
The Significance Of Statistics In SLP And Linguistics

No matter what you major in most of the time there's always some type of math/statistics in it even if it's just a little. I'm majoring in Speech Language Pathology and from what I knew before researching was that statistics does play a small role in this field. You wouldn't think that though because what does statistics have to do with speaking? Well like I said, before researching I only knew that statistics plays a role with the diagnostics in a child's speech. I also knew that there's a little standard deviation here and there and also there's accuracy levels of a child's production.

The relationship between statistics and Speech Language Pathology is when you interpret a score from a standardized assessment given to a client which include mean, median, standard deviation, percentile ranks, raw scores, bell curve and etc. Also you use statistics for determining scores and how many standard deviations they fall from the mean which you can do if you know simple math. It basically helps interpret and understand test results. Also descriptive statistics are used to describe the amount of communicative problems in children.

Statistical language acquisition studies the process of how humans develop the ability to perceive, produce, comprehend and communicate with natural language in all of its aspects through the use of general learning mechanism's operating on statistical patterns in the linguistic input. Statistical learning acquisition claims that infant's language learning is based on a pattern perception rather than an natural biological grammar. Several statistical elements such as frequency or words, frequent frames, phonotactic patterns and other regularities provide information on language structure and meaning of language acquisition.

Statistics not only plays a role in speech language pathology but it also plays a role in linguistics. Linguistics and speech language pathology are tied together because linguistics is learning about many aspects of human language, including sounds (phonetics and phonology), words (morphology), sentence (syntax), and meaning (semantics). Linguistics plays a role in speech language of course because SLP's work with clients to help with language impairments and linguistics is the scientific study of language.

Statistics allows SLP's to summarize numerical data and then draw inferences from them. A distinction is sometimes made between descriptive statistics on one hand and inferential statistics on the other. The need to summarize comes from the fact that there is variation in the numerical values associated with the data. If there was no variation there would be no need for statistics. If a SLP is interested in the way that voiced-voiceless distinctions are maintained by speakers of English it begins by taking measurements of voice onset times (VOT) for example, the time between the release of the stop and the onset of voicing in initial stops. The first set of data consists of ten reps from each of 20 speakers of ten /p/ initial words. If there was no difference in VOT time, either between words or speakers there would be no need here for statistics. A group of speakers may produce VOT values that are all distinct on for example, their first pronunciation of a particular word. The VOT values of an individual speaker may be different from word to word or between repetitions of the same word. So the SLP could have as many as 2,000 different values. The first contribution of statistics will provide the means of summarizing the results in a meaningful and readily understandable way. One common

approach is to provide single typical value to represent all of the VOT times together with a measure of the way in which the VOT times vary around this value (the mean and standard deviation). In this way, a large number of values is reduced to just two.

Another example is that if a SLP is interested in the nature of aptitude for learning foreign languages. There are 100 subjects that are given a language aptitude test and then an achievement test. Looking at the two sets of scores may give clues but the SLP won't be able to absorb all the information conveyed by the 200 scores by only looking at the scores separately. The SLP needs to find out the direct relationship between two the sets of scores. Statistics serves the purpose of decreasing complex data to manageable proportions and allows the strength of the relationship to be represented in a single value.

Statistical methods have gone from being virtually unknown in computational linguistics to being a fundamental given. In 1996, no one can profess to be a computational linguist without a passing knowledge of statistical methods. These fields require surveys to be done periodically on language speakers so that SLP's can update their knowledge on how people speak, what people use language for, in different locations, across different age groups, etc., in terms of dialect and accent. So there's lots of data involved in that part of linguistics. Statistics is known to be a quantitative approach to research. However, most of the research done in the fields of language and linguistics is qualitative. In quantitative research linguistic features are classified and counted and even more complex statistical models constructed in order to explain observed facts. In qualitative research we use the data only for identifying and describing features of language usage and for providing real occurrences/examples of particular phenomena. Among the linguistic community, statistical methods or more generally quantitative techniques are mostly ignored or avoided because of the lack of training, fear and dislike too. The reasons why is because these techniques are just not related to linguistics, philology or humanities. Statistics falls into the area of sciences and mathematics.

George Zipf was one of the first linguists to prove the existence of statistical regularities in language. His best known law proposes a constant relationship between the rank of a word in a frequency list and the frequency with which it is used in a text. Another Zipf law showed the opposite relationship between word length and its frequency. In some languages such as English the most commonly used words are monosyllabic ones. This effect seems to account for our tendency to abbreviate words whenever their frequency of use increases. For example, the reduction of 'television' to 'TV' or 'telly'. It would also seem to be a quicker communication principle to have the popular words short and the rare words long. These examples show how some linguistic patterns are regular and independent of speaker, writer, or subject matter, and how linguistic behavior conforms closely to quantitative or statistical patterns.

In conclusion, without statistics in SLP and linguistics there would be no way to diagnose clients, give treatment plans or get any statistical information needed to better the client's speech and life.

Reference

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