

DREAM GESP STUDY II USING DYNAMIC VIDEO-CLIPS: INVESTIGATION OF CONSENSUS VOTING JUDGING PROCEDURES AND TARGET EMOTIONALITY

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ABSTRACT

This study was a partial replication and extension of a previous study (Dalton, Steinkamp, & Sherwood, in press). It investigated whether individual versus small group consensus judging procedures, and/or the emotionality of the dynamic target video clips, would affect the frequency of correct identification of the target in a free-response dream GESP study.

Two people located in Edinburgh, Scotland (Edinburgh participants) and a third person located in Derby, England (remote participant) acted both as experimenters and as participants. On each of the 28 trial nights, a one minute video clip, which was randomly-selected from 72 possible target clips, was shown repeatedly in a locked room in the Department of Psychology between 3.00-4.30am. Participants slept in their respective homes and recorded their dreams upon awakening. The following morning the participants viewed all four video clips from the selected target pool (i.e., 3 decoys plus the target) in a random order and then judged the correspondences between the clips and their dream mentation.

The Edinburgh participants obtained a greater number of direct hits using their group judgements than by using their own individual judgements. The discussion method was also marginally more successful than the objective consensus method. As hypothesised, using the discussion consensus judging method, the Edinburgh participants scored 12 direct hits during the 28 trials which is significantly higher than the mean chance expectation (exact binomial $p=0.0294$, $ES(h)=0.38$). The objective consensus judging method yielded 11 direct hits which is approaching a significant deviation from the mean chance expectation (exact binomial $p=0.0679$, $ES(h)=0.30$). As individuals, none of the participants obtained a significant score: the Edinburgh participants both scored 7 direct hits (exact binomial $p=0.5721$, $ES(h)=0.00$), the remote participant scored 9 direct hits (exact binomial $p=0.2499$, $ES(h)=0.16$).

Participants, both as a group and as individuals, obtained a greater proportion of direct hits when the target was emotionally negative than when it was either positive or neutral. The direct hit rate for negative emotion targets (5 direct hits during 8 trials) was significantly higher than the mean chance expectation for both group judging methods and for one of the individuals (FS) (exact binomial $p=0.0273$, $ES(h)=0.79$) which partially supported our hypothesis.

Post hoc analyses involving correlations between the global aa index of the Earth's geomagnetic field and target rankings were also reported.

¹ We would like to acknowledge the Economic and Social Research Council (ESRC) for their financial support of Simon Sherwood, the Society for Psychical Research and the Institut für Grenzgebiete der Psychologie und Psychohygiene for their support of Kathy Dalton, and Fundação Bial for their support of Fiona Steinkamp. Also, Drs. Jessica Utts and John Palmer for statistical advice.

INTRODUCTION

A large proportion, estimated to be 33-65% (Van de Castle, 1977), of spontaneous cases of extrasensory perception (ESP) have been reported during dreams (e.g., Gurney, Myers, & Podmore, 1886). Such cases often feature information about close relatives or friends and often feature negative life events (Ullman, Krippner with Vaughan, 1989; Van de Castle, 1977). Thus, emotional, often negative contents are fairly common.

Some experimental research has found that dreams (e.g., Braud, 1977; Child, Kanthamani, & Sweeney, 1977; Dalton et al., in press; Ullman et al., 1989; Van de Castle, 1971) and hypnagogic/hypnopompic imagery (Braud, 1977; Gertz, 1983; White, Krippner, Ullman, & Honorton, 1971) seem to be conducive to ESP. Indeed, some studies have suggested that dreams may be more conducive to ESP than ganzfeld conditions (Kanthamani, Khilji, & Rustomji-Kerns, 1989; Kanthamani & Khilji, 1990; Kanthamani & Broughton, 1992). The Maimonides dream studies (Ullman et al., 1989), which mainly investigated dream telepathy, are undoubtedly the most well-known and most successful (Child, 1985). A recent meta-analysis of 450 Maimonides dream telepathy sessions found the overall hit rate to be 63% (mean chance expectation (MCE)= 50%) with odds against chance of 75 million to one (Radin, 1997). Attempted replications of the Maimonides dream studies have not been so successful, though the conditions surrounding these attempts may not have been particularly conducive (see Van de Castle, 1977).

Dynamic targets

The dream ESP studies, and later the ganzfeld studies, represented a move away from the early forced-choice methods towards free-response methods. Most dream GESP studies have used static target materials, such as art prints or slides, though some studies have used more dynamic target materials such as projector slides with an accompanying soundtrack, a person performing mimes, or films/videos. Other free-response GESP research has suggested that dynamic and multi-sensory targets might be more conducive to ESP than static targets (Dalton & Utts, 1995; Delanoy, 1989; Honorton, Berger, Varvoglis, Quant, Derr, Schecter, & Ferrari, 1990). The present study used dynamic video clips with accompanying soundtracks.

Emotionality of targets

Spontaneous cases of dream GESP frequently contain emotional information which is often negative. Evidence from experimental studies of GESP suggests that emotional target materials are more conducive than neutral materials (Bierman, 1995, 1997; Moss & Gengerelli, 1968 cited by Gelade & Harvie, 1975; Radin, 1997). Other writers have agreed with the potential conduciveness of emotional target material (e.g., Dalton, 1997a; Ullman et al., 1989; Van de Castle, 1977; Watt, 1989). Krippner (1975) suggested that emotional stimuli are more effective in dreams than in non-dream experiments. However, it is not clear whether positive or negative emotional targets are more psi-conducive. Some studies have found that positive materials may have a larger effect than negative materials (Dalton, 1997b; Radin, 1997); others have found the reverse to be true (Dalton et al., in press). This study attempted to address this question by comparing the direct hit rate for positive, negative and emotionally neutral target video clips. More specifically, it was hypothesised that the group would score significantly higher than the overall chance expectation when the targets were

negative as this was the finding in a similar study carried out at Edinburgh (Dalton et al., in press).

Small group participation and consensus judgement methods

Some studies have used majority-vote or pooled rating/ranking procedures in order to try to maximise ESP performance (Fiske & West, 1956, 1957; Kennedy, 1979; Ryzl, 1966; Taetzsch, 1962; Thouless, 1960 - cited by Carpenter, 1991; Braud, 1977; Kanthamani et al., 1989; Kanthamani & Khilji, 1990). Carpenter (1995) has been using group consensus judgements of the contents of regular quasi-psychotherapeutic group meetings as a method of facilitating ESP. Ullman (1989) has also been conducting exploratory research with small groups to see if their dreams are conducive to ESP. A previous dream GESP study using a consensus vote judging procedure found that this method yielded a higher number of direct hits than individual judgements (Dalton et al., in press). The present study also aimed to explore whether a group consensus based on a discussion of each individual's judgements would be more or less successful than determining the consensus purely on the objective pooling of individual judgements.

To summarise, this study was a replication and extension of our previous study (Dalton et al., in press). The aim was to investigate whether dreams (and also hypnagogic/ hypnopompic imagery) might be conducive to general extrasensory perception. Further aims were to investigate whether individual versus small group consensus judging procedures and/or the emotionality of the dynamic target video clips would influence task performance.

Hypotheses for the present study were

- H₁ The direct hit rate for the group discussion consensus judging method would be significantly higher than the mean chance expectation.
- H₂ The direct hit rate for the negative emotion targets would be significantly higher than the mean chance expectation.
- H₃ The direct hit rate for judgements attributed to hypnagogic or hypnopompic imagery would be significantly higher than the mean chance expectation.

Exploratory investigations

1. To explore whether there would be a difference between the direct hit rates for two group judging methods: discussion consensus and objective consensus.
2. To explore whether the group direct hit rates would be higher than the individual's hit rates.
3. To explore whether the direct hit rates would differ according to the emotionality of the target.
4. To explore whether a participant who had obtained a significant direct hit rate in a previous dream GESP study (Dalton et al., in press) would be able to obtain similar results from a remote location.

METHOD

Design

This study used a clairvoyance design (i.e., no sender), although possible precognition could not be ruled out. Twenty-eight trials were prespecified as part of a repeated measures design. There was one pilot trial on the 4th September 1997. Two trials during the course of the study had to be aborted¹. The pilot and the aborted trials were not included in the analysis. The experimental trials were carried out between 14th September and 13th December 1997. Typically, there were 2-3 trials per week.

The independent variables were (1) the judging method used (discussion consensus, objective consensus, individual) and (2) the emotionality of the target clips (positive, negative, neutral). There were two different participant locations, approximately 220 miles apart: Edinburgh, Scotland (SS, FS); Derby, England (KD).

The dependent variables were (1) the accuracy classification per trial (a direct hit or a miss), (2) the dream-mentation-video-clip correspondence rating per trial (1-99), and (3) the dream-mentation-video-clip correspondence ranking (1-4) per trial.

Experimenters and participants

Three of the authors (SS, KD, FS) acted both as experimenters and as participants. The fourth author (CW) did not act as a participant or experimenter. CW collated and looked after both the remote participant's (KD) dream mentation and judgements and stored a copy of the computer printout for each trial. CW was also responsible for checking the raw data and the statistical analyses. Two of the experimenters (SS, FS) set up the system for the selection and subsequent display of the target for each trial. These experimenters set up 14 trials each on a mostly alternate basis.

All three participants typically report that they experience more than one dream per night on a regular basis and are able to recall at least some of the contents the following morning. Typically, the participants reported 2-4 different dreams per night on trial nights.

Apparatus

The free-response testing system at the University of Edinburgh is designed to be used under a variety of experimental designs. It is a computer-based system that can provide automatic data recording, highly effective shielding against sensory cues, and resistance to both participant and intentional experimenter bias. The system has been used in a number of automated ganzfeld studies which have been conducted at Edinburgh (e.g. Dalton, 1997b). For more details of the equipment, the laboratory, and security measures, see, for example, Dalton et al. (in press), Dalton (1997b) or Dalton, Morris, Delanoy, Radin, Taylor, & Wiseman (1994).

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On the first occasion, the experimenter discovered that the computer program had not been able to complete its task of showing the target clip because both VCR's had been switched off. On the second occasion, an experimenter error meant that the computer program moved onto the judging sequence before the four possible video clips had been shown.

Pseudo-random number generator

Following recommendations for the reporting of randomisation methods (Milton & Wiseman, 1997), the target pool and the target clip within the selected pool for each trial were determined using a pseudo-random number generator (pseudo-RNG). The pseudo-RNG was a computer algorithm. The program used the RANDOMIZE TIMER command to generate a seed number for the random number function, RND. Initially, the computer program generated a random number to determine which of the 18 pools of clips would be used for the forthcoming trial; the program then generated a second random number to determine which of the four clips within the selected target pool would be used as the target clip. The computer program also utilised this procedure to determine the order of presentation of the video clips for the judging process.

Global tests of the randomness of the pseudo-RNG output generated by this method on the same equipment have been carried out in the past at periodic intervals and have not revealed any significant deviations from the expected distribution (Dalton, 1997b). Global tests of the random number output for selection of the target pool (1-18) and the target clip (1-4) were also carried out after the data for this study had been collected. A test program was used to generate two series of 10000 random numbers, one series between 0-18 and one series between 0-4. A chi-square goodness of fit test (carried out on Microsoft Excel for Windows 95 version 7.0 using the CHITEST function) found that neither of these series deviated from the expected distribution to a significant extent.

Target materials

This study used 18 separate target pools each containing four video clips taken from films, TV programmes, and cartoons. Thus, the target clip on any given trial was one out of a possible 72 video clips. Each video clip was one minute in duration and had an accompanying soundtrack. This set of target clips has been used in a previous sender/no sender ganzfeld study (Morris, Dalton, Delanoy, & Watt, 1995). The remote participant had a duplicate set of video clips which were viewed on her home VCR and television set.

One of the authors (KD) had previously had the 72 video clips viewed and categorised in terms of its emotionality (i.e. positive, negative, neutral) by three independent judges (see Dalton, 1997b). There were 24 positive, 26 negative, and 22 neutral video clips according to these three judges.

PROCEDURE

Selection and displaying of the target video clip

The selection of the target clip was performed by a pseudo-random number generator (RNG) which was controlled by a Microsoft Quick Basic computer program. The displaying of the target clip during the night and the displaying of the complete target pool during the judging procedure was also controlled by the computer program.

Prior to each trial the dream study computer program had to be activated by one of the Edinburgh experimenters (SS or FS). This was usually done towards the end of the working

day to avoid possible disruption to other ongoing research. Trials set up during the weekend were done at the experimenters' convenience. In order to run the dream program, the experimenter needed to enter a password (known only to SS, FS, & KD).

The computer created a file on the hard disk in which the details of the trial would be recorded. Note that this file could not be accessed by the experimenter without disrupting the experimental set-up. The experimenter was therefore blind as to which pool of target clips and which target clip had been selected for the forthcoming trial. A 3.5" floppy disk was also placed into the floppy disk drive (a copy of the trial datafile would later be transferred to it). Having checked that all relevant equipment was switched on, the experimenter initiated the dream program.

The target clip was later shown a total of 20 times between approximately 3.00-4.30am (via the computer-controlled VCR) on the television monitor and stereo headphones in the Target room.

Recording of dream mentation

During each trial night the Edinburgh participants (SS, FS) and the remote participant (KD) slept at their respective homes and wrote down the contents of any dreams or hypnagogic or hypnopompic imagery that they could recall either throughout the night or the following morning.

Judging procedure

Edinburgh participants - The following morning, the two participants (SS, FS) came into the Koestler Parapsychology Unit's (KPU) experimental suite bringing with them their hand-written dream mentation reports.

The name of each video clip in the selected target pool appeared on the computer monitor in turn and each clip was then displayed on the TV monitor. Once the names and the order of the four video clips were known, the experimenter telephoned the remote participant and communicated this information to her.

The Edinburgh participants then watched each of the video clips in the computer-designated order whilst reviewing their dream mentation. Participants were allowed to view any or all of the clips again. Each individual then gave a dream-mentation-video-clip correspondence rating from 1-99 to each clip ('99' indicating a perfect correspondence). The clips were then placed in rank order with a rank of '1' being given to the clip with the highest correspondence to the dream mentation, '2' to the next highest correspondence and so on. Thus, the lower the

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From trial 3 inclusive onwards, the television monitor remained switched off until after the order of the video clips in the target pool had been communicated to the remote participant. In trials 1 and 2, the TV monitor was switched on at the beginning which meant that the participants viewed each of the four clips before the order of clips had been communicated to the remote participant. The experimenters recognised the possibility that they might inadvertently communicate cues about the correspondence between clip contents and their own dream mentation during the telephone conversation with the remote participant and thus changed the procedure accordingly.

rank assigned to the clip, the higher the correspondence with the dream mentation and the higher the expectation that it was the actual target. The participants then swapped their dream reports with each other (without having discussed or having mentioned their own dream mentation) and performed a similar rating and ranking procedure. Note that participants' judgements of their own mentation were recorded on separate pieces of paper so that they were blind as to the other participant's judgements at this stage. Participants were not permitted to go back and alter their own judgements.

Having read and judged the correspondence between the dream mentation and the four video clips in the target pool, the Edinburgh participants discussed their own and each other's mentation until they had reached a consensus regarding which clip they considered to have been the target. This was known as the 'discussion consensus' judgement method. The individual's 'own' and 'other' correspondence ratings and rankings were then collated and entered onto a record sheet (by SS) and checked by FS. The sum of the ranks given to each individual clip (based on both participants' 'own' and 'other' judgements) was calculated. The lowest sum of ranks was given a rank of '1', the next lowest a rank of '2' and so on. This was known as the 'objective consensus' judgement method. If there were any ties to the sums of ranks, the sum of the ratings was calculated for each tie and the highest sum of ratings was allocated the lower rank. If the sums of ratings tied, the range of ratings was calculated and the smaller range was given the lower rank. The objective consensus rankings were then entered into the computer. The individual ratings and rankings, the discussion consensus and the objective consensus rankings were recorded by hand on the record sheet.

Remote participant - In the morning, the remote participant (KD) entered her dream mentation into an e-mail message which was sent to CW via KD's connection to a public internet service provider. Note that this was carried out before KD was informed of the names of the clips for the trial. Once she had been informed of the names and the order of the video clips by the experimenter, the remote participant manually found the position of each clip on her duplicate videotape using her VCR and viewed each one on her TV set in the designated order. The remote participant was free to watch each clip more than once if she wished to do so. The remote participant then followed the same individual rating and ranking procedure as the Edinburgh participants. Once the judging procedure had been completed, the remote participant entered her correspondence ratings and rankings into an e-mail message which was then sent to CW. Thus, the remote participant kept a hand-written and a computer hard disk copy of her mentation and correspondence ratings and rankings. Once this had been completed, the remote participant awaited a telephone call from the experimenter.

Once the objective consensus rankings had been entered into the computer, the experimenter telephoned the remote participant and checked that she had completed³ her judging procedure and had e-mailed a copy of her mentation and judgements to CW.³ The experimenter then instructed the computer to show which of the video clips had been the target, whilst on the phone to the remote participant, so that all three participants obtained feedback regarding their performance simultaneously.

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Although the remote participant also verbally informed the experimenter of her rankings of the four clips prior to the target being revealed, this was not actually recorded by the experimenter.

Once the trial was completed, the experimenter instructed the computer to save the trial data to a floppy disk and also to print out three hard copies of the trial datafile. One copy was stapled to the record sheet and the hand-written reports from the Edinburgh participants and kept in a folder in FS's office in the experimental suite. The second copy was kept in SS's office; the third copy was kept in CW's office. Note that the hard and floppy disk files and the printouts contained only the objective consensus rankings. The remote participant's dream mentation and judgements were kept in the form of e-mail messages which were stored in CW's e-mail account. These e-mail messages were printed out as they came in.

Statistical analysis

A table of raw data for the individual and consensus judging methods was produced from the experimental record sheets and the printouts of the remote participant's judgements by the first author (SS). SS also noted which experimenter had set up each trial, the name of the target clip and the emotionality of the target clip. This raw data table was checked against a similar table produced by KD. The trial by trial raw data records from the remote and the Edinburgh participants, the exact binomial probabilities, effect size calculations, sum of ranks analyses and global tests of randomness for the pseudo-RNG were double-checked by CW.

Pre-planned analyses

The critical ratio (CR) test, which is usually used to calculate the probability of gaining at least a given number of direct hits (assuming the null hypothesis is true), was not used as it is not recommended if np (number of trials \times probability of a direct hit) is less than 10 (Palmer, 1986, p.148). Instead, the exact binomial probabilities for obtaining at least a given number of direct hits were calculated using the BINOMIST function of Microsoft Excel for Windows 95 version 7.0. The planned analysis of the direct hit rate for judgements attributed to hypnagogic/hypnopompic imagery (H_3) was not carried out due to insufficient data.

In terms of calculating the effect size, previous studies, including our own, have used Cohen's h (Cohen, 1977) to index the difference between two proportions (or hit rates). Calculations of Cohen's h and its 95% confidence limits were carried out by hand (by SS) using the formulae given by Rosenthal & Rosnow (1991, p.449).

Post-hoc analyses

It has been suggested that sum of ranks analyses might generally be expected to be a more sensitive measure of ESP performance than direct hits because it uses more information per trial (Milton, 1997). An inconclusive review of ganzfeld studies found that sums of ranks did outperform direct hits measures in terms of deviations from chance and effect sizes but not to a significant degree (Milton, 1997). A sum of ranks analysis was also carried out (Palmer, 1986) in this study as it may facilitate further consideration of this issue.

After the data had been collected, the authors also decided to investigate a possible relationship between dream GESP performance (in terms of rankings) and the earth's geomagnetic field (GMF) as they had done in a previous study (Dalton et al., in press). The daily average antipodal (aa) index, which is the average change in global GMF from midnight to midnight on the day in question, was selected as the GMF measure (data was obtained by KD once the study was completed). A Spearman's rho correlation coefficient was calculated

for the relationship between the GMF measure and each of the objective-consensus and individual target rankings.

RESULTS

Group versus individual judging methods

Table 1 shows that using the discussion consensus judging method, the Edinburgh participants scored 12 direct hits (i.e., correct identification of the target) during the 28 trials (direct hit rate= .43 or 43%, mean chance expectation (MCE)= .25 or 25%). This is significantly higher than the mean chance expectation (exact binomial $p= 0.0294$ for ≥ 12 direct hits, $ES(h)= 0.38$, 95% C.I. (h)= 0.00–0.75). The objective consensus judging method yielded 11 direct hits during the 28 trials (direct hit rate= .39 or 39%) which is approaching a significant deviation from the mean chance expectation (exact binomial $p= 0.0679$ for ≥ 11 direct hits, $ES(h)= 0.30$, 95% C.I. (h)= -0.10–0.66). Thus, our hypothesis H_1 that the group would perform significantly better than the mean chance expectation using the discussion consensus judging method, was supported.

Table 1 also shows the two Edinburgh participants both scored 7 direct hits during the 28 trials (direct hit rate= .25 or 25%, MCE= .25 or 25%) which is clearly not higher than chance expectations (exact binomial $p= 0.5721$ for ≥ 7 direct hits, $ES(h)= 0.00$, 95% C.I. (h)= -0.44–0.34). The remote participant scored higher than the Edinburgh participants and obtained 9 direct hits during the 28 trials (direct hit rate= .32 or 32%) which is also non-significant (exact binomial $p= 0.2499$ for ≥ 9 direct hits, $ES(h)= 0.16$, 95% C.I. (h)= -0.25–0.50). The Edinburgh participants obtained a greater number of direct hits by using their group judgements than by using their own individual judgements. The discussion consensus method also yielded a marginally greater number of direct hits than the objective consensus method.

	Correspondence rankings				Row total (sum of ranks)
	1	2	3	4	
Expected	7	7	7	7	28 (70)
Discussion	12	---	---	---	---
Objective	11	5	8	4	28 (61)
Edin. (SS)	7	13	4	4	28 (61)
Edin. (FS)	7	8	8	5	28 (67)
Remote	9	7	3	9	28 (68)

Note: a rank of 1 = a direct hit

Table 1: Number of direct hits and distribution of ranks assigned to the target clips by the Edinburgh participants (both as a group and as individuals) and by the remote participant.

Post hoc sum of ranks analyses (Palmer, 1986, p.148) gave the following results: objective consensus (CR(z)= 1.44, $p= 0.0749$, one-tailed); Edinburgh participant (SS) (CR(z)= 1.44, $p= 0.0749$, one-tailed); Edinburgh participant (FS) (CR(z)= 0.42, $p= 0.3372$, one-tailed); remote participant (KD) (CR(z)= 0.25, $p= 0.4013$, one-tailed). These results show that, as with the dichotomous scoring method, the objective consensus method yielded a result which was approaching a significant deviation from the chance expectation. Using the sum of ranks analysis, the Edinburgh participants' performance appeared to be slightly better than it did using the dichotomous scoring method; however, the remote participant's performance appeared to be slightly worse using the dichotomous scoring method. All individual performances were still non-significant using the sum of ranks analysis method.

Emotionality of the target clips

Table 2 shows that the majority of the target clips in the study were emotional, either positive (57.1%) or negative (28.6%). However, both as a group and as individuals, participants obtained a greater proportion of direct hits when the target was negative than when it was either positive or neutral. The direct hit rate for negative emotion targets was significantly higher than the mean chance expectation for both group judging methods and for one of the individuals (FS) (exact binomial $p= 0.0273$ for ≥ 5 direct hits, $ES(h)= 0.79$, 95% C.I.(h)= 0.09–1.69) which partially supports H_2 .

	Emotionality of the target clips			Row total
	Positive	Negative	Neutral	
Times selected as target	16	8	4	28
Target type availability	24	26	22	72
% of category	16/24= 66.7%	8/26= 30.8%	4/22= 18.2%	-----
% of total no. of trials	16/28= 57.1%	8/28= 28.6%	4/28= 14.3%	100%
	No. of direct hits per emotionality type (%)			
Discussion consensus	6 (37.5%)	5 (62.5%)	1 (25.0%)	12
Objective consensus	5 (31.3%)	5 (62.5%)	1 (25.0%)	11
Edinburgh (SS)	4 (25.0%)	3 (37.5%)	0 (-----)	7
Edinburgh (FS)	2 (12.5%)	5 (62.5%)	0 (-----)	7
Remote (KD)	4 (25.0%)	4 (50.0%)	1 (25.0%)	9

Table 2: Number and proportion of direct hits by emotionality of the target clips

The direct hit-rates for the positive emotion targets were all non-significant. However, it is important to note that the different target types were not selected an equal number of times and there are differing numbers of each target type within the 18 pools of video clips and so the probability of each target type being selected was not equal.

Relationship with the Earth's geomagnetic field

The results of the post hoc analysis indicated that the correlations between the global aa index and target rankings were as follows (all two-tailed): group objective consensus $r_s = -.327$, $p = .090$; Edinburgh participant (SS) $r_s = -.163$, $p = .407$; Edinburgh participant (FS) $r_s = -.013$, $p = .947$; remote participant (KD) $r_s = .075$, $p = .706$. Thus, the Edinburgh participants, both as a group and as individuals, demonstrated a negative relationship between GMF and dream-GESP target rankings, i.e., as the Earth's geomagnetic field increased the dream-GESP performance increased. The remote participant demonstrated a small positive relationship. The relationships were all non-significant, although the relationship for the group objective-consensus judging method was approaching significance.

DISCUSSION

The results of this dream GESP study found that only the group consensus judging methods yielded a performance, in terms of number of direct hits, which was greater than chance expectations to a significant (discussion consensus, $p = 0.0294$, $ES(h) = 0.38$), or approaching significant (objective consensus, $p = 0.0679$, $ES(h) = 0.30$), extent. If ESP was operating in this study, the effect size was small; a value of $h = 0.20$ is considered to be a small effect, $h = 0.50$, a medium effect size (Rosenthal & Rosnow, 1991). Further exploration of the data revealed that, as individuals, neither the Edinburgh participants nor the remote participant scored significantly higher than chance expectations in terms of the number of direct hits. The group consensus judgements obtained a greater number of direct hits than the individual judgements which is a replication of our previous findings (Dalton et al., in press). The discussion consensus judging method also obtained a marginally greater number of direct hits than the objective consensus judging method.

Both the individual and the group judgements obtained a greater number of direct hits when the targets were emotional as opposed to neutral; more specifically, performance was best when the targets were negative. However, the emotionality results should be interpreted with some caution (see below).

A post hoc sum of ranks analysis also found that the objective consensus and individual scores did not reach significance, although the probabilities of the Edinburgh participant scores were much closer to the criterion level for significance using this technique. This provides some support for previous research which has suggested that sum of ranks analysis may be more sensitive than that based on direct hits and may yield greater deviations from chance and larger effect sizes (Milton, 1997).

Group versus individual judging methods

This study does provide some limited support for the occurrence of GESP during dreams but it seems that information received by more than one person was required in order to be able

to make judgements which were more accurate than chance expectations. Our finding that consensus judging procedures might be conducive to ESP, perhaps more so than individual procedures, supports previous findings for both dream GESP (e.g., Braud, 1977; Dalton et al., in press; Kanthamani et al., 1989; Kanthamani & Khilji, 1990) and waking GESP (e.g., Fiske & West, 1956, 1957; Kennedy, 1979). There did not appear to be much advantage to be gained by discussing possible target-mentation correspondences in order to reach a consensus as opposed to determining the consensus simply by pooling the independent individual judgements. The practicality of each of these consensus judging methods may depend on the choice of judging requirements. Whilst an objective consensus method could easily be used for either hit/miss or rank ordering scoring methods, the discussion consensus method takes much longer and is much more difficult.

So, why might group judgements be more successful than individual judgements? If ESP has a relatively weak effect then a combination of extrasensorially perceived information relating to the same target from more than one person may be required in order to boost the accuracy of target judgements to a significant level. However, looking at the success of a judging procedure which involves a single overall consensus call per trial, based on several individuals, is different from looking at the number of hits per trial based on the individual calls of several individuals per trial. In the latter case, the overall score may be partially due to a stacking effect. If more than one call is made per trial then the likelihood of a hit is increased because there is more than one chance of getting it correct. It must be recognised that our overall results may also have been partially biased by the stacking effect since we reported both individual and group performance which are not independent.

Emotionality of the target clips

Participants tended to perform more successfully with emotional as opposed to neutral targets which supports previous research (e.g., Bierman, 1995, 1997; Dalton et al., in press; Moss & Gingerelli, 1968; Radin, 1997). The fact that participants tended to perform better with negative as opposed to positive targets supports our previous dream GESP study (Dalton et al., in press) but is in contrast to other findings from ganzfeld and presentiment studies (Dalton, 1997b; Radin, 1997). Previous research has also found that spontaneous cases of dream ESP often feature negative life events (Ullman et al., 1989; Van de Castle, 1977). However, our findings regarding the emotionality of the target material should be treated with caution for these reasons: (1) the comparison is based on a small number of trials, (2) the different types of target emotionality were not expected or observed to appear an equal number of times throughout the study because they were not counterbalanced across the target pools, (3) the emotionality categorisations were determined by a small number of independent judges - it is not known whether the participants' categorisations would have been in agreement, (4) perhaps there was a participant response bias towards selecting negative clips as being the target.

So, why might sleep, and also emotional target material, be conducive to dream ESP? In evolutionary terms, some organisms are likely to be at risk whilst they are asleep. It has been suggested that the periodical appearance of REM sleep and dreams provides a vigilance mechanism, which is oriented to the present and the future, and also an anticipatory arousal mechanism which counteracts these risks (Tolaas, 1986; Ullman, 1990). The dream vigilance mechanism would come into operation during each sleep cycle and would result in

awakening, if a potential threat was identified and was considered to be of sufficient importance, or a continuation of the sleep cycle and a return to non-REM sleep. There might be an ESP component within this mechanism which monitors information which is distant in terms of space and time (Ullman, 1986). It has further been suggested that, as society has developed, the dream vigilance mechanism has become focused on potential psychological rather than physical dangers and, in particular, to events which might disrupt connections with significant others (Ullman, 1986). If such a mechanism does exist, it would explain why many spontaneous cases of dream ESP feature emotionally-close persons and negative life events. It would also explain why negative target materials may be more conducive to dream ESP in the laboratory than positive or neutral materials.

Relationship with the Earth's geomagnetic field

The negative relationship between the GMF index and the group's objective-consensus target rankings ($r_s = -.353$) was in the opposite direction to the relationship obtained in a previous Edinburgh dream-GESP study ($r_s = .224$). The finding in this study is also contrary to previous research which has found that dream ESP is more likely when the Earth's geomagnetic field is lower (e.g., Persinger & Krippner, 1989). However, recent research suggests that the relationship between GMF and free-response ESP performance may depend on the Local Sidereal Time (LST) at the time of the trials (Spottiswoode, 1997). This factor may explain the discrepancy with the previous study - further analysis would be required to address this issue.

CONCLUSION

This study was a fairly successful replication of our previous dream GESP study (Dalton et al., in press). However, the effect sizes for the small group judging were slightly lower in this study (discussion $ES(h) = .38$, objective $ES(h) = .30$) than in the previous study ($ES(h) = .46$). Effect sizes for individual judgements were also much lower in this study. However, the group direct hit rates per emotional target type were of a similar magnitude. Possible reasons for these differences, apart from the procedural differences and the use of a different target pool, may be that in this study the schedule for the judging periods was more variable and involved earlier morning meetings (sometimes around 7am) due to increased demands on the laboratory facilities. Another contributing feature may have been a lack of novelty or a change in the group dynamics. However, one of the positive aspects of this study, from the group participants' perspective at least, was that it maintained a relaxed and fairly informal atmosphere, features which have been found to be conducive in other small group dream ESP research (Ullman, 1989). It seems that home-based dream GESP research may continue to be a fruitful endeavour, particularly if it utilises emotional dynamic target material and consensus judging procedures.

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