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Changes in the Style and Contents of Abstracts from The Journal of Consulting and Clinical Psychology between the 1960s and the 2010s

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ABSTRACT

This study was conducted to examine changes in the style and content of abstracts from the Journal of Consulting and Clinical Psychology across time. Characteristics examined were word commonness, word activation, word pleasantness, sentence length, abstract length, mentions of inferential statistics and mentions of drugs (both street drugs and pharmaceuticals). Abstracts (N=510) were downloaded from volumes published before the wide introduction of computers (1968-9) and from those published in more current years (2016-17). Scores for word pleasantness and word activation were assessed with the Dictionary of Affect in Language. Word commonness was scored in comparison to a corpus of everyday English, and sentence length and abstract length were measured in terms of number of words. There were several strong and significant differences between abstracts from the pre-computer era and those from the 21st century, including greater length, more mentions of inferential statistics and more mentions of drugs in the later time period. A stepwise discriminant function analysis was able to correctly predict the origin (early or pre-computer versus 21st century) of 98% of the abstracts on the basis of the characteristics measured (canonical correlation=.89).

Keywords: Journal of Consulting and Clinical Psychology, abstracts, style

INTRODUCTION

An abstract is a brief summary of a scientific article. Abstracts are useful because they inform the reader about the topic of the article and they help with the decision to read the article itself. Abstracts are also crucial for scientific communication, as published research, if accessible, can aid future research. Abstracts that are considered to be attractive are usually easily readable (Guerin, Pepe, & Lepri, 2012). Language and style are important characteristics of an abstract (Whissell, 2013) and they are useful in determining whether someone will continue on to read the article represented by an abstract (Fidel, 1986). Information commonly reported in abstracts includes the purpose of the study, the characteristics of the population studied, and the main outcomes of the research. Statistical analyses performed are often mentioned as well.

The *Journal of Consulting and Clinical Psychology* is a journal of the American Psychological Association that publishes articles concerning the diagnosis and treatment of psychological disorders. The journal also includes articles relating to factors such as gender, sexuality, and ethnicity, and those treating the development, validation, and use of techniques of diagnosis, treatment, and prevention of disordered behavior. According to its web site(https://www.apa.org/pubs/journals/ccp) the journal has a five-year impact rating of 5.77 and is ranked tenth out of 130 clinical psychology journals. It was originally named the *Journal of Consulting Psychology*. In 1968, the name of the journal was changed to the *Journal of Consulting and Clinical Psychology*.

The field of statistics has evolved significantly over time, partly due to the availability of computerized programs for data analysis such as SPSS and SAS. For example, in this research the authors employed an SPSS discriminant function analysis in order to compare two groups and predict group membership. Such an analysis would have been extremely difficult for researchers to perform in the early 1960s, when both computers themselves and statistical programs were generally inaccessible. Searches for articles, in which abstracts play an important role, have also been increasingly computerized over time. In the early 1960s, many journals did not even include abstracts with their articles. Today, articles are accessible through a wide variety of resources ranging from those subscribed to by university libraries such as Scholar's Portal to the freely available Google Scholar. Most commonly, searches involving these engines begin with a search based on key words and a scan of titles, followed by the reading of abstracts, and then, if the material is deemed of interest, by the downloading or reading of the article itself. In this research, it is posited that computers have been one source of influence on the style and content of abstracts.

Hypotheses of the Research

The first hypothesis of the research is that drugs will be mentioned in abstracts significantly more often in recent years (2016-17) as opposed to earlier ones (1968-9). The category of "drug mentions" is defined as including pharmaceutical drugs (e.g., Concerta and SSRIs), street drugs (e.g., marijuana and cocaine), and substance use disorders, (e.g., those involving nicotine and alcohol). Drug use has increased dramatically within the time period studied (Martins, Mazzotti, & Chilcoati, 2005), as was the case for marijuana (Miech & Koester, 2012). It has been reported that marijuana use disorders were more prevalent in the United States in 2002 than 1992 (Compton, et al., 2004). Regarding pharmaceutical drugs, the first SSRIs (e.g., Prozac) were introduced around 1985, after the date represented by the earlier sample of abstracts. An increase in problems associated with drugs should lead to an increased mention of drugs in journals with an applied focus, such as the one studied here.

The second hypothesis of the study was that mentions of inferential statistics in abstracts would increase significantly in the recent era. The use of inferential statistics increased drastically in the JSTOR family of journals between 1933 and 1996 (Stigler, 1996). Also, within the 19th and early 20th century (which, in this study, would be represented by the 1968-9 sample), there were many researchers who did not apply inferential statistics to their data (Smith, Best, Cylke, & Stubbs, 2000), although they did use alternative analytic approaches. Statistical computer programs are relatively new in the field of science and are more likely to be used in the post computer era. The use of ANOVA (analysis of variance) in experimental psychology had decreased after the Second World War but has increased steadily since 1950 (Rucci & Tweney, 1980). The use of statistics in scientific journals

has increased over time (Trevisani &Tuzzi, 2014). All these results point to a likely greater attention to statistics in abstracts written in 2016-17. In this research the presence of inferential statistics in an abstract was deduced from the mention of particular techniques (e.g., t-test, regression, ANOVA) or the mention of p (alpha) values or significance.

In the third hypothesis of the study, it was predicted that the word pleasantness of abstracts would decrease in the post-computer era – in other words that the language would have a more negative emotional tone in recent years. In a related hypothesis, it was further predicted that the word activation of abstracts would increase within the same time span (that recent abstracts would have a more arousing tone). Suicide rates have increased throughout the last half century(https://psmag.com/social-justice/household-guns-linked-to-youth-suicides) including the most recent years (Twenge, Joiner, Rogers, & Martin, 2018). As noted above, substance use has increased significantly over the years as well. The Google Ngram Viewer(Books.google.com/ngrams) was used to examine the rate of words appearing in published sources across several decades. According to this tool, the use of words such as "depression", "suicide" and "substance" have increased steadily over the time span represented in this research. Because words associated with suicide, depression, and addiction, have a negative and activating emotional tone, it was predicted that recent abstracts would be less pleasant and more active in emotional tone.

METHOD

All articles were accessed through the Laurentian University online databases. Fifteen of the sampled articles did not discuss research and did not have an abstract. Every one of the remaining abstracts (N=510) was read and scored by the first author. There were 292 abstracts from the pre-computer era (1968-9), and 218 abstracts from the post-computer era (2016-17). The researcher specifically searched for whether abstracts mentioned any type of inferential statistics and/or any type of drugs. These variables were scored as 0 or 1 for each abstract. Inter-rater reliability was assessed by the second author reading 20 randomly chosen abstracts (10 abstracts from each era, two scores per abstract). There was 88% agreement among raters.

The remaining measures of the study were scored by a computer program which consulted the Dictionary of Affect in Language (Whissell, 2009). The program matched every word in each abstract with the Dictionary. Ratings for matched words were imported into a data set. In addition to the emotional scores of pleasantness and activation, the program computed scores for sentence length, abstract length, and word commonness. The normative everyday English mean for pleasantness and activation in texts scored by the Dictionary is 50.

The measures of the research are listed and described further in Table 1.

Table 1 Description of the measures of the research

Measure	What this Measure Implies/How it was Measured
Pleasantness	High pleasantness indicates the inclusion of many pleasant words such as "therapy" and "improve" in the abstract; Low pleasantness indicates the inclusion of many unpleasant words such as "disorder" and "anxiety" in the abstract; Words are scored in comparison to the Dictionary of Affect
Activation	High activation indicates the inclusion of many active words such as "effort" and "success" in the abstract; Low activation indicates the inclusion of many passive words such as "rest" and "calm" in the abstract; Words are scored in comparison to the Dictionary of Affect
Word Commonness	Commonness scores were assigned to words on the basis of how many times the word appeared in a normative sample of 348,000 words: higher scores represented more common words: "the" is the most common English word Words that had a low commonness score, e.g., "universality" and "dyadic" are characterized as rare words
Sentence Length	Average number of words in a sentence
Abstract Length	Number of words in the abstract
Statistics Mentions	Indicating whether the abstract mentioned inferential statistics (1) or not (0)
Drug Mentions	Indicating whether the abstract mentioned pharmaceutical or street drugs or addiction (1) or not (0)

RESULTS

A stepwise discriminant function analysis was employed, first to compare means for all predictor variables in the two sets of abstracts, and then to predict group membership on the basis of the measures of style and content of abstracts. Comparisons of means for 1968-9 abstracts and 2016-17 abstracts are outlined in Table 2. There were significant differences between the two samples for all variables except the pleasantness of language. As predicted in the first and second hypotheses, the mention of drugs and of inferential statistics in abstracts both rose. In fact, there was a nine-fold increase (from 3% to 27% and from 7% to 65%) for both variables. The third hypothesis was partly confirmed: activation rose across time, but pleasantness did not fall – it remained relatively constant. Abstracts probably became somewhat easier to read because sentence length decreased significantly. However, word commonness fell, meaning that more rare words were employed, and abstracts more than doubled in mean length (from 110 to 263 words), which suggests that more recent abstracts include more information relevant to the article.

Table 2. Differences between earlier and later abstracts in terms of the measures of the research

Measure	*Earlier: 1968-9 Mean or %*	*Later: 2016-17 Mean or %*	*p*
Drug Mentions	3% of abstracts	27%	<.01
Inferential Statistics Mentions	7%	65%	<.01
Pleasantness	47.13	47.50	>.23
Activation	51.91	52.62	<.03
Word Commonness	3219	2516	<.01
Sentence Length	19.56	18.06	<.01
Abstract Length	110 words	263 words	<.01

The stepwise discriminant analysis employed all study variables except pleasantness as significant predictors of group membership. The standardized canonical discriminant function coefficients were .9 for abstract length, .4 for the mention of drugs, .3 for the mention of statistics, -.3 for commonness of words and -.15 for sentence length. High scores were predictive of membership in the 2016-17 group of abstracts. The function was associated with a canonical correlation of .89, and it correctly classified 98% of all the abstracts. There was almost no chance that an abstract would be mis-classified in terms of its years of origin. Rather, greater length, more frequent mention of drugs and statistics, greater activation, shorter sentences, and the use of rarer words correctly identified abstracts from 2016-17. On the other hand, shorter abstracts with longer sentences, more common words, more passive language, and fewer mentions of drugs and statistics were correctly identified as being from 1968-9.

DISCUSSION

Abstracts from the *Journal of Consulting and Clinical Psychology* have changed dramatically across the almost 50 years represented by the data. Most notably, they have doubled in length, and increased their mentions of drugs and inferential statistics.

Computers have been suggested as one possible contributor to the changes noted, but journals have changed in many other ways as well. For example, guidelines for abstract length have moved from about 100 words to 250 words, and many journals provide authors with detailed instructions on what to include in an abstract. The *Journal of Consulting and Clinical Psychology* has available, on its web site(https://www.apa.org/pubs/journals/ccp) some APA guidelines for writing abstracts. It also has several sample articles offered for potential authors to peruse. These sample articles all have longer abstracts, and furthermore these are structured abstracts which have separately labeled sections for the objectives of the study, the methodology, results, and conclusions.

Both the extended length criteria and the need to write a structured abstract would increase abstract length. When abstract length was removed as a potential predictor in the discriminant function analysis, strong and significant prediction was still possible, with a canonical correlation of .70 and 82% of cases correctly classified on the basis of the remaining variables. As is evident from Table 2, strong differences between the two groups of abstracts appear for variables other than length.

One unanswered question involves the implications of the differences noted in the journal's abstracts between 1968-9 and 2016-17. This article has described the abstracts and changes in them rather thoroughly, but the effect of these changes on readers remains to be studied. In a long career of studying structured abstracts, James Hartley has suggested that they are more efficient, easier to read, and longer (but not to the point where length becomes a burden) than unstructured ones (Zhang & Liu, 2011). Future studies could focus on the chain of events between the reading of an abstract and the reading of the article it describes. The APA style guide indicates that the purpose of an abstract is to help readers decide whether to read the full text, so one crucial connection to be made is the one between abstract and article.

Every good piece of research that answers one question (How did abstracts in the *Journal of Consulting and Clinical Psychology* change over time?) raises several new ones. Future research should focus on readers' responses to abstracts. It must also fill in the blanks between the two time periods studied: are the changes described here sudden or were they gradual?

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