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Effect of gazing at the camera during a video link on recall

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Abstract

The impact of looking into the camera during a presentation over a video link (resulting in the perception of mutual gaze) on information recall was investigated. In a face-to-face context mutual gaze has been shown to facilitate the encoding and subsequent recall of information [Fry, R., Smith, G.F., 1975. The effects of feedback and eye contact on performance of a digit-coding task. J. Soc. Psychol. 96, 145–146; Otteson, J.D., Otteson, C.R., 1980. Effect of teacher's gaze on children's story recall. Percept. Motor Skill. 50, 35–42; Sherwood, J.V., 1988. Facilitative effects of gaze upon learning. Percept. Motor Skill. 64 (3 Part 2), 1275–1278]. One explanation for these findings is that gaze acts as an arousal stimulus, which increases attentional focus and therefore enhances memory [Kelley, D.H., Gorham, J., 1988. Effects of immediacy on recall of information. Commun. Edu. 37(3), 198–207]. Two studies were conducted in order to test whether gazing at the camera during video-mediated presentations resulted in similar benefits as mutual gaze in a face-to-face context. In s*tudy* 1 a confederate presented information about two fictitious soap products. In one condition, the confederate gazed at the camera for 30% of the presentation, therefore giving the participants the impression that he was gazing in their direction. In the other condition the confederate did not gaze at the camera. Participants viewed the sales presentations from both conditions. In the condition where gaze was directed at the camera, participants recalled significantly more information about the sales presentation. *Study* 2 employed the same pre-recorded sales presentations used in *study* 1, however they were delivered to the participants under audio-only conditions (therefore, the image was switched off). Results from *study* 2 indicated no recall differences between the two conditions. Findings from these studies would seem to indicate that the perception of gaze aversion over a video link (a consequence of the salesman not looking into the camera) has a negative impact on information recall. This has practical implications for video-mediated presentations. In a distance learning environment lecturers could be advised to look into the camera in order to promote more efficient learning in students.

Keywords: Video-mediated communication; Gaze; Recall

1. Introduction

Video-mediated communication (VMC) is regarded as a valuable tool for applications such as remote collaboration, conferencing, and distance learning (Finn, 1997). According to Campbell (1998), videoconferencing systems duplicate the experience of face-to-face meetings as closely as possible without the burden of travel. Unlike audio-conferencing, VMC allows participants access to visual information, and therefore there is a likelihood that many of the advantages associated with co-present face-to-face interaction can be replicated (Sellen, 1997). Currently, corporate and academic sectors appear to be making the most use of videoconferencing technology. In a business environment, VMC is used to serve a host of functions, for example interviews, meetings, product announcements and training (Videotalk, 1999). In the academic sector, "distance learning" is a relatively new application, which incorporates audio and video technologies for

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educational purposes, so that widely dispersed students can attend training seminars and courses without travelling to where the course is being presented (Videotalk, 1999).

The implementation of videoconferencing systems is largely based upon the assumption that visual signals improve human interaction. If visual signals were unimportant, then communication over the telephone would surely suffice? Rutter (1987) however has argued that visual signals are less effective during a videoconference compared to face-to-face interactions. Heath and Luff (1991) also noted that non-verbal behaviours have less of an influence on communication over video: in other words they are either ignored, or do not serve any communicative benefit. Although it is clear that VMC systems allow users access to non-verbal signals, one problem is that VMC results in an attenuation of visual cues (Doherty-Sneddon et al., 1997). One aspect of this is that the complexities of human gazing behaviour are not replicated in most VMC systems. During a videoconference information from the eyes is limited. Due to the manner in which normal video systems are set up, mutual eye contact is impossible. The camera is usually placed above the monitor and not inside of it, and therefore if one participant looks at the eyes of another person, it will appear to the other user that he/she is looking in a downward direction.

As well as natural eye contact being compromised, Monk and Gale (2002) indicate that full gaze awareness is also difficult to achieve in a normal videoconferencing set-up and is dependent upon the scope of the image provided. Traditionally, VMC is set-up in such a manner that only an image of another person's head and shoulders is available. The problem with this is that individuals in a videoconference will be unaware as to where and at what their partner is looking at. Monk and Gale (2002) indicate that providing wider coverage to expand to the environment around participants may therefore be beneficial. In doing so, images of the participants' faces will become less clear, however, Daly Jones et al. (1998) indicate that benefits of facial expressions have been over stated in most task contexts.

Various novel attempts have been made by researchers to provide full gaze awareness in VMC. Velichkovsky (1995) and Vertegaal (1999) for example used eye-tracking devices to help detect where individuals were looking. Gemmel and Zhu (2002) suggest using a software solution to correct gaze in videoconferencing. The developers have designed a system which provides eye contact and full gaze awareness by modifying the head and eye position to a desired head and eye position. Monk and Gale (2002) report the benefits of full gaze awareness in VMC. Using apparatus that supported gaze awareness (GA Display), a number of effects were found. In comparison to two conditions (VMC with eye contact and audio-only), the gaze awareness set-up resulted in a lower number of turns and words in order to complete the task. The researchers go on to suggest that this finding can be explained in terms of understanding. Essentially, full gaze awareness provided an alternative non-linguistic method for checking one's own and another individual's understanding. In conditions where gaze awareness is not possible, individuals must signal understanding verbally, which is less efficient and therefore takes a longer period of time.

Although video-mediated technologies constrain gazing behaviour, some perceived degree of gazing behaviour can be replicated in videoconferencing technologies through looking directly into the camera: this gives the viewer the impression that the other participant is gazing in the direction of their eyes (and therefore results in a perception of mutual gaze). An example of this is the strategy employed by television presenters to give the impression that they are talking to the audience. Users of VMC technology, of course, focus attention on the monitor (displaying the image of the other conversational participant) and not at the camera. The result of this practice is that users appear to be looking away from the person(s) with whom they are communicating, which in turn means that they do not look like they have conviction in what they are saying (Tiffin and Rajasingham, 1995). Technological solutions to this problem include the 'videotunnel' (Smith et al., 1991), which replicates natural eye contact through the use of strategically placed 'half-silvered mirrors.' Doherty-Sneddon et al. (1997) compared VMC using videotunnels and normal videoconferencing with no eye contact, finding that when eye contact was possible users tended to over-gaze. Participants in the videotunnel condition gazed on average 239 times at their conversational partner (more than double that recorded in face-to-face dialogues), compared to participants in the normal videoconferencing condition who gazed on average 144 times. Consequently, users became distracted by their partner's face and took significantly longer and used significantly more words to achieve a comparable level of task success. Indeed, Beattie (1981) has indicated that over-gazing interferes with cognitive processing and speech planning. Doherty-Sneddon et al. (1997) go on to argue that this over-gazing effect may be a direct result of the novelty of using such equipment, and are interested to note whether this would change over a period of time. Over-gazing may also be explained in terms of equilibrium theory. According to Argyle and Dean (1965) there are many cues to intimacy (for example proximity, touch and eye contact), and in cases where such cues are restricted individuals may compensate with other available cues. In this case participants may have compensated for a lack of proximity by over-gazing.

Although there are a number of VMC systems which can replicate the complexities of gazing behaviour, for example Gazemaster (Gemmel and Zhu, 2002), companies still make use of systems which do not allow natural eye contact to take place. Considering the wealth of research which suggests that eye gaze plays an important role in human communication, it would be expected that the inability to use such cues will have an adverse effect on communication. In a face-to-face context gaze has been shown to have a number of communicative benefits, for example helping to regulate speaker exchanges (Kendon, 1967), and as an indicator of interpersonal information, for example signalling levels of attentiveness (e.g. Kleinke et al., 1975). In addition to its social impact gazing behaviour has also been shown to have a number of cognitive effects. Beattie (1981) for example, indicated that excessive levels of inappropriate gazing result in high levels of physiological arousal, which in turn may interfere with cognitive processing. Such interference may have an effect on an individual's ability to perform cognitive tasks, for example memory tasks. This theory is also borne out by Glenberg et al. (1998) cognitive load hypothesis. Glenberg et al. found that people averted their gaze when attempting to answer questions that were deemed moderately difficult. The authors go on to propose that such behaviour is beneficial as it allows the individual to disengage from environmental stimuli (for example, the other individual's face), and therefore enhances performance directed by non-distracting stimuli.

Whereas research indicates that excessive amounts of gazing can interfere with cognitive processing, experimental evidence also suggests that gazing behaviour can improve memory for verbal information. For example, Fry and Smith (1975) showed that students remembered more instructions from a teacher who gazed at them more frequently. Similarly, primary school students remembered more of a story when their teacher gazed more frequently (Otteson and Otteson, 1980). Sherwood (1988) also found positive effects of gaze upon recall: verbal presentations with gaze improved memory for information compared to presentations without gaze. Titsworth (2000) found students retained more information in the long-term when their teachers employed immediacy behaviours (for example eye contact). Such behaviours are said to produce a greater perception of closeness between individuals. This effect is not limited to verbal information. Using a forced-choice recognition task, Hood et al. (2003) found that faces displaying direct gaze were encoded and retrieved by adults and children more successfully than faces with deviated gaze. The findings from these studies can be explained in terms of arousal. Kelley and Gorham (1988) suggest that gaze acts as an arousal stimulus, which increases attentional focus and therefore enhances memory. It may also be the case, however, that when accompanying verbal information, gazing behaviour serves as a non-verbal indicator to important information that requires attention, much in the same way that eyebrow movements are used to reinforce important aspects of speech (Ekman, 1979; Whittaker and O'Conaill, 1997).

Considering the positive effects that gaze have on human memory, can it be used to serve this same function in video-mediated contexts? This is an important question: if gaze can be used effectively to facilitate processing and recall of information even when it is mediated, this supports the importance of gaze in human cognition and also has design implications for VMC. Although it has been argued that non-verbal signals have less of an impact during VMC, some perceived level of mutual gaze can be achieved if the user looks directly into the camera. In order to test the effects of gaze across a video link on information recall, participants were instructed to watch a salesman presenting information about fictitious soap products. In one condition the salesman looked at the camera (video-mediated gazing), and in the other condition did not look at the camera. It is expected that looking directly into the camera will improve information recall.

2. Study 1: The influence of video-mediated gazing on information recall

This study focuses on how video-mediated gazing affects the encoding and subsequent recall of information. In order to test the benefits of video-mediated gazing, recorded video recitations were used which displayed a confederate presenting information about fictitious soap products. In one condition the participants viewed the confederate gazing at the camera at predefined points in the speech. In the other condition the confederate focused his attention entirely on the monitor and therefore it did not appear as if he was gazing in the participants' direction. In both conditions no interaction between participant and salesman was possible due to the fact that the sales recitations were pre-recorded. The measure of task performance was a recall test, where participants were asked to remember as much about the soap products as they could. It was expected that the video-mediated gazing condition would result in better performance on the recall task. Improved recall of information across a video link is desirable for a number of reasons. Video technologies are being used more frequently for distance learning. It is clear from a number of studies in this area that students often experience a decrease in social co-presence (Armstrong-Stassen et al., 1998; Abbott et al., 1993). In other words not being physically present in the same room as the instructor (lecturer) gave the students the impression of being alone (Abbott et al., 1993). Consequently many students reported difficulties

in maintaining attention. It is expected that the perception of mutual gaze across a video link will act as an arousal stimulus, which will help to increase student attention and improve memory.

2.1. Method

2.1.1. Participants

Thirty-two students (both undergraduate and post-graduate) from the University of Stirling participated. Sixteen participants were male, and 16 participants were female. Participants were randomly assigned across the experimental conditions. All participants had no prior experience with video-mediated technologies, or limited experience with video-mediated technologies (for example had used such equipment on a few occasions in the past only). No details of age were taken. The salesman (confederate) was male and 35 years of age at the time the recording took place. Only one salesman was used in order that differences in selling techniques could be eliminated.

2.1.2. Design

A within-subjects design was employed. Participants were assigned to watch one of four videos (each containing two sales recitations and two levels of gaze access); therefore 8 participants were randomly assigned to each video. The videos were designed in such a way as to counterbalance order effects. The videos were as follows:

Video 1—Product 1 (gaze) and Product 2 (no gaze);
Video 2—Product 2 (no gaze) and Product 1 (gaze);
Video 3—Product 1 (no gaze) and Product 2 (gaze);
Video 4—Product 2 (gaze) and Product 1 (no gaze).

2.1.3. Materials

In room 1, a colour monitor (JVC TM-14EK(B)) was mounted in a wooden box, with a video camcorder (Sony CCD-TR2200EPAL) placed directly above the monitor. A microphone was placed to the right of the monitor, and video and audio quality were as high as achievable in the lab. The monitor and camcorder in room 1 were connected to room 2, adjacent to room 1, in which a video camcorder (Sony CCD-TR2200EPAL) was used to play the pre-recorded recitations to the participants. Both monitors were 35.56 cm (14 inches) in size.

Each participant was distanced approximately 1 m from the monitor and the scope of the view included the salesman's face and upper body.

For product 1, the gazing condition was accompanied by 30% gazing (of total speech time), and 32% gazing (of total speech time) for product 2. The salesman memorised the recitations before the recording took place. In the gazing condition, the salesman gazed at the camera at predefined moments in the speech. Refer to Appendix A for a copy of the sales recitations, with underlined words/phrases indicating the points in the speech where the salesman gazed directly into the camera. The sales recitations were designed in a manner so that all variables could be held constant, except looking at the camera to simulate mutual gaze. This included ensuring that the salesman kept his body position constant throughout the sales recitations.

2.1.4. Procedure

Participants were seated in a videoconferencing room and were asked to face the monitor. Participants were informed that the study was investigating the marketability of two separate products and also whether videoconferencing equipment could be used successfully to sell products. This measure was taken to distract the participant's attention away from the real aim of the study. Participants were informed that they were about to see someone who would describe two different products to them. Participants were led to believe that the salesman was communicating real time over a video link. In order to prevent participants from talking to the salesman and thus discovering that it was actually a pre-recorded video, participants were requested to refrain from conversing with the salesman. Participants were informed that the experimenter wished to ensure standardisation with all participants, needing all participants to receive the same information in roughly the same period of time. Once these instructions had been relayed the experimenter left the room and played the tape. Finally, all participants were given an unexpected recall test for both products (in the order that they had been viewed). The number of correct answers were noted. After completing the experiment, participants were debriefed as to the deception and the true nature of the research.

2.1.5. Scoring

Participants were given a recall test for information contained in the recitations for both products. For both recall tests a highest possible score of 21 points was achievable. See Appendix B for a list of the questions.

2.2. Results for Experiment 1

Participants were scored on the number of correct answers on the recall test. Mean scores were then taken for the two levels of gaze (gaze at camera, and no gaze at camera) by summing the scores for the two products (Table 1).

Using a paired samples t-test, differences between the two gaze conditions were analysed. The gaze condition resulted in significantly more information being remembered than the no-gaze condition ($t(31) = 2.31, p < 0.05$). Participants can therefore remember more information

Table 1
Mean scores for two levels of gaze (standard deviations in parentheses)

Gaze at camera	No gaze at camera
7.02 (3.25)	5.70 (2.45)

from speech that is accompanied by video-mediated gazing.

2.3. Summary of study 1

Results from this study indicate that more information is recalled when gaze is directed at the camera. These findings can be interpreted in a number of ways. One explanation for the recall effect is an arousal based one. It is possible the perception of mutual gaze (a consequence of the confederate gazing at the camera) acted as an arousal stimulus, increasing attention and therefore facilitating the encoding of information (Kelley and Gorham, 1988). This would therefore lend support to Fry and Smith (1975), Otteson and Otteson (1980), Sherwood (1988) and Titsworth's (2000) claims that a speaker's gazing behaviour can influence a listener's mental processing of information and subsequent memory for it. Furthermore, this explanation would inform us that this function of gaze can also be completed successfully over a videoconference. In other words, the perception of mutual gaze can have the same psychological and cognitive impact during a videoconference as actual mutual gaze in a face-to-face context.

Alternatively, it is also possible that the perception of gaze aversion (a consequence of the confederate not looking into the camera) had a negative impact upon memory performance. In the condition where the salesman did not look at the camera it would have appeared to the participant that he was looking in a downward direction for the duration of the presentation and therefore avoiding eye contact. From the participant's point of view this may have been off-putting and distracting, particularly as it would have gone against expectations of how people normally conduct themselves in social situations. Furthermore, gaze aversion signals a number of important messages to the onlooker. For example, individuals who avoid eye contact may be perceived as defensive (Kleck and Nuessle, 1968), evasive (Hemsley and Doob, 1978) and inattentive (Kleinke et al., 1975). The formation of a negative impression of an individual may also lead to less inclination to listen to what they have to say.

These results may also be explained in terms of eye gaze acting as a cue to important information. Through looking up at the camera in speech one would assume that this would bring attention to what the speaker is saying, perhaps in the same way that we raise our eyebrows, nod our head, or change the tone of our voice to signal the importance of any given element of a speech (Ekman, 1979; Whittaker and O'Conaill, 1997). Gaze in this instance is informing the listener that something important has been uttered.

3. Study 2: The influence of video-mediated gazing on information recall: an audio-only comparison

This study aimed to further clarify the link between gaze over video and memory. The same pre-recorded video tapes were played audio-only (therefore the image was switched off) to a separate group of participants in order to eliminate the possibility that differences in recall between the two levels of gaze were due to any other factor, for example a better vocal performance by the salesman in the video-mediated gazing condition. It is possible that the higher levels of gazing in *study* 1 may have resulted in differences in speech patterns outside of the experimenter's control. For example, the confederate may have changed his verbal performance in conjunction with gazing at the camera (e.g. more intonation on the parts of the speech that were accompanied by gaze). Indeed many researchers agree non-verbal and linguistic processes are intricately linked (for example, Clark and Brennan, 1991; McNeill, 1985; Weiner et al., 1980). Therefore, by playing the same information to participants under audio-only conditions, these extraneous variables could be eliminated. It was expected that there would be no difference between the sales recitations when played to participants audio-only.

3.1. Method

3.1.1. Participants

Thirty-two undergraduate students from the University of Wolverhampton participated. Eight participants were male, and 24 participants were female. All participants had no prior experience with video-mediated technologies, or limited experience with video-mediated technologies (for example had used such equipment on a few occasions in the past only). No details of age were taken. The confederate was the same salesman used in *study* 1, and was therefore male and 35 years of age at the time the recording took place. Only one salesman was used in order that differences in selling techniques could be eliminated.

3.1.2. Design

A within-subjects design was employed. Participants were assigned to listen to the sales recitations used in *study* 1 under audio-only conditions. Participants were split into four groups of 8. Each group listened to one of four pre-recorded videos (the same videos used in *study* 1); therefore 8 participants were assigned to each video.

3.1.3. Materials

The sales recitations were played to the participants using a video recorder (Panasonic NV-HS900) and wall-mounted speakers. Audio quality was as high as achievable in the lab.

3.1.4. Procedure

Participants were seated in groups of 8. Participants were informed that the study was investigating the marketability of two separate products. Participants were informed that they were about to hear someone who would describe two different products to them and that they should listen to the information that was being presented to them. As in *study* 1, participants were led to believe that the salesman was communicating real time over a audio link. Once the instructions had been relayed the experimenter played the tape. After hearing the information participants were given an unexpected recall test for both products (in the order that they had been heard). The number of correct answers were noted. After completing the experiment, participants were debriefed fully as to the nature of the research.

3.1.5. Scoring

Participants were given a recall test for information contained in the recitations for both products. For both recall tests a highest possible score of 21 points was achievable. See Appendix B for a list of the questions.

3.2. Results for study 2

Participants were scored on the number of correct answers on the recall test. Mean scores were then taken for the two levels of gaze (Table 2).

A paired samples *t*-test was used to test for differences between the gaze conditions. Under audio-only presentation there was no difference between the video-mediated gazing condition and the no gazing condition in the amount of information recalled ($t(31) = -0.439$, $p > 0.05$).

3.3. Summary of study 2

Results from this study reveal no difference in the amount of information recalled between the two levels of gaze when the sales recitations were played to participants with the image switched off. This finding would therefore seem to indicate that the difference in *study* 1 was a consequence of something in the visual domain, more than likely the manipulation of gaze as all other variables were held constant.

Table 2
Mean scores for two levels of gaze (standard deviations in parentheses) for audio-only presentations

Gaze at camera	No gaze at camera
6.59 (2.91)	7.00 (3.45)

4. Overall discussion

A significant difference in recall between the gaze and no gaze conditions was found in *study* 1. However, there was very little numerical difference between the recall score in the gaze condition in *study* 1 (7.02) and the recall scores for the audio-only conditions in *study* 2 (6.59, 7.00). This would seem to suggest that the most likely explanation for the recall effect in *study* 1 is that the perception of gaze aversion had a negative impact upon recall. Therefore, it would seem that not looking into the camera results in poorer memory performance, as opposed to looking into the camera improving recall. However, some attention should be given to the fact that participants in the audio presentation were tested in groups of eight, whereas participants were tested individually in the video presentation. Research suggests that the mere presence of others can improve our performance on a task, if that task is relatively simple (e.g. Bond and Titus, 1983; Levine et al., 1993). Therefore, although unlikely, a social facilitation effect may have occurred in *study* 2.

The findings from this study have practical implications for videoconferencing in the real world. More and more academic institutions are making use of videoconferencing for distance learning. Research suggests that students find it more difficult to pay attention to lecture material when communication takes place over VMC (Armstrong-Stassen et al., 1998). It is possible that this dip in attention is directly related to the fact that communication is taking place in a non co-present setting. In other words, VMC does not allow lecturers to express a number of immediacy behaviours (for example eye contact), which help to improve perceptions of closeness between the student and the lecturer. If the student feels removed from the communication this will have a negative impact on how much attention he/she pays to the material. Looking into the camera will result in the perception of mutual gaze, which may increase feelings of co-presence.

It could be argued that this strategy will have little benefit for two-way communications, as the person looking into the camera has less opportunity to pick up visual information from their conversational partner. If someone is looking into the camera then they cannot at the same time be looking at the monitor. Research by Doherty-Sneddon et al. (1997) however does suggest that continually looking at the image of another participant is distracting and has a negative impact upon task performance. For example, participants took significantly longer to complete the task. A number of

other researchers have also noted such 'TV watching' effects (Abel, 1990). Research into face-to-face communication also indicates that we do not look at a conversational partner's face for the entire length of a conversation. Argyle (1988), for example noted that the speaker spends approximately 40% of time looking at their conversational partner's face. The listener, on the other hand, will typically spend 75% of time looking at their conversational partner's face. It could be suggested then that gazing at the camera will give the participant an opportunity to look away from their partner's face. In turn, this should mean that participants will become less distracted by their partner's face.

Considering the findings of this research, it would be interesting to note whether the perception of gaze across a video link also affects arousal in the same way that it has been described to in a face-to-face setting (e.g. Beattie, 1981). Further investigations may also compare how efficiently video-mediated gazing replicates other functions of gaze in a face-to-face context. For example, Kendon (1967) indicates that gaze is important in helping to regulate speaker exchanges in face-to-face communication. Can video-mediated gazing also be used to benefit the turn-taking process? There is an abundance of research which suggests that the amount of gaze used by individuals in a face-to-face context has an effect on how others perceive them. For example, higher levels of gaze are preferred over low levels: indeed people are perceived as being more intelligent, more trustworthy, and more friendly when they make more direct eye contact. An important question then is whether these same perceptions will also be realised in a video-mediated context when direct gaze at the camera is employed.

Overall, it would seem that the perception of gaze aversion across a video link has a negative impact on information recall. Perhaps this can be attributed to the kind of information that gaze aversion signals about an individual. The perception that someone is avoiding eye contact may result in the formation of negative attitudes towards that person, which may in turn have an impact upon how the information is received. If someone is perceived in a negative light, individuals may feel less inclined to listen to what they have to say. Although these findings are theoretically interesting, the fact that participants in *study* 1 were tested individually and participants in *study* 2 were tested in groups makes it difficult to draw firm conclusions as to what exactly has caused the recall effect. This necessitates further investigation to help clarify the link between video-mediated gazing and information recall.

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Appendix A. Sales recitations—underlined words/phrases indicating sections accompanied by video-mediated gazing

Product 1

"Fresh Face" is a brand new soap that has been developed by scientists in Italy. This product is a triple purpose soap and provides an all new cleansing experience. Firstly, it leaves your skin smelling like your favourite after-shave or perfume. Secondly it doubles as an air-freshener, leaving your bathroom smelling perfumed and odour free thanks to our unique odour-eating ingredients. Thirdly this product helps to fight the build up of spots through the active ingredient blemish-buster. This product is on sale for £1.89 or alternatively you can purchase a special three pack for only £4.50. This soap is available at all good retailers but thanks to a special promotion can be purchased at Johnson's Chemists, where if you buy one soap you receive a free box of toothpaste. Our soap makes an ideal gift for your partner and is sold in Five different varieties—for women there's Moonlight for the romantic, the sweet smelling Daphne and the refreshing Atlantis. For men there's Rhino and Brutus. We hope that our product will reach you in perfect condition but we have a money back guarantee if you are not entirely satisfied. For further information on this product phone Glasgow on our free 24-h line. The number is (0141) 446619 and you can talk to our customer services manager Lynne Thomas. So please remember—"Fresh Face" is the feel good soap.

Product 2

"Smooth-Skin" is a completely new soap produced in Portugal that leaves you feeling invigorated and refreshed. This product is a triple action soap, which contains apricot and honey. This soap exfoliates your skin ridding you of the build up of dead skin cells. Also it contains active moisturising ingredients which leave your face feeling smooth and silky. Our product, however, also contains a special gel which prevents the bar of soap from leaving a messy, sticky residue on your bathroom sink. Our soap costs £1.25 for a single bar or alternatively you could pick up a triple pack for £3.90. This product can be bought at all good shops and due to a special promotion with Wilson's toiletries can be purchased with a free bottle of Shampoo. This product makes an ideal present for Mothers and is sold in 4 different colours—sensuous ocean blue, exotic coconut brown, exciting fox red and relaxing shamrock green.

We guarantee 100% satisfaction with our product but if you wish to return this item you can swap it for another product of equal or less value. For more information on our exciting range of gifts please ring toll free on Birmingham (0121) 559937 and speak directly with our product designer Billy Wood. Please remember "Smooth Skin" is the fuss free soap.

Appendix B. List of questions for recall tests for both products with numbers of points available in brackets

Product 1

(1) What was the name of the product? (1)
(2) In what country has the product been developed? (1)
(3) What three purposes does this product serve? (3)
(4) What is the name of the spot-fighting ingredient? (1)
(5) How much does it cost to purchase one bar? (1)
(6) How much does it cost to purchase a three pack? (1)
(7) With which retailer is there a special promotion? (1)
(8) What do you get free when you buy one bar of soap? (1)
(9) For whom does this product make an ideal gift? (1)
(10) How many different varieties are there? (1)
(11) Name the women's varieties (3)
(12) Name the men's varieties (2)
(13) What guarantee comes with this product? (1)
(14) What is the free-phone number that you must call for more information? (1)
(15) What is the name of the customer services manager? (1)
(16) Complete the slogan for this product: "Fresh Face is the…" (1)

Product 2

(1) What was the name of the product? (1)
(2) In what country is the product produced? (1)
(3) What two ingredients are contained in this product? (2)
(4) What three purposes does this product serve? (3)
(5) How much does it cost for a single bar? (1)
(6) How much does it cost for a three pack? (1)
(7) With which company is there a special promotion? (1)
(8) What do you get free when you buy a bar of soap? (1)
(9) How many different colours does the product come in? (1)
(10) Name the colours (full name with exact shade required) (4)
(11) What guarantee comes with this product? (1)
(12) What is the free-phone number that you must call for more information? (1)
(13) Which city is this service based in? (1)
(14) What is the name of the product designer? (1)
(15) Complete the slogan for this product: "Smooth skin is the…" (1)

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