

**EFFECTS OF AGING-RELATED STEREOTYPE CONSISTENCY ON
FALSE MEMORY CONSTRUCTION AND MEMORY PERFORMANCE**



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**EFFECTS OF AGING-RELATED STEREOTYPE CONSISTENCY ON
FALSE MEMORY CONSTRUCTION AND MEMORY PERFORMANCE**

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

Effects of Aging-Related Stereotype Consistency on False Memory Construction and Memory Performance

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The present study investigated the effects of consistency of information with aging-related stereotypes on false memory construction and memory performance. Information consistency modulates attentional allocation which then influences encoding and retrieval processes. The unexpectedness of stereotypically-inconsistent information was hypothesized to attract more attention than stereotypically-consistent information and enhance memory. Eighty-eight young adults aged between 18 and 28 were randomly assigned to either the stereotype-consistent or the stereotype-inconsistent passage conditions. The passages described a protagonist and a criminal event. The protagonist was a young adult in the stereotype-consistent condition and an elder in the stereotype-inconsistent condition. Misleading information was provided after the passage. After a four-minute filled interval, participants first completed the recall test in which they had to retrieve the exact sentences from the passage. Afterwards, they completed a forced-choice recognition test in which they chose the presented sentences out of four alternatives. Results revealed that, the participants in the stereotype-consistent condition were more likely to assimilate the misleading information in the recognition test and they had lower overall recognition for the sentences in the passage than the participants in stereotype-inconsistent condition. Recall performance of participants did not differ across the groups. The results partially suggest that stereotypically-inconsistent information is resistant to reconstruction and it is more likely to be remembered accurately. The results are

discussed within the framework of fuzzy-trace theory and in relation to the findings in the memory and aging literature.

Keywords: Aging, Ageism, Stereotype, False Memory, Misinformation Effect



ÖZ

Yaşlanmaya İlişkin Stereotiplerin Uyumluluğunun Bellek Hatası Oluşumu ve Bellek Performansına Etkisi

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Bu çalışmanın amacı yaşlılık stereotiplerinin uyumluluğunun bellek hatası oluşumu ve bellek performansı üzerindeki etkilerini incelemektir. Bilginin beklentilerle uyumluluğu dikkat süreçlerini etkileyerek, bilginin belleğe kodlama ve bellekten geri çağırma süreçlerini etkiler. Bu araştırmanın hipotezi, stereotiplerle beklenmedik şekilde uyumsuz bilgilerin, stereotiplerle uyumlu bilgilere göre daha fazla dikkat çekip daha iyi bellek performansı ortaya çıkaracağı yönündedir. Yaşları 18 ile 28 arasında 88 katılımcı, stereotiplerle uyumlu ve stereotiplerle uyumsuz paragraf koşullarından birine tesadüfi olarak atanmıştır. Paragrafta bir ana karakter tasvir edilmiş ve suç içeren bir olay betimlenmiştir. Ana karakter paragrafın stereotiplerle uyumlu olduğu koşulda bir genç yetişkin, stereotiplerle uyumsuz olduğu koşulda bir yaşlıdır. Paragraftan hemen sonra katılımcılara paragraf ile ilgili yanlış bir bilgi verilmiştir. Ardından dört dakikalık bir boşluk dolduran görev tamamlanmıştır. Sonrasında katılımcılardan serbest hatırlama görevinde paragrafın cümlelerini bire bir yazmaları istenmiştir. Ardından, zorunlu seçmeli tanıma testinde katılımcılar paragrafta verilen cümleyi dört şık arasından seçmiştir. Bulgular, tanıma testinde stereotiplerle uyumlu koşuldaki katılımcıların yanlış bilgiyi daha fazla benimseyip bellek hatası oluşturduğunu ve paragraftaki cümleler için tanıma performansının stereotiplerle uyumsuz koşuldaki katılımcılara göre daha düşük olduğunu göstermiştir. Gruplar arasında hatırlama performansında farklılık gözlemlenmemiştir. Bu sonuçlar, stereotiplerle uyumsuz bilgilerin yeniden

yapılandırmaya daha dirençli olduğunu ve daha doğru hatırlandığını göstermektedir. Sonuçlar, bellek ve yaşlanma literatürü ile bağlantılı olarak ve belirsiz iz kuramı çerçevesinde değerlendirilmiştir.

Anahtar Kelimeler: Yaşlanma, Yaş Ayrımcılığı, Stereotip, Bellek Hatası, Yanlış Bilgi Etkisi





To mom & dad and my darling Ömer

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Chapter 1

Introduction

1.1 Stereotypes

According to Bartlett's Schema Theory (1932), individuals search for information that fits their schemas and remember it better. General knowledge is shaped by the social groups that individuals have a commitment to. Furthermore, members of social groups have common predispositions such as, similar ideals and interests that results in cognitive biases and shapes members' perception, comprehension, retrieval, and reconstruction of information. Thus, prior schema affects individuals' cognition (W. F. Brewer & Treyens, 1981). Such schemas are useful since the world around us is too complex to process by every single detail. An instance of social schemas, stereotypes (Hamilton & Troler, 1986), are regarded as energy saving since they enable individuals to simplify information processing (e.g. Gilbert & Hixon, 1991; Macrae, Milne, & Bodenhausen, 1994). Stereotypes are ones' beliefs, knowledge, and expectations regarding a social group (Hamilton & Sherman, 1994). Because stereotypes are automatically activated, it is easy to access stereotypic information in face of unknown individuals (Devine, 1989; Pratto & Bargh, 1991).

Since individuals are limited in their cognitive resources when dealing with incoming information consciously (Miller, 1956), cognitive economy is a determinant of stereotyping (Sherman, Macrae, & Bodenhausen, 2000). Thus, by the use of stereotypes, instead of recognizing every individual in terms of their specific traits, it is easier to organize information about unknown individuals by considering important aspects of their identity. Social group membership, which often represents central aspects of individuals' identity, often yields such key information (Tajfel & Turner, 1986). Therefore, with directing attention, individuals select what information to process from the environment, which is a crucial ability to control limited cognitive resources (Lindsay, 2020).

1.2 Stereotype Consistency and Attentional Allocation: A Theoretical Debate

There is an ongoing debate regarding whether stereotypes guide attention towards either stereotype-consistent information or stereotype-inconsistent

information. On one side, Schematic filter models claim that, attentional filters are biased towards retrieving stereotypically-consistent information in both recall and recognition tasks to economize cognitive resources, since such information is easier to comprehend (Hamilton & Sherman, 1994; Sherman, Lee, Bessenoff, & Frost, 1998; Stangor & McMillen, 1992). Because of individuals' tendency to preserve their cognitive resources, stereotypically-inconsistent information may be difficult to process by relying on more resources. As a result, stereotypically-inconsistent information is prone to be neglected as schematic filter models assume. On the other hand, the memory literature predicts that, stereotypically-inconsistent information gets more attention than stereotypically-consistent information (e.g., Schank & Abelson, 1977) and the information that receives more attention is better encoded in memory (Chun & Turk-Browne, 2007). The argument is that, information that does not fit with individuals' expectation needs to be processed thoroughly because of its difficulty in comprehension (Hastie, 1980; Srull, 1981). Moreover, Script Pointer + Tag (SP + T) model (Woll & Graesser, 1982), proposes that, stereotypically-consistent information can be coded as merely a generic example of expectancy with a script pointer, whereas stereotypically-inconsistent information needs to have a unique code (a tag) because it violates expectancies that stem from prior knowledge. Therefore, for the construction of a unique code, individuals need to attend the information more. Meanwhile, Associative Network (AN) model, firstly proposed by Hastie (1980) as a model of social memory and expanded by Srull and Wyer (1989), is a common ground of SP + T model and Schematic filter models. It proposes that, information that is consistent with a target social group is more strongly associated in memory that leads to enhanced remembering, which is in line with schematic filter models. It also predicts that, stereotype-inconsistent information is processed comprehensively, rather than being ignored as schematic filter models assume, and such an elaboration of inconsistent information leads to enhanced memory as SP + T model predicts. According to AN model, which information, either stereotypically consistent or inconsistent, result with a greater remembering depends on to what extent the inconsistent information is elaborated. If inconsistent information is subjected to extensive processing in order to make sense of it, it stands out more in memory than consistent information; however, if that is not the case, consistent information results in better memory. Thus, AN model

assumes that, both stereotypically-inconsistent and stereotypically-consistent information may be well recalled depending on the condition. These particular opposite perceptions may stem from the notion that, social information is processed unequally by highlighting some information more (Stangor & McMillan, 1992). By processing differential details about the social world, every individual may encode divergent information, which in turn, may have an effect on the retrieval processes. These theoretical propositions have been discussed in recent research.

1.3 Stereotype-Consistent Information Processing

Because stereotypes are well-structured social schemas, superficial or less controlled processing of incoming social information can be enough which, in turn, can result in an overreliance on already existing stereotypical information (Araya, Akrami, & Ekehammar, 2003). In accordance, incoming stereotype-consistent information can be fitted in those already existing schematic social knowledge structures, which creates an integrative memory (Macrae, Bodenhausen, Milne, & Ford, 1997). Therefore, that well-established memory linkages regarding stereotype-consistent information dominates individuals' memory systems. Such a dominance of stereotypical information may be one of the reasons that stereotype activation happens in an automatic manner (Monteith, Woodcock, & Gulker, 2013). Such an issue is also emphasized by Dorrough, Glöckner, Betsch, and Wille's research (2017), in which, participants selected products out of four categories which fit stereotypically either with women (hand lotions and flutes) or with men (soccer balls and saws) as products. Those products were recommended by eight hypothetical product testers as targets who were distributed equally to sexes. Participants were asked to select one product out of two. Moreover, they were told that they could make their selection based on the recommendations of testers. There were four testers for each product who were identified by either a male name or a female name half-and-half in order to activate stereotypical knowledge from memory. Accordingly, researchers found that, participants selected the products when the type of product (male product vs. female product) was congruent with the sex of target who was recommending the product (e.g., hand lotions were preferred in a greater extend when it was recommended by a female tester). In other words, a reliance on a congruency between type of product and the sex of the tester (e.g., when selecting a male product, male testers' ratings become

more superior over women testers' ratings) was observed. Moreover, before the selection phase of the experiment, researchers aimed to pre-activate stereotype knowledge by asking half of the participants to rate the trustworthiness of testers with male or female names. Participants in pre-activation condition experienced more intrusion of stereotypical knowledge during product selection than the participants who were not involved in pre-activation. Thus, with the greater accessibility of the stereotypical knowledge from memory, intrusion with stereotypes was found to increase during the product selection. Researchers interpreted their results as an indication of memory-based source for information intrusions subserved by dominant stereotypical knowledge. This finding suggests the automatic processing and the dominance of stereotypically-consistent information in memory. Such a dominance of stereotypically-consistent information may stem from the established associations of existing knowledge, and in turn, may facilitate its retrieval.

1.4 Stereotype-Inconsistent Information Processing

What about the processing of stereotype-inconsistent information? Research suggests that, information that is inconsistent with expectations is likely to take more time to process than information that is expected (Sherman et al., 1998). Thus, within the context of stereotypes, individuals seem to elaborate more on stereotypically-inconsistent information and construct more interitem associations in memory (Araya et al., 2003). That fits with above discussed standpoint of memory literature, SP + T model, which assumes a comprehensive processing of inconsistent information to form a unique code, and the AN model's prediction that stereotypically-inconsistent information is processed elaborately in order to make sense of it. However, instead of adopting such effortful processing in face of an unknown individual, De Neys, Vartanian, and Goel (2008) showed that, individuals rely on intuitions and stereotypes. Thus, speed of processing for consistent information outpaces the speed of inconsistent information which may lead to an overreliance on consistent stereotypical information over non-stereotypical information. Such a notion was supported by previous research which examined White American participants' response speed in a task where participants were required to identify Black versus White faces and pleasant vs. unpleasant words in an Implicit Association Task (IAT; Amodio & Devine, 2006; Nosek, Greenwald, & Banaji, 2007). Response keys were either paired with faces and

words in a consistent way to stereotypes White Americans hold for Blacks (i.e. Black – unpleasant and White – pleasant) or in an inconsistent way (i.e., Black – pleasant and White – unpleasant). It was shown that, White Americans’ responses were faster when Black faces were paired with unpleasant words than pleasant words. However, high speed of information processing may lack detail and encoding efficiency and may result in a lack of memory of consistent information. This was what Araya and colleagues discovered in their research where they investigate the effect of directed-forgetting on stereotypically consistent, inconsistent and irrelevant information after they primed social categories as in-group and out-group. Accordingly, they found out that, directed-forgetting effects show up for stereotype-consistent and irrelevant information but not for stereotype-inconsistent information. They claimed that, this was a result of processing stereotypically-inconsistent information more elaborately. Since individuals attend to the gist of the information in the stereotype-consistent condition, a directed-forgetting effect was observed because individuals did not attend to such consistent information and thus they did not elaborately encode it. Considering all of these, due to the automatic processing of consistent information, encoding may not be efficient, which in turn, would affect retrieval adversely.

1.5 False Memory Construction and Memory Performance Within the Scope of Stereotype Consistency: Empirical Findings

False memories include the recollection of events and information that is not actually experienced (Gleaves, Smith, Butler, & Spiegel, 2004). Within the context of the theoretical debate, it is reasonable to expect stereotype consistency to affect false memory construction. This expectation is also supported by several studies (e.g., Neuschatz, Lampinen, Preston, Hawkins, & Toglia, 2002).

A milestone study which showed a direct effect of schematic knowledge on memory was carried out by Sulin and Dooling (1974). In their research, they provided participants with two biographical passages that were identified with a famous character which was also used for a fictitious character. As famous characters, they used Adolf Hitler and Helen Keller whose names were in another condition substituted by fictitious, non-famous characters by keeping biographical passages the same. Although passages involved true assertions regarding the historical character, each sentence was low in thematic relatedness (e.g., “He confronted these groups directly

and so silenced them” from the passage Adolf Hitler). Then, they constructed a key sentence that is the alternate version of one of the original sentences. The key sentence was same with original sentence in terms of grammatical order. However, unlike the original sentence, the key sentence was high in thematic relatedness according to a well-known central feature of the famous characters (e.g., “He hated the Jews particularly and so persecuted them.” from the passage Adolf Hitler). For the recognition tests, participants were provided with the exact same passages except that the original sentence was switched with the key sentence that matched the prior knowledge about the famous character. Afterwards, participants were asked to rate each sentence indicating whether it was *exactly the same as*, *slightly different from*, or *very different* from the sentence that was shown initially. It was discovered that, participants were inclined to falsely remember the highly thematic key sentence in place of the low thematic original sentence only for famous characters, not for non-famous fictitious characters. That is assumed to be because they were more likely to rely on their existing knowledge. Such a result is in line with the explanations of Araya and colleagues (2003), individuals attend to the gist of information when they have a schema about the information presented; therefore, they may neglect the details the information.

Regarding the effect of stereotype consistency on memory, it is crucial to consider Kleider, Pezdek, Goldinger, and Kirk’s (2008) research. In their research, they delivered participants stereotype-consistent or stereotype-inconsistent photographs where a woman and a man displayed actions either in the kitchen or in the backyard of a home. The man was depicted as a handyman working at home, which was stereotypically supported with his clothes and most of his actions. Meanwhile, the woman character’s clothes and most of her actions gave the impression that she was a homemaker living at home. While some of the actions were consistent with both of the characters’ depictions (e.g., woman mixing cake, sweeping the floor; man tightening hinges on a cabinet, using wrench), others were inconsistent (e.g., woman hanging a tool belt on a chair; man opening a can of frosting). Photographs were presented sequentially and for the kitchen scene there was equal number of consistent and inconsistent actions with six role-neutral actions (e.g., drinking water) for both actors. However, for the backyard scene, there was only stereotype-consistent actions for both

actors in order to reinforce stereotypic roles (e.g., woman playing with the child; man fixing play equipment). After the presentation of scenes, participants completed a distraction task. Then, participants took a memory test for the given photographs either immediately or two days later. Memory test included the original actions and foils that were either consistent with a typical handyman or with a typical homemaker. Accordingly, participants were asked to indicate whether the statement was describing an old action that was seen before or a new one. If old was selected, participants were further asked to indicate who was the character exhibiting the action and to make a remember/know judgment (see Tulving, 1985). Accordingly, researchers showed that memory was better for stereotype-inconsistent actions than stereotype-consistent ones when the memory test carried out immediately. However, participants who took the delayed test revealed more memory errors by source misattributions to actions. Researchers interpreted the results as an indication of overreliance on schematic knowledge when memory fades in time. Additionally, new statements were less likely to be indicated as old when the test was taken immediately than in the delayed test. Interestingly, source misattributions were observed regardless of the retention interval where source attributions were made in a stereotype-consistent manner. This result indicates that, sources of falsely remembered actions were determined by reliance on existing schemas. In the second experiment, they also searched for the effect of misleading suggestion on memory. They kept the materials and the procedure exactly as their first experiment except an inclusion of a suggestion phase before the memory test. The suggestions were either stated new actions that were not in the original sequence or old actions. While new action suggestions included stereotype-consistent, stereotype-inconsistent or neutral actions (e.g., ‘*Someone* hammered a nail.’), old actions were introduced either as old actions done by opposite actors or action in a neutral form. Accordingly, they discovered that the misleading suggestions had less effect when the memory test was carried out immediately than when delayed memory test was conducted. Moreover, when participants received new consistent or neutral suggestion, they revealed a higher tendency to falsely recall the not existing suggestion in a stereotype-consistent manner compared to inconsistent suggestions. Thus, individuals’ source attributions were consistent with existing schemas. This result may be an indication of the dominance of stereotypically-consistent information in memory

especially when actual memory traces cannot be reached because they fade over time as it was evident in Kleider and colleagues study (e.g., delayed memory test). However, their research also infers that stereotype-inconsistent information becomes prominent over stereotype-consistent information especially in an immediate memory test. Thus, it may be concluded that recently encountered stereotype-inconsistent information stands out in memory as it is unexpected and needs thorough processing to make sense, which is especially in line with the suggestion of SP + T model. However, in time, because stereotypically-consistent information becomes part of already existing schemas, such information can be easily fitted into memory and facilitate remembering as one of the predictions' of AN model.

1.6 Stereotypical Information Processing and Fuzzy-Trace Theory

It is important to consider the assumptions and predictions of the fuzzy-trace theory (FTT; Brainerd & Reyna, 2002) due to its explanations of memory errors. FTT provides a basis to interpret the underlying mechanism behind the aforementioned research results and the assumption of Araya and colleagues' (2003) regarding the tendency of gist processing in the face of stereotype-consistent information. According to the theory, memory traces are differentiated as two types: While verbatim traces are precise representations of memory, gist traces are meaning-oriented summarized memory representations. FTT suggests that, retrieving the gist of information make individuals to be more prone to false memory construction, whereas being able to retrieve the verbatim information inhibits memory errors. If stereotype-inconsistent information receives more attention due to its unexpectedness which, in turn, ease the retrieval processes of inconsistent information (W. F. Brewer & Treyens, 1981), stereotype-inconsistent information may be processed in a verbatim manner and that, in turn, can decreases false memory construction. In contrasts, well-established schematic structures need less processing; therefore, enable individuals to rely on existing knowledge, like stereotypes (Araya et al., 2003). In consequence, individuals may block incoming information in order to lower its allocation in cognitive system and just encode and remember the gist of information when the information is stereotypically-consistent (von Hippel, Narayan, Jonides, & Hilton, 1993). Thus, relying on only the gist of information may lead memory errors. This has a similar sense with Bartlett's (1932) attribution of memory errors in story recall to schemas

which serves as a general knowledge structure. Similarly, Pickrell, Bernstein, and Loftus (2004) stated that, schematic knowledge structures give way to what individuals pay attention to. They further indicated that, because existing knowledge enables individuals to not attend every single detail from the environment, the use of schematic information has a potential to distort memory, whereas because of the uniqueness of unusual or unexpected information, like stereotypically-inconsistent information, such information encoded in a more efficient manner. As a result, it is reasonable to expect that stereotypically-inconsistent information would be retrieved in more verbatim manner, and that it would be less prone to memory errors than stereotypically-consistent information.

1.7 Social Categorization Based on Aging-Related Information

Since individuals perceive others as members of a social group based on differentiation of factors such as religion, gender, age, and race (Hamilton & Sherman, 1994), they may be more likely to retrieve the information that is consistent with the expectations for that specific social group. That is also consistent with Tajfel and Turner's (1986) suggestion about individuals' tendency to recognize central aspects of unknown individuals. Moreover, such a categorizing in social world is supported by stereotypes (Hewstone & Giles, 1997). Indeed, there are many social groups in society that individuals have stereotypical information about. As an example, age groups, as Ikier (2009) stated, is a way to group individuals in society. Indeed, we seem to recognize age-related information at the very beginning when we meet unknown individuals (Kite, Deaux, & Miele, 1991). According to Swift, Abrams, Drury, and Lamont (2018), age categories are handled as descriptive (e.g., character traits) and prescriptive (e.g., expected behavior) attributes, that result from combined effects of maturation and biological aging processes and social system that is organized around age and aged-based stereotypes. Swift and colleagues further claimed that aging stereotypes can be both positive and negative. When negative stereotypes outweigh the positive ones, it can result in ageism and ageism towards elder population is the most worrisome and consequential form of ageism among age groups (Greenberg, Schimel, & Martens, 2004). According to Greenberg and colleagues, this is because death becomes more salient for elder individuals and this make them more likely to be

exposed to death-related thoughts by younger individuals and such an exposure causes elders to internalize negative stereotypes.

Schmidt and Boland (1986) conducted a study in which they tried to discover views of young adults (aged in between 18 to 33) about typical elder profile and found out number of stereotypes about elder individuals. According to their results, young adults have a stereotypical view about elder adults based on three major trait clusters including eight general traits related to chronological age (e.g., gray-haired, retired, gnarled hands, wrinkled skin), 59 negative specifications (e.g., forgetful, waiting to die, poor, dependent on family, complaining), and 32 positive specifications (e.g., tough, mellow, family oriented, knows a great deal). They further stated that, elder stereotypes are not one type; thus, attitudes toward elder individuals are variable. M. B. Brewer, Dull, and Lui (1981) were the ones who firstly suggested that, there is not one type of elder stereotype; rather, individuals hold several stereotype categories for elders. As a result of their research with college students, they came up with three distinguishable “types” of elder individuals: The “grandmotherly” type that characterized elder women who love animals and children, who are family-oriented, and pass their time in the kitchen, the “elder statesman” is the profile of eligible conservative elder gentleman with high-status in the society, and the “senior citizen” represents elder individuals from both sex being isolated and inactive. Even if there are both positive and negative stereotypical views of the elder, which ones are more dominant is a matter of debate. In meta-analyses (e.g., Kite, Stockdale, Whitley, & B. T. Johnson, 2005; Kite & B. T. Johnson, 1988), it was shown that negative view of elders is more dominant among adults. On the other hand, a recent study of Carlson, Black, Holley, and Coster (2020) pointed to a more positive perception of the elder individuals. Their study aimed to create an updated survey from previously used common assessment tools. They obtained 117 items representing positive, negative, and physical descriptive stereotypes about elders from former studies. With factor analysis they came up with 39 items out of 117. Three factors were formed consisting of 19 negative, 14 positive, and 6 physically descriptive items. Moreover, by analyzing the stereotype strength of each item they found out a predominance of positive items (e.g., considerate, patient) over the single negative item (emotional) and the two physical items (gray-haired, wrinkled skin).

1.8 Ageism and Stereotype Threat

Although aforementioned research indicated an override of positive stereotypes over negative stereotypes, it is worth noting to handle negative stereotypic attitudes because of its possible detrimental effect on elders. Negative stereotypical attitudes towards elder individuals may cause them to experience stereotype threat (Steele, 2010; Steele & Aronson, 1995), which implies the detrimental effects on the behaviors of the stereotyped group that make them behave as confirming the negative stereotypes (Steele, Spencer, & Aronson, 2002). That is what exactly Hess, Auman, Colcombe, and Rahhal (2003) revealed in their study. When negative aging stereotypes were emphasized, elder adults' memory performance became worse than younger adults and when those stereotypes became more salient, this effect became even worse. Even by activating stereotypes subliminally, cognitive performance was affected (B. R. Levy, 1996). By implicitly priming elders either with positive or negative aging stereotypes, B. R. Levy examined participants' performances on variety of cognitive tasks and found out that, elder participants' performance improved when they were positively primed, whereas deteriorated when they were negatively primed. Not only their cognitive performance, but also their well-being (Marquet, Chasteen, Plaks, & Balasubramaniam, 2019), physical performance (Barber, Hamel, Ketcham, Lui, & Taylor-Ketcham, 2020; Hausdorff, B. R. Levy, & Wei, 1999; B. R. Levy, 2000), and mental health (B. R. Levy, Chang, Lowe, Provollo, & Slade, 2021) was affected adversely due to the activation of negative aging stereotypes. Thus, stereotypes seem to put stereotyped group in a vicious cycle by making them act in a confirmatory manner which, in turn, may even intensify the existing stereotypes among adults.

1.9 Aim of the Current Research and Hypothesis

In light of those studies stated above, in order to examine the effects of stereotype-consistency on false memory formation and memory performance, the present study involved a misinformation paradigm in which after presenting misleading information regarding a target event, individuals' memories tend to be distorted (Loftus, 1975; Loftus, Miller, & Burns, 1978; Loftus & Palmer, 1974). Based on this suggestion of misinformation literature, the present study aimed to discover how exposure to misleading information would affect false memory construction in the case of stereotypically-consistent information and stereotypically-inconsistent

information. To this end, the present study focuses on aging-related stereotypes since elder stereotypes became especially dominant with the beginning of COVID-19 pandemic (see Monahan, Macdonald, Lytle, Apriceno, & S. R. Levy, 2020). Because the elder population was the most vulnerable population to the virus, this led to the formation of additional stereotypes about the elderly as well. In specific, the study aims to provide an understanding of how elder individuals are perceived and whether information that is inconsistent with the view about elders creates a difference in memory performance and accuracy. Even though there are plenty of studies on the effects of stereotype-consistency on memory (e.g., Berman, Read, & Kenny, 1983; Doosje, Spears, de Redelijkheid, & van Onna, 2007; Hastie & Kumar, 1979; Hemsley & Mamurek, 1982; Jackson & Rose, 2013; Kleider et al., 2008; Neuschatz et al., 2002; Pezdek, Whetstone, Reynolds, Askari, & Dougherty, 1989), to our knowledge, this is the first study that investigates the effects of consistency of aging stereotypes on memory and false memory in the misinformation paradigm.

With this aim, a passage was constructed describing a complex event in which information contradicted with the expectancies young adults have for the elder population, but fitted the general expectancy regarding young individuals. Since the research was carried out with Turkish young adults, elder stereotypes especially prevalent in Turkey were taken into account in the construction of the passages (e.g., spending time at home, lonely, weak sociality, walking difficulties; Çayır, 2012; Daniş & Kara, 2017). The subject of the passage was described either as a young character (consistent condition) or an elder character (inconsistent condition). Related to the aforementioned discussion whether stereotypically consistent or inconsistent information allocate attentional resources, previous studies revealed contradictory results. While some studies revealed better memory performance for stereotypically-inconsistent information (e.g., Hastie & Kumar, 1979; Hemsley & Mamurek, 1982; Neuschatz et al., 2002; Pezdek et al., 1989), other findings indicate better memory for stereotypically-consistent information (e.g., Berman et al., 1983). Considering the contradictions in theoretical propositions and empirical findings, further research is necessary. Thus, with the current study, it is aimed to investigate the effect of information consistency on memory by asking if stereotype-consistent or stereotype-inconsistent information make individuals more vulnerable to memory error, by

providing misleading information related to the passage participants listened. Further, recall and recognition performance was also compared based on the given information (either consistent or inconsistent). Current research's hypothesis took shape by the standpoint that the stereotypically-inconsistent information will get more attention. That is because, even if there is some evidence supporting the opposing standpoint by revealing greater attentional direction towards stereotype-consistent information, there is more evidence supporting the stereotype-inconsistent information's dominance in attentional allocation. Moreover, considering the current research, it is sensible to expect unexpected elder profile get more attention than usual, expected young adult. Hence, it was hypothesized that, participants in the stereotype-consistent condition would encode the gist of the passage, so that they would be more prone to assimilate the misleading detail into the original information, and that they would have a poor performance on both recall and recognition tasks than the participants in the stereotype-inconsistent condition. We also measured participants' stereotypes about the elderly since the hypothesized effects may be affected by the magnitude of the aging stereotypes that the participants have.

Chapter 2

Method

2.1 Participants

Ninety-six participants were recruited for the experiment. Eight of them were excluded because they stated that they failed to hear the first sentence of the passage from the voice recording, which is the sentence that includes the main character's age. From the remaining sample, one participant's data was removed because his z-score was above three in the free recall task. Thus, the final sample consisted of 87 participants, including 32 males and 55 females. The age range of the participants were between 18 and 28 (see Table 1). Participants were randomly assigned to two passage conditions (stereotype-consistent vs. stereotype-inconsistent). While the number of male participants were equal for both conditions ($n = 16$), the number of female participants were 28 for stereotype-inconsistent condition and 27 for stereotype-consistent condition. All of the participants had at least high-school education (see Table 2). Participants in consistent and inconsistent groups did not differ significantly in their reports of neurological and psychological problems, $X^2(1, N=87) = .505, p = .477$. Four participants out of 44 in inconsistent group stated neurological/psychological problems (e.g., depression, attention deficit hyperactivity disorder, anxiety) and six participants out of 43 in consistent group stated neurological/psychological problems (e.g., depression, attention deficit hyperactivity disorder, anxiety, obsessive-compulsive disorder).

Table 1.

Descriptive Statistics for Age (N = 87)

Group	Age (in years)				
	n	Mean	SD	Min.	Max.
Stereotype-consistent	43	23.60	3.17	18	28
Stereotype-inconsistent	44	23.05	2.92	18	28

Table 2.

Descriptive Statistics for Education (N = 87)

Group	Education (in years)				
	n	Mean	SD	Min.	Max.
Stereotype-consistent	43	16.26	2.70	10	21
Stereotype-inconsistent	44	16.18	2.68	11	22

2.2 Materials

2.2.1 The passages and the misleading question. The two passages were exactly the same except that for the consistent condition, the first sentence stated that the main character was 20 years old, and for the inconsistent condition, it indicated that the main character was 80 years old. The passages were constructed by the author based on general stereotypical depiction of elders from literature and got its final form based on three pre-tests which included four participants, 19 participants, and five participants, respectively. The final passages depicted a complex event in which a snatching occurs that is noticed by the main character who then runs after the snatcher. Besides this complex event, the passages indicated habits (e.g., going for a run every morning) and some qualities (e.g., energetic, sportive) of the main character and his plan for that day (going to a birthday party of a friend) all of which were inconsistent with an expected elder profile. Passages contained eight sentences and they were voice-recorded. Voice recording was preferred in order to prevent multiple readings, any individual differences in reading and to equalize the presentation rate of the passages across participants. In the voice recording, the passages were read without a particular emphasis to any word and with a stable and clear tone of voice. The pretests assured clarity of the voice recording as well. Since the only difference in between inconsistent and consistent passages were the first age sentence, first a single recording was made. Then the alternative voice recording was obtained by cutting the first sentence to produce stereotype-consistent and stereotype-inconsistent passages by using Adobe Premiere Pro. Moreover, the speed of the utterance was reduced to an average speed and the sentence breaks were synchronized to eliminate any tracking difficulties again by Adobe Premiere Pro. Each recording was 44 seconds long. The

misleading question was constructed from a detail related to the complex event in the sixth sentence (See Appendix A for the passages and the misleading question).

2.2.2 Non-verbal filler task. This was a four-minute task that included simple mathematical operations.

2.2.3 Free recall task. It was a verbatim free recall task in which participants were asked to retrieve exact wording and exact details from the passage.

2.2.4 Recognition task. It was a forced-choice recognition task that involved eight questions related to each original sentence of the passages. Each old sentence was presented along with options including changed details (see Appendix B). One of the questions included the detail that was given by the misleading question which was presented along with the actual detail. There were four options for each question and the options were pretested to assure that they are clear and that they are alternatives that can be chosen as the correct response.

2.2.5 Manipulation check for the passages. Participants was asked to rate to what extent the behaviors and qualities of the fictitious character they have listened from the passage were suitable to their expectations regarding the character's age group on a 5-point Likert scale (1= *totally unsuitable*, 5= *totally suitable*).

2.2.6 Attitudes towards the elderly scale (KAOP; Turkish version). This scale of Kogan (1961) aimed to evaluate individuals' attitudes towards the elder population. Scale contains 17 positive and 17 negative items that makes a total of 34 items. It is a 6-point Likert scale that ranges from *strongly agree-6* to *strongly disagree-1*. For positive attitudes the scores of 6 categories are 1, 2, 3, 4, 5, and 6, respectively, and scores for negative attitudes are calculated in the reverse manner. The total score that could be obtained from the scale is in between 34-204 which indicates negative attitude towards elders with low scores and positive attitudes with high scores. A score of 102 is considered as a neutral attitude towards elderly. Cronbach's Alpha test of the Turkish version of Kogan's Attitudes Towards Elderly Scale revealed 0.77 and 0.79 for positive subscale and negative subscale, respectively. It is 0.84 for total scale (Erdemir, Kav, Citak, Hanoglu, & Karahan, 2011).

2.2.7 Positive and negative ageism scale (PNAS). With this scale, university students' attitudes towards elder individuals is targeted. Scale has two subscales as

Positively Discriminative Attitudes and Negatively Discriminative Attitudes. In total it is a 23 item scale which is divided as 13 items and 10 items to positive statements and negative statements, respectively. The measurements are on 5-point Likert scale, ranging from *totally agree-5* to *totally disagree-1*. The maximum score from positively discriminative attitude subscale can be 65 and the minimum score can be 13. Higher scores indicate a greater tendency of positive attitudes towards elders. Regarding negatively discriminative attitude subscale the maximum score can be 50 and the minimum score can be 10. This time, the highest score represents a low level of negatively discriminative attitudes towards elder individuals. The Cronbach's Alpha for the scale is 0.80 (Yurttas & Sarikoca, 2018).

2.2.8 Demographic form. This form asked about age, gender, education and general health of the participants.

2.3 Procedure

The experiment was held by meeting with each participant online on Zoom platform and this study was approved by Bahçeşehir University Ethics Committee. All participants provided informed consent. Participants were randomly assigned to stereotype-consistent passage condition and stereotype-inconsistent passage condition with equal number of participants in each condition. Each participant was informed that there would be a voice recording that needed to be started and ended by the experimenter so they were asked for permission to share their screen and give remote screen control to the experimenter for the duration of the voice recording. The voice recording was sent to the participants' email address and they were asked to use headphones to eliminate any possible outside noise. Then the voice recordings were downloaded to participants' computer in order to prevent any internet connectivity problem during listening. Before the actual voice recording, participants were informed that a short voice control recording will be played prior to the main voice recording and they do not need to pay attention to it. Such a voice control recording was provided in order to check for any technical problems. It was a three second recording which involved only "voice control" statement. Through this control recording, sound settings were controlled by the experimenter and each participant's volume of the device was maximized to eliminate any loss during main voice recording. Then, for the actual main voice record, participants were asked to put their

headphones on and carefully listen the passage all at once, from the beginning to the end. They were warned that once the voice recording started, it could not be paused. They were also informed that, they would be asked about the passage from the voice recording in the later stages of the experiment so that they need to remember the details about it. At the end of the voice recording, participants were asked to delete the voice recordings permanently both from their devices and from their e-mail addresses' in order to prevent participants to play the voice recording after they stopped screen sharing. Then, they were asked to stop screen sharing. Afterwards, participants were given a yes/no question regarding the passage they have listened. The question was the critical misleading question that contained a detail that the passage did not have. Following their responding, they were engaged in a four-minute filler task in which they completed the filler task consisting of simple mathematical equations and they were warned that the accuracy of their answers matter and were asked try their best to not make mistakes. This was a procedure to make participants not think of the passage. Immediately after the filler task was completed, participants were asked to recall the passage in a verbatim manner and write down the sentences in the passages as exactly as possible. After they completed the free recall task, participants were engaged in a forced-choice recognition task. One of the questions was related to the misleading detail. Then, participants responded to the manipulation check question. Following the rating, in order to examine if participants have a stereotypical attitude towards elders, they took the KAOP and PNAS. At the end, they filled out the demographic form and received a debriefing about the study.

Chapter 3

Results

3.1 Free Recall Scoring Criteria and Recognition Scoring

All mean scores were calculated as percentages. Free recall scores were calculated for each participant under three scoring criteria: Lenient criterion, strict criterion, and verbatim criterion. All of the scoring were done by two independent raters both of whom were involved in the experimentation process. In order to ease the scoring process, passages were broken down into 58 idea units, which is a widely used procedure in prose memory (e.g., Bransford & M. K. Johnson, 1972). Lenient and strict criterion scoring were calculated based on those idea units. On the other hand, verbatim criterion required the whole sentence in the exact way; thus, scoring was based on sentences of the passages. While lenient criterion was more flexible in scoring (synonyms and an analogical sense of meaning of idea units were accepted), strict scoring criterion required the exact idea units. However, different conjugations of verbs and location changes of idea units were accepted both in lenient and strict criteria. For the recognition task, correct-recognition and false alarms were calculated. Participants' level of falsely assimilating the misleading information to their verbatim recall, their responses to the misleading question and their correct recall and recognition performance were compared.

3.1.1 Inter-rater reliability analysis for free recall scores. The interrater reliability among the two independent raters was calculated for the three recall scores by using Pearson correlation. Results indicated a very strong significant positive correlation between two raters scores for the lenient criterion, $r(86) = .99, p < .001$, for the strict criterion, $r(86) = .99, p < .001$, and for the verbatim criterion, $r(86) = .98, p < .001$. According to these results, a high inter-rater reliability was obtained for all of the free recall scoring criteria.

3.2 Statistical Analysis for Manipulation Check and Scales

First of all, stereotype-consistent and stereotype-inconsistent passage ratings regarding the compatibility of main character's qualities and behaviors according to

his age group was compared by Pearson Chi-square test. Results revealed that, groups differ in their compatibility responses to the passage, $X^2(4, N=87) = 44.99, p < .001$, Cramer's $V = .72$. While one participant out of 43 found the main character incompatible in the consistent group, 30 participants out of 44 found it incompatible in the inconsistent group.

Kogan's Attitudes Towards the Elderly Scale (KAOP) and Positive and Negative Ageism Scale (PNAS) were completed by all participants in order to assess their attitudes towards elder individuals. KAOP total score and the Positive and Negative subscale scores of PNAS were compared among stereotype-consistent and stereotype inconsistent group by independent samples t-test. KAOP total score not differed significantly between the consistent ($M = 130.35, SE = 2.51$) and inconsistent ($M = 124.30, SE = 2.68$) groups, $t(85) = 1.65, p = .103, d = 0.35$. PNAS positive subscale scores of consistent ($M = 42.28, SE = .81$) and inconsistent ($M = 42.05, SE = 1.19$) groups, $t(85) = .162, p = .872, d = 0.03$, and negative subscales scores of consistent ($M = 41.07, SE = .84$) and inconsistent ($M = 39.41, SE = .97$), $t(85) = 1.30, p = .198, d = 0.28$, did not reveal any significant difference as well. Thus, participants in the two groups did not differ in their attitudes regarding elder individuals.

3.3 Statistical Analysis of Recall and Recognition Tests

Independent samples t-test was conducted to reveal any group differences in free recall scores under three criteria (lenient, strict, verbatim) and recognition score (see Figure 1.). Free recall score under lenient criteria did not reveal any differences between the consistent ($M = 33.71, SE = 1.52$) and the inconsistent ($M = 35.58, SE = 1.76$) groups, $t(85) = -.80, p = .426, d = 0.17$. Indeed, strict scores of participants did not differ significantly across groups with the consistent group ($M = 14.91, SE = .99$) and the inconsistent group ($M = 16.06, SE = 1.21$), $t(85) = -.73, p = .468, d = 0.16$. The last scoring criteria of free recall, verbatim criteria, did not show up any difference between the consistent ($M = 3.78, SE = .98$) and the inconsistent ($M = 5.68, SE = 1.03$) groups as well, $t(85) = -1.34, p = .185, d = 0.29$. However, recognition score of the inconsistent group ($M = 63.35, SE = 2.65$) was significantly higher than the consistent group ($M = 55.81, SE = 2.54$), $t(85) = -2.05, p = .04, d = 0.44$. Results indicated that, even though there was no statistically significant difference between the groups in

terms of recall performance, recognition scores differed significantly between the groups with higher performance from the stereotype-inconsistent group.

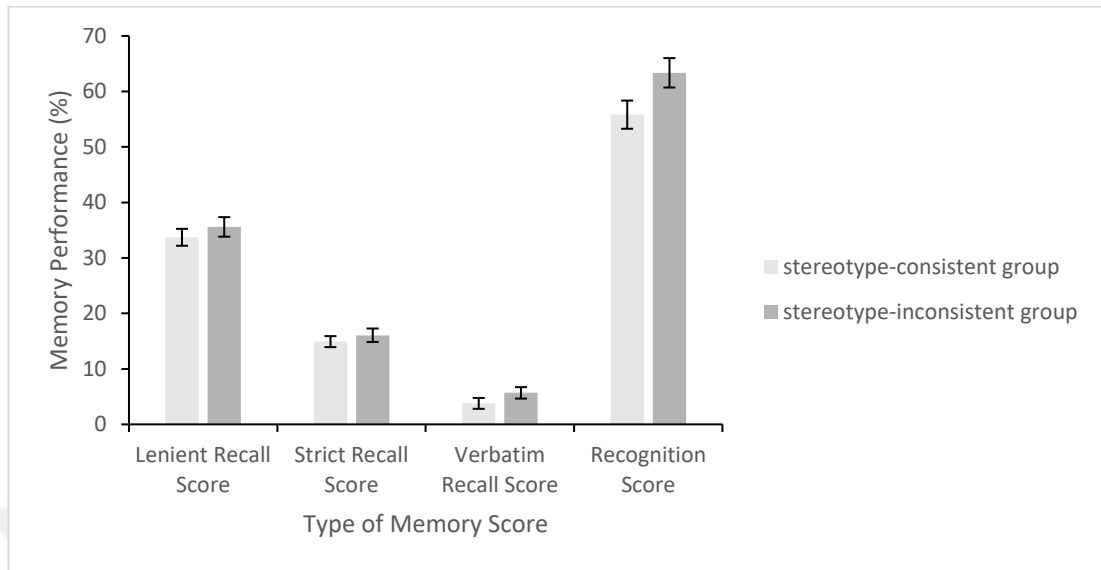


Figure 1. Mean percent recall and recognition scores and standard errors.

Pearson Chi-square analysis was conducted to determine whether groups differed in their false recognition of misinformation. Twenty-four participants out of 43 in the consistent group and 14 participants out of 44 in inconsistent group falsely recognized the misinformation. These frequencies were found to be statistically different, $X^2(1, N = 87) = 5.09, p = .03$, Cramer's $V = .24$. According to this result, misinformation was recognized more among participants in stereotypically-consistent condition than participants in stereotypically-inconsistent condition. However, in the recall test, intrusions with the misinformation were minimal and similar in the two groups: Two participants in the consistent group and three participants in the inconsistent group generated the misinformation in verbatim recall.

Chapter 4

Discussion

4.1 An Evaluation of Current Research's Findings Within the Scope of the Theoretical Discussion and Literature

The aim of the current investigation was to point to the theoretical discussion regarding the effect of stereotype consistency on attentional allocation and in turn, memory efficacy. Accordingly, the question of how information that is inconsistent with elder individuals but consistent with young ones would affect false memory formation and memory performances was addressed. With this objective, a passage was created depicting a complex event with information that violates expectancies from elders but fits with young adulthood. Based on this passage, two passage conditions were constituted where either a young adult was the fictitious main character of the event (stereotype-consistent condition) or a fictitious elder was the main character (stereotype-inconsistent condition). Moreover, participants from both conditions were given the same misleading question regarding the passage in order to examine if false memory implementation differ between conditions. In accordance, two main findings were achieved. Firstly, as it was hypothesized, participants from stereotype-consistent condition exhibited more false memory due to the misleading information in recognition test. Secondly, recognition memory performance was better for stereotype-inconsistent condition as expected as well. However, groups did not differ in their recall performances.

According to the theoretical discussion, stereotypically consistent and inconsistent information was expected to differ in the way they attract attention. Considering FTT (Brainerd & Reyna, 2002), if detailed information processing is carried out, verbatim traces will be more available, but if the information is merely encoded by meaning in superficial terms, then memory will be represented by the gist traces. As FTT attributes better memory to verbatim traces and more false memory to gist traces, either consistent or inconsistent information would be expected to reveal better memory with verbatim traces. When we examine the current research results,

free recall performance was expected to demonstrate which information type has verbatim traces in memory since participants were asked to extract exact details in the passage. With item specific recollection, verbatim traces enable errorless, detailed recall performance, while gist recall is a product of reconstruction based on familiarity judgments (Brainerd & Reyna, 2010; Brainerd, Reyna, & Howe, 2009) and it is known that reconstruction can bring memory errors (Bartlett, 1932). The point is that, current research results of free recall test, did not show a difference in verbatim representation across the consistent and the inconsistent conditions. Based on this finding, it is difficult to claim that inconsistent (or consistent) information attracts significantly more attention that would result in verbatim recall. Therefore, it becomes difficult to take a standpoint on the discussion of whether consistent or inconsistent information leads to better memory. The formation of the opposing perspectives, the one that supports consistent information's prominence and the one that assumes inconsistent information as prominent, may be based on different factors. For instance, as Kleider and colleagues (2008) discovered, inconsistent information's memory strength was better in the case of an immediate retrieval, whereas consistent information outpace it in a delayed test. Thus, above mentioned perspectives that give way to the theoretical discussion may be accurate under different conditions. Hence, those possible factors, like delayed versus immediate memory performance, can be investigated in future research.

Unlike the recall test, there were significant differences across groups for the recognition test and false memory formation. Stereotypically-inconsistent information was less open to reconstruction of memory since the inconsistent group exhibited better recognition performance and less false memory than the consistent group. In that sense, these findings did not suit with Bartlett's (1932) suggestion regarding individuals' tendency to rationalize unfamiliar information according to existing schemas by reconstruction which may result with distortion. On the other hand, such a result complies with SP + T model's prediction that, inconsistent stereotypical information will be coded with a unique tag in memory that specifically result with better recognition memory (Woll & Graesser, 1982). Thus, such an efficient encoding, may be the reason why inconsistent information signified a resistance toward reconstruction. Accordingly, the prediction that stereotype-inconsistent information is

totally discounted (e.g. Schematic Filter model) may not be an assertion that can be supported according to current findings. Nevertheless, it can also not be inferred that stereotypically-inconsistent information is processed thoroughly (e.g., SP + T model), because the recall performances of participants did not imply a verbatim processing.

Recognition tests are known to result with superior performance compared to recall tests (Postman, 1963) because more information is required in memory in order to recall an item. Recognition memory is a familiarity-based memory (Kintsch, 1970) which involves a sense of feeling that a specific item is familiar, but a conscious recollection of the item is not necessary for accurate performance (Tulving, 1985). Based on these, the indifference between stereotype-consistent and stereotype-inconsistent groups' recall performance may be because of the challenging nature of the recall task itself, since even the maximum score of the lenient criterion of recall, which was the most flexible criterion, was maximum 35%. However, the difference across groups that was evident in recognition test and in falsely recognizing misleading information as old indicates that, stereotypically-consistent information was remembered in a more familiarity-based manner. By only changing minor details in the choices in the recognition test used in the current research, a sense of familiarity was probably preserved and as Greene (1999) suggests, familiar information increased memory errors in recognition test. Consistent groups' higher false memory for misleading information and lower overall recognition performance than the inconsistent group may be due to the fact that, stereotypically-consistent information is encoded by as gist, which allows familiar items to result in erroneous recognition. On the other hand, even though the recall of stereotypically-inconsistent information did not differ from stereotypically-consistent information, in the recognition test, participants in the inconsistent group were better able to differentiate the sentences in the passage. This result supports the prediction of SP + T model and one of the predictions of AN model which suggests greater attentional allocation for inconsistent information. Based on these results, even it would not be accurate to infer verbatim processing for stereotypically-inconsistent information in a recall test, in a recognition test, inconsistent information seems to be easier to recollect by detail, without relying on the match between familiar items deduced from gist traces. One of the shortcomings of the present study was that, remember/know judgments were not taken. If we had

anticipated a difference across the recall and recognition tests, we could collect these measurements. While remember judgment represents a conscious recollection of a memory, know judgment is just a sense of familiarity with the absence of conscious recollection (Tulving, 1985). Previous investigations presented more remember judgments for inconsistent items than consistent item (e.g., Lampinen, Faries, Neuschatz, & Toglia, 2000; Neuschatz et al., 2002). Hence, taking individuals' subjective feedbacks regarding their memories would be useful to support our explanations.

The lower recognition and higher misinformation effect observed in stereotype-consistent group compared to the stereotype-inconsistent group may be an encoding-based failure. Worse memory performance may indicate that the details of information were never encoded well and not transferred to long-term memory. Indeed, as discussed earlier, the gist-based processing stereotype-consistent information possibly undergoes may account for encoding failures of information details. On the other hand, the reason why stereotype-inconsistent group outperformed stereotype-consistent group only in the recognition task, and not in the recall task, may be because free recall has two subsequent stages to be achieved in order to obtain successful retrieval: First candidate items are retrieved from memory and then recognition process is required to select the correct information among the items that are retrieved. That is a process proposed by the two-stage theory (Anderson & Bower, 1972; Kintsch, 1970). According to this theory, unsuccessful recall is either a consequence of an inability to retrieve information from memory or making wrong decisions at the stage of recognition. Therefore, while recognition tasks involve only one stage, recall tasks involve two stages to be achieved which makes them more difficult. Considering the current results, participants from both conditions obtained low free recall probably because they failed at the first stage of the recall task in which they needed to retrieve the given information. The inability to correctly retrieve the information can either be because of an encoding-based failure or retrieval-based failure. However, since participants in the stereotype-inconsistent condition well-recognized the given information in the recognition test, their low performance in the free recall test may be due to a retrieval-based failure unlike participants in stereotype-consistent condition.

It is important to note that, memory performance for consistent and inconsistent information may differ in time as Kleider and colleagues (2008) discovered. In specific, they revealed that, when the memory test was carried out immediately, memory for stereotype-inconsistent was found to be better, whereas with a delayed test, stereotypically-inconsistent information resulted in more memory errors than stereotypically-consistent information (also see Neuschatz et al., 2002). Since the memory test in the current study was carried out immediately, including a delayed recall memory measurement would be interesting in order to observe whether such an effect of time would be observed in the context of the present experiment. This can be a topic that can be discovered in future research. This would provide information about the way individuals process aging-related stereotypical information in the long run as well.

It is also crucial to mention that, the mismatch between the modalities of the first delivery of the information (voice recording) and the recognition test (visual) may have affected the results based on transfer-appropriate processing principle (Morris, Bransford, & Franks, 1977). It is proposed that, memory would be best when encoding processes match with retrieval processes. Thus, considering the current research, the mismatch between the modalities of encoding and retrieval at the time of recognition task might have lowered the performance of participants. Providing the information with the same modalities may enhance memory performance. Additionally, effects of modality match and mismatch between encoding and retrieval may be systematically investigated in future research. This line of research may also be fruitful in the examination whether individuals can differentiate the source of the information by identifying auditorily versus visually presented information (M. K. Johnson, Hashtroudi, & Lindsay, 1993).

4.2 Individual Differences in Information Processing Styles

Besides all of these, individuals may differ in the way they handle stereotypical information, either consistent or inconsistent, due to variety of factors. Need for cognition (NFC) may be one of the individual differences that might predict people's attitudes toward stereotyping. NFC is defined as a stable characteristic feature that increase individuals' tendency to engage in effortful cognitive activation and make people who are high in NFC to process information deeply and elaborative, and seek

new information (Cacioppo, Petty, Feinstein, & Jarvis, 1996; Levin, Huneke, & Jasper, 2000). Hence, NFC may predict individuals' performance on processing stereotype-inconsistent information since it is a source for cognitive effort. Individuals high in NFC are known to elaborate more on given information that can activate semantic processing (Cacioppo et al., 1996). According to FTT, semantic processing leads to meaning based gist traces and the activation of semantic connections is assumed to lead to false memory (Brainerd & Reyna, 2002). Previous studies showed increased false memory among individuals high in NFC both in recognition tasks (e.g., Graham, 2007) and recall tasks (e.g., Leding, 2011). Future research can investigate whether this is the case for stereotypically-inconsistent information as well.

Additionally, need for cognitive closure as a motivational desire to resolve ambiguous, uncertain information that cause discomfort (Kruglanski & Webster, 1996) may also be a factor determines how an individual deal with stereotypically-inconsistent information. Some studies demonstrated that, need for cognitive closure leads individuals to search for stereotypically-consistent information and avoid inconsistent ones in order to prevent any conflict with pre-existing information (e.g., Dijksterhuis, van Knippenberg, Kruglanski, & Schaper, 1996), others revealed the opposite (e.g., Kimmelmeier, 2015). P. Strojny, Kossowska, and A. Strojny (2016) revealed a more complex picture of the preference of information to process among individuals high in need for closure. They demonstrated an interplay between need for closure and cognitive capacity. According to their results, only individuals who were high in need for closure and who did not have their cognitive resources depleted due to memory tasks showed a tendency to remember expectancy-inconsistent information in order to resolve the uncertainty but not individuals who were limited in their cognitive resources. Further research can be carried out by controlling such potential determinants of individuals' information selection styles.

4.3 Future Research Suggestions and Limitations

Implicit priming of stereotypes is known to increase the activation of stereotypical knowledge (Wheeler & Petty, 2001), which, then is known to guide individuals' unintentional behaviors (e.g., Araya et al., 2003; B. R. Levy, 1996). Based on this literature, in future research, priming effects can be investigated in a condition in which individuals need to predict a stereotyped group member's behavior in the

future after being primed with stereotypically-inconsistent information. For example, participants can be exposed to a stereotypically-inconsistent protagonist and then a few days later, after implicitly reminding the inconsistent actions of the protagonist, they can be asked to anticipate the successive actions of the protagonist. In such a design, the question of whether participants will respond on the basis of existing schemas or recently presented non-stereotypical information can be investigated. Enriching the answer to this question with brain imaging methods may enable to observe any possible differences in brain activities in between participants from stereotype-consistent and stereotype-inconsistent conditions when they try to make future prediction of character's behavior.

The focus of the present study was on elder stereotypes which is known to be largely shared across cultures (see Löckenhoff et al., 2009). However, it would be interesting to replicate the present research with culture-specific race stereotypes such as the stereotypes for African Americans in North America and Syrians in Turkey. Prior research showed that these stereotypes are automatically processed (e.g., Amodio & Devine, 2006; Nosek et al., 2007). In future research, investigating dominant race stereotypes may yield important implications regarding the effects of stereotypes on memory performance and false memory formation.

The main limitation of the current research is regarding the generalizability of the stereotyped information the passages have. Even though the passages were constructed around prevalent elder stereotypes in Turkey based on literature (e.g. Çayır, 2012; Danış & Kara, 2017) and pre-tested the functionality of the given information, individuals may have divergent stereotypical beliefs about elders that might not overlap with stereotypes that someone else have. Different elder profile participants have around them may shape their expectations about elder individuals in general, which, in turn may create a threatening discrepancy since such a factor could not be controlled. Yet, by pre-tests and relying on general attitudes towards elders acquired from the literature, this limitation was at least minimized. Moreover, attitudes for elders measured by questionnaires were found to be similar across experimental groups, which also partially controlled this potential confound.

Conducting an experiment via online platforms is new and has become prevalent during the pandemic. Online research may create a limitation because of its limits in

control. Although participants are asked to participate in the study in a quiet non-distracting environment, they cannot be tested in the same non-distracting environment. This limitation was aimed to be controlled by asking participants to use headphones, especially during the voice recording, in order to minimize background noise.

4.4 COVID-19 and Elder Stereotypes

The aim of the current study was to investigate the role of stereotype consistency on false memory construction, as well as recall and recognition memory performance. With this aim, elders were the stereotyped group that was focused on since stereotypical attitudes towards elders are mainly negative, and these negative attitudes began to have a more dramatic negative effect on the elderly since the beginning of COVID-19 pandemic. Either by seemingly positive responses (e.g. delivering foods to their homes, special shopping hours etc.) or by negative and ageist responses (e.g. less priority for health care, see as a burden etc.) elders become disproportionately vulnerable to the effects of COVID-19 at the social and behavioral level as well as the virus itself (Monahan et al., 2020). Monahan and colleagues indicated that, the isolation of elder individuals, either by positive intentions or negative ones, affect their mental health negatively and exposed them with the stereotypic problems of their ages'. Stereotypic expectations have a power to make individuals to behave in a way to elicit the expected behavior (Cundiff, 2020), which has evident for elder individuals (Kotter-Grühn & Hess, 2012; B. R. Levy & Myers, 2004). In particular, stereotype threat theory (Steele, 2010; Steele & Aronson, 1995) also highlighted this issue by positing a risk for confirmatory behavior of negative age stereotypes, which, in turn, lead to perpetuation of those stereotypic ageist expectations. Accordingly, studies revealed the adverse effect of being exposed to age-related stereotypic information on elders' self-esteem (Marquet et al., 2019), memory performances (Hess et al., 2003; Weiss, 2018), hippocampal volume (B. R. Levy, Ferrucci, Zonderman, Slade, Troncoso, & Resnick, 2016), physical performances (Barber et al., 2020) and stress reactivity (Weiss, 2018). Thus, while still the pandemic conditions continue that has made the elder stereotypes more evident, handling elder stereotypes in a context of false memory construction and memory performances became even more crucial which was one of the motivations of the current investigation.

4.5 Concluding Remarks

In conclusion, this study was carried out to uncover the dynamics between stereotypes and memory within the scope of attentional allocation predictions that are made by distinct models. While SP + T model and one prediction of AN model, stands by the prediction that unexpected stereotypic information gets more attention and processed in detail, specifically Schematic filter model and the other prediction of AN model, claims an overreliance on consistent stereotypic information. Research results of the current experiment partly supported SP + T model and AN model by revealing a greater tendency of stereotype-consistent group's false memory generation compared to stereotype-inconsistent group. Such a result may indicate that, participants from the inconsistent group were more vigilant in order to encode the inconsistent information, which needed attentional allocation to make sense of it, as suggested by SP + T model and AN model. The results of the present research are crucial in the sense that, there is pattern of elder profile individuals expect to see which seems to be violated with the unexpected elder profile depicted in the study. Regarding this expected elder profile, even though the literature points to the existence of positive stereotypes (e.g., Carlson et al., 2020) negative stereotypes seem to be enough to lead to ageism towards elders (Greenberg et al., 2004). This is a problematic issue because of the stereotype threat and discrimination that elders face (e.g., Barber et al., 2020; B. R. Levy et al., 2016; Marquet et al., 2019; Weiss, 2018). However, it is important to note that, not all means to reduce stereotypes have been exhausted. There are some promising studies pointing to factors that can decrease stereotyping. Motivation to generate accurate social impressions (e.g., Neuberg, 1989), taking the perspective of an out-group member (e.g., Brannon & Walton, 2013) and being exposed to counter-stereotypic information (e.g., Blair, Ma, & Lenton, 2001; Park, Felix, & Lee, 2007) are some of the factors discovered to reduce stereotypes. Hence, it is important to understand cognitive functions behind stereotype processes, so that it can be possible to prevent adverse effects of stereotypes. With this regard, the current research addressed effects of aging stereotypes on memory, in order to both contribute to the existing theoretical discussion and extend applied findings regarding attentional processes that possibly have an influence on stereotyping.

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