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Computerized Learning of WordPerfect Using Precision Teaching

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This study examined the time required to learn and the efficiency of learning WordPerfect 5.1 (DOS) commands using a computer-based course developed by Precision Learning Systems, Inc. The results showed that the subject was able to learn the course in less than four hours and was able to effectively use WordPerfect 5.1 after a total of ten hours of practice. Discussion examines the relevance of the skills taught and possible ways of improving the existing course.

Business, corporations, and technical schools spend significant amounts of time and resources teaching employees to perform specified services or tasks. Most often without the powerful technique of fluency development, a large amount of information is provided in a "show" rather than "do" style, usually in workshop or seminar format which does not emphasize skill practice. Employees may continue to acquire information by reading and rereading manuals or instructional materials that lack fluency building as a performance goal. Binder (1989) stated, "Most conventional training procedures and materials actually prevent or retard fluency in one way or another" (p. 17).

When skills are learned to "fluency" during training, they are immediately useful in everyday performance, and they endure even after a significant period without practice (Binder 1987, 1988; Haughton 1972). Johnson and Layng (1992) state, "fluency requires the skill to be available to the selecting environment as a behavior that can be readily linked or combined with other behaviors thereby allowing students to perform complex tasks and solve complex problems" (p. 1476). It can be summarized then that fluency has positive effects on both skill acquisition and generalization.

Domestic use and sales of personal computers have increased dramatically over the past ten years (*Statistical Abstract of the United States,* 1992). The number of personal computers sold in 1981 was 1.11 million and increased to 9.50 million by 1988. Computers used in the work place increased from 1.24 to 20.53 million from 1981 to 1988. The educational system also increased its use of computers in schools from .13 to 2.36 million during the same seven year time period (*Statistical Abstracts of the United States,* 1992). With this increase in computer usage, it becomes important to find better ways (i.e., faster, better retention) to learn to use software programs.

There are numerous ways to learn software programs: manuals, workshops, tutorials, and knowledgeable friends or co-workers. These almost always require a significant investment of time. Some problems with these common methods, however, are low response frequency, unclear stimuli, ambiguous concept description, poor sequencing, and inefficient skill development.

Although there are general concepts involved in computer operation, each specific computer software program uses arbitrary system commands that evoke somewhat standard features. For example, many word processing programs have features such as moving, underlining, bolding text, but each program has its own series of key strokes to carry out these tasks. To "know" a program is to know--literally--which keys to press in certain situations to access features of the software. Most computer training focuses on the function and capabilities of the software, but neglects to assist the trainee in mastering the "mechanics" of operation. Consequently, the product of much computer training is a vague understanding of the features

with low fluency in the skills with which to access them. It is left to the trainee to learn to operate the system by reading the manual and slowly becoming fluent in the system's command process (i.e., keystroke combinations). Learning from typical resources (e.g., manuals) is slow for all and nearly impossible for others. A process that would bring a trainee to fluency in essential skills quickly and efficiently would be a useful addition to training. It is this goal, skill development, that the Precision Learning System (PLS) course is designed to meet.

This paper demonstrates that information required to run WordPerfect (WP) 5.1 can be learned quickly and retained over extended periods of time as a result of fluency building exercises. How quickly fluency was built with one adult learner will be shown. Extensions of these skills to the practical aspect of operating the software successfully will be discussed.

Method

Participant

The subject was the first author, Kimberly, a twenty-eight year old Ph.D. trainee at The Ohio State University. Her exposure to WordPerfect (Version 5.1) through a two hour training session approximately eleven months prior to the study was minimal and insufficient to develop skills or maintain retention. The subject did have general knowledge about computers and word processing programs prior to the study. She was able to use two other word processing programs, First Choice and Professional Write, for IBM compatible systems and one word processing program, Microsoft Word, used with Macintosh computers.

General Description and Operation of Precision Learning System. The Precision Learning System (PLS) course is a computer-based learning program modeled after (SAFMEDS) Say - All - Fast - Minute - Every - Day - Shuffle (Lindsley, 1980; Potts, Eshleman, & Cooper 1993). To begin use of the Precision Learning System course, the learner selects a module, enters the number of minutes (time interval) she or he would like to spend studying the set of questions and signals the program to start. The program then simultaneously randomizes the order of questions in the selected module, presents the first one, and begins counting down the time. The learner reads the first question and responds to stop the clock. The system then evaluates the answer, gives feedback on accuracy of the response, and waits for the learner to press a key before showing the next question and beginning the process again. This cycle is repeated until there is no more time left, or until all questions have been answered. Most modules contain a range of thirty to sixty questions. During the trial, the Precision Learning Systems software records the number of correct and incorrect responses the learner has given, computes percentage correct, number of correct answers per minute, and displays the results. Since the timer turns off and on during practice trials, the program is actually recording response latencies, the interval between the moment the question appears on the computer screen and the instant the response is made. "Counts per minute" is actually a calculation of average latency. After completing the session, the learner can review the questions missed, run the same module again, choose another module, or quit the program.

Description of WordPerfect Course. The course contains one lesson with four modules. Module One consists of fifty-five questions, of which fifty-two are key stroke combinations, two are True/False questions, and one requires a single digit number. For the key stroke combinations, the subject must press a function key either alone or along with the Shift, Control, or Alt key simultaneously (i.e., Shift-F1 or Alt-F3) to obtain a correct response. Module Two contains sixty questions; fifty-nine of which require key stroke functions, and one is a three letter character string. Module Three has forty-eight questions; forty-seven are key stroke combinations, and one is a single letter. Due to the limited number of questions in Module Four, it was not included in this study.

Procedure

The subject used the Precision Learning Systems course as the sole method for learning during the study. The subject completed a

maximum of four trials per day, per module, until an instructional aim of at least twenty correct responses per minute and a maximum of two incorrect responses per minute was attained. The modules were run on a 286 IBM compatible PC in the subject's home. She did not use the actual word processing program until completion of the study.

Sessions. The subject only practiced Module One during the first week. At the beginning of the second week, the subject started Module Two and continued building fluency on Module One. During the end of the second week, the subject did one sprint with Module Three and then did not use it again until the end of week three. During week three and four, all of the modules were run at least one time. During week five, none of the modules was run. The sixth week, the subject reviewed all the modules.

Maintenance Assessments. Two weeks after reaching the instructional aim, maintenance assessments began and continued intermittently over the next seven weeks. To examine the effects of maintenance assessments on fluency, schedules were varied across modules. Module One was run one time per day for three continuous days, and Module Two was run two times per day for four consecutive days. The second assessment for maintenance began on May 31, 1993 for Modules One and Two. Module One was completed two times per day for four continuous days, while Module Two was run one time per day for seven days over an eight day time period. The only maintenance assessment completed for Module Three began over five weeks after the original completion of the study. Module Three was run one time per day for twelve consecutive days.

Results

Performance on the modules are independent data sets, since the content for each module is unique.

Module One

The instructional aim (20+FC; ≥2FIC) for Module One was reached after ten days (trials occurred on six of these days), sixteen counting periods, and a total of sixty-seven minutes of clock time. The celeration for corrects was x4 and for learning opportunities was ÷5. After reaching aim the first time, three days lapsed before the next session. On subsequent days, performance would start out slightly below aim, but on the second session during the same day the score was consistently either at or above aim. Typically there were five to six days between sessions after reaching instructional aim the first time. The highest score in Module One was twenty-eight corrects per minute without any learning opportunities.

Module Two

Aim for Module Two was reached after twenty-nine days (eleven days on which sessions occurred), twenty counting periods, and a total of seventy-eight minutes clock time. The overall celeration for corrects was x1.5 and ÷1.8 for learning opportunities. After reaching aim the first time, the subject went below aim only one additional time during the study. The highest score was twenty-four correct per minute without any learning opportunities.

Module Three

Aim for Module Three was reached after nineteen days (six days of which sessions occurred) eleven counting periods, and a total of thirty-five minutes of clock time. The overall celeration was x1.4 for corrects and ÷2 for learning opportunities. The high score for Module Three was twenty-three corrects per minute without any learning opportunities.

Assessment Maintenance Data

Module One. Two different sets of maintenance data were conducted on Module One. During both assessments the subject never fell below aim. The first set of maintenance data was arranged with the subject completing one session per day for three consecutive days. The first trial was above aim with twenty-one correct per minute and .4 learning opportunities per minute. The highest score for the first maintenance set was twenty-eight correct per minute without any learning opportunities.

The second set of maintenance data lasted for four continuous days with two sessions each day. The first session the subject scored twenty-two corrects with 1.3 learning opportunities per minute. The highest score for the second maintenance set for Module One was forty corrects per minute without any learning opportunities.

Module Two. Two different sets of maintenance data were collected for Module Two. The first maintenance set lasted for four continuous days, containing two sessions per day. Both sessions on the first day of maintenance data were below aim. On the second day, the second trial was above aim at twenty-one corrects per minute with two learning opportunities per minute. On the final day of the first maintenance set, the highest score (e.g., thirty-two corrects per minute with .5 learning opportunities per minute) was attained.

The second maintenance set was completed one time per day for seven days over an eight day time span. Only once during the second maintenance set did the subject score below aim. The highest score during the second maintenance set was the last trial with a score of thirty-two corrects per minute without any learning opportunities per minute.

Module Three. Approximately five weeks after the study was completed, one maintenance assessment was completed for Module Three. The assessment lasted for twelve consecutive days with the subject completing one session per day. The first three sessions fell below aim, while the last nine sessions were all above aim. The lowest score in the nine sprint span was twenty-one corrects per minute with one learning opportunity per minute, and the highest was thirty corrects per minute without any learning opportunities per minute.

Discussion

Celerations for the modules range from x1.4 to x4 and ÷1.8 to ÷5. This range may be due to the subject skipping only one day a couple of times before reaching the instructional aim in Module One (showing higher celerations), while in Modules Two and Three, the subject skipped many continuous days over several weeks before reaching the instructional aim (showing lower celerations). If the number of counting periods and total time required to meet aim is compared by modules, the results are relatively close in all three modules. The counting periods ranged from eleven in Module Three to twenty in Module Two. The total time ranged from thirty-five minutes in Module Three to seventy-eight in Module Two. Of the three modules, Module Three required the least amount of counting periods and the least amount of actual time to reach the instructional aim. This may be because Module Three contains fewer questions than the other two modules.

The total amount of time spent on the three modules combined was three hours and ten minutes, not including maintenance data. This is an extremely short amount of time to become fluent on such a large and detailed amount of information. The subject, however, spent additional unrecorded time reviewing incorrect responses at the end of some sessions. After completing a timing session, the computer allows an option to review missed questions from the last session, with feedback on each response but without timing or data collection. The learner was able to take as much time as necessary to read and respond to the questions. When the subject was first learning the key stroke combinations and functions, the review sessions took longer. This may have been due to the large number of questions that the subject scored incorrectly and to reading the questions slowly before responding. The learner reviewed answers approximately half of all opportunities.

The PLS course not only provided the subject with the function key combinations to do specific procedures in WordPerfect (WP) 5.1 {i.e., centering (Shft-F6), spell checking (Cntl-F2), saving the program (F10)}, but it also provided practice in the actual motor skills required to perform those functions.

Prior to completion of the course, the subject had never successfully operated WordPerfect 5.1 After completing the PLS course, the learner practiced using WP 5.1 for approximately an hour and pressed all of the

function keys to see exactly what would transpire on the screen. This first session was very slow and awkward, as might be expected. After another two hours of familiarization, the subject was able to operate the most frequently used function keys precisely without hesitation. Since learning WP 5.1 using the PLS course, the subject's use of WP 5.1 has been sporadic (e.g., periods up to one month without using WP 5.1). However, the learner has maintained mastery of the keystroke commands.

The use of the PLS course to learn WP 5.1 has many benefits in convenience, efficient learning with retention, and mastry of features. For convenience, the subject was able to practice the modules inconsistently (skipping several days between sessions) and was still able to learn the modules in a very short time. The program was used at varying times of the day or night in the subject's home on her own personal computer. The amount of time set for each session can be changed to as little as one minute and as long as thirty minutes, although the recommended time for a session of this type is five minutes. Efficiency of the PLS course allowed the subject to learn the course in a little over three hours with almost full retention of skills after two weeks without using the course. These skills have continued to allow the subject to successfully use the WP 5.1 program without use of the PLS course for approximately one year.

Improvements

As this was the first complete controlled "field test" of the program, several suggestions for improvement of the PLS program are presented. In the future, the program might change the order that the functions are taught. Currently, the course presents in Module One functions involving the F1 - F3 keys, Module Two, F4 - F6 keys, and Module Three teaches F7 - F8 keys. This arrangement teaches some functions that are not needed in basic document preparation. A better format may introduce more important commands first and leave others to later optional modules. For example, the List function (F5) is used frequently and should be in the first module, while the Macro function (Alt-F10), which is not frequently used, could be placed in a later module which the trainee may or may not wish to master.

In this study, the program included functions related to function key commands. It excluded other pertinent information about the application such as navigational information of WordPerfect 5.1. Some examples of the navigational keys are the home, page up, page down, the arrow keys, insert, and the end keys. Since the conclusion of this study, additional modules to address the navigational keys have been added.

Limitations

In working with computers, a combination of fluency building exercises along with informational sessions may provide the best training. An individual might use the PLS Course until fluency is reached and then attend an instructional session or workshop where the applications of the program are discussed. Precision Learning Systems has found this sequence, fluency on the basics first, followed by a presentation, to work very well on other subjects. At the informational session, additional practice with the actual program used could be provided, in a controlled setting, with immediate assistance as needed. This would allow the learner to combine fluent tool skills in more complex operations.

Conclusion

The total time needed to learn WordPerfect 5.1 fluently was approximately ten hours. Three hours were spent working on the PLS course, approximately four hours were spent on review sessions, and another three hours were spent exploring WordPerfect 5.1 and becoming completely comfortable using WordPerfect. The time spent to become familiar with WP 5.1 was very short considering the large amount of functions which needed to be mastered before the WordPerfect could be used fluently.

Future research could directly compare another mode of learning WP 5.1 to the PLS course. For example, subjects might be assigned to either the PLS course or a daily workshop. Assessments of performance would be taken after the completion of each day's requirements

from the different treatment types. An additional extension might be to combine two different techniques to see what results would be produced.

Benefits of the PLS course include learning efficiency. The course provides adequate amounts of fluency building exercises for the subject to function quickly and precisely in the WP 5.1 program after less than four hours of study. The text portion of this manuscript was completed by the subject using WordPerfect 5.1.

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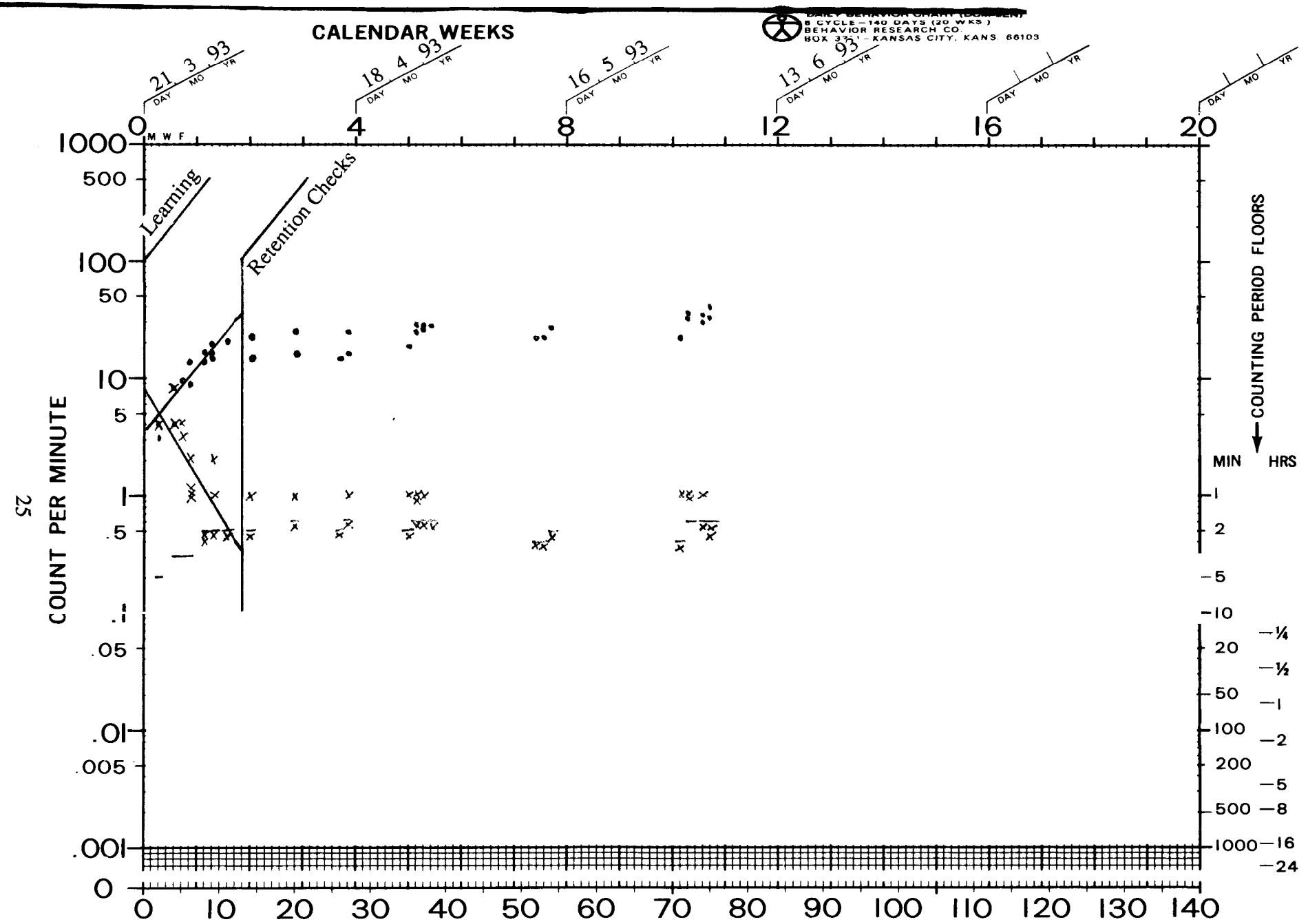

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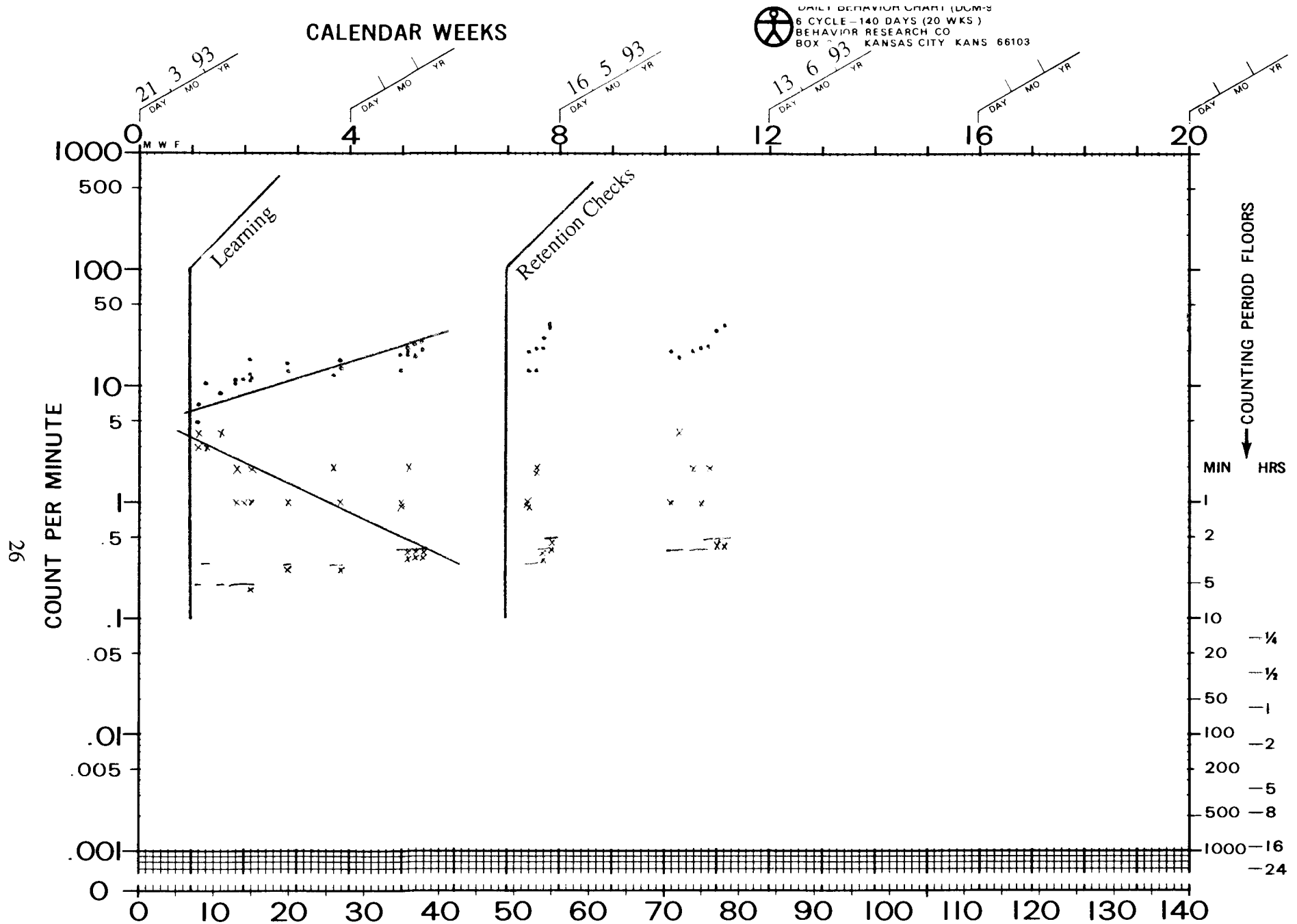

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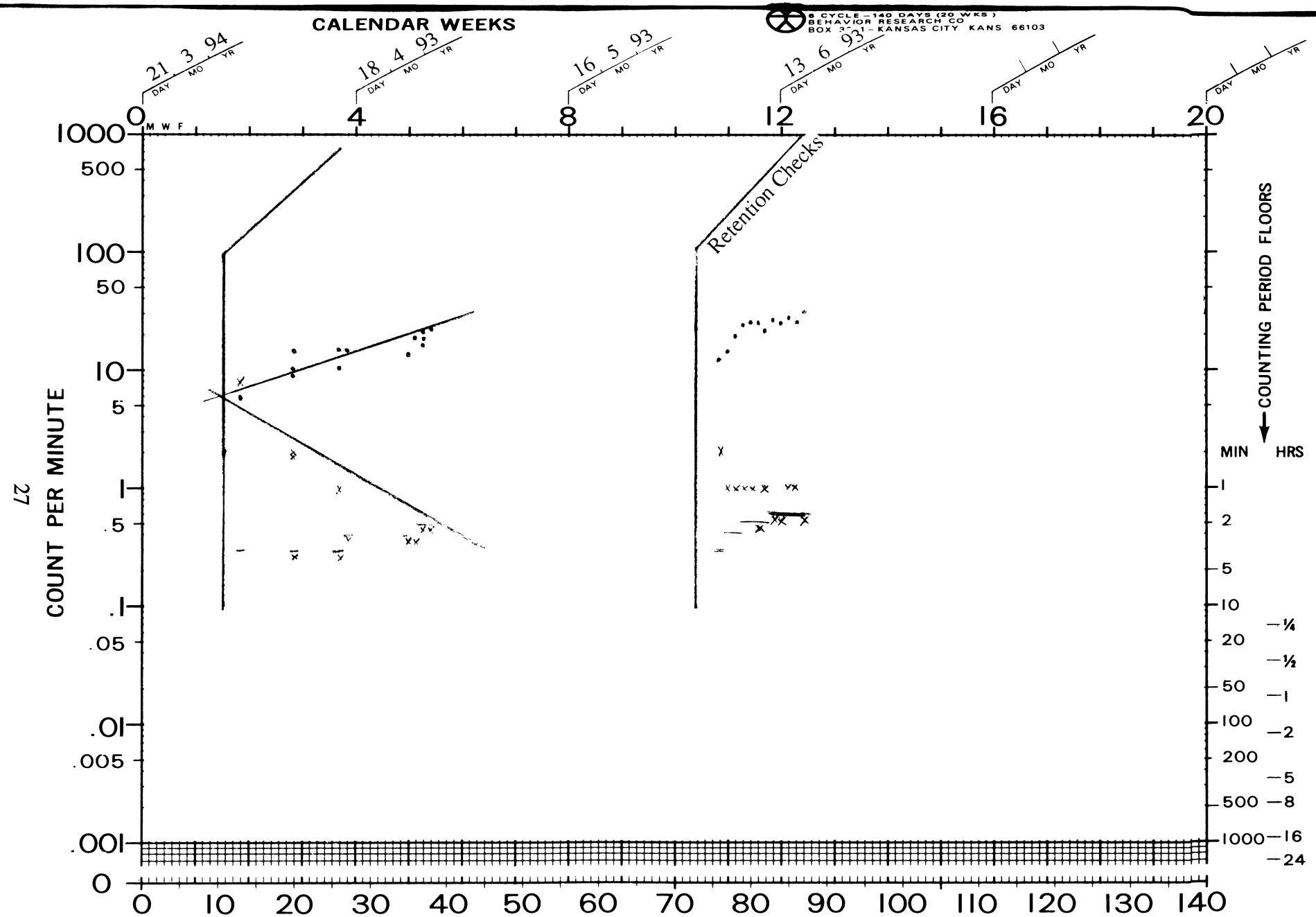

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DEPOSITOR	AGENCY		TIMER	COUNTER	CHARTER		