

# A Behaviouristic Interpretation of the Popularity of Mobile Text Messaging

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## Abstract

The use of mobile text messaging – SMS - has grown quite enormously over a short period of time. This has happened in spite of the fact that mobile phones have a quite clumsy user interface and that the cost of sending a message is relatively high. Three types of explanations for the popularity of SMS are suggested and discussed here: ; The rational explanation, the explanation that looks to new interaction patterns, and the ethnographic explanation. While these help understanding the popularity of mobile messaging, they cannot account for important aspects of the mobile messaging. It is suggested that an analysis of messaging based upon Skinner's variant of behaviorism could offer new insight into messaging. Some of the basic terms of such an analysis are set forth, and it is suggested how the framework could be used to analyze mobile messaging. Finally, a short outline of other phenomena this approach could help explain is offered.

## 1 Introduction

The use of the SMS text messaging system has increased dramatically over the last years For instance, the Norwegian population of about 4,5 mill sent 515 mill SMS messages in 1999, and 3,137 mill in 2003, representing a six fold increase over four years (The Norwegian Post and Telecommunication authority, 2003). This popularity is bewildering given the cumbersome interface of this communication device. First, characters have to be entered using the mobile phones' tiny numeric keypad. Second, the message length is constrained to 160 characters. Third, the display is small and hard to read. The designers may be excused by the fact that the SMS system was never intended for person-to-person messaging but rather for system messages, e.g. to warn of incoming voicemail. In addition to the "behavioural cost" associated with sending a message, messaging in Norway has also been quite costly in monetary terms, about 0.15 \$ per message.

This paper looks at the apparent paradox of a popular service with a cumbersome design from a new angle. Its primary concern is to investigate in what respects a behaviouristic analysis and explanation of mobile text messaging could be worthwhile. The paper has three sections. In the first, existing explanations are analysed, and it is concluded that while these indicate new and interesting user interaction patterns, the phenomenon remains "underexplained". In the second section, a behaviouristic interpretation of SMS communication is introduced. The framework is outlined and the key elements of an SMS interaction is analysed in this framework. The last section points out how this framework could help explain key findings in texting behaviour and suggest some empirical studies that would throw further light on the viability of the analysis method proposed.

## 2 Explanatory paradigms

The phenomenon of SMS use, especially among youths, has been described in numerous recent publications (Ling, 2004, Ling & Yttri 2002, Grinter & Eldridge, 2002, Grinter & Eldridge 2003, Taylor & Harper, 2002, Taylor & Harper 2003). An underlying tone of bewilderment can be seen in most of them. The explanation offered for the high degree of popularity of SMS can be grouped under three sections: 1) *Rational*. These explanations tend to suggest that the popularity is what we should expect given what we know about the populations motives and

preferences. 2) *New or easier ways of interaction*. A prime example is Rich Ling and colleagues' description of "micro coordination" (Ling & Yttri, 2002). 3) A third type of explanation might be called "*ethnographical*". Here the focus is upon the subtle functions that messaging might fill in the social life of users. Taylor and Harpers' analysis of messages as gifts is a prime example (Taylor & Harper, 2002, Taylor & Harper 2003). The following is not intended to give a comprehensive review of different explanations of the phenomenon, just to point out some main characteristics.

## 2.1 Rational explanations

The reason for SMS popularity is explained by factors like the cost, accessibility or availability, and opportunity. These types of explanations are summarized aptly in Rich Ling's last book: "Given this popularity, we have to wonder what is so beguiling about text messages. Much of the answer is that text messages are relatively cheap and they are convenient. Text messaging allows us to maintain contact with friends and colleagues, but at the same time it is inconspicuous. Texting allows us to be expressive even in situations where other forms of communication are not appropriate. For example we can text when sitting on the bus, in the classroom, or, in the case of socially starved teens, under the covers late at night." (Ling, 2004, p.147). The point in this type of explanation is that Mobile messaging is cheap, convenient, and can be done inconspicuously.

## 2.2 Explanations based on changes in interaction possibilities

These types of explanation could be seen as a subgroup of the ones just discussed. Mobile messaging allows for a relaxed planning when people are to meet up. Before the advent of mobile phones, a meeting had to be planned both with place and time set in advance. The mobile phone has made it possible to relax this requirement considerably. Now it is possible to adjust the time and place literally down to the last minute. Rich Ling and colleagues, who first described this phenomenon, have named it "micro-coordination" (Ling & Yttri, 2002). Because the new way of planning is much easier and flexible than the former, it could be argued that it contributes to the popularity of mobile messaging. Another phenomena attributed to mobile messaging is spontaneous organised groups (Reingold, 2002). However, in this case the messaging is more an explanation of a phenomenon than the other way around.

## 2.3 Ethnographic explanations

Explanations that focus on mobile messaging as tool for establishing and maintaining social relationships are grouped under this heading. An outstanding example is Taylor & Harpers analysis of mobile messaging as gift giving (Taylor & Harper, 2002, 2003). In their analysis they are quite explicit in framing gift giving as an explanation for popularity: "... what is it about the gift and in particular the mobile phone and its content that makes it 'work' in the exchange ceremonies that young people perform? The answer to such a question will, we believe, provide one way of assessing the probable success or failure of future mobile-phone features among young people." (Taylor & Harper, 2003, p 269). The point here is not gift giving per se, but that "...people *shape* technologies for everyday, practical purposes and as a means to meet their social (as well as moral) obligations." (op. cit p. 294).

It is not the goal or function of this paper to argue that the three the types of explanations summarised above are wrong. They throw light on the popularity of mobile text messaging each in their own way. Each of them has their obvious merit. At the same time it should be uncontroversial to argue that they do not present the whole and definite story. Consider for instance the results reported by Grinter & Eldridge that more than half of the messages sent are "singles", i.e. messages that doesn't receive a reply, and that: "Most of the single messages that were sent asked, either explicitly or implicitly, for a response. Some were conversational openers such as 'Hi what are you doing?' or 'What's up.'" (Grinter & Eldridge, 2003, p. 444). These types of phenomena seem to be "under- explained" by the current explanation paradigms. It doesn't seem right to argue that these singles are gifts since there is no reciprocal pattern. They do not seem to have any coordination function and they definitely do not seem to be rational. So why do people struggle with a lousy interface to write messages like "what's up" and "Hi how are you?" and pay to have it sent, when they quite often won't get an answer and when they do get an answer its exactly what you would expect, like "OK"? The suggestion presented here is that this type of behaviour is better explained by utilizing concepts from radical behaviourism than by the paradigms sketched earlier.

### **3 A behavioural approach**

Many different approaches can and have been called “behaviourism”, thus “behaviourism” is not a very precise term. In the following some central terms from the nomenclature of radical behaviourism are presented. For an authoritative view see some of B.F. Skinner's work, for instance Skinner (1969).

#### **3.1 Some terms in the operant analysis of behaviour**

The central claim of radical behaviourism is that behaviour can be effectively described, predicted and controlled by using three mutually interdependent concepts: The discriminatory stimulus (SD), the operant (O) and the reinforcement (R), or S-O-R. The operant (O) is the organism's behaviour that operates on the environment. The reinforcement (R) is the consequence of that behaviour for the organism, and the discriminatory stimulus (SD) is the situation in which the behaviour occurs. The operant is not defined by how the behaviour looks, but by the effect it has. Further, the reinforcement (R) is not defined as pleasure or pain, but by the actual effects it has on the frequency of the operant. If behaviour in a situation has an effect and this effect does not change the frequency of the behaviour in that situation, then the effect cannot be called reinforcement. In practical settings the operant analysis of behaviour is often concerned with behaviour that either is not wanted or is wanted, but lacking. In these cases, the operant is given by the practical situation, and the problem is to figure out which consequences of the operant function as reinforcement and either remove or administer such consequences.

Through laboratory and field studies, the effects of different types of schedules governing the relation between the responses and the reinforcement have been investigated. These rules for reinforcement are called “reinforcement schedules”. There is a major distinction between continuous reinforcement schedules and intermittent reinforcement schedules. The former describes a schedule where a reinforcer follows each operant, while in the latter case only some operant responses are reinforced. Two important classes of schedules are the interval and the ratio schedules. The interval schedules prescribe a time interval between reinforced responses. The time interval may be fixed (constant) or variable. Thus a schedule could be FI15 or fixed interval fifteen (sec), which would mean that after a response was reinforced, no response inside the next fifteen sec interval would be reinforced. The first response after the 15 sec interval would be reinforced and restart the interval. A ratio schedule prescribes a certain number of responses before reinforcement. A FR15 schedule would imply that fifteen responses had to be performed before reinforcement. Both ratio and interval schedules might have variable intervals or variable number of responses required. For instance, a variable ratio 15 schedule VR15 would indicate that the mean number of responses needed to bring about a reinforcement was 15, but it would vary from less to more. Different schedules of reinforcement produce different rates and patterns of response. Variable schedules produce a steady response rate, while fixed schedules tend to produce pauses after reinforcement is received, while ratio schedules produce higher response rates than interval schedules. In the start of a learning situation it is often necessary to reinforce every occurrence of the response. Later, the reinforcement ratio can be stretched considerably.

The discontinuation of reinforcement is called extinction. Discontinuation of reinforcement leads to a progressive decline in the frequency of the operant. How fast this decline occurs depends partly upon the schedule of reinforcement the behaviour was controlled by. The less reinforcement needed to keep the organism responding, the more resistant is the behaviour to extinction. This is often called the “partial reinforcement extinction effect” (PREE). Further, a variable schedule produces greater resistance to extinction than a fixed schedule. Thus, behaviour on a low reinforcement density, variable ratio schedule, would tend to give rise to high and constant rate of responding, and be hard to extinguish. (There is a considerable literature on the PREE. One controversy relates to the difference between single schedule and multiple schedule situations. The PREE is primarily associated with the first type of situation (e.g., Svartdal, 2000), of which SMS would be a very good example.)

Many more schedules and combinations of schedules have been investigated and many other concepts are important to an operant analysis of behaviour, for instance the distinction between shaped and rule governed behaviour. However, the intention is not to give an introduction to operant behaviourism. The purpose is just to sketch enough of the basic concepts to make their application to mobile text messaging meaningful. Any introductory textbook in psychology provides treatment of the concepts.

### 3.2 Application to mobile text messaging

Given the concepts introduced above, an operant analysis of mobile text messaging could proceed as follows. The behaviour, or operant, we are interested in is sending of messages. For now the content of the messages do not concern us. To send a text message is quite clearly defined, and is easily observed and as such it is easy to analyse as an operant. An operant analysis of this behaviour would entail observation of the behaviour, the situations in which it occurs and the consequences it produces.

The situation in which the behaviour occurs must specify time and place, and also whom the message is sent to. If it is fruitful to analyse this behaviour in this manner, the receiver of the message is probably acting as an important discriminative stimulus. One would be especially interested in finding what consequences acted as a reinforcement of the behaviour. A good guess is that receiving a message acts as a reinforcement. However, it is an empirical question whether receiving messages acts as reinforcement on sending messages. It may be the case for some persons, and it may not be for others. To establish that sending of messages are under the control of receiving messages, one has to establish that the frequency of the operant increased when followed by a receiving a message. Other consequences like having a phone call or meeting a person might also function as reinforcement of the behaviour.

A behaviouristic analysis of mobile text messaging then would treat the sending of a message as an operant (O). The time and place where the sending occurs, together with the recipient of the message, would be treated as discriminative stimuli (SD). The analysis would search for the reinforcement of the operant among consequences like receiving a message, having a phone call or a meeting (R).

In order to establish that the analysis is correct, it must be shown that the reinforcement has some control over the operant in the situation. There are a number of different experimental and field procedures that could be used to this end (see Baily & Burch, 2002, for a recent and comprehensive treatment).

## 4 Explanations and suggestions

So far this paper has argued that 1) current explanations of mobile messaging do not explain important parts of the phenomenon, and 2) that it is possible to analyse sending of messages in operant terms. Now its time to look at what such an analysis would offer if it turned out successful.

Some of the bewildering phenomena of mobile messaging include:

- Writing messages without any “rational” reason.
- Very large amounts of messages written
- Writing messages repeatedly to same person without getting answers
- Accruing bills way over their ability to pay
- Affectional behaviour towards mobile phones
- Sorrow and abstinence when phone is taken away

These phenomena would be expected if sending text messages were under control of certain types of reinforcement schedules:

- First, under certain circumstances, writing a thoughtful message might increase the likelihood of a response, under other it might not be important. Thus, in case the behaviour is controlled by receiving a message, it should not be the least surprising that people sending messages that are relatively devoid of content and apparently without any “reason”.
- Secondly, if the behaviour is on a variable ratio schedule, a high response rate is expected.
- Thirdly, in the case that the behaviour is under the control of a low-density variable reinforcement schedule, a high rate of sending messages without getting answers is to be expected. Further, writing messages would be resistant to extinction, thus we would expect a continuation of message writing a long time after the receiver has stopped answering.

- Forth, it is hard to get behaviour under the control of consequences that are far removed from the action in time. Bills for using phones are typically far removed from the actual use of the phone. Thus, to be effective, they need to be mediated by verbalized rules. A large part of human behaviour is rule-governed. Sending messages may or may not be partly a rule-governed behaviour. One such rule could link sending messages to bills and the necessity to pay them. If such rules are not in play or are ineffective, it is to be expected that comparatively more immediate reinforcement, like receiving a message, control the behaviour. In such circumstances it is expected that phone users accrue bills they are not able to pay, which is exactly what we sometimes observe .
- Fifth, stimuli are grouped in primary and secondary reinforcements. Primary reinforcement has the ability to change the frequency of an operant by itself. A secondary reinforcement is a stimulus that is neutral, but takes on a reinforcement value by being correlated or coexistent with a primary reinforcement. If receiving messages is a primary reinforcement, it should be expected that the mobile phone itself take on a secondary reinforcement value. Further, if receiving messages is a positive reinforce, it would tend to increase the frequency of behaviour that precedes it. This could typically be some kind of handling of the mobile phone. This kind of behaviour is often called “superstitious behaviour” (Skinner, 1948).
- Sixth, the loss of a source of reinforcement is often accompanied by longing and sorrow.

Thus, a range of the phenomena often seen in use of mobile text messaging could be explained by an operant analysis. It must be stressed, however, that these explanations only hold in the event that such an analysis is performed, and that it turns out that the behaviour is fact under the control of schedules of reinforcement.

It is suggested above that a number of techniques could be used to determine whether sending messages are under control of schedules of reinforcement. For example, the following experiment may be suggested as one feasible example. It has been known for a long time that schedules of reinforcement may be combined. A typical finding is that if behaviour is under the control of two schedules, the proportion of responses made to each of the schedules is proportionate to the ratio of reinforcements of the two schedules. Thus, if the behaviour is under control of one VR5 and one VR10 schedule one would expect two times as many responses to the VR5 schedule as to the VR10 schedule. It would be quite easy to investigate if this relationship holds in mobile messaging. In such an analysis, it could be assumed, for instance, that the operant is sending a message, a received message is reinforcement and that different schedules hold for the different addresses that messages are sent to and received from. If the relationship holds, it is an indication that sending messages could fruitfully be analysed in behavioural terms.

## 5 Concluding remarks

In summary, three suggestions have been offered: 1) Current explanations of the popularity of mobile messaging leave out some important facets. 2) It is possible to analyse mobile messaging by utilizing the terminology of radical behaviourism, and it is an empirical question whether it is successful or not. 3) A successful analysis of mobile messaging in terms of radical behaviourism would help to explain the popularity of messaging and offer explanations to many of the perplexing phenomena that surround it.

The argument presented above has the form of a sketch and both large and small issues have not been addressed. One of the obvious and important issues that must be addressed in a proper analysis is the content of the messages. It is quite possible that the content of the message determines the degree to which a message turns out to be a positive reinforcer or not. Thus, to neglect the content of messages may be a huge simplification. In defence of this simplification, however, it must be remembered that what is presented here is the case that a behavioural analysis could be fruitful and ought to be tried. The paper does not in any way pretend to give any definitive analysis of the matter.

Behaviourism has often been linked to positivism and a mechanical, dehumanising outlook on human beings. Would an analysis as suggested here dehumanise users of mobile text messaging? Some might argue this supposedly because the analysis would suggest that the behaviour could both be predicted and controlled. In this respect however, behaviourism doesn't differ much from psychology in general. One of the aims of psychology is to explain and control behaviour, and in the event it is successful in doing so, the accusation of dehumanisation and mechanisation invariably follows.

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