

# The Effects of Time Delay in Electronic Commerce

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## ABSTRACT

An experiment is conducted to ascertain the effects of time delay on consumer behaviour in the context of electronic commerce (e-commerce). Our experiment has found that sequences of delays cause annoyance amongst the subjects. There is little to suggest that psychological adaptation to the time delay may exist. Patterns of delay – such as increasing and decreasing downloading speeds – also matters when a subject evaluates an e-commerce shopping experience.

## Keywords

Download speeds, peak-and-end effects, time delay, patterns of delay, e-commerce

## INTRODUCTION

Anyone who has used computers and the Internet would agree that time delay will rank amongst one of the highest irritants of computer usage. Why is delay important, or even relevant in e-commerce? ZDNet has reported that a study by the Boston Consulting Group found that in a survey of 12,000 online customers, 48% of them gave up trying to buy some products because the web pages took too long to load [1]. In a multi-billion dollar business-to-consumer e-commerce industry, that is a lot of potential customers lost.

Furthermore, consumers are now faced with a large choice of e-commerce retailers. A major determinant of which retailer to use will be determined by the consumer's perception of his or her previous experiences with each retailer. While price and availability are major considerations in themselves, Brynjolfsson and Smith [2] pointed out there exist many other factors which consumers take into account in an e-commerce purchasing decision. Trust is probably the single most important factor in e-commerce, and the effects of time delay can significantly reduce consumer trust towards an e-commerce retailer.

## RESEARCH

### Pilot study: initial findings

By building on existing research on individual

psychological behaviour, our research has found that: 1. Time delay does annoy an individual while he or she is attempting to purchase goods online; and 2. There is evidence that the sequence in which the individual experiences delay does matter while shopping online.

### Motivation and literature

From one perspective, delays should only matter if there is an increase in the total duration of an experience. Based on recent research, however, we expected that how the delay is distributed over a sequence of activities within an experience (while holding the total duration of the experience constant) would also affect an individual's evaluation of their overall experience.

Kahneman and his colleagues, for example, have documented that the duration of an experience has only a small role to play in the retrospective evaluation of that experience, if that experience is negative [3]. They term this *duration neglect*. Kahneman *et al.* also found that the worst and the final moment of that experience, that is, the peak-and-end effect, usually dominate the evaluation of a negative experience by an individual. For example, imagine a patient currently undergoing a painful medical examination. After the examination, the patient is asked to evaluate the overall level of pain suffered. The patient will use his or her memories of the most painful period, along with the final moments of the examination for the evaluation. The duration of the examination has only a very small role to play in the patient's overall pain evaluation (subject to the patient experiencing a sequence of diminishing pain towards the end), contrary to conventional wisdom.

Ross and Simonson [4] have found that – all other things being equal – individuals prefer to experience a sequence of improving events (e.g. bad news first before good news) over a sequence of worsening events (good news first, followed by bad news). Ross and Simonson's research can be generalised to many common time-related events being experienced by an individual. For example, the preference for improving sequence of events by an individual has been demonstrated in domains as diverse as vacations, TV advertisements, queuing, pain and emotional experience [5].

Furthermore, research by Hsee and his colleagues' [6] have found that an individual's overall satisfaction with a sequence of events is positively related to the speed at which the outcome of events improve over time. In other words, the quicker the good news arrives after the bad news, the more satisfied the individual becomes.

#### Methodology

To test for the effects of delay in e-commerce, a simulated model of an e-commerce site is used. The subjects are required to make hypothetical online purchases in a simulated online supermarket website. There are two tests, with the first test requiring the subjects to make two simple and hypothetical online purchases, with one website having significantly faster downloading speeds than the other, with all other things being equal.

The second test is slightly more complicated. The subjects are required to make a series of online purchases, and the only thing that varies is the pattern of delay. The subjects will be undergoing a constant sequence of websites five times in a row, with the time delay (or downloading speed) between these five sets of sequences varying, according to the Ariely pattern [7].

The Ariely pattern is a sequence of delays (see Figure 1) which produce an average delay of 3 (normalised) for the whole duration of the sequence.

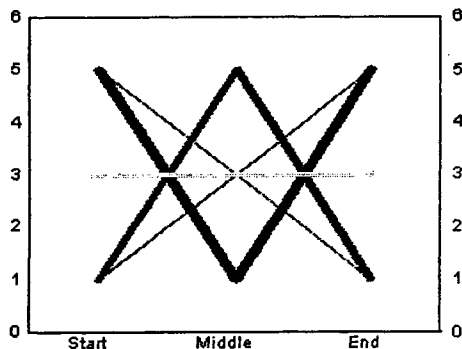


Figure 1: Ariely patterns

The vertical axis represents the relative time delay; the larger the number, the longer the delay

There are all together five patterns of web downloading speeds. They are : 1. fast-to-slow, 2. fast-slow-fast, 3. slow-to-fast, 4. slow-fast-slow, and 5. constant speed. It can be hypothesised that the subjects will rate the slow-to-fast the most favourable sequence (due to a preference for improving endings) and the fast-to-slow the least favourable sequence.

#### Experiment

24 subjects took part in an e-commerce experiment. A hypothetical supermarket website is created and the subjects are required to purchase common groceries from the supermarket online. They are told that delays are

expected, and asked to rate how the delays affected them. The subjects are required to purchase a series of groceries from different sections in the supermarket, and they will experience the delay after selecting each item and placing it into their shopping basket. After a sequence of five delays (corresponding to one of the Ariely patterns), they will rate their level of annoyance. The subjects will then go on to experience another four more sequence of delays, each corresponding with a different Ariely pattern. The order in which the patterns occur is randomised to remove any unwanted psychological effects.

Since the experiment is still running at the time of this report, and due to the current small size of the sample, it is still too early to include any conclusive results which the reader may benefit from.

#### FUTURE WORK AND CONCLUSION

The author has lined up future experiments to test Kahneman *et. al's* theories on duration neglect, as well as the under-researched areas of consumer choice under time pressure. Many assumptions are made in e-commerce about the psychology of the consumer with regards to delays and time pressure, but little has actually been studied. We hope that this research would enable us to understand the experience of a consumer in the context of electronic commerce.

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