0.95	3.33±0.92	3.03±0.72
34	employable/ unemployable	2.74±0.92	3.48±0.98	3.14±0.93
35	strong character/ weak character	3.24±0.85	3.13±0.79	2.83±0.85
36	unintelligent/ intelligent	3.04±0.65	2.83±0.71	3.06±0.60
37	emotionally adjusted /emotionally maladjusted	2.84±0.90	3.17±0.92	3.09±0.77

3.3 Image Attributes by Type of Communication Disorder

The Euclidean distances analyzed using the ALSCAL similarity matrix (Table 3 and Fig. 1, 2, 3) revealed that all three groups converged on stress values after four iterations, with a final stress value of 0.001 and RSQ (stress and squared correlation) values ranging between 0.95 and 0.96, indicating a very high reliability of the model. The two-dimensional similarity matrix analysis (Fig. 1, 2, 3) showed that in the first dimension, the typical group was characterized by 'challenging,' 'fearless,' 'extroverted' attributes on the right and 'active,' 'social' on the left, termed 'extroversion.' In the second dimension, 'confident,' 'strong personality,' 'intellectual' were on the right, and 'trustworthy,' 'mentally stable' on the left, interpreted as 'introversion.'

Compared to the typical group, all three groups portrayed a 'calm' external image, but stuttering and voice disorders internally projected a 'sensitive'

Table 3. S-stress for verification of the model

	Iteration	S-stress	Improvement	RSQ
normal	1	0.12403	-	
	2	0.10019	0.02384	0.95211
	3	0.09913	0.00106	
	4	0.09905	0.00008	
stuttering	1	0.09050	-	
	2	0.07038	0.02012	0.96903
	3	0.06909	0.00129	
	4	0.06881	0.00027	
voice disorder	1	0.13342	-	
	2	0.09556	0.03787	0.95931
	3	0.09320	0.00236	
	4	0.09284	0.00036	

image, particularly more pronounced in voice disorders. Stuttering was also marked by an 'uncooperative,' 'insincere' external image and a notable 'restless' internal image. The typical group was perceived as externally 'insensitive' and internally 'sensitive,' whereas stuttering and voice disorders were seen as externally 'sensitive' and internally 'insensitive.' Compared to the typical group, stuttering and voice disorders were characterized internally as 'passive,' 'unstable,' 'careless,' 'physically abnormal,' 'lacking humor,' and 'weak personality.'

Stuttering and voice disorders commonly exhibited 'insensitive,' 'loud,' 'talkative,' 'arrogant,' 'flexible' external images, and 'passive,' 'fearful,' 'stable,' 'perfect,' 'indecisive,' 'humorous' internal images. However, stuttering distinctly showed an internal 'friendly,' 'passive' image compared to the typical and voice disorder groups. Voice disorders uniquely displayed 'fearless,' 'challenging' internal images.

Fig. 4, 5, 6 depict the model's fit, with observed versus estimated Euclidean distances linearly aligned along the diagonal, indicating high model fit. The x-axis is the actual observed Euclidean distance and the y-axis is the Euclidean distance estimated by the function. In all three types, the pairs are linearly located on the diagonal, which is interpreted as a good fit of the model.
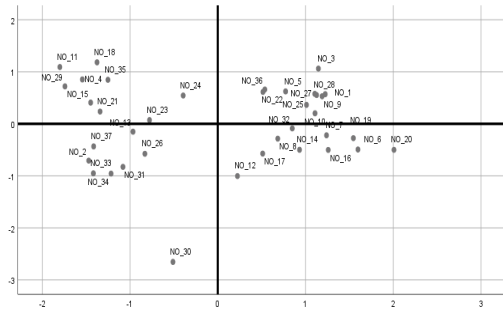
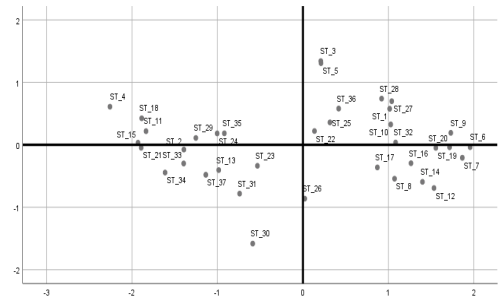Fig. 1. Euclidean Distance of normal adults

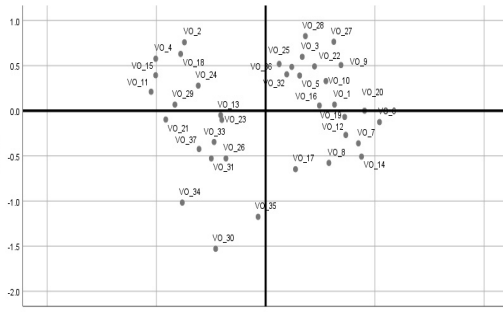
Fig. 2. Euclidean Distance of stuttering

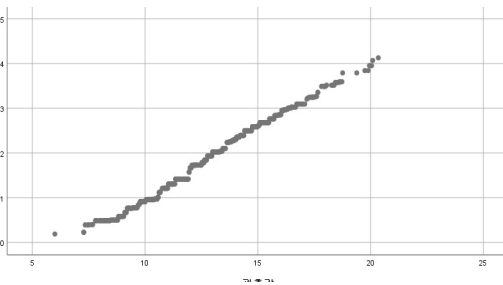Fig. 3. Euclidean Distance of voice disorder

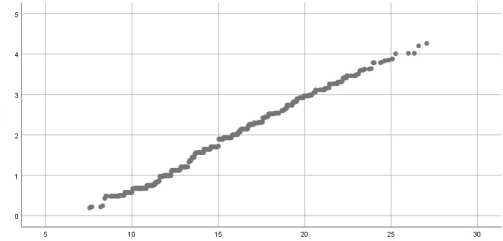Fig. 4. Scatterplots of normal adults
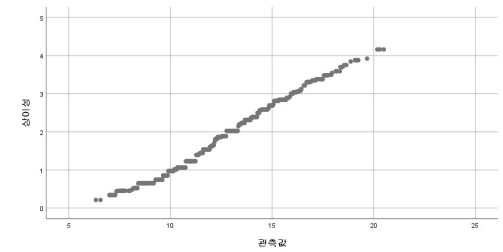

Fig. 5. Scatterplots of Stuttering

Fig. 6. Scatterplots of voice disorder

Table 4. Coordinate values of multidimensional scale by type

perceptions	normal		stuttering		voice disorder	
	Dimension 1 (explicit)	Dimension 2 (inner)	Dimension 1 (explicit)	Dimension 2 (inner)	Dimension 1 (explicit)	Dimension 2 (inner)
guarded/ open	1.2246	.5695	1.0152	.5773	1.2611	.0684
calm/nervous	-1.4707	-.7076	-1.3931	-.0760	-1.4868	.7585
uncooperative /cooperative	1.1463	1.0616	.2091	1.3401	.6702	.5977
bold/shy	-1.5433	.8525	-2.2577	.6102	-2.0124	.5765
unfriendly/ friendly	.7728	.6224	.2115	1.3076	.6226	.3900
self-conscious /self-assured	1.5973	-.4936	1.9562	-.0378	2.0848	-.1255
Tense/ relaxed	1.2388	-.2209	1.8655	-.2077	1.6985	-.3608
sensitive/ insensitive	.6837	-.2851	1.0719	-.5430	1.1588	-.5779
anxious/ composed	1.1891	.5293	1.7304	.1910	1.3796	.5064
unpleasant/ pleasant	1.1079	.2021	1.0275	.3262	1.1038	.3288
outgoing/ withdrawn	-1.7995	1.0911	-1.8859	.2181	-2.0967	.2106
quiet/ loud	.2240	-1.0047	1.5337	-.6926	1.4676	-.2679
intelligent/ dull	-.9661	-.1512	-.9853	-.4048	-.8232	-.0495
reticent/ talkative	.9317	-.4996	1.3988	-.5939	1.7554	-.5079

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approaching/ avoiding	-1.4487	.4081	-1.9298	.0325	-2.0132	.3931
fearful/ fearless	1.2584	-.5020	1.2645	-.2951	.9845	.0578
passive/ agressive	.5118	-.5720	.8712	-.3624	.5471	-.6475
confident/ afraid	-1.3759	1.1817	-1.8865	.4244	-1.5560	.6293
introverted/ Extroverted	1.5452	-.2752	1.5549	-.0492	1.4471	-.0686
hesitant/ daring	2.0079	-.5005	1.7156	-.0390	1.8116	.0010
secure/ insecure	-1.3414	.2362	-1.8926	-.0469	-1.8287	-.0973
emotional/ bland	.5146	.6132	.1352	.2201	.8948	.4910
perfectionistic /careless	-.7780	.0714	-.5323	-.3365	-.8020	-.1011
bragging/ self-derogatory	-.3943	.5441	-1.0085	.1827	-1.2333	.2783
inflexible/ flexible	1.0108	.3641	.3163	.3584	.4784	.4854
sincere/ insincere	-.8305	-.5758	.0214	-.8626	-.7266	-.5284
notlikeable/ likable	1.1051	.5757	1.0391	.6985	1.2481	.7641
not trustworthy/ trustworthy	1.1261	.5532	.9205	.7395	.7282	.8268
decisive/ indecisive	-1.7415	.7199	-1.2528	.1094	-1.6610	.0678
physically normal /physically abnormal	-.5107	-2.6538	-.5875	-1.5824	-.9153	-1.5296
reliable/ unreliable	-1.0806	-.8272	-.7407	-.7817	-.9948	-.5283
poor sense of humor/ good sense of humor	.8486	-.0882	1.0844	.0358	.3864	.4032
mentally stable/ mentally unstable	-1.4175	-.9522	-1.3952	-.2990	-.9442	-.3460
employable/ unemployable	-1.2160	-.9573	-1.6126	-.4448	-1.5262	-1.0176
strong character/ weak character	-1.2519	.8459	-.9194	.1841	-.1378	-1.1751
unintelligent/i ntelligent	.5365	.6595	.4184	.5799	.2488	.5183
emotionally adjusted /emotionally maladjusted	-1.4147	-.4347	-1.1366	-.4803	-1.2192	-.4239

4. Discussion

This study employed multidimensional analysis to explore the intrinsic and subjective attributes that influence public perceptions of fluency and voice disorders. The findings revealed that both disorders are associated with relatively high scores on negative images such as 'closed-off,' 'sensitive,' 'introverted,' 'unstable,' 'emotionally volatile,' 'unlikable,' 'physically abnormal,' 'emotionally unstable,' 'unsuitable for employment,' and 'unable to emotionally adapt' compared to typical individuals. Seo [7] investigated perceptions of speech disorders among college students using a vignette approach and found that stuttering was associated with perceptions of being 'closed-off,' 'dull,' 'emotionally volatile,' and 'unreliable,' while voice disorders were linked to 'sensitive' and 'uncooperative' traits. Both this study and Seo's research consistently identified negative perceptions of 'closed-off' and 'emotionally volatile' for stuttering, and 'sensitive' for voice disorders, suggesting these traits represent common negative stereotypes associated with these communication disorders.

An interesting aspect highlighted by Kalinowski et al. [21] is that the negative stereotypes about people who stutter persist not only during speaking situations but also in non-speaking contexts. Their study showed that the general public perceives individuals who stutter as 'fearful,' 'tense,' 'anxious,' 'sensitive,' 'cautious,' 'avoidant,' 'passive,' and 'emotionally volatile,' even when they are not speaking. Kalinowski and colleagues interpreted these findings as an indication that the public broadly categorizes stuttering as a communication disorder that transcends verbal and non-verbal boundaries [21]. This study similarly found pervasive negative stereotypes about stuttering in both verbal and non-verbal contexts, which supports the trends observed in previous research [22-24].

The perceptions and attitudes of non-disabled individuals towards those with communication disorders are crucial for the intervention strategies for these disorders. Shin [25] examined the perceptions of general and special education teachers towards communication disorders,

noting significant role differences. While general teachers emphasized roles typically associated with non-disabled children, special education teachers focused on direct involvement and individualized educational and rehabilitation plans for children with disabilities. Regardless of the role differences, both groups recognized the importance of fostering positive peer perceptions about children with communication disorders. Thomas et al. [26] found a positive correlation between teachers' attitudes and knowledge about stuttering and reduced overt symptoms of stuttering in the classroom, highlighting the impact of informed and positive attitudes on reducing stigmatization.

These studies collectively suggest that fostering positive perceptions among non-disabled children about their peers with communication disorders and promoting natural verbal and social interactions in inclusive educational settings are essential for ensuring that children with disabilities can exercise their basic rights in society [27].

Limitations of this study include the non-random convenience sample, which restricts the generalizability of the findings. Future research should employ scientifically validated sampling methods. Additionally, the uneven gender distribution and the focus on specific regions limit the generalizability of the results. More research involving diverse regions and participants is needed. Previous studies have primarily focused on stuttering, which complicates the interpretation of distorted images of various communication disorders. Future research should explore the perceptions, attitudes, and knowledge of individuals closely associated with people with communication disorders, such as caregivers, teachers, and friends.

5. Conclusion

In conclusion, this study, along with corroborative findings from Snyder [24], Young and Harmer [28], and others, underscores the necessity for ongoing education and advocacy to reshape public perceptions and attitudes towards stuttering and voice disorders. By extending the educational outreach beyond the immediate educational settings and into the broader community, we can ensure a more inclusive and supportive environment for individuals with communication disorders.

Future research should continue to explore the nuanced perceptions of different community members, including those not directly involved in the education or care of individuals with communication disorders. Studies like those by Kim et al. [6], which examine perceptions among diverse groups such as speech-language pathologists and laypeople, are crucial for developing comprehensive strategies that address the varied misconceptions and knowledge gaps that exist across different segments of society.

By addressing these challenges through a multifaceted approach that includes education, advocacy, and direct engagement, we can significantly improve the quality of life and societal integration for individuals with communication disorders. This endeavor not only benefits those directly affected but also enhances the overall social cohesion and empathetic capacity of our communities.

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