

Relationship Between Grip And Pinch Strength and Preferred Note-taking Technique: A Mixed-Methods Study

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BACKGROUND

Occupational therapy approaches rehabilitation through engaging clients in meaningful occupation, establishing goals to regain independent function and improve the quality of life of the individual. Handwriting is an important skill most individuals possess and a client's ability to continue partaking in this skill may be impacted by an unexpected event. Handwriting is a complex activity that involves the integration of biomechanical, linguistic, cognitive, developmental, and learning processes (Accardo et al., 2007).

It has been noted that the frequent use of keyboards to produce texts to facilitate communication could lead to a general loss of handwriting skills (Sulzenbruck, Hegle, & Heuer, 2011). However, there is limited research on how grasp strength and fine motor ability may correlate with keyboarding and/or handwriting.

For the purpose of this study, we measured the grip and pinch strength of college students and compared their results by their preferred note-taking technique to assess association. Additionally, we examined the qualitative answers as to why the participants preferred their note-taking technique.

By further assessing the relationship between handwriting and retention, we begin to look at the importance of how motor-based tasks may impact cognitive tasks, and perhaps vice versa.

METHODS

Design: This research was a mixed-methods study. This study consisted of both quantitative and qualitative data to broaden the depth of the research.

Subjects: The population was college students on Florida Gulf Coast University's Campus. The data included all years, from freshman to graduate students. There were a total of 81 participants. Five subjects were excluded from the data because they did not meet the inclusion criteria of preferred note-taking method, bringing the total number of participants to 76.

Instruments: The Jamar ® Hand Dynamometer, Baseline ® Hydraulic Hand Dynamometer, and Baseline ® Mechanical Pinch Gauge. To achieve the purpose of the study, a questionnaire was designed for participants asking about their year in college, age, whether or not they took notes in class, and their preferred method of note-taking and why.

Procedure: Researchers approached students on campus and asked if they were interested in participating in the study. Participants were given an overview of the informed consent and also received a copy. Participants were asked the questions on the questionnaire and answers were recorded by the researchers.

Then grip and pinch strength were recorded. Standard protocol for grip and pinch strength was used. The client performed three trials of each gross grip and pinch, which were then averaged.



RESULTS

There were no statistically significant correlations, indicating that preferred method of note-taking did not relate to a higher/lower pinch and grip strength (Table 1).

Quantitative Data

		One Way ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Gross Avg	Between Groups	769.525	2	384.762	.908	.408
	Within Groups	30947.820	73	423.943		
	Total	31717.345	75			
3-Jaw Avg	Between Groups	8.518	2	4.259	.365	.696
	Within Groups	852.890	73	11.683		
	Total	861.408	75			
Lat Avg	Between Groups	43.882	2	21.941	1.022	.365
	Within Groups	1567.236	73	21.469		
	Total	1611.118	75			

Table 1: Comparison of Grasp and Pinch Strength Between Note-taking Groups.

Qualitative Data

Participants that preferred handwritten notes listed reasons such as increased retention, decreased distractions (i.e. internet), more engaging, increased organization, and improved ability to draw/create diagrams.

Participants that preferred keyboarding listed reasons such as faster note-taking, more convenient, legibility, fatigue from handwriting, and easily accessible.

DISCUSSION

This study focused on obtaining pinch and grip strength in college students and comparing it to their preferred method of note-taking-whether handwritten, typed, or both, to determine whether a relationship existed between strength and note-taking method. The quantitative data did not show statistical significance in regards to grip/pinch strength with preferred note-taking method. Qualitative data presented reasons why people prefer handwriting and keyboarding methods. The common theme of retention and handwriting is consistent with the literature that handwriting creates a more complex memory trace than created by typing (Smoker, Murphey, & Rockwell, 2009).

Limitations: During this study, gender was not formally documented, though during data collection researchers had made mental note of some potential differences between males and females in terms of grip and pinch strength. Since this information was not formally collected, it was not utilized during data analysis and not accounted for when drawing conclusions.

RECOMMENDATIONS

Future researchers are advised to collect additional demographic information when recording participant data. In addition to recording gender, including more questions addressing areas such as physical activity, course of study, and even related medical diagnoses would have provided additional information for further qualitative analysis.

Regarding potential improvements pertaining to sampling, it may be beneficial to increase the number of participants and to expand upon existing inclusion/exclusion criteria. Participants consisted only of students at Florida Gulf Coast University; expanding the study to students at the other institutions may be beneficial, as it may raise additional questions surrounding note-taking in the classroom. Including the grip and pinch strength scores of those participants who do not take notes would be another potential improvement for future studies.

Due to the lack of association between strength and note-taking preference, continuing this quantitative line of research is not recommended. Instead, qualitative research may be collected to understand the implications associated with preferred method of note-taking and alternative methods for students in clinical settings.

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