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Improving Staff Performance Through Checklists

Duane Lee Bacon
Western Michigan University

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IMPROVING STAFF PERFORMANCE
THROUGH CHECKLISTS

by

Duane Lee Bacon

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Master of Arts
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Western Michigan University
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April 1981
IMPROVING STAFF PERFORMANCE
THROUGH CHECKLISTS

Duane Lee Bacon, M.A.
Western Michigan University, 1981

Analysis of a checklist system suggested that it may be a useful method of improving staff performance and that three features were important: task definitions, recording responses on checklists, and periodic supervisor review. A checklist system incorporating these features was developed for an administrative staff in a large instructional system. A multiple baseline design and one reversal were used with three small groups of front-line staff, whose task completion was determined by permanent products left by the tasks. The percent of tasks completed improved by 28.8% when the checklist system was in effect. This study indicates that checklists may be a worthwhile method of managing worker performance.
ACKNOWLEDGEMENTS

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Lastly, I would like to extend my appreciation to my wife, Mary, for the moral support and encouragement she provided during the entire project.

Duane Lee Bacon
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>ii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>iv</td>
</tr>
<tr>
<td>Chapter</td>
<td></td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>II. METHOD</td>
<td>3</td>
</tr>
<tr>
<td>Subjects and setting</td>
<td>3</td>
</tr>
<tr>
<td>Baseline</td>
<td>3</td>
</tr>
<tr>
<td>Intervention</td>
<td>4</td>
</tr>
<tr>
<td>Design</td>
<td>7</td>
</tr>
<tr>
<td>Reliability</td>
<td>12</td>
</tr>
<tr>
<td>III. Results</td>
<td>13</td>
</tr>
<tr>
<td>IV. Discussion</td>
<td>16</td>
</tr>
<tr>
<td>Instructions from supervisor</td>
<td>17</td>
</tr>
<tr>
<td>Discriminative control of checklists</td>
<td>17</td>
</tr>
<tr>
<td>Pairing of successful task completion with checklists</td>
<td>18</td>
</tr>
<tr>
<td>Display of accomplishments</td>
<td>18</td>
</tr>
<tr>
<td>Periodic supervisor review</td>
<td>19</td>
</tr>
<tr>
<td>Additional issues</td>
<td>19</td>
</tr>
<tr>
<td>APPENDICES</td>
<td>21</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>30</td>
</tr>
</tbody>
</table>

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LIST OF FIGURES

Figure 1. This is an example of the checklist used by the subjects. The column furthest left lists each main task and its sub-tasks. The next column indicates the response required, when the task is completed. The top of the checklist asks for general subject information and gives general directions for checklist responses .......................................... 6

Figure 2. This is the handout specifying the criteria for correct task completion. The first column indicates the task to be completed, the second describes the criteria for that task, and the third indicates the appropriate response to be made on the checklist ........................................ 9

Figure 3. This graph shows the percentage of tasks completed by each group on the ordinate. Each data point across the abscissa represents 1 week of data for the five subjects in Group 1, the five subjects in Group 2 and the four subjects in Group 3. The dotted line separates the baseline condition in which no checklists were used from the intervention during which checklists were used ........... 15
An important concern in any organization is consistent completion of tasks by workers, and the identification of procedures which effectively facilitate such performance. Gilbert (1978, pp. 89-94; 296) indicates that guidance systems such as checklists are viable, inexpensive alternatives to other methods of improving staff performance. However, information concerning the necessary components of a checklist system is limited, due to a paucity of empirical research on their use. One representative study was conducted by Brethower (1970). In his study, children's disruptive behavior in a classroom decreased, when the children's teacher gave them checklists of good behavior, and explained the definition of each listed behavior. In separate phases, the study showed that children's performance improved when peer group leaders recorded their behavior, and it deteriorated when children self-recorded, but no one else reviewed the data. Thus, this study implies that three components may be important: 1) task definition, 2) recording responses on checklists, and 3) supervisor review.

An analysis of the "traditional" use of checklists also suggests the importance of these three checklist system components. In many common applications, managers may give employees checklists of tasks without establishing precise requirements for using the checklists. The appearance of checklists alone does not insure that the workers
will ever look at them. Alternatively, if the workers are required to record daily checks, they will be more likely to at least view the checklist daily.

However, the workers could merely record the checkmarks without actually performing the tasks to desired criteria, unless the list prompts further details. Consequently, the second specification would require the recording of particular details of performance, such as time of task completion or the amount completed. Since such specific details are only available if the tasks have actually been performed, the workers may be more likely to complete the tasks first, and may be less likely to record false data.

But, even this requirement does not guarantee the continued use of a checklist, because the checklist would only be visible to the individual worker. Its use may or may not continue, depending on the other consequences available for completing tasks. Therefore, a third feature promoting checklist maintenance is a periodic review of the checklists by a supervisor. Presumably, workers would be more likely to fill in the checklists on a regular basis, if supervisors made note of whether they did so on a regular basis.

The present study sought to develop a checklist system incorporating all three of these features. Any of the features may be most important in influencing performance, but the combination of all three was investigated to verify that performance would in fact improve, compared to a system with no checklists at all. Given success of this first step, it would be the task of later research to assess the relative effects of various components.
CHAPTER II

Method

Subjects and setting

The present research involved the staff in the introductory psychology program at Western Michigan University. This program uses a teaching technology incorporating small sections, frequent assignments, and student teaching apprentices (TAs). The staff consists of three paid graduate students functioning as middle-managers, 12 paid undergraduate staff, who perform front-line supervisory duties, and 30 academic-credit staff, the TAs. The TAs perform office duties and supervise the activities of small sections of students. All of the staff work an average of 12-14 hours per week.

All academic-credit student TAs chose a 2-hour daily work shift. The experimenter selected three groups—14 TAs, who, because of their work hours, would be unlikely to interact with one another. The three groups included a morning 2-hour shift, an early afternoon 2-hour shift, and a late afternoon 2-hour shift. Each day, the TAs spent one hour in office duties and one hour in the classroom.

One week prior to intervention, all subjects signed informed consent forms.

Baseline

Measurement began at the start of the school semester, when the
staff received manuals describing their tasks. Each TA received a maximum of four points per day for completing his or her office duties in each of four task categories—record keeping, grading, lesson completion, and system maintenance. In addition, the TAs earned a maximum of four more points per week, by taking a quiz. At the end of the semester, each TA's percentage of points determined that TA's course grade. This research was concerned with the office-hour requirements, which directly affected the TAs' grades.

The criteria for task completion were specified by a 16-page manual, which TAs received at the start of the semester. This manual described all the TA office duties, and the TAs took a quiz over the information in the manuals during the second week of the semester. The quiz questions sampled TA knowledge of all four task categories. Each subject demonstrated mastery of the manual information by scoring 90% or better on his or her quiz.

The baseline supervisory system required the TAs to be monitored by their front-line supervisors, who were monitored by middle-managers. The subjects' supervisors were present throughout the TA office hours and awarded the TAs' daily points.

**Intervention**

The intervention included a checklist that specified the TA tasks in terms of accomplishments (Figure 1). There were codes on the checklist signifying how each subdivision in each category should be checked (i.e., promptness requires a time to be written, not just a checkmark). The checklists were to be completed daily.
Figure 1. This is an example of the checklist used by the subjects. The column furthest left lists each main task and its sub-tasks. The next column indicates the response required, when the task is completed. The top of the checklist asks for general subject information and gives general directions for checklist responses.
FIGURE 1

TA Checklist

In all cases, if Not Applicable: record a Ha
In all cases, if Not Accomplished: record a X
If accomplished, record according to the checklist key

<table>
<thead>
<tr>
<th>Key to Checklist</th>
<th>Weekly Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA Name__________</td>
<td>--------------</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Promptness</th>
<th>Time Arrived</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Rate</td>
<td>Time Watered</td>
</tr>
<tr>
<td>File Materials</td>
<td>Time Filed</td>
</tr>
<tr>
<td>Assigned Extra Tasks</td>
<td>Number Finished</td>
</tr>
</tbody>
</table>

Points

Discussion with ATA

Daily Lesson | Duration of Lesson |
Information for Day | Check Mark |

Points

Information for Day

Newsletter | Time Read |
Big Red | Time Checked |
Blackboard | Time Checked |
Completion of requested tasks | Number Completed |

Points

Daily Grading

Record in book | Duration of time |
Grade change requests | # of requests |
Computer work | duration required |
Post updated Print outs | Time posted |

Points

Bookwork

Worksheet | Points Received |
Quiz | Quiz Score |
Turn in any special forms | # of forms |

Points

DAILY GRADE

ATA Initials

Absences (completed by ATA) | See below |

COMMENTS

If excused absence with a sub: Mark an ES
If excused absence without a sub: Mark an EN
If unexcused absence with a sub: Mark an US
If unexcused absence without a sub: Mark an UN
and placed in folders which remained in the office.

Six of the 17 checklist items did not leave a permanent product (such as promptness of arrival); however, these components were included on the checklist, because they were indirectly related to completion of other tasks (e.g., if TAs were late, they were less likely to complete all their tasks).

At the start of intervention, the experimenter—a middle-manager—gave the subjects handouts describing the criteria for each accomplishment listed on the checklist (Figure 2) and also gave a 10 to 15 minute oral explanation of the checklist. The TAs were told that completing the checklists would in no way affect their course grades, although the experimenter would examine their checklists weekly. At the beginning of each week, the TAs received a new checklist, but the experimenter made no mention of the checklists already turned in.

The experimenter covertly monitored the percentage of tasks completed; this was based on five major permanent products, which would only be present if most of the other 12 tasks were completed. The five major indicators were quiz scores, worksheet scores, computer printouts posted, gradebooks updated, and mailboxes checked. Tasks were considered accomplished only if the permanent products were in the appropriate locations and were correctly completed (i.e., quizzes had to be graded and in the quiz folder in order to count).

**Design**

The design was a multiple baseline, which included a reversal
Figure 2. This is the handout specifying the criteria for correct task completion. The first column indicates the task to be completed, the second describes the criteria for that task, and the third indicates the appropriate response to be made on the checklist.
### TA Checklist Criteria

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Task Definition</th>
<th>How to Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promptness</td>
<td>Arrive in office no later than 5 minutes past the hour.</td>
<td>Do not use X, in all cases record the time you arrived.</td>
</tr>
<tr>
<td>Water Rats</td>
<td>Water all your assigned rats the required times.</td>
<td>Record: the time you watered them.</td>
</tr>
<tr>
<td>File Materials</td>
<td>When you are cleaning up for the day, all the materials you are responsible for must be correctly filed in appropriate place. If articles are strewn about - incomplete.</td>
<td>Record: the time filed.</td>
</tr>
<tr>
<td>Assigned Extra Tasks</td>
<td>Perform duties asked of you by the ODA or ATA such as stapling materials or regrading lab reports if ODAs find grading errors.</td>
<td>Record: the number of tasks performed/the number of tasks assigned.</td>
</tr>
<tr>
<td>Daily Lessons</td>
<td>Involves a daily 5-10 minute discussion with your ATA over the text material,</td>
<td>Record: the duration of the discussion in minutes.</td>
</tr>
<tr>
<td>Information For the Day</td>
<td>Record any requests from the blackboard, newsletter, or message board on the daily outline form.</td>
<td>Record: a check mark.</td>
</tr>
<tr>
<td>The Newsletter</td>
<td>Read the information on the newsletter and initial it.</td>
<td>Record: the time you read the newsletter.</td>
</tr>
<tr>
<td>TASKS</td>
<td>TASK DEFINITION</td>
<td>HOW TO RECORD</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Big Red</td>
<td>This usually contains forms, announcements, or additional information. Remove any of these fliers and read them, but don't replace them.</td>
<td>Record: the time you checked Big Red (as in all time recordings, record to nearest minute).</td>
</tr>
<tr>
<td>The Blackboard</td>
<td>Read chalkboard upon arrival.</td>
<td>Record: time to nearest minute you scanned it.</td>
</tr>
<tr>
<td>Completion of Required Tasks</td>
<td>Specified on blackboard or message board and must be completed.</td>
<td>Record: number of required tasks completed/number required.</td>
</tr>
<tr>
<td>Record in Book</td>
<td>Put each student's daily points in the gradebook and by Monday the previous week's scores must be tallied.</td>
<td>Record: the duration of time this task required in minutes.</td>
</tr>
<tr>
<td>Grade Change Requests</td>
<td>Fill out one form for each student requesting a grade change and give them to ATA.</td>
<td>Record: the number you filled out.</td>
</tr>
<tr>
<td>Computer Work</td>
<td>Graph discrepancies between computer printout and grade from answer key. Graphs must be current.</td>
<td>Record: length of time this task took in minutes.</td>
</tr>
<tr>
<td>Post Updated Printouts</td>
<td>Post updated grades every day, if not updated - incomplete.</td>
<td>Record: time printout was posted.</td>
</tr>
<tr>
<td>Turn in any Special Forms</td>
<td>Certain assigned periodic tasks, such as PPRs or class evaluations will be assigned. You will turn these in on time and they must be placed in the folders in the materials' file in order to properly be turned in and correct.</td>
<td>Record: the number of forms handed in.</td>
</tr>
</tbody>
</table>
**TABLE 2**
(Continued)

<table>
<thead>
<tr>
<th>TASKS</th>
<th>TASK DEFINITION</th>
<th>HOW TO RECORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worksheet</td>
<td>Should be completed and turned in to your ATA prior to the materials' discussion. This worksheet must be 100% correct in order to receive credit for doing it.</td>
<td>The ATA will write the score on your checklist.</td>
</tr>
<tr>
<td>Quiz</td>
<td>Take the quiz after the discussion. You must receive at least 3 pts. out of 4 on the quiz for credit.</td>
<td>The ATA will grade the quiz and record the score on the checklist.</td>
</tr>
</tbody>
</table>

The comments' section is for you to indicate any peculiar circumstances or problems that occurred or which may explain any difficulties in completing a particular task or tasks. At the end of the period, your ATA will record your tentative daily grade (or points) according to your task completion rate for that day. The ATA will also check for accuracy and fill out your absence section. If you are absent, your substitute will use your checklist, but any mistakes affect both you and the substitute.
procedure. The three groups of TAs received the checklists after 3, 7 and 11 weeks of baseline, respectively. The first group stopped using checklists concurrently with the third group receiving checklists; the next week, the second group no longer received checklists.

Reliability

At the end of each day, the experimenter made a covert accuracy check, by counting the permanent products left by each task. He also covertly examined each of the checklists at the end of the day, in order to determine whether the TAs regularly used their checklists. Approximately every eighth day, an independent observer also counted all the permanent product data. The reliability was calculated with the following equation: 100% - (Disagreements/Agreements + Disagreements). Reliability ranged from 95% to 100%.

At the end of each week, the reliability of the checklist application was also determined, by calculating the difference in two task completion indicators: the completed tasks the TAs recorded on their checklists, and the task completion rate actually observed by the experimenter. The reliability was computed like the interobserver reliability and ranged from 94% to 100%.
CHAPTER III

Results

For all three groups, the checklist system increased the percentage of tasks completed; the overall average increase was 28.8% (Figure 3). Though performance varied across tasks and across groups, low performance increased and high performance maintained throughout the intervention (see Appendix A).

Independent of this research, during the seventh week, the program supervisor introduced a special checklist (see Appendix B), which seemed to produce a large fluctuation in Group 3. However, this checklist was only used once, and its effects appeared temporary since the subsequent week showed an 18% decrease in Group 3's performance, suggesting a return to normal baseline performance.

When Groups 1 and 2 no longer received checklists, their performance levels decreased by about 10%.
Figure 3. This graph shows the percentage of tasks completed by each group on the ordinate. Each data point across the abscissa represents 1 week of data for the five subjects in Group 1, the five subjects in Group 2 and the four subjects in Group 3. The dotted line separates the baseline condition in which no checklists were used from the intervention during which checklists were used.
FIGURE 3

Per cent Tasks Completed

Baseline          Checklists          No Checklists

100   80   60   40   20

Weeks

Group 1

Group 2

Group 3

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CHAPTER IV

Discussion

The checklist system in this study was superimposed upon an existing staff supervision system. However, that system was quite inaccurate throughout the entire study. During baseline, the covertly-observed task completion levels averaged between 45 and 60%, and during intervention, those completion percentages averaged between 80 and 100%. Regardless of the actual tasks completed, the front-line supervisors continuously awarded 95 to 100% of the subjects' daily points. This suggests poor methods of measuring performance by the supervisors. Interestingly, the checklists improved performance inspite of these relaxed contingencies, which might otherwise promote poor performance.

Although the checklist system was a package intervention and future research is needed to separate each component of the package, one may still make a tentative analysis of checklist effectiveness by considering five points:

1) the role of instructions from a supervisor,
2) the discriminative control of checklists,
3) the pairing of successful task performance with checklists,
4) the role of display of accomplishments, and
5) the periodic supervisor review of the checklists.
Instructions from supervisor

The experimenter in this study was the manager of the subjects' front-line supervisors. Therefore, one might expect initial use of the checklists due to a general history of reinforcement for following instructions from authorities (because the experimenter/manager delivered the checklist instructions in this study).

But instructions alone cannot maintain behavior without effective consequences, so continued use of checklists in this study must be explained by analyzing the contingencies for actually using the checklists.

Discriminative control of checklists

When the subjects initially used the checklists, their task-completion levels improved. This improvement may be the result of supplementary cues. Since there was a large number of tasks to complete, and since the system's existing cues for performing those tasks were vague, the subjects were unlikely to complete all their tasks reliably. However, a checklist comprises a list of tasks, which may supplement those existing cues, resulting in a greater tendency to complete all the tasks. This increased tendency may occur because of self-given instructions, which are evoked by the list of tasks, or because the unchecked task descriptions may directly set the occasion for performing the task without stating instructions. In either case, this suggests a cue function of the checklist.
Pairing of successful task completion with checklists

In addition, a pairing of checklist usage with task completion may have increased the likelihood of future checklist usage, since the subjects were more successful in completing their tasks during intervention. Presumably, those completed tasks acquire some conditioned reinforcing properties, either through occasional pairings with other events such as praise from supervisors, or through a history of reinforcement for completing tasks. Whether task completion directly affects checklist usage, or if it is related to some form of self-instructions concerning checklists, is a question for future research.

Display of accomplishments

The use of the checklist required a complex interactive response, including viewing the list, recalling details of the task, and recording those details on the list. The results of this behavior (e.g., the marks on the checklist) may have acquired some reinforcing properties; that is, they provided a visual record of accomplishments, which reinforced viewing the list. Consequently, checklist usage may have maintained in part, because the visual stimulus of a completed checklist increased the likelihood of future checklist viewing. It is notable that the time delay between working on a task and viewing the list was too long for the display to function as reinforcement for actually working on the task. It may have had an indirect effect through some form of self-given
statements, but demonstration of this effect also requires further research.

Periodic supervisor review

Another, perhaps crucial, factor in this study was that the middle-manager periodically reviewed the completed checklists. The experimenter told the subjects that their grades were not related to checklist usage. Even so, whenever a supervisor reviews someone's performance, that person is probably functioning under the implication that the consequences may affect their job evaluation. Therefore, performance may have improved because the workers completed tasks to avoid handing in an incomplete checklist and/or to be reinforced by seeing a completed list. Thus, maintenance of checklist usage was probably affected by the periodic review, and whatever implied consequences accompanied such a review.

Additional issues

The subjects in this study improved their performance and did not misrepresent their performance on the checklists, even when they failed to complete tasks. This fact raises at least three possible issues:

1) Did their honesty result from lack of relation between grades and performance?

2) Did the requirement of handing in checklists imply consequences from the supervisor and thereby result in self-given statements regarding the possible outcome of
"cheating" on the list? And,

3) Did the other variables which affected checklist usage and job performance (e.g., reinforcing properties of an accurate record of accomplishments) exert enough control on the subjects to promote accurate checklist usage?

Further studies might be directed to all of these questions, as well as to a component analysis of this particular checklist package. Nonetheless, it appears that a checklist system is an effective method of improving staff performance, and therefore, is perhaps a viable and inexpensive alternative or addition to other methods of improving staff performance.
Appendix A. This is the special checklist the program director introduced during Week 7 and was only used on that week.
Psychology 150 T.A.'s

To be completed before you leave on Monday, October 27.

I. Grade books completed
   a. Are they up-to-date? _____
   b. Are all the totals summed accurately? _____
   c. Has an ATA or ODA checked it and put their initials on the gradesheets? _____
   d. Does your total possible agree with the sample sheet and the computer? _____
   e. Exam I recorded? _____

II. Computer files completed
   a. Are all scores in?
      1. Rat lab points? _____
      2. 1½ exp. quiz and report points? _____
      3. All quizzes? _____
      4. Units 1 and 2 self-man points in? _____
      5. All grade changes made? _____
   
   b. You can check if all the above are in. You can check the above from your bookprint. _____
   
   c. Have you posted an up-to-date comp printout and have you made an Exam I hall sheet; Is Big Red completely empty? _____

III. PPRs completed

   Have you completed the updated PPR and turned in to ATA? _____

IV. After all the above is completed, have you put all of your old datronics and Friday lecture forms in an envelope which has the date, your name and your section number on it? _____

   Have you checked with your ODA in order to see your total points up to now? _____

Please try to complete this checklist, because then we won't have to worry about anything that happened prior to this time.

Thanks.
Appendix B: The following five graphs indicate the percentage of the particular tasks completed by each group. Each point along the abscissa represents 1 week of data for each group.
Per cent Mailboxes Checked

Baseline | Checklists | No Checklists

100-1 | 80- | 60- | 40- | 20- | 14

Weeks

Group 1

Per cent Checked

Baseline | Checklists | No Checklists

100 | 80- | 60- | 40- | 20

Weeks

Group 2

Mailboxes

Baseline | Checklists | No Checklists

100 | 80- | 60- | 40- | 20

Weeks

Group 3

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