

AN ABSTRACT OF THE THESIS OF

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Title: Comparative Analysis of House Drawings in Older Adults with and without Dementia

Abstract approved: Kurt D. Baker

The present study attempted to determine whether house drawings of adults over age seventy-five were significantly different between adults with dementia and adults without dementia. The methods and scoring procedures presented in this study are important in developing quick and efficient screening devices for cognitive functioning. Forty-one participants (19 dementia, 22 non-dementia) drew a house from memory (command administration) and copied a three-dimensional model of a house (copy administration). Two judges, trained in the Kirk and Kertesz (1993) scoring criteria, scored the drawings independently. Inter-rater reliability levels between raters' scores were 0.75 indicating the mean overall impairment was the only item within an acceptable range. All other items did not meet acceptable inter-rater reliability standards. Results indicated command and copy scores were significantly lower, indicating higher quality, in non-dementia than dementia group. No significant differences were present between command drawings and copy drawings in the dementia group. No significant differences occurred between command and copy conditions of non-dementia group supporting hypothesis three. Visual

differences in illustrations were also present between dementia and non-dementia group.

The methods and scoring criteria of this particular study are useful in identifying those with moderate to severe dementia and non-dementia. However, due to reliability issues, lack of specific and clear definitions in scoring criteria, and labor intensive tasks this screening device is a less than adequate screening tool.

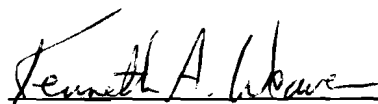
COMPARATIVE ANALYSIS OF HOUSE DRAWINGS IN OLDER ADULTS WITH
AND WITHOUT DEMENTIA

Presented to
The Division of Psychology and Special Education
EMPORIA STATE UNIVERSITY

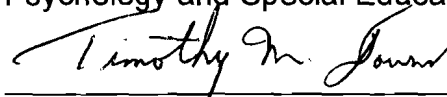
In Partial Fulfillment of the Requirements
For the Degree
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By
Michelle D. Nienkamp
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Approved for the Division of
Psychology and Special Education



Approved for the Graduate Council

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CHAPTER I

INTRODUCTION

Over the next few decades, there will continue to be an increase in the older adult population. With this increase, there will be a rise in dementia cases in the community creating a higher demand for helping professionals in geriatric settings. A concomitant need is for reliable and valid screening tests to identify dementia and other brain impairments in older adults (Marcopulos, McLain, & Giuliano, 1997).

Although no single test can serve as an effective screening device for brain impairment, drawing procedures may help determine if there is a need for further evaluation (Holmes, 1992). Because drawing procedures are brief, easy to administer, and economical, they are often used in clinical assessment, screening, and research of cognitive function (Clement et al., 1996). The purpose of the present study is to compare drawings in older adults with and without dementia using a scoring system developed by Kirk and Kertesz (1991, 1993). This scoring system is designed for use with house drawings of people with brain impairments.

By investigating drawings in adults over seventy and using various methods of administration, mental health and various other professionals will gain important knowledge about the effects of age on drawing performance and the influences of types of stimuli used as models. Art and recreation therapists can use the results of such screening in determining what types of behavioral

activities and instructions would be most beneficial in meeting a particular older adult's needs.

Levels of Dementia

Some decline in perceptual, planning, motor, and cognitive abilities are a normal part of aging. However, brain impairments, such as dementia, are not a natural consequence of aging (Holmes, 1992). Dementia, according to the Diagnostic Statistical Manual-IV (American Psychiatric Association, 1994), often occurs as the result of physiological conditions from the effects of a general medical condition, persistent substance use, or from a combination of factors. When a person suffers from dementia, plaques develop between neurons in the brain. These plaques deteriorate brain structures associated with memory, affect, mood, motor movements, and eventually vital organs of life (Zola, 1999). People with Alzheimer's dementia may show disorientation, attention and memory impairments, language disturbances, or apraxia, and gait or movement disturbances. In the later stages of Alzheimer's dementia, a person may show purposeless wandering, agitation, apathy, and disrupted speech (Knapp, 1994). Constructional ability, or the ability to draw or construct two- or three-dimensional figures or shapes, may also be impaired (Strub & Black, 1993).

Reisberg, Ferris, Leon, and Crook (1982) identify seven levels in primary degenerative dementia. The first two levels include no cognitive decline, and very mild cognitive decline in which one may forget familiar places and names. Lower levels of concentration, memory retention, and decreased performance in

employment and social settings accompany level three, or mild cognitive dementia. Moderate cognitive decline, level four, might include personal history memory deficit, decreased short term-memory, flattening affect, and withdrawal from challenging situations.

In level five, moderately severe cognitive decline, a person may require assistance in choice of proper clothing to wear (Reisberg et al., 1982). The person may be unable to recall his or her current address, time, or place.

Severe cognitive decline, level six, may include forgetting the name of one's spouse and an unawareness of short-term events and experiences in life including surroundings, year, and season (Reisberg et al., 1982). The patient may have difficulties with serial numbers backwards and forwards. At this level, the person generally requires assistance with activities of daily living, yet the person is able to distinguish familiar from unfamiliar things in their environment. In level six, the person may demonstrate delusional behavior and an increase in agitation, anxiety, and obsessive behaviors. Assistance may be required in bathing, dressing, and when using the toilet.

In very severe cognitive decline, or level seven, all verbal abilities are lost and the person may only grunt. Basic psychomotor skills are lost, and the person requires assistance in toileting, feeding, and walking. In the last stages of life, a person may require assistance in sitting and holding up his or her head (Reisberg et al., 1982).

Characteristics in Drawings of Older Adults with Dementia

Older adults in the same stages of dementia may demonstrate variability in behaviors and drawing characteristics (Friedland et al., 1988). Friedland et al. found that patients in the same stage of dementia demonstrate diverse constructional abilities in their drawings. While some patients' drawings are intact, others' drawings are barely recognizable.

In studying drawing characteristics between normal older adults and older adults with Alzheimer's dementia, Knapp (1994) found that Alzheimer's dementia adults typically drew houses smaller than older adults without dementia. She also finds Alzheimer's adults use no more than four colors in a drawing while older adults without dementia typically use more than five colors in their drawings.

Cummings and Zarit (1987) described a case study in which an artist with dementia simplified his artwork as his disease progressed. Details in the drawings or paintings became less elaborate from previous images. Color schemes also became simpler. Shading was abandoned, and it became impossible to distinguish the perspective between figure, or object, and ground, or background. The artist gradually lost his motivation for painting.

Wald (1986) found variable characteristics in the artwork of Alzheimer's dementia adults. Characteristics included perseveration (involuntary repetition of lines, shapes, or forms on the same drawing or from drawing to drawing), omission of details, fragmentation, disorganization, perceptual rotation,

overlapping configurations, and a confused perspective. She observed regression in the artwork as the disease progressed: fused images and boundary confusion in which the adult with dementia may draw off the edge of the paper, on another person's drawing, or onto the table. Wald described how emotional regression, as viewed through the artwork of Alzheimer's dementia, often parallels their physiological regression.

Fluctuations in the cognitive decline of older adults' with Alzheimer's dementia may be detected in their artwork (Wald, 1983). In one case study, Wald (1984) described the artwork of a woman with dementia as she regressed through the advanced stages of dementia. She found that the less deteriorated adults with dementia could often recognize deficiencies in their artwork. In the early stages of Alzheimer's dementia, older adults may have difficulties following directions and sequencing. The woman in Wald's case study demonstrated perseveration in her drawings by filling in every space and repeating lines. The same woman's collages became cluttered and ceramic pieces became disorganized and chaotic ("disorganized" and "chaotic" were not defined by Wald). In the more advanced stage of dementia, the woman drew human figures in which body parts are in unusual places. For example, legs and feet were drawn sticking out of the head instead of the body, and a head was drawn within a head. As she regressed to the final stages of dementia, the woman drew formless pictures, fragmented lines, and staccato dots, dashes, and loops (specific terms were not specifically defined by Wald).

Screening for Constructional Apraxia

Drawing tasks are one method of assessing constructional apraxia--an inability to construct or assemble objects from their component parts (Marsh & Philwin, 1987). People with constructional apraxia may be unable to organize separate parts into a unified whole (Fall, 1987). Everyday functional abilities affected by constructional apraxia include dressing, setting a table, or assembling an appliance from written or illustrated instructions.

Strub and Black (1993) define constructional praxis, or constructional ability, as nonverbal motor movements used to perform complex learned movements such as drawing or constructing figures and shapes, buttoning a shirt, or feeding oneself. To copy or reproduce a model or drawing at the experimenter's verbal or written command requires adequate visual or auditory perception. Motor strength and coordination also affect drawing performance. The person must integrate the experimenter's request into an image and use this information to perform necessary motor movements to complete reproduction of a model. Verbal or written requests to draw or construct two-dimensional or three-dimensional figures or shapes require different sensory responses and complex perceptual motor tasks involving integration of the occipital, parietal, and frontal lobes of the brain (Strub & Black, 1993). Sometimes the only objective evidence of early signs of brain dysfunction are in performance on either command (verbal or written request) drawings from memory or copy drawing tasks (Marcopulos, McLain, & Guiliano, 1997).

Two-dimensional versus three-dimensional models. Fall (1987) described how constructional praxis performance depends on the type of stimuli used as models for presentation. Benton's study (as cited in Fall, 1987) found that both brain damaged and control subjects had improved constructional performance with a block model versus a photograph model. Fall stated various methods of administration make different demands on a person's perceptual analysis and may affect the accuracy of performances in constructional tasks. Unlike previous house drawing studies in which a two-dimensional model was used, the present study used a three-dimensional model of a house in a copy condition. The purpose of this was to increase the perceptual analysis on the object.

Copy drawings versus command drawings. The ability to draw from copies and the ability to draw pictures on command, or from memory, each tap into different levels of constructional ability (Strub & Black, 1993). Cummings and Zarit (1987) described a case study in which a 75-year-old male artist with Alzheimer's dementia was least impaired in his ability to copy figures when first examined. However, his ability to copy figures slowly deteriorated as his dementia progressed. Grossman (1988) found that brain-damaged patients could recognize and copy pictures; however, they could not draw pictures of the same targets from memory. As drawing deficits may result from memory or constructional problems, or combination of the two, it is important that memory be tested in isolation (Strub & Black, 1993).

House drawings. Only a small number of studies include house drawings according to investigations of spontaneous command and copy conditions. Significant relationships existed between spontaneous command house drawings and copy house drawings in older adults with dementia and an older adult control group (Moore & Wyke, 1984). In comparison to the older adult control group, the dementia group drew smaller and simpler versions of command drawings. Although the dementia group included more details in the copy condition than in the command condition, details were incorrectly positioned, and the drawings had a fragmented appearance.

In another study of house drawings, Alzheimer dementia adults demonstrated significantly poorer performances in command house drawings and house drawings copied from a model than did non-dementia adults with the same task (Ober, Jaquist, Koss, Delis, & Friedland, 1991). Alzheimer's dementia adults often incorporate words or parts of words into their drawings (Cummins & Zarit, 1987; Ober et al., 1991). With increasing severity of dementia, an increase in stimulus boundedness, or tracing over the two-dimensional house copy model, was present (Henderson, Mack, & Williams, 1989; Ober et al., 1991). Grossman (1988) found that adults with brain dysfunction could recognize and copy pictures, but they could not draw pictures of the same targets from memory.

After looking at an illustration of a house for ten seconds, Kirk and Kertesz (1991, 1993) requested adults in their study to illustrate a copy of the house. Using a scoring system Kertesz developed in 1982, as part of the Western

Aphasia Battery, Kirk and Kertesz found significant differences between drawings of adults with early stages of Alzheimer's dementia and normal control adults. Alzheimer's adults drawings were simplified, displayed fewer angles, and lacked qualities in perspective and spatial relations in comparison to the normal control adults. Some Alzheimer's dementia adults drew directly on the two-sided illustration house model in the copying tasks. Kirk and Kertesz used the term *closing-in* to describe this characteristic. Henderson, Mack, and Williams (1989) also described how Alzheimer's dementia adults traced or copied over a two-sided illustration of a house model.

Age and setting variables. Few investigations of drawing performance have looked at adults over age seventy-five. However, three age groups ranging from the age of sixty-six to age ninety-seven were used in a study of clock drawing performance (Cahn & Kaplan, 1997). No significant differences were found on clock drawing performances of the three age groups in cognitively intact older adults living in the community.

Lakin (1960) compared institutionalized adults' drawings of human figures with non-institutionalized adults. Non-institutionalized adults drew larger, taller and more adequately centered figures than institutionalized adults. Prolonged hospitalization may have had psychological effects on the institutionalized group, affecting drawing performance (Lakin, 1960). The age of the adults (ranging from age 67 to age 85) was not a factor in his study. However, in another study, Lakin (1956) found a sudden decline in the quality of human figure drawings of

adults over sixty-eight-years-old. Rapid decline in the quality of drawings corresponded with increasing age. With an increase of the older adult population and the knowledge that drawing performance may decline with age, it would be important to establish normative data for screening tests identifying brain dysfunctions versus normal decline in functioning with age (Marcopulos et al., 1997).

Hypothesis and Implications of Study

The present study attempted to determine whether house drawings of adults over age seventy-five would be significantly different between adults with dementia and adults without dementia. The following hypotheses were investigated:

Hypothesis 1: Both command and copy administration scores would be better in older adults without dementia than in older adults with dementia.

Hypothesis 2: Drawing scores in a command, or memory, administration would be significantly worse than drawing scores of a copy administration in older adults with dementia.

Hypothesis 3: No significant difference would occur between the command and copy administrations of older adults without dementia.

CHAPTER II

METHODS

Participants

A total of forty-one participants' drawings were used in the present study (34 women and 7 men). A total of 37 residents from Emporia Presbyterian Manor and four residents from Newton Presbyterian Manor agreed to participate in the study. The manors were located in small mid-western towns of Emporia and Newton, Kansas. Each senior citizen home included independent living, assisted living, and health care centers with total dependent care. Seventy-seven residents from Emporia Presbyterian Manor and seven residents from Newton Presbyterian Manor, both senior citizen homes, were asked to volunteer as participants in this study. Mean age of participants was 87.5 years (range 75 years to 96 years). Education level ranged from five years to doctorate levels.

Several reasons prevented nursing home residents from participating. Eleven adults from Emporia Presbyterian Manor and two adults from Newton Presbyterian Manor declined to participate by their own choice or legal guardian's choice. Twenty-nine adults from Emporia Presbyterian Manor and one adult from Newton Presbyterian Manor did not respond to the task or were unable to complete the task. In addition to medical issues, specific difficulties included prospective participants wandering away from examiner, falling asleep or manifesting confusion and low levels of concentration.

Participants' illustrations were divided into two groups: drawings from those with dementia ($N = 19$) as diagnosed by a general physician and drawings from those without dementia ($N = 22$). Criteria for inclusion in two groups were as follows: participants had to be 75 years old or older with no major visual or motor impairments. Since specific etiologies, severity, and duration of dementia were not reported in the participants' medical charts, all types of dementia were included. The examiner asked nursing staff in each facility for recommendations of patients with mild to moderate dementia. The examiner recruited participants until a minimum of twenty participants provided drawings for each of the two groups.

All participants or their legal guardians signed informed consent statements authorizing them to participate in the study (see Appendices A, B and C). The investigator obtained demographic and medical information from participants' charts with approval from the manor's executive director, nursing director, activity director, and Presbyterian Manor, Inc. lawyer (see Appendix D). Permission was also obtained from the Institutional Review Board for Treatment of Human Subjects at Emporia State University. Records were available to examiner due to the professional association with each facility.

To ensure confidentiality, each participant's set of three drawings was assigned a three-digit participant code number, and all identifying data were masked. Dementia and non-dementia drawings were intermingled before being scored.

Materials and Instrumentation

Materials included large print instruction cards, colored ink pens, white paper, and a three-dimensional model of a house represented in Figure 1. See Appendix E for complete details on materials.

Scoring Criteria

Two judges (a master's level clinical psychologist and a master's level art therapist) scored the drawings independently. Both raters were trained in the Kirk and Kertesz (1993) scoring procedures (see Appendix F).

Criteria used to rate the drawings were specifically designed to assess constructional drawing impairment and had previously been applied to participants with neurological dysfunction (Kirk & Kertesz, 1989, 1991, 1993). Inter-rater reliability was assessed by the Kendall's Tau (b) correlations between two raters' scores for each item in the scoring criteria.

Procedure

A modification of the drawing task from Moore and Wyke (1984) was used. Drawing tasks included two command drawings of a house in which adults illustrated a house from memory and a drawing made by copying a three-dimensional model (see Figure 1). All instructions were given in both verbal and written form. The examiner administered the drawing tasks individually to each participant with each task administered in the same order. Verbatim notes of participants' verbal and nonverbal responses to the three drawing tasks were taken. At the completion of the drawing tasks, the participant was thanked, and



Figure 1. Photograph of Three-Dimensional Model House

questions were answered. See Appendix E for detailed administration procedures.

CHAPTER III

RESULTS

Inter-rater Reliability

Reliability of the ratings was assessed by the Kendall's Tau (b) correlations between the two rater's scores for each item in the scoring criteria (with total number of illustrations ranging from 115 to 117). The only acceptable inter-rater reliability rating was on the item measuring overall impairment with a mean reliability coefficient of 0.746 at 0.0001 level of significance. Inter-rater reliability levels of 0.800 are considered acceptable in research.

Overall impairment, or rating of each drawing as a whole, was an average of scale items two through seven (total illustrations = 117). Although inter-rater reliability was not high on items two through seven, there was an increase in inter-rater reliability on overall impairment. Because the overall impairment scores are composite scores of items two through seven, using this score was considered acceptable.

The first scoring item, overlap, was not included in the study because agreement could not be made between two raters on how to score item. In the original Kirk and Kertesz (1991, 1993) study, overlap was a "tendency for drawings to be superimposed on the two-dimensional copy conditions." Because the investigator was only person to identify drawing overlap on the three-dimensional model, this item was discarded. Other items in the Kirk and Kertesz

scoring system were not used for analysis because adequate inter-rater reliability was not achieved.

Statistical Analyses

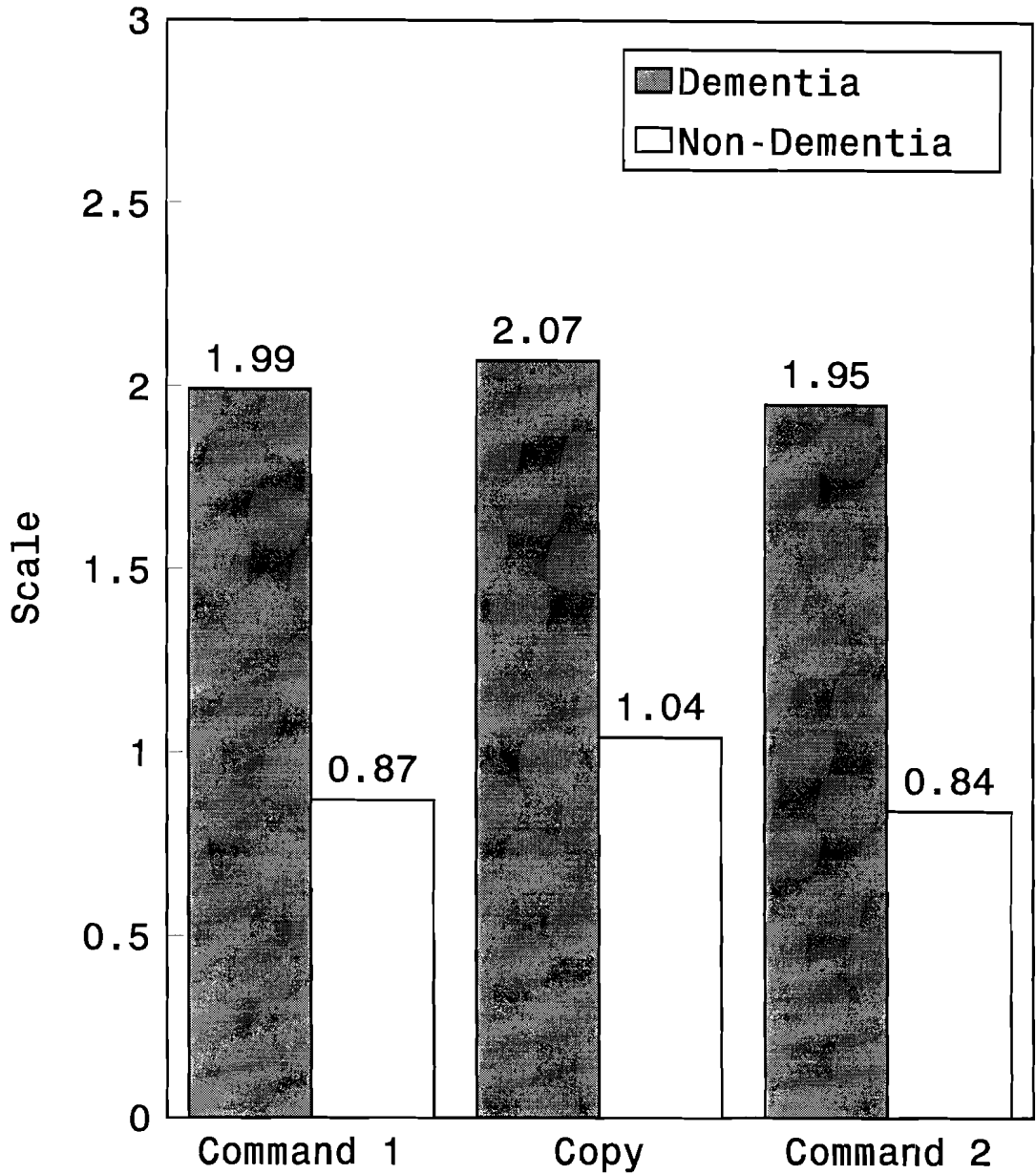
Both within-participant variables and between-participant variables were analyzed. Independent variables included the neurological condition of participants and the administration of the drawing task. The dependent variable was the average of the two raters' scores on the overall impairment item from the Kirk and Kertesz (1993) criteria used to rate the drawings. A two (Group: dementia or non-dementia) by three (Administration: command one, copy, and command two) mixed factor analysis of variance (ANOVA) was utilized in this study to determine if a statistical difference existed between the dementia and non-dementia adults over the age of 70. It was also determined if a statistical difference existed between the copy and command conditions both within and between each group. All data were analyzed at the $p < 0.05$ level of significance.

Only 15 drawings were analyzed from the dementia group because four dementia adults were unable to complete all three drawing tasks due to cognitive impairments and decline in concentration and level of functioning. However, all dementia participants were able to complete the first command drawing task.

As predicted, both command and copy scores were significantly better (i.e., lower) in older adults without dementia than older adults with dementia (dementia, $N = 15$; non-dementia, $N = 22$) as shown in Figure 2 and Table 1.

Figure 2

Condition vs. Presence of Dementia



Dementia N = 15, Non-dementia = 22

Table 1

Summary of Two by Three Analysis of Variance of Overall Mean Impairment as a Function of Group (Dementia, Non-Dementia) and Administration (Command 1, Copy, Command 2)

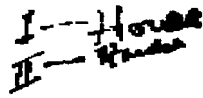
<u>Source</u>	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>
Between Subjects Effect				
Group	1	31.62	31.62	36.86*
Error	35	30.02	0.86	
Within Subjects Effect				
Administration	2	0.52	0.26	2.98**
Group x Administration	2	0.04	0.02	0.24***
Error	70	6.17	0.09	

* $p < 0.0001$ ** $p < 0.06$ *** $p > 0.05$

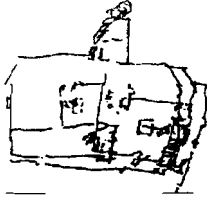
Differences between dementia and non-dementia illustrations reached a significance of $p < 0.0001$ with $F = 36.86$. (Dementia command 1 (DC1) SD = 0.65, DC1 M = 1.99, non-dementia (ND) C1 SD = 0.54, NDC1 M = 0.87, D Copy SD = 0.57, D Copy M = 2.07, ND Copy SD = 0.65, ND Copy M = 1.04, DC2 SD = 0.58, DC2 M = 1.95, NDC2 SD = 0.53, NDC2 M = 0.84). Visual differences were also present between the majority of dementia and non-dementia illustrations. A selected range of illustrations from six dementia and six non-dementia participants are shown in Figure 3 and Figure 4.

Contrary to Hypothesis 2, no significant differences in the dementia group were present in mean overall impairment scores between command drawings and copy drawings (Command 1 (C1) SD = 0.65, C1 M = 1.99, Copy SD = 0.57, Copy M = 2.07, Command 2 (C2) SD = 0.58, C2 M = 1.95). Consistent with Hypothesis 3, there were no significant differences between the command and copy conditions of older adults without dementia (C1 SD = 0.54, C1 M = 0.87, Copy SD = 0.65, Copy M = 1.04, C2 SD = 0.53, C2 M = 0.84 (see Figure 2).

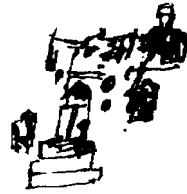
Content analysis of verbatim notes revealed a majority of participants discussed memories associated with drawn houses. Five dementia participants and six non-dementia participants associated personal memories of a house or building with the task. Thirteen participants (five dementia, eight non-dementia) associated a non-specific memory with the task, including basic house structures and repair needs. One dementia participant and seven non-dementia participants told stories or used humor while illustrating houses.



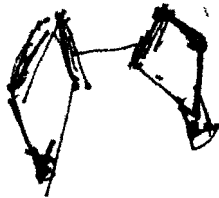
D Command 1



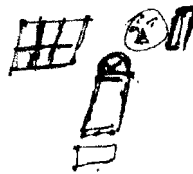
D Command 1



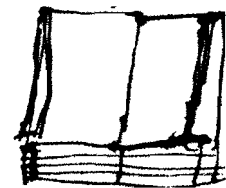
D Copy



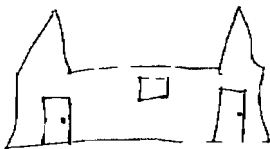
D Command 1



D Copy



D Command 2



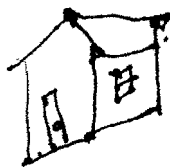
D Command 1



D Copy



D Command 2



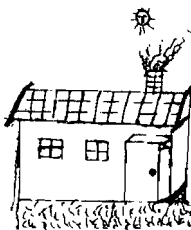
D Command 1



D Copy



D Command 2



D Command 1

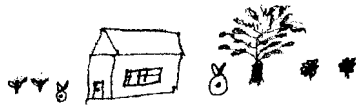


D Copy



D Command 2

Figure 3. Examples of Dementia Illustrations. Items do not represent accurate orientation to paper in original illustrations.



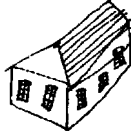
ND Command 1



ND Copy



ND Command 2



ND Command 1



ND Copy



ND Command 2



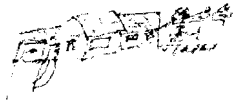
ND Command 1



ND Copy



ND Command 2



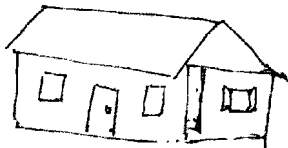
ND Command 1



ND Copy



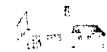
ND Command 2



ND Command 1



ND Copy



ND Command 2



ND Command 1



ND Copy



ND Command 2

Figure 4. Examples of Non-Dementia Illustrations. Items do not represent accurate orientation to paper on original illustrations.

CHAPTER IV

DISCUSSION

Hypotheses and Drawing Conditions

Significant differences were found between dementia and non-dementia groups on copy and command illustrations confirming similar results found in Moore and Wyke (1984) and Ober, Jaquest, Koss, Delis, and Frieland (1991) studies. The first hypothesis in this study was supported as command and copy condition scores were better in non-dementia than dementia illustrations despite the limitations of reliability and training level of raters. Therefore, significant differences would likely hold true with a larger number of participants in the study between these conditions.

The second hypothesis was drawing scores in the command, or memory, condition would be significantly worse than drawing scores of a copy condition, or drawing of a three-dimensional model house, in older adults with dementia. This hypothesis was not supported. Reasons for minimal differences in performance of each condition may be attributed to participants' brain dysfunction preventing them from improving performance in the copy condition. Hypothesis three was supported, in that no significant differences occurred between command and copy conditions in non-dementia participants.

The present study did confirm the Kirk and Kertesz (1991, 1993) studies in that the majority of dementia drawings were simplified. Five dementia patients in current study were not able to copy figure or complete command drawings. Two

dementia participants incorporated words or parts of words into their drawing similar to results found in Ober et al. (1991) and Cumming and Zarit (1987). Closing-in, or overlap, was evidenced with some dementia participants as they began tracing over the three-dimensional model of the house. The investigator stopped participants, so the model house would not be altered. Dementia participants also drew on stimulus cards or used cards to draw straight lines. Henderson, Mack, and Williams (1987) and Kirk and Kertesz (1991) found similar results with overlap characteristics in dementia drawings.

Confounding Variables

There were many confounding variables and limitations in the current study. Clearer identification of severity and duration of dementia is needed. Severity and diagnosis was not noted in medical charts--acquiring and keeping updated information was not always realistic. This is not an unusual issue in geriatric care and should be addressed in all research.

Some participants were diagnosed with depression although symptoms of confusion, lack of orientation to time and place, and aphasia were present. Verbatim notes of participant's verbal and non-verbal responses indicated evidence of dementia symptoms and of cognitive impairments based on DSM-IV criteria (American Psychiatric Association, 1994) in both dementia and non-dementia participants. Some participants were unable to complete all three drawing tasks due to physical or cognitive reasons even when examiner returned at a later time.

Kirk and Kertesz (1991,1993) scoring criteria has been used in too few studies to be considered a valid measure of drawing impairment of constructional apraxia. Reliability of all items in the original scoring criteria is questionable in current study. Although these two previous studies demonstrated adequate inter-rater reliability (mean reliability coefficient of 0.79 in 1991, study and 0.81 in 1993 study), results of current study are only based on overall impairment because reliability could not be established.

In current study, raters were in seventy-five percent agreement on the overall impairment item. However, other items from the scoring criteria of current study did not demonstrate adequate inter-rater reliability. The inter-rater reliability in the current study might be improved with increased training and practice among two raters.

The purpose of drawing tasks and the Kirk and Kertesz scoring procedures was to establish a quick and efficient use as a screening device for brain impairment. Because of reliability issues this scoring system is a less than adequate diagnostic tool. Vaguely defined terms in the original Kirk and Kertesz (1991, 1993) scoring criteria contributed to low inter-rater reliability. For example, the oversimplification item was defined as a, "tendency to oversimplify the drawing, leaving out details." There is a need for more specific and clearer definitions as well as visual examples on a scoring continuum similar to those found in clock drawings on the mental status exams and the geometric design scoring criteria of WPPSI-R (Wechsler Preschool and Primary Scale of

Intelligence-Revised) intelligence tests. When counting types and total numbers of detailed angles in an illustration, one should consider the amount of time and tedious efforts it takes to score such an item for screening purposes. One must also consider how artists intentionally manipulate angles to demonstrate visual perspective.

Overall impairment mean scores on the first drawing alone were useful in determining dementia versus non-dementia participants. One might consider just using the first eight to ten items on the Kirk and Kertesz scoring criteria as these items were least time consuming to score. The composite overall impairment score was also the most reliable item from all scoring criteria.

Future Research Considerations

Future research might include establishing a baseline for non-dementia older adult and younger adult drawings. Inadequate norms and few studies of drawings of houses in normal adults over seventy-five are available. A normal baseline is necessary to identify or recognize constructional apraxia in older adults. Future research should also use a larger number of participants to improve the statistical power and to explore gender differences and the effect of other variables, such as color use.

With a larger number of participants, copy and command conditions could be counter-balanced, creating a stronger study. Further studies might also compare independent living non-dementia with total health care non-dementia

adults. Lakin (1960) found variables of isolation, lack of contact, and socioeconomic conditions influenced outcomes of drawing performance.

One might also look for visuoconstructive, or color disturbances, and closeness of size to the model when studying illustrations of older adults. It might also be helpful to compare completed house drawings with performance on the Dementia Rating Scale (Reisberg et al., 1982).

Future studies might compare use of different media in constructing two-or three-dimensional figures. However, based on the difficulty encountered in this study, one might encounter difficulties in developing scoring criteria for three-dimensional construction.

Conclusion

When studying behaviors of older-adults completing drawing tasks in assessments, the drawing process can reveal how participants adapt to their environment. One can assess how a person handles stressful situations, conflicts, and their personal style by how the participant approaches the task. This particular screening device can be useful but care needs to be taken to avoid reliability issues and labor intensive tasks, such as time and involvement in scoring.

One should use caution in the use of art as a diagnostic tool as it is just a tool, or one component. Drawings should be used to determine if there is a need for further evaluation. One should also observe verbal and non-verbal tasks, behaviors, and attitudes towards the task. Content analysis of verbatim notes in

current study might reveal differences in memory, or types of memory retained among dementia and non-dementia participants. Knowledge of neuropsychology assessments and the use of art therapy with various skill levels of older adults in health care facilities are of practical use. One can modify art tasks according to participants' cognitive level and constructional, or drawing, abilities.

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Appendix A

Legal Guardian Consent Form

Emporia Presbyterian Manor

Legal Guardian Consent Form

Dear guardians:

I am a graduate student at Emporia State University in Emporia, Kansas, and employed as an activity assistant at Emporia Presbyterian Manor. I am designing and conducting a research study to examine drawings by the elderly with and without dementia. This information will help caretakers, nurses, and other professionals who work directly with the elderly plan ways to improve upon factors that influence older adults' lives.

Emporia State University and Presbyterian Manor both require that I obtain written permission for testing participants in my study. Your loved one along with other participating adults will be asked to draw a house. It will take approximately ten minutes of your loved one's time. There are no known discomforts expected in the resident's participation in this study. Your loved one may choose not to participate. You and your loved one's participation is voluntary and he or she may discontinue participation at any time. All information on your loved one will be totally confidential. Names will not be reported. Only group results will be used.

There is potential for publication of participants drawings or records for academic use. In each case all identifying data (name, occupation, etc.) will remain confidential.

Thank you for your help in this project. Please sign the form below and return it to me in the enclosed, stamped self-addressed envelope. Please return the consent form and any requests for additional information in the return envelope by **July 3, 1998**. If you have any questions regarding this study, please feel free to call me at (316) 340-0418. Thank you for your help and consideration in this project.

Michelle Nienkamp, M.S.
Graduate Student
Emporia State University

I have read and understood the explanation provided to me and allow _____
to participate in the study.

Name of Resident
Date:_____

Signature of Legal Guardian

Appendix B

Informed Consent Document

Emporia Presbyterian Manor

Informed Consent Statement

Emporia Presbyterian Manor

I am a graduate student at Emporia State University in Emporia, Kansas, and employed as an activity assistant at Emporia Presbyterian Manor. I am designing and conducting a research study to examine drawings in the elderly. Emporia State University and Presbyterian Manor Inc. both require that I obtain written permission for testing participants in my study. This information will help caretakers, nurses, and other professionals who work directly with you and other elders plan ways to improve upon factors that influence elders' lives. The purpose of this document is to inform you about a study. This information is given so you can decide if you want to participate in this study.

- 1) The purpose of this study is to look at the drawing characteristics of elderly adults.
- 2) You will be asked to draw three pictures of a house.
- 3) All information obtained in this study will be identified only by a code number, and your name will not be associated with the information gathered by the researcher.
- 4) You are in no way obligated to participate in this study if this is your decision.

There is potential for the publication of pictures of your drawings or records for academic use in which all identifying data (name, occupation, etc...) will remain confidential.

✂ _____

I have read the above statements and agree to participate in the study.

Name

Date

Appendix C

Informed Consent Statement

Newton Presbyterian Manor

Informed Consent Statement

Newton Presbyterian Manor

As a graduate student at Emporia State University in Emporia, Kansas, I am required to complete a research, thesis project. Emporia State University and Newton Presbyterian Manor both require that I obtain written permission from participants in my study. The information as follows is to inform you about the research study, so you can decide if you want to participate.

The purpose of this study is to look at drawing characteristics of older adults with and without dementia. This information will help professionals who work with older adults plan ways to improve assessing dementia and improve factors that influence older adult lives. You will be asked to draw three pictures of a house. It will take approximately ten to twenty minutes of your time, and there are no known discomforts expected in the participation of this study. All participation is voluntary, and you may discontinue at any time. Information obtained in this study will be identified only by a code number, and your name will not be associated with the information gathered by the researcher. Only group results will be used. There is potential for the publication of pictures of your drawings or records for academic use in which all identifying data (name, occupation, etc...) will remain confidential.

I have read the above statements and agree to participate in the study.

Name

Legal Guardian (if applicable)

Appendix D

Permission to Conduct Study at Presbyterian Manors

May 28, 1998

1201 Triplett Dr., Apt. G83
Emporia, KS 66801.

Mr. Closson
Executive Director
Emporia Presbyterian Manor
2300 Industrial Rd.
Emporia, KS 66801

Dear Mr. Closson:

In partial fulfillment in completing a Master's Degree in clinical psychology, I would like to conduct a study comparing drawings in the elderly over seventy-five years of age with and without dementia. With the increase in dementia cases, there is a need for reliable and valid drawing tests to identify dementia or other cognitive disorders. It will be useful to know the effects of age on drawing performance.

Only participants who agree to the informed consent documents will be selected to participate in the study. All informed consent statements and drawings will be pre-assigned a code number to ensure confidentiality for the residents.

If you have any questions regarding this study, please feel free to contact me at the Emporia Presbyterian Manor. Thank you for your consideration in this project.

Sincerely,

Michelle Nienkamp, M.S.

Appendix E

Drawing Administration Procedures

Drawing Administration Procedures

Physical Conditions:

Drawing tasks should be administered in a well-lighted, quiet, and comfortable room (in most cases the participants' private rooms). Physical distractions or interruptions should be minimized. Furniture should be comfortable and the appropriate size for each participant. A smooth surface, such as a clipboard or table of an appropriate height should be provided. The investigator should sit opposite the participant so he or she can observe the participant's behavior.

Materials:

- Three index cards (4 inches by 10 inches) with large bold-typed written instructions
- A large supply of blank white paper (8.5 inches by 11 inches)
- A set of eight colored, non-toxic, washable pens .2mm wide. Pens were arranged from left to right in the following order to maintain consistency: black, brown, red, orange, yellow, green, blue, and purple. Pens were placed in the same order at the beginning of each drawing task.
- One three-dimensional wooden house model (1.75 inches by 1.75 inches by 3.50 inches).
- Two clip-boards
- One pen

Materials not in use were placed out of the participants' sight but within reach of the investigator. Self-conscious efforts to conceal materials were avoided since this behavior might make the participant suspicious or apprehensive. Visual aids (4" x10" index cards with written instructions) were used to give instructions to all participants to help compensate for any hearing impairment.

Procedures:

After developing rapport with the participant and obtaining informed consent, the first drawing procedure began. Before beginning the first task, the first instruction card was presented and read out loud:

I will be asking you to create three drawings.

Give your best effort to each task.

Do you have any questions?

The investigator answered questions and used judgement in deciding if elaboration was needed. The first instruction card was then removed.

If participants wandered away or fell asleep during the task due to characteristics of dementia, this was noted. Participants were encouraged to complete the three drawing tasks. If the drawing tasks brought up uncomfortable feelings, the tasks were discontinued. The investigator handled the situation in therapeutic manner appropriate to the situation. The investigator noted the number of participants who were not approachable or not able to complete the tasks and possible reasons for each. Participants continued illustrations until

they felt that the tasks were completed to the best of their abilities. Length of time was not recorded.

First drawing task:

The investigator placed a blank sheet of white paper horizontally in front of the participant approximately two to three inches from the edge of the table, so the participant could look down on it. Eight colored markers were placed to the left of the paper on the table if the participant was right handed and to the right of the paper if the participant was left handed. If the participant had trouble reaching the markers, the investigator assisted the participant by moving the markers directly in front of the participant until the participant could reach the markers. If the participant could not decide on a color, the investigator stated:

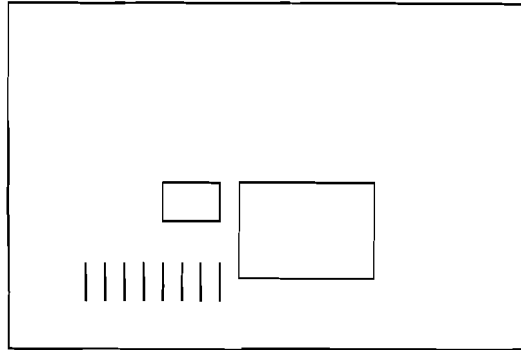
Tell me which colors you would like to use.

If the participant did not respond, the investigator stated:

Point to a color you like.

The investigator picked up the color the participant pointed to and placed it in front of the participant's hand only if it was obvious the participant could not pick up the object on his or her own.

A large print instruction card was placed to the side of the white paper. If the participant was right-handed, the instruction card was placed on the left side of the paper. The instructions were placed to the right if the participant was left-handed. The placement looked as follows for a right-handed person:



The investigator read from the second instruction card:

Draw a house including at least two sides of the house. Please draw until you feel the picture is finished. Tell me when you are through.

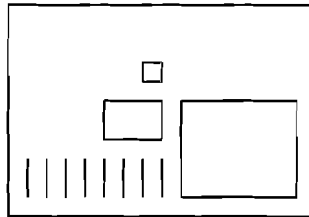
The investigator wrote notes on a separate sheet of paper on a clipboard indicating verbatim what colors the participant used, nonverbal responses, and verbal responses to the task. When the participant completed the first drawing task, the investigator removed the first drawing and instruction card.

Second Drawing Task:

A blank sheet of white paper was placed in front of the participant as before. A three-dimensional wooden house model was placed in front of the participant. If the participant was right-handed, the model was placed to the left of the paper. If the participant was left-handed, the model was placed to the right of the paper. A third large print instruction card was placed to the right or left of the drawing paper as before. Instructions were placed in front of the wooden house model house and were as follows:

Copy this model house including at least two sides of the house.

Please draw until you feel the picture is finished, and tell me when you are through.



The investigator took verbatim notes of colors used, verbal responses, and non-verbal responses to the task. When the second task was complete, the investigator removed the second drawing, the model, and the instruction card.

Third Drawing Task:

The investigator placed a blank white sheet of drawing paper in front of the participant as before. The first drawing task was repeated using the first task instruction card. At the completion of the drawing tasks, the participant was thanked and questions were answered. A code number matching the informed consent code number was written on the three drawings. The drawings were numbered indicating the order of the drawing tasks.

Appendix F

Kirk and Kertesz Scoring Criteria

Kirk and Kertesz Scoring Criteria

Items Rated on 0-3 Scale

Scale

0, normal

1, mildly abnormal

2, moderately abnormal

3, severely abnormal

___ Overlap

Tendency for separate drawings to be superimposed (single rating for all drawings)

___ Spatial relationships

Tendency for components of drawings to be put together abnormally with respect to one another in a piecemeal fashion, so that the whole picture is distorted, resembling an "exploded diagram"

___ Simplification

Tendency to oversimplify the drawing, leaving out details

___ Angle production

Difficulty forming angles with a tendency to represent them as gaps, scrawls, or curved lines

___ Perseveration

Tendency to redraw lines, parts of the drawing, or the entire drawing (drawing the same features more than once within a drawing)

___ Tremor

Tendency for lines to be shaky

___ Perspective

Tendency for three-dimensional perspective to be poorly represented

___ Overall impairment

Rating of each drawing as a whole

Items Rated on -3 to +3 Scale

Scoring system as above but with negative numbers indicating leftward error and positive rightward error.

___ Orientation

Tendency for drawings to be placed diagonally on the page. Sign indicates the side away from which the drawing leans

___ Neglect

Tendency for one side of the drawing to be incomplete or underdeveloped

___ Displacement

Tendency for drawings to be displaced toward one side of the page (single rating for all drawings)

Items counted

___ Details

Total number of details included (i.e., numbers, windows, etc.)

___ Details externalized

Number of details incorrectly placed outside rather than inside the outline of the drawing

___ Angles

Total number of angles drawn and percentage acute, right, and obtuse

___ Redrawn lines

Number of lines that have been overdrawn at least once

___ Line joining

Number of gaps separating lines that should meet

___ Line crossing

Number of crossings of lines that should just meet

___ Extras

Number of items spontaneously drawn in addition to those requested (single rating for all drawings)

Permission to Copy Page

I, Michelle Merkamp, hereby submit this thesis to Emporia State University as partial fulfillment of the requirements for an advanced degree. I agree that the Library of the University may make it available for use in accordance with its regulations governing materials of this type. I further agree that quoting, photocopying, or other reproductions of this document is allowed for private study, scholarship (including teaching) and research purposes of a nonprofit nature. No copying which involves potential financial gain will be allowed without written permission of the author.

Michelle D. Merkamp
Signature of Author

August 20, 1999
Date

Comparative Analysis of House Drawings in
Older Adults With And Without Dementia
Title of Thesis

Dorey Cooper
Signature of Graduate Office Member

August 20, 1999