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## Virtual (Digital) Hoarding in relation to Saving Cognition and Possession Tendency among Nursing Teaching Staff

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### Abstract:

**Background:** The collection of digital files to the point of loss of view is known as virtual hoarding, and it eventually leads to stress and disorganization. **Aim:** This study aimed to investigate the relationship between virtual hoarding, saving cognition and tendency to possession among nursing teaching staff. **Design:** A correlational descriptive research design was utilized. **Setting:** This study conducted at faculty of nursing, technical nursing institute (Assiut University), faculty of nursing and technical nursing institute (Sohag University). **Subjects:** Research involved all (a convenience sample=307) nursing teaching staff who are working in the previously mentioned settings and accepting to participate in this research. **Tools:** Data were collected through: Personal data sheet, The Digital Hoarding Questionnaire (section 1), Accumulation and storage behavior list (section 2), Saving Cognitions Inventory and Possession as self-extension tendency scale. **Results:** the most accumulated files used by participants were text files (84.4 %). There was statistically significant difference between saving cognition scale and digital hoarding. There was statistically significant difference between possession as self-extension scale and digital hoarding. **Conclusion:** saving cognition and possession tendency were predictor factors for digital hoarding. **Recommendations:** Strategies to Overcome Digital Hoarding as; The old account storm (Fish old accounts out by looking into trash folders, and as soon as find such an unused account, delete or unsubscribe from it), additional research could be focused on psychological intervention program for those with digital hoarding.

**Keyword:** *Saving Cognition, Tendency to Possession & Virtual Hoarding*

### Introduction:

Hoarding is a common and debilitating psychiatric disorder, characterized by the need to save possessions and strong emotional distress when discarding items regardless of their actual value **Yap1& Grisham (2019)**. According to psychiatry, Hoarding can be symptoms of underlying mental health issues including obsessive-compulsive disorder and attention deficit hyperactivity disorder, and it can also take the form of a separate condition termed hoarding disorder. **Frost et al., (2015)**. Hoarding disorder patients may accumulate anything, including trinkets, apparel, food, and pets. As their possessions overtake their living areas and make it difficult to organize and declutter, obsessive hoarders may experience significant distress. Hoarding Disorder focused on physical possessions, but a potential subtype of the disorder has been identified as individuals' ownership of digital possessions this subtype is named virtual (digital) hoarding **Hulber (2020)**.

A new sort of hoarding called "virtual hoarding" may have emerged as a result of advancing technology and the incalculable possibilities for virtual storage. Virtual hoarding is the accumulation of digital files to the point of loss of view, which eventually results in

stress and disorganization. Virtual hoarding has a significant impact on everyday life functioning even though it does not interfere with the cluttering of living places. **Bennekom, et al., (2015)**

Many concerns with data retention and distribution in personal and professional contexts can be radiated by virtual hoarding behaviors. Relatively speaking, some people hoard data for organizational or personal reasons to the point where they jeopardize their livelihoods and social life. However, some people's actions in evading using accepted organizational archiving procedures can result in greater overall losses for organizations. From a domestic and personal standpoint, choosing to amass thousands of files while ignoring copyright may contribute to eroding some of the social supports for the information economy and the funding of creative artists. **(Newman, 2013)**. Insights from hoarding of physical goods may help us to understand what is involved in the hoarding of virtual information **Oravec (2017)**.

Every day, more and more people amass virtual possessions. Virtual possessions are any personal digital artefacts that are saved on computers, phones, or other devices and include things like game accounts, pictures, music, e-books, emails, messages,

and movies. Virtual possessions are neither imaginary nor material but potentially contain aspects of both **Kubat (2018)**. Individuals have acquired a variety of virtual products, ranging from straightforward email address rosters to intricate fantasy sports lineups and incredibly detailed avatars. **Oravec (2015)**.

Despite the fact that their goods are unimportant, hoarders develop strong emotional links to them. Virtual possessions can be personalized and given symbolic meaning. Similar to traditional goods, virtual possessions can also lead to attachment. **Unanue et al., (2016)**.

Indeed, **Bardhi & Eckhardt (2017)** noted that liquid consumption also supports a flimsy commitment to virtual consumption, which is prized momentarily and for the access it offers. It is not necessary for attachment items to be highly valuable. Ordinary objects that develop personal significance over time may also serve attachment functions. Legal ownership is not necessary for attachment possessions, but psychological appropriation—the act of perceiving something as 'mine'—must take place before it can be considered an attachment. Once a possession has gained psychological appropriation, a connection to it develops, leading to the incorporation of the property into the self-concept. A crucial aspect of possession attachment is how much an item can serve as a representation of the self. **Atasoy & Morewedge (2017)**.

Some occupations may be more susceptible to virtual hoarding problems than others. According to research by **Holten, et al., (2016)**. Some jobs have indicated that hoarding data has become an interest. **Haddad & Toney-Butler, (2020)** state that nurses are the most prevalent group of practicing clinicians globally, making them the most major users of health technologies.

Technology continues to influence the nursing field and healthcare in some exciting ways. The use of technology by nurses in the fields of education and research is growing at an astounding rate. It is difficult to envision designing a course or class without considering how technology could be utilized to motivate students to study and achieve other educational objectives. **Zadvinskis, et al., (2018)**.

According to the most current Horizon Report<sup>1</sup>, there is a change occurring in higher education where students are learning through creation rather than by digesting knowledge that is presented by the teacher. Students engage in groups to solve problems, analyze cases, and discuss more complex nursing-related issues in an increasing number of nursing programmers. They produce multimedia content such as websites, podcasts, videos, and more. Together, they learn from one another, and they create learning-related products. The use of digital tools by Price and

colleagues<sup>2</sup> to enable students to write and share their tales on palliative care principles led to a thorough understanding of the topics. **Oermann, (2020)**.

### Significant of the study:

The features of IT and digital hoarding are basically discussed in the literature to determine work efficiency of professionals, company resources, and behaviors of consumer **Neave et al., (2019)**. But there are not enough studies to measure the digital hoarding behaviors in academics. Furthermore, it is critical that those struggling with hoarding issues have access to psychological therapy and counseling that may be able to reduce their distress or incapacity. Mislabeling hoarding can further alienate persons who are in need, are struggling, are frequently alone, and have little to no assistance. Acknowledging the very real difficulties that hoarders face may mean that some of the issues that affect motivation to change and participation in legal services can be addressed. If the person with hoarding difficulties feels they are heard and respected without judgment, therapeutic efforts may pay dividends **Holmes et al., (2015)**. So that, the study significance lies in identify the relationship between virtual hoarding, saving cognition and possession tendency among nursing teaching staff

**Aim of the study:** The study aimed to investigate the relationship between virtual hoarding, saving cognition and tendency to possession among nursing teaching staff.

### Subjects and Methods

#### Research design: -

A correlational descriptive research design was utilized. Aim to describe the mutual relationship between an independent variables (saving cognition and possession tendency) and a dependent variable (virtual hoarding) among the study's groups.

#### Research questions: -

- Q1:** What is the relationship between virtual hoarding, possession tendency and saving cognition?  
**Q2:** Does the digital hoarding conditions depend on the participants' possession tendency and their saving cognition?

**Research setting:** This study conducted at faculty of nursing, technical nursing institute (Assiut University), faculty of nursing and technical nursing institute (Sohag University).

**Subjects:** Research involved all (a convenience sample=307) nursing teaching staff who are working in the previously mentioned settings and accepting to participate in this research.

**Tools of the study:** Three tools were used to collect data of the study:

**Tool I: Personal data sheet:** it was developed by the researchers and involved the demographic

characteristics of the teaching staff. Such as age, gender, residence, occupation, and education level

**Tool II:** was developed by Neave et al., (2019) and has two sections:

**Section I: The Digital Hoarding Questionnaire (DHQ):** The questionnaire comprises 10 items aimed to assess the extent of digital hoarding and comprised two key factors, the first factor is difficulty deleting which provokes feelings of loss or stress when data is deleted and comprising 6 items (1, 3, 4, 5, 8&9). While, The second factor, "accumulation" indicates that mass collection of digital files is simply seen as the most practical and least effortless solution to managing data at scale and containing 4 items (2, 6, 7&10). Items were scored on a Likert-type scale from 1 (not at all) to 7 (very much so). The accumulating sub-scale scores ranged from (0-28). Difficulty deleting sub-scale scores ranged from (0-42). Higher score indicating greater hoarding behavior (less deleting activity).

**Reliability:** The internal consistency reliability of the (DHQ) scores was evaluated through Cronbach's coefficient alpha. It was 0.94, suggesting great reliability.

**Section2: Accumulation and storage behavior list:** is a list of common digital items person might currently have stored on computer/network drive (e-mail, text files, numerical files, presentation files and Photographs).

**Tool III: The saving cognitions inventory (SCI):** was developed by Steketee et al., (2003) used to assess beliefs of the participants about saving. It's a self-report measure containing 24 items and divided into four subscales: emotional attachment (10 items): 1, 3, 6, 8, 9, 10, 13, 16, 22, 23, control over possessions (3 items): 5, 18, 24, responsibility towards possessions (6 items): 2, 7, 11, 12, 15, 19 and memory concerns (5 items): 4, 14, 17, 20, 21. Respondents' rate on a Likert-type scale from 1 to 7 the extent to which they experienced each thought when attempting to discard an object. Total Score = Sum of all items, ranging from 24 to 168. The SCI has demonstrated good internal consistency. Internal consistency estimates were acceptable for all subscales  $\alpha = .93$

**Tool IV: Possession as self-extension tendency scale (Ferraro et al., 2011):** It is an 8-items self-report scale to measure the extent to which possession is related to the self is a critical determinant of whether possession is distressing if lost. The scale proposes a framework for understanding the formation of possession autocorrelation, arguing that the ability of possession to represent important areas on which a person bases their self-esteem influences possession autocorrelation. Also, it shows that propensity to incorporate possessions into the self

modifies this relationship, while the monetary value of the possession does not affect the strength of the autocorrelation of possession. This eight-item scale asked participants to respond to items to indicate a numeric percentage value between zero and 100, (0 = not at all true about me, 100 = completely true about me). High score revealed high attachment to possession. It has very good psychometric properties and excellent internal reliability in consistency in this study ( $\alpha = 0.91$ ).

#### **Validity of tools:**

A jury of three expertises in psychiatric and mental health nursing were asked to assess the importance and relevance of each item of scales. Also, they reviewed the tools for clarity, relevance, comprehensiveness, understanding and applicability. Corrections were done according to the modifications needed.

#### **Ethical consideration:**

- Research proposal was approved from ethical committee in the faculty of nursing Assiut University.
- There was no risk for study subject during application of the research
- The study was following common ethical principles in clinical research.
- Written consent was obtained from director of each place and oral from the patients that are willing to participate in the study, after explaining the nature and purpose of the study.
- Confidentiality and anonymity were assured.
- Study subject had the right to refuse to participate or withdraw from the study without any rational any time.
- Study subject privacy was considered during collection of data.
- All interviews were holed with prior appointment with the respondents.

#### **Pilot study:**

Pilot study was carried out before starting data collection on 10 % of nursing teaching staff to test the clarity, feasibility of the interview questionnaire and to estimate the time needed to fill it. They were excluded from the total sample. The necessary modifications were done in data collection.

#### **Procedure of data collection:**

After approval of the study by the Ethical Committee of the faculty of nursing and obtaining permission to proceed from the Deans of the Nursing faculties of both Assiut and Sohag. Participants were informed that completion of the study will be voluntary, the investigators met them individually and provide explanation about the nature and importance of the study outside of class time. Then, investigators distribute the study tools to gather the data and answer any question arising from participants. As the

researchers collect the study tools reviewed it for its competencies. Finally, participants were fully questioning and thanked for their participation. The data was collected four days a week for (3) months, from June to August 2021. Each interview took about 20 to 25 minutes.

### Statistical analysis

Data were fed to the computer and analyzed using IBM Statistical Package for Social Sciences (SPSS) software version 20.0. (Armonk, NY: IBM Corp). The qualitative data were

described using numbers and percents. While the quantitative data were described using range (minimum and maximum), mean, standard deviation. person correlation used to display the association between scores. Univariate and Multivariate Linear regression model for the effect of saving cognitions inventory and self-extension tendency on Digital Hording The significance of the results was judged at the 5% level. For detecting test-retest reliability of ordinal data, Kendall's tau and Spearman's rho were utilized, as well as Cronbach's coefficient alpha

### Result:

**Table (1): Distribution of Personal data for Studied sample (n=307)**

Items	No	%
<b>Age group</b>		
Less than 30 years	151	49.2
From 30-40 years	81	26.4
More than 40 years	75	24.4
<b>Mean <math>\pm</math>SD (range)</b>	<b>34.65<math>\pm</math>9.55(23-62)</b>	
<b>Gender</b>		
Male	18	5.9
Female	289	94.1
<b>Residence</b>		
Urban	223	72.6
<b>Rural</b>	84	27.4
<b>Education Level</b>		
Bachelor degree	140	45.6
Master degree	53	17.3
Doctoral degree	49	16
Assistant professor	37	12
Professor	28	9.1
<b>Years of experience</b>		
Less than 1 year	30	9.8
from 1-<5 years	103	33.6
from 5-<10 years	72	23.5
from 10-<20 years	56	18.2
More than 20 years	46	15.0
<b>Occupation</b>		
Professor	28	9.1
Assistant professor	37	12
Lecturer	49	16
Assistant lecturer	53	17.3
Instructor	65	21.2
Nursing specialist	75	24.4
<b>Place of work</b>		
Assiut University	207	67.4
Sohag University	100	32.6
<b>Does your current job role entail any responsibility for data protection?</b>		
No	30	9.8
Yes	277	90.2

**Table (2): Distribution of file types (accumulated or hoarded files) for Studied sample (n=307)**

File type	No	%
<b>Read emails currently in inbox</b>		
No	92	30.0
Yes	215	70.0
<b>Unread emails currently in inbox</b>		
No	128	41.7
Yes	179	58.3
<b>Emails currently in 'deleted' folder</b>		
No	222	72.3
Yes	85	27.7
<b>Emails in archived folders</b>		
No	187	60.9
Yes	120	39.1
<b>Text files. For example, word documents, reports, PDF's etc.</b>		
No	48	15.6
Yes	259	84.4
<b>Numerical files. For example, statistical data files, spreadsheets databases etc.</b>		
No	148	48.2
Yes	159	51.8
<b>Presentation files. For example, PowerPoint files, poster files etc.</b>		
No	104	33.9
Yes	203	66.1
<b>Photographs</b>		
No	122	39.7
Yes	185	60.3

**Table (3): Distribution of digital hoarding items for Studied sample (n=307)**

Items	Relative weight	Mean±SD	Ranking
I find it extremely difficult to delete old or unused files	0.42	2.94±1.83	8
I tend to accumulate digital files, even when they are not directly relevant to my job	0.37	2.59±1.57	9
Deleting certain files would be like deleting a loved one	0.44	3.1±1.81	6
If I delete certain files, I feel apprehensive about it afterwards	0.44	3.07±1.74	7
I strongly resist having to delete certain files	0.36	2.53±1.72	10
I feel strongly that some files might be useful one day	0.38	2.64±1.63	5
I lose track of how many digital files I possess	0.39	2.7±1.65	4
Deleting certain files would be like losing part of myself	0.58	4.05±1.73	1
Thinking about deleting certain files causes me some emotional discomfort	0.53	3.68±1.88	2
At times I find it difficult to find certain files because I have so many	0.51	3.59±1.8	3

**Table (4): Distribution of self-extension tendency items for Study sample (n=307)**

Items	Relative weight	Mean±SD	Ranking
I have a special bond with my favorite possessions.	0.65	4.58±2.09	2
I consider my favorite possessions to be a part of myself.	0.61	4.26±2.09	3
I often feel a personal connection between my special possessions and me.	0.60	4.19±2.12	4
Part of me is defined by the special possessions in my life.	0.57	3.97±2.08	8
I feel as if I have a close personal connection with the possessions I most prefer.	0.58	4.09±2.12	7
I can identify with important possessions in my life.	0.66	4.61±2	1
There are links between my special possessions and how I view myself.	0.59	4.1±2.09	6
My favorite possessions are an important indication of who I am.	0.60	4.2±2.15	5



**Table (5): Descriptive of saving cognitions inventory scale for Study sample (n=307)**

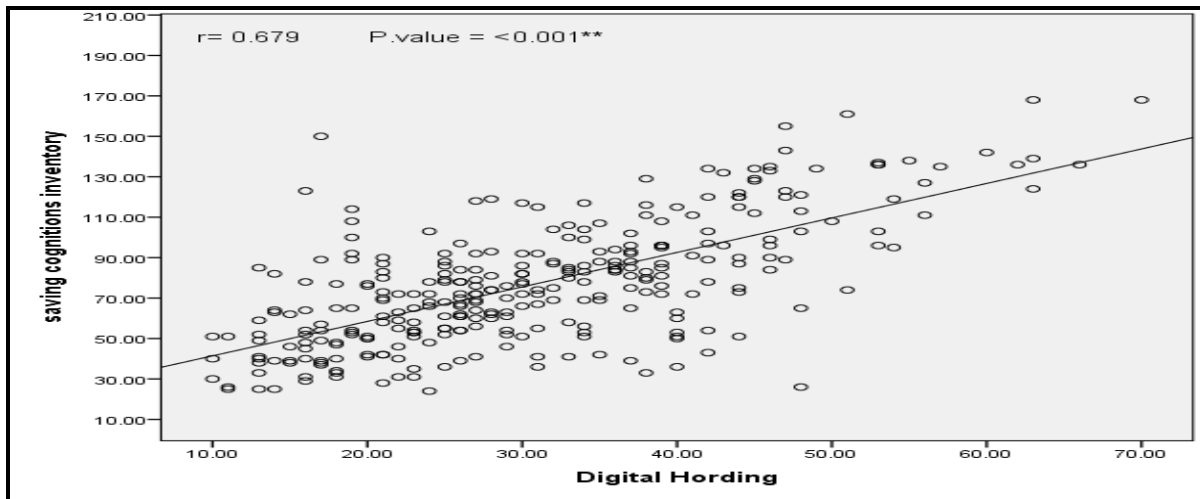
Sub-scale	Max Score	Mean±SD	Range
Emotional attachment	70	27.95±13.89	10-70
Responsibility towards possessions	42	20.65±7.99	6-42
Memory concerns	35	16.67±6.71	5-35
Control over possessions	21	11.79±4.87	3-21
<b>Saving cognitions inventory</b>	<b>168</b>	<b>77.06±30.23</b>	<b>24-168</b>

**Table (6): Univariate and Multivariate Linear regression model for the effect of saving cognitions inventory and self-extension tendency on Digital Hoarding**

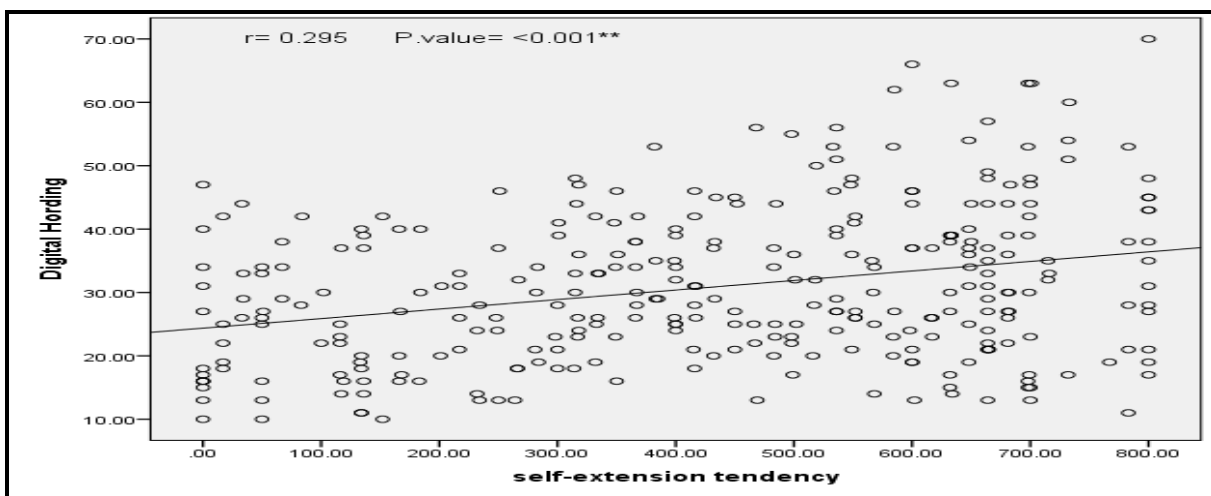
	Digital Hoarding					
	Univariate			Multivariate		
	Beta	T	Sig.	Beta	t	Sig.
Saving cognitions inventory	0.679	16.162	0.000**	0.692	14.556	0.000**
Self-extension tendency	0.295	5.388	0.000**	-0.027	-0.573	0.567

Dependent variable is Digital Hoarding

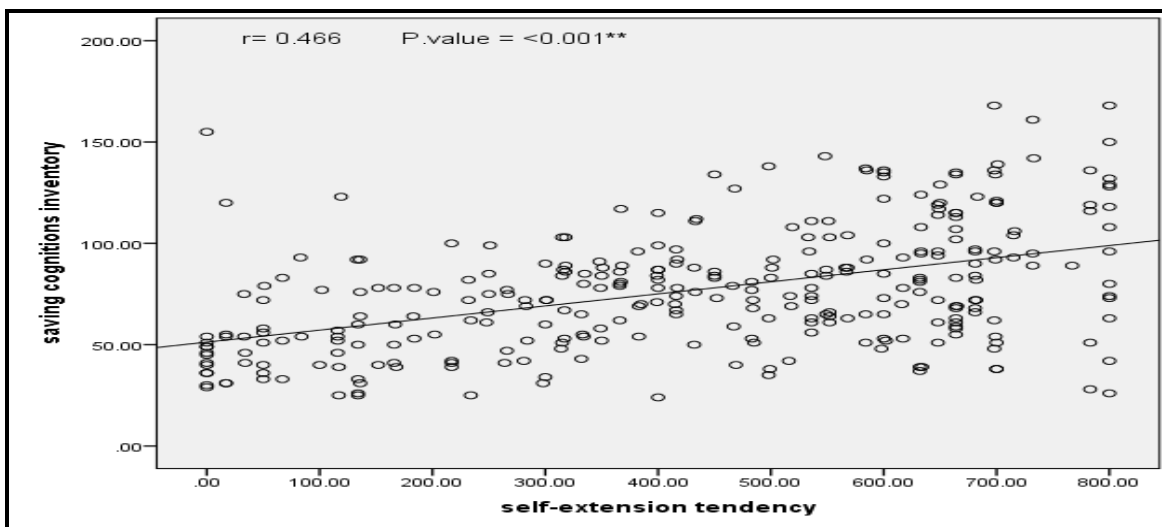
\*\*statistically Significant Factor at P. value <0.01



**Figure (1): Correlation between Digital Hoarding and Saving Cognition among studied sample**



**Figure (2): Correlation between Digital Hoarding and Self-extension tendency (possession) among studied sample**



**Figure (3): Correlation between Saving Cognition and Self-extension tendency (possession) among studied sample**

**Table (1):** The present table reflects that; approximately, half of study sample were less than 30 years while about quadrant of them were more than 40 years (49.2%, 24.4%) respectively, the main age of study sample ( $34.65 \pm 9.55$  (23-62)). in relation to gender the majority of the sample were females (94.1%), as for the residence of the participants, about two third were from urban area (72.6%). Regarding place of work (67.4) from Assiut while (32.6%) were from Sohag. In relation to the role of job responsibility for data protection the majority of studied person (90.2%) were have job responsibility for data protection.

**Table (2):** Reveals that, the most accumulated files used by participants were text files followed by emails currently in 'deleted' folder then unread email inbox messages (84.4%, 72.3%, & 70%) respectively.

**Table (3):** Examining of the digital hoarding scale reveals that, "Deleting certain files would be like losing part of myself" and "Thinking about deleting certain files causes me some emotional discomfort" were ranked descendingly as the first two most cause of digital hoarding among studied sample " (Mean $\pm$ SD= $4.05 \pm 1.73$  &  $3.68 \pm 1.88$ ). While, the item "I strongly resist having to delete certain files" (Mean $\pm$ SD=  $2.53 \pm 1.72$ ) was ranked as the last cause of digital hoarding as perceived by studied sample.

**Table (4):** Demonstrates that, the theme "I can identify with important possessions in my life" ( Mean $\pm$ SD = $4.61 \pm 2$ ) was ranked as number one which reflected how possessions play an important role in defining an individual's identity and making them feel 'relevant and valuable. ', followed by the theme "I have a special bond with my favorite possessions" (Mean $\pm$ SD= $4.58 \pm 2.09$ ) which conveyed to what

extend possessions served as a touchstone of self-confidence, reminders of unique interests and, sometimes, formed physical extensions of self-concept. But "Part of me is defined by the special possessions in my life" was ranked as the last theme.

**Table (5):** Participants' emotional attachment had the highest mean score on the saving cognition subscale (27.95 13.89), followed by their responsibility towards possessions ( $20.65 \pm 7.99$ ) among participant.

**Table (6):** The sign of a linear regression coefficient illustrates that, there are positive correlation between each saving cognition, possession as self-extension tendency and digital hoarding. A positive coefficient indicates that as the value of the independent variables increases (saving cognition & possession as self-extension tendency), the mean of the dependent variable (digital hoarding) also tends to increase (*P. value*  $\leq 0.000^{**}$ ).

**Figure (1):** This figure depicts that, there is a proportional relationship between digital hoarding and saving cognition ( $r = 0.679$ ) with (*P. value*  $\leq 0.001^{**}$ ) which means increase digital hoarding with increasing saving cognition.

**Figure (2):** This figure conveys that, there is a positive correlation between digital hoarding and possession as self-extension tendency ( $r = 0.295$ ) with (*P. value*  $\leq 0.001^{**}$ ). This result suggested that increasing self-extension tendency (possession) leading to accumulation of different files.

**Figure (3):** Represents that, there is statistically significant positive correlations between saving cognition scale and possession as self-extension tendency scale ( $r = 0.466$ ) with (*Pvalue*  $\leq 0.001^{**}$ ). Result reflected that, more of saving cognition associated with more of possession tendency.

## Discussion

The present study is aimed to investigate the relationship between virtual hoarding, saving cognition and tendency to possession among nursing teaching staff. The following discussion will focus upon the findings related to the aim of the study.

As regard distribution of file types (accumulated or hoarded files) for Studied sample the results of the present study revealed that, the most accumulated files used by participants were text files followed by emails currently in 'deleted' folder then unread email inbox messages.

In partial agreement with the present results, **Tugtekin, (2022)** when examining the density of files accumulated by the participants according to the file types, it was found that the majority of the participants collected the most photos, videos, and e-mails. This could be explained by that, the nature of the work of the group participating in the research and their interesting direction for future research as this text files may be helpful.

In relation to examining of the digital hoarding scale, the finding of the present study revealed that, "Deleting certain files would be like losing part of myself" and "Thinking about deleting certain files causes me some emotional discomfort" were ranked descendingly as the first two most cause of digital hoarding among studied sample " (Mean±SD=4.05±1.73&3.68±1.88) respectively. While, the item "I strongly resist having to delete certain files "(Mean±SD= 2.53±1.72)" was ranked as the last cause of digital hoarding as perceived by studied sample. This might be due to the social cognitive theory of mass media which proposed that dispositional greed strengthens user's' motivations to accumulate digital files moreover high levels of dispositional greed may lead users to desire to preserve what they have. The study by **Vitale et al. (2018)** in this regard claimed that both hoarders and minimalists were identified and questioned. Those with hoarding tendencies reported their attitudes and actions. The more emotional aspects of hoarding, such as feeling upset at the notion of "letting go" of particular files, were discussed, and these tend to be files with more sentimental significance, such images. They also talked about the propensity to keep documents because they might be important in the future, which is more in line with our "accumulating" aspect.

On other hand a survey of 2,000 Americans Conducted by **OnePoll (2021)** on behalf of Western Digital **found that**, one-quarter of participants' data storage is made up of old, unnecessary files, (35%) of respondents said they consider their old files memories that they don't want to lose. Another 32% said they consider clearing out old files to be a boring

chore, and 26% feel too guilty about deleting their old files. However, 24% also said they often feel stressed by the amount of old data sitting on their phones, and 21% believe all that hoarding has a negative impact on their overall wellbeing

**Schiele & Hughes, (2013)**. Noting that, the study finding displayed how possessions play an important role in defining an individual's identity and making them feel 'relevant and valuable. Furthermore, possessions served as a touchstone of self-confidence, reminders of unique interests and, sometimes, formed physical extensions of self-concept. In accordance, the result of **Thorpe et al., (2019)** study suggested that, individuals can become as so attached to digital possession as do with physical possessions as they become part of their identity and sense of self. Additionally, **David & Norberg, (2022)** postulated, that loss of possession even digital were equivalent to loss of identity. It appears that uncertainty about self may lead some individuals to rely on possessions for their self-identification, which can lead to feelings of vulnerability when separated from their possessions. In the same line **Saunders et al., (2019)** proposed that, some hoarder people believed that their entire life is on their personal computers and these represent a part of self-identity.

According to the current research, emotional attachment had the highest mean score on the saving cognition subscale (27.9513.89), followed by responsibility for one's property (20.657.99). The study by **Pardini et al., (2023)** in this regard focused on the cognitive and emotional processes that were connected to the discarding behaviors in hoarding disorder patients. In order to prevent bad thoughts and feelings, possessions are purchased and kept. People may get more attached to their goods than other people due to negative attitudes and emotional attachment. Moreover **Zidariu & Dobre (2020)** founded that, hoarders feel a sense of responsibility toward digital files because these files could be important and useful in the future.

According to the current data, there was a strong correlation between digital hoarding and saving cognition ( $r= 0.679$ ;  $P$  value  $0.001^{**}$ ), which suggests that as saving cognition scores rise, so does digital hoarding.

This finding is consistent with research conducted by **Faraci, et al. in 2020** who examined the psychometric properties of the Saving Cognition Inventory and discovered a strong and favorable connection between SCI (Saving Cognition Inventory) scores and the other measures of hoarding severity. According to **Sayied & Khalifa (2019)** Egyptian study, saving cognition was a strong predictor of hoarding symptoms. The same authors discovered that the other predictor factors, most likely



conserving cognition, which was especially significantly correlated with experiential avoidance and difficulty discarding, may better explain the zero order link between these two phenomena. As regard correlation between digital hoarding and possession as self-extension tendency, the finding of the present study revealed that, there was a positive correlation between digital hoarding and possession as self-extension tendency ( $r= 0.295$ ) with ( $P. value \leq 0.001^{**}$ ). This result suggested that increasing self-extension tendency (possession) scoring, leading to accumulation of different files or hoarding behavior.

These findings corresponded with the study of **Cushing, (2021)** who stated that, Self-extension of possessions can influence personal behavior and therefore may influence the maintaining behavior, actions associated with the long-term preservation or preservation of personal information. In addition, **Sayied & Khalifa (2019)** stated that, Possessions often represent past events. Deleting them feels like losing part of the self or one's life. Possessions also become sources of comfort or safety, and their removal results in feelings of vulnerability.

The present finding illustrated that, there was positive statistically significant correlations between saving cognition and possession as self-extension tendency this explained by that, emotional attachment which considered as one aspect of cognitive saving scale leads to accumulation of files or increase tendency to possess files. This finding congruent with **Thorpe et al., (2019)** who formulated the cognitive behavioral model of physical hoarding has been postulated that, emotional attachment to and beliefs about object, vulnerable factors to information possession styles. **Also, Girts, (2019)** recommended that, the inability to discard files derived from the belief or thought that, possessions of no use must be saved.

According to the relation among saving cognition, possession as self-extension tendency and digital hoarding it was observed that, there were positive correlation between the three variables. This explained by that, the personal cognition is responsible for possession tendency which led finally to hoarding behavior. This consistent with **Alon et al., (2019)** who pointed out the predicted factors to hoarding digital files were saving cognition and tendency to excessively accumulate files in personal advices as safe storage for their files.

### Conclusion:

Saving cognition and possession tendency were predictor factors for digital hoarding

### Limitations of the study

This study has some limitations:

1. Some respondents may be aware that their activity is not necessarily "hoarding", they may have participated in a study researching digital hoarding with potential bias of offering the perspective of a digital hoarder.
2. It is unclear whether some of the responses come from potential pathological hoarders or not.
3. This study could not draw comparisons from a wider feature pool. As, hoarding disorder is a well-researched condition that can provide insights into the symptoms, features and assessment of individuals with hoarding tendencies but can't differentiate collectors from compulsive hoarders.

### Recommendations:

1. Strategies to Overcome Digital Hoarding as; The old account storm (Fish old accounts out by looking into trash folders, and as soon as find such an unused account, delete or unsubscribe from it))
2. Additional research could be focused on psychological intervention program for those with digital hoarding.
3. We hope that scientific attention will be paid to further researches to explore of the psychological mechanisms underlying digital hoarding behavior.

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