

Study on serial position curve phenomena



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The Serial Position Curve is a psychological phenomena founded by Murdock (1962) in an experiment where the participants were tested for recall on a list of words previously learnt. This experiment has in turn become an accepted measure of memory testing. The theory for the serial position curve is that people recall a list of pre-learnt words best at the beginning and at the end of the given list. Typically, when a sequence of visual or verbal material is presented, the initial and later items in the sequence are remembered better than those from the middle of the sequence (Baddeley, Papagno & Andrade 1993; Glanzer & Cunitz 1966; Neath 1993). These effects are termed primacy and recency effects, respectively.

Well-known primacy effects occur when people are forming a summary impression of a single entity such as a person, product or event. When information about a single entity is presented sequentially, there is usually a primacy or “ first impression” effect, whereby the earliest information has a larger impact on the unitary impression that later information does (Anderson 1973; Asch 1946).

In addition, sensory scientists report a primacy bias in hedonic assessment of food; the first food sampled is experienced most strongly, so it is likely to be the most memorable (MacFie, Bratchell, Greehoff & Vallis 1989). One reason putforward for the primacy effect is that the initial items presented are most effectively stored in long-term memory because of the greater amount of processing devoted to them.

Several studies have investigated the effects of location in a sequence on end-of-sequence choices, there is still no clear answer to the question of

which location in a sequence is most advantageous. Several researchers have conducted that there are primacy effects in choice (Carney & Banaji 2008; Miller & Krosnick 1998), and many descriptive studies of consumer choice have found such effects (Becker 1954; Berg, Filipello, Hinreiner & Sawyer 1955; Coney 1977; Dean 1980).

One suggested reason for the recency effect is that these items are still present in working memory when recall is solicited. One suggested reason for the primacy effect is that the initial items presented are most effectively stored in long-term memory because of the greater amount of processing devoted to them. There is some support backing up these ideas. Firstly, the primacy effect but not the recency effect is reduced when the items are presented faster. In addition, the primacy effect is enhanced when items are presented slowly, this suggests such factors can reduce and enhance processing of each item, therefore showing evidence of permanent storage. Secondly, the recency effect but not the primacy effect is reduced when a distracter task is given such as a maths continuous subtraction prior to recalling list items. This task in turn, requires working memory, and therefore interferes with the list items trying to be rehearsed and learned.

The question of primacy versus recency dominance is not clear cut and continues to be investigated and debated. Marketing researchers generally have heeded the psychologists caution to vary presentation order in consumer product testing. However, there have been no recorded attempts to determine whether first or last position bias does influence consumer choice. Glanzer & Cunitiz (1966) study investigating memory recognition and primacy-recency effects found that if a distracter task was introduced

immediately after participants had learnt a list of words, that the recency effect was wiped out, but the primacy effect remained. However, Bjork and Whitten (1974) found that there was still a recency effect in free recall when the participants counted backwards for twelve seconds after each item in the list was presented. According to Atkinson and Shiffrin (1968) this should have eliminated the recency effect.

The vast majority of research into the serial position effect and memory has been conducted using verbal stimuli. These have found familiar bow-shaped serial position functions using a variety of theory including probed recall (Avons, Wright & Pammer 1994, Nairne, Whiteman & Woessner 1995) and serial reconstruction (Nairne, Reigler & Serra 1991). Similar results arise if the stimulus materials are familiar pictures that can be verbally encoded (Manning & Schreier 1988). Recent research has shown that serial reconstruction tasks using random matrices (Avons, 1998) and unfamiliar faces accompanied by verbal suppression (Smyth, Hay, Hitch & Horton 2005) yield similarly shaped bow-shaped curves.

In contrast, when memory for visual stimuli is examined using probed recognition the typical finding is not of a bow-shaped serial position curve but one with no primacy and only last item recency. Phillips & Christie (1977) first demonstrated this non-standard serial position curve using a range of paradigms, with this finding

being replicated using a variety of materials and methods (Avons, 1980; Avons, 1998; Broadbent and Broadbent, 1981; Hanna & Loftus, 1993; Kerr,

Avons & Ward, 1999; Kornes, Maggnussen & Reinvang, 1996; Walker, Hitch & Duroe, 1993).

Miles and Hodder (2005) looked at the effects of serial position on recognition memory for odours. The seven studies presented in their report looked at the contradiction in the present literature concerning the effect of serial presentation of odours on immediate recognition of test items. Usually, recognition tasks give the participant a sequence of items followed by two test items; one of which is familiar. The participant is then asked to identify the familiar item. Such a task is known as a two-alternative forced choice (2AFC) task. Using such a type of testing usually creates recency effects in the absence of primacy effects (Miles 2005).

Moreover, whilst considerable primacy-recency research has been conducted by using visual and auditory stimuli (Aldridge, J. W. & Farrell, M. T. 1977; Broadbent, D. Dines, R. & Broadbent, M. 1978; Engle, R. W. & Durban, E. D. 1977) and to a lesser extent, motor stimuli (Magill, R. A & Dowell, M. N. 1977), little study has been devoted in this area to the sense of taste.

However, Ward, Avons & Melling (2005) reported qualitatively equivalent serial position functions for both unfamiliar faces and nonwords when applied to a two-alternative forced-choice (2AFC) recognition task and a serial order reconstruction task. The recognition task demonstrated single-item recency whilst the construction task demonstrated both primacy and recency. On the basis of these analogous functions, Ward et al (2005) proposed that the serial position effect differs due to task, rather than stimulus or modality dependent. For example, a 2AFC recognition task produced recency effects

only, and serial order reconstruction tasks produces primacy and recency effects. Although, research conducted on olfactory memory and recognition has suggested memory for olfactory stimuli is different from memory for other stimuli (Baddeley 1976; Herz & Engen 1996) as it has been found that immediate recognition of odours is considerably worse than that noted in visual or auditory tasks (Lawless 1978).

Research into taste memory has previously investigated the presentation order effects (Dean 1980). This study measured the effects of position order in consumer taste testing on overall product preference and product rating scores. It was found that consumer product evaluations appeared to have been influenced strongly by presentation order, as first position products were preferred over later ones. This was based on both food and beverages. However, it could be argued that the results were found due to underlying reasons such as attention decrement, which is an idea emerged from serial order effects research that suggests that attention decreases over the course of stimulus exposure. In addition, it is suggested another underlying reason is a possible palate desensitisation effect, which is where participants become progressively less able to discriminate as a result of an initial taste or sensory masking effect. This effect is thought to have been visible even though Dean (1980) used water and crackers between products, as the participants taste discrimination may have become temporarily impaired. A second study into taste preference by Mantonakis, Rodero, Lesschaeve & Hastie (2009). This study found that their measure of preference revealed a primacy advantage for the 2-wine, 3-wine, 4-wine and 5-wine sequences and a recency effect for the 4-wine and 5-wine sequence only. Mantonakis et al

(2009) suggested bias reasons for this, the first was a first-is-best bias which is to account for the consistent primacy effect. In addition, the second bias was the bias in favour of each new wine accounts for the recency effect, it was found that the participants with higher expertise in wine were more persistent in looking for a better wine later in the sequence.

Furthermore, Melcher & Schooler (1996) had investigated the verbal overshadowing of taste memory regarding a situation where domain-specific perceptual expertise exceeds verbal expertise. Three groups of participants were used, non-wine drinkers who have virtually no experience with the stimulus and have low perceptual expertise and low verbal expertise, wine drinkers who have developed a palate for wine, therefore they have moderate perceptual expertise yet low verbal expertise, and the third group was wine experts who have high perceptual expertise and high verbal expertise. It was found that verbal overshadowing did in fact occur in the wine drinkers group whereby their perceptual expertise exceeded their verbal expertise. A possible explanation for this given by Lewis, Seeley & Miles (2009) is that the novice wine drinkers may not have the ability to provide verbal descriptions that were sufficiently analytic in order to establish a change in style that could carry over to the wine-recognition stage. The experts on the other hand, may have been analytic in their approach to the initial wine tasting and so, even if the verbal description task did produce a carry-over of a controlled analytic style, then this style would not have been deleterious to their wine recognition skills.

Another area of taste memory that has been explored is the processing of Navon letters and wine recognition in a series of tests (Lewis, Seeley & Miles

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2009). It was found that wine recognition was more accurate after the reading of the global letters rather than after the reading of the local letters of the Navon stimuli.

The present study investigated the effects of position order in a sequence of wines and taste recognition of a 'trial' wine in a series of trials. The experimental hypothesis for the present study was that there would be a significant difference in correct scores between the first and third position and the second position, therefore, that primacy and regency effects would be present in taste memory.