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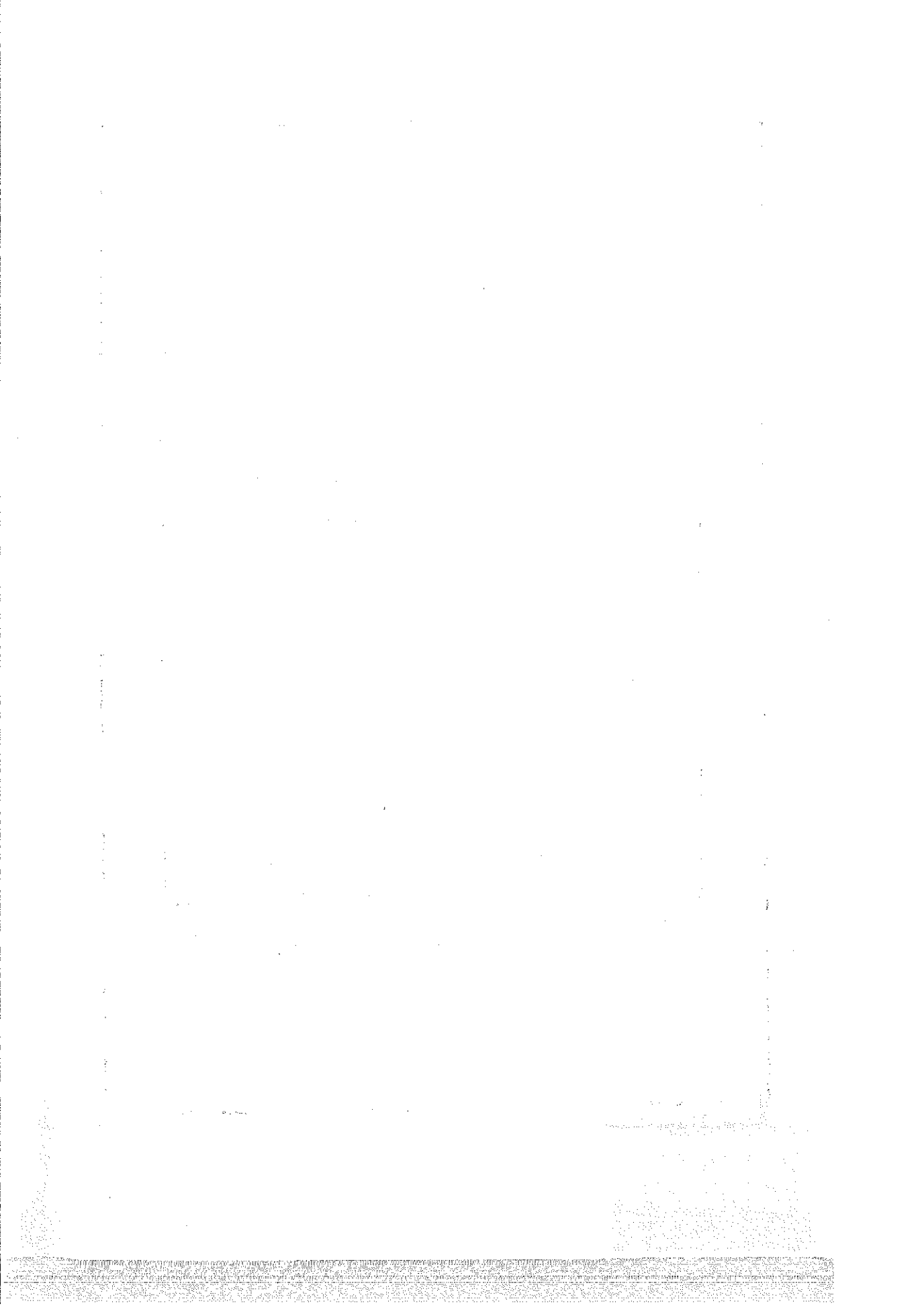
SUBLIMINAL INFORMATION AND ITS
INFLUNCES ON EXPRESSIVE AND
PERFORMANCE BEHAVIORS

BY

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Abstract: The present study aims at examining the effect of subliminal auditory information on expressive behavior (aesthetic feelings) and performance behavior (mathematical problem solving) in the light of openness to experience facets, by using 30 Egyptian male university students aged between 18-21 years. An Arabic version of the Openness to Experience Test (Neo PI-R), and a locally designed test for measuring Aesthetic Feelings for Paintings were used. Results showed that the effects of subliminal information on expressive behavior were stronger than on performance behavior. Weak and not significant relationships between openness to experience facets and direct subliminal information influences has been found.

Subliminal perception: Findings of the previous research studies showed that subliminal information influence different types of behaviors, among them, pathological behavior (Silverman & Geisler, 1986; Khalil, 1989; 1994); learning (Eriksen, 1960; Harrison, 1970); sales behavior (McConnell; Culter & McNell, 1958); attitude change (Swart & Morgan, 1992); and academic performance (Parker, 1982). Subliminal perception in the psychological literature refers to the registration and processing of weak stimuli which may remain outside awareness (Borgeat & Goulet, 1983). Hence, the term "awareness" is not an operative or determinative. It is rather a stimulus intensity subliminal is adopted under the level, at which, the person decides that there is no stimulus (Khalil, 1989; 1994)

Shevrin and Rennick (1967) reported that the subliminal stimuli, which could produced a behavioral effect, were also instrumental in modifying an ongoing electrocerebral response. Hartley, 1969 (cited in: Dixon, 1971) pointed out that there are cortical discrimination of the subliminal emotional stimuli. Dixon (1966) reported that "the perceptual defence and kindled phenomena

depended upon either the facilitation or inhibition of the reticular activating response as a function of a pre-awareness discrimination of inputs at a cortical level”.

Expressive and performance behaviors: Since the human behavior is bipolar, and its poles are: coping (or performance), and expressive behaviors. The properties of the expressive behavior pole are low awareness, disinterest, and spontaneity, while coping (or performance) behavior pole's properties are the reverse (El-Sheikh, 1978) .

In the present study, the aesthetic feelings responses for paintings represent the expressive behavior and mathematical problem solving responses refer to the performance or coping behavior.

Wollheim (1987) noted that a spectator of painting who possesses the three perceptual capacities of a) “seeing-in“; b) expressive perception and c) visual delight. Seeing-in refers to the features associated with seeing pictures; expressive perception refers to the capacity that one has for seeing a painting as feelings expressed; while visual delight refers to the emotional state that could be evoked by perceptual experience (Takahashi, 1995). Soueif (1983) reported that the perceptual experience is one of the aesthetic components, and it is influenced by what he named a cultural frame. In the aesthetic experience, a person has a high level of awareness of the aesthetic stimulus, and a low level of other stimuli surrounding him. Accordingly, Havner (cited in: Stolnetz, 1974; Said, 1990) described the aesthetic experience as awareness, attentiveness, and activity towards the aesthetic object.

It was found that the right hemisphere is fully capable of determining and deducing the individual's feelings (Joseph, 1988). MacLean 1949 (cited in Carlson & Hatfield, 1992) proposed that the limbic system, plays an important role in regulating visceral activity in a wide

variety of emotional settings. The notion that the limbic system is the seat of all emotions has received real criticisms. Generally, the Peripheral Nervous System has its powerful impact on emotional experiences (feelings) and emotional expression (behavior). King, Curtis and Knoblich's (1991) showed that the right side of the brain, especially the temporal lobe: amygdala area, is important in processing the cognitive-emotional information; therefore, accordingly, King and his associates study stressed the relationship between emotions impact and aesthetic preference.

Hypotheses

Because the lower awareness is a condition in both information input subliminally and expressive behavior or aesthetic feelings. On the other hand, because cortical arousal facilitates the subliminal information impact on mathematical problem solving activity (Khalil,1994); the present study hypothesized that the inserted subliminal information may lead to form an expressive behavior as aesthetic feelings for paintings, and could shape the performance behavior in the case of solving mathematical problems (Hypothesis I).

Chakalis's and Lowe's study (1992) showed that subliminal positive affirmations could enhance memory. Chaklis's and Lowe's results received additional support from some other studies (e.g. Khalil 1989; 1994). Based on the previous results, the present study hypothesized that the subliminal information which influences both expressive and performance behaviors will last for a long time (Hypothesis II).

In addition, the intensity of the subliminal information effects may correlate with the openness to experience personality facets which include some personality traits,

such as fantasy, aesthetic, feelings, and ideas (Hypothesis III).

In the present study, fantasy means that the individual has a vivid imagination and an active fantasy life, his daydreams could be considered as a way of creating an interesting inner world for himself. The aesthetic facet means that the individual has a deep appreciation for art and beauty, in general. The feelings facet implies receptivity to one's own inner feelings and emotions and the evaluation of emotion as an important part of life. It could also refer to the depth of the experiences and to the more differentiated emotional states which individual may possess. The ideas of facets represent what one feels when he/she enjoys both philosophical arguments and brain-teasers (Costa & McCrae, 1992).

These definitions of openness facets and findings suggested positive correlations between openness to experience facets and subliminal information influences.

Method

Subjects: Subjects of the present study were 30 Egyptian male, right-handed, university psychology students, their ages ranged between 18 - 21 years ($19.37 \pm .95$). All have adequate hearing.

Apparatus: A slid projector was used to present 10 copies of famous paintings (Gogh, Picasso, Da Vinci, Dally, Magreot, Said, and Ragheb), and 10 mathematical problems with four alternative answers for each problem. Two headphones were linked to two recorders for listening to the music through one and experimental information (subliminal

simuli) through the other at the same time. Three tapes; soft music, neutral sentences to measure the insertion level of experimental information that is recorded on the third tape.

Tests: 1) Aesthetic Feelings for Paintings Test, consisting of 11 columns; the first one contains 23 aesthetic feelings taken from the Aesthetic Feelings Test which was locally developed by El-Sheikh, 1991. Each column of the test is marked with the number of the painting exposed. The subject reported the intensity of his feelings on a 5-Point Likart Scale Format, after each painting is exposed.

2) Openness to Experience facets Test (Neo PI-R /O) was translated into Arabic from Costa and McCrae's Neo PI-R (Younis & Khalil, in press).

Through the base line and experimental mean scores for MonaLisa painting the aesthetic feelings reliability was calculated ($n=30$, $r=.8$). The openness to experience facets reliability by Alpha coefficients were calculated, as follows: $O1=.646$; $O2=.739$; $O3=.47$; and $O5=.536$ ($n = 252$, Egyptian university males student). (*ibid*, in press)

The Experimental Procedure

The experiment was divided into four sessions. In the first session; a) The openness to experience (Neo PI-R/O) and general data list were administrated in groups (4 or 5 Ss), and b) The paintings were consequentially exposed for a period of one and half minutes, each painting. This session lasted about 45 minutes for each group.

The second session (the stage of base line)-- in which the subjects were tested individually as follows: a) After each painting was exposed, the subject reported on a 5-point scale, his aesthetic feelings intensity, b) Then, the mathematical problems were presented in a period of one and half minutes for each problem and the subject was asked to choose the correct solution out of four alternatives,

c) These responses could be considered as a base line on which subject's feelings to the 6 & the 7 paintings are chosen, to represent high or low intensity's scores, and two wrong answers for mathematical problems, and d) The experimental sentences could change the scores of the base line responses and which will be recorded on tape.

The third session (experimental stage) --- was similar to the second session; but, a) The auditory subliminal stimulus intensity was determined to the left ear before exposing the paintings (or Ps), and that auditory subliminal sentences were presented simultaneously at the time of exposing the 6 & the 7 paintings to the left ear of the subjects who were listening to the music in the right ear, b) The procedure in the previous step was repeated, but for the subliminal sentences for two mathematical problems (Mps) which were presented to the right ear of the subjects, c) After presenting each painting, the subject should report his aesthetic feelings intensity on the test, and d) After presenting the MPs, the subject was asked to choose the correct solution. These responses were considered as a direct subliminal information influences (DSII).

The fourth session (A follow up stage): The paintings (Ps) and mathematical problems (MPs) were presented to the subjects in a group session (4 or 5 Ss), and the subjects were asked to report their aesthetic feelings to each painting and to choose the correct solution to each of MPs. These responses were considered as an indirect subliminal information influences (ISII).

The second, third, and fourth sessions lasted together about 55 minutes each.

Results

First: *The subliminal information influences on expressive behavior (aesthetic feelings):*

1) The direct subliminal information influences (DSII): the mean of changes between base line and experimental stages scores were calculated for; a) The experimentally chosen feelings for the second, third, fourth, and the fifth paintings were considered as control paintings feelings (CPI); b) The experimental feelings for the sixth and seventh paintings, were considered as an experimental paintings (EP1), in which subliminal information were inserted; c) The experimentally chosen feelings for the eighth, ninth, and tenth paintings, and for which the subliminal information influences may be extended (FP1); and d) T-test was also calculated to determine the significances of the possible changes. The t-test values for EP1 differences scores were found to be statistically significant (t-value= 11.49, $p < .001$, $df = 239$). Moreover, the FP1 differences scores were statistically significant (t-value = 3.34, $p < .01$, $df = 239$). There were also statistically significant differences between CPI and EP1 means (t-value = 7.59, $p < .001$, $df = 239$), and also between EP1 and FP1 means (t-value = 8.09, $p < .001$, $df = 239$). Tables 1 and 2 illustrates the results in detail.

Table 1 : t-test values for direct and indirect subliminal influences (n = 30).

	CP			EP			FP		
	M	SD	t-value	M	SD	t-value	M	SD	t-value
DSII(1)	1.8	7.23	1.18	8.33	11.2	11.49**	1.47	6.8	3.34*
ISII(2)	.42	7.57	.25	8.65	10.48	10.99**	.64	6.75	.13

note: CP = feelings changes for pre-experimental paintings (control paintings) EP = feelings changes for experimental paintings ; FP = feelings changes for post-experimental; DSII = direct subliminal information influences and ISII = indirect subliminal information influences .
 ** = $p < .001$, * = $p < .01$.

Table 2 : t-test values between experimental changes and control and extension changes for direct and indirect subliminal information influences on aesthetic feelings (n = 30).

EP1		CP1			EP1		FP1		
M	SD	M	SD	t-value	M	SD	M	SD	t-value
8.33	11.2	1.8	7.23	7.59**	8.33	11.2	1.47	6.8	8.09**
EP2		CP2			EP2		FP2		
M	SD	M	SD	t-value	M	SD	M	SD	t-value
8.65	10.48	.42	7.57	9.1**	8.65	10.48	.64	6.75	9.25**

note : EP1 = direct subliminal influences for experimental paintings ; CP1 = direct changes for pre-experimental paintings (control p.) ; FP1 = direct changes for post-experimental paintings ; EP2 = indirect subliminal influences for experimental paintings ; CP2 = indirect changes for pre-experimental paintings and FP2 = indirect changes for post-experimental paintings .
 ** = p. < .001

2) The indirect subliminal information influences (ISI): The mean changes between base line and the follow up stages' scores were also calculated for; a) The experimentally chosen feelings for 2, 3, 4, and 5 paintings as control paintings in the follow up stage (CP2); b) The experimental feelings for 6 and 7 paintings, as experimental paintings in the follow up stage (EP2); c) The experimentally chosen feelings for 8, 9, and 10 paintings in the follow up stage (FP2), and d) The t-test was calculated among the averages; EP2 differences (t-value = 10.99, p. < .001, df = 208), CP2 differences (t-value = .25, p. n, df = 208), FP2 differences (t-value = .13, p. n, df = 208), between EP2 and CP2 means (t-value = 9.1, p. < .001, df = 208), and

between EP2 and FP2 means (t -value = 9.25, p < .001, df = 208). The results are shown in Tables 1 and 2 .

Second: The subliminal information influences on performance behavior (mathematical problems solving) :

1) The percentages of the correct solutions for MPs to base line, experimental, and the follow- up stages, were computed concerning the followings: a) Pre-experimental mathematical problems (PEM), b) Experimental mathematical problems (EM1), and c) Post-experimental mathematical problems (OEM1). The results are shown in Table 3.

Table 3: The PEM, EM, and OEM percentages for experiment stages ($n = 30$).

Experiment stages	Percentages		
	PEM	EM	OEM
Base line (1)	.38	0.0	.44
Experimental (2)	.44	.25	.44
Follow up (3)	.48	.25	.54

note : PEM = pre-experimental mathematical problems ; EM = experimental mathematical problems and OEM = post-experimental mathematical problems .

2) The z values were also computed to assess the significance of the differences between percentages, and the results are shown in Table 4.

Table 4 : The z values are computed to differences between percentages .

Base line stage	Experimental stage		
	PEM	EM	OEM
PEM	0.1	---	---
EM	---	4.17*	1.43
OEM	---	---	---

note * = p < .001

Third: The relationships between openness to experience facets and the direct subliminal information influences, was measured by using the Pearson Coefficient. Results showed no significant relationships between openness to experience facets and the direct subliminal information influences. The results are shown in Table 5.

Table 5 : The relationships between direct subliminal information influences and openness to experience facets (n = 30).

	O1	O2	O3	O5	T.O
EP1	.07-	.18	.17	.04-	.18

note : EP1 = direct subliminal information influences to experimental paintings; O1 = fantasy facet ; O2 = aesthetic facet ; O3 = feelings facet ; O5 = ideas facet and T.O = openness to experience. Critical value of $r = 0.361$ at 0.05.

Discussion

Allison (1963) found that the subliminal effects could appeared when subjects were encouraged to think globally and intuitively, Gordon (1967) found that the students in departments of arts and humanities have shown significant subliminal effects. Kettlewell's and Lipscomb's study (1992) pointed out that the abstraction aesthetic preferences to paintings may be increased in the case of the domination of the right brain, which often seen as underlying synthetic thinking. Accordingly, these results suggested that the subliminal information influences were stronger on

expressive behavior (or aesthetic feelings) than on the performance behavior.

In addition, the individuals' meditation and awareness to paintings details as a condition for enhancing the aesthetic feelings may be arouses the cortical arousal which facilitated the subliminal effects (Khalil, 1994), and which may activates the cultural frame and enhances the positive psychological set. Both of which have important influence or impact in the case of learning aesthetic (Khalil, 1996).

Allison 1963 (cited in Sackiem et al , 1977) found that when subjects were encouraged to think in analytic, logical and organized modes, subliminal effects could be not found. The analytic, logical and organizational modes of thinking were encouraged by exposing mathematical problems which could be the cause of the low effects of subliminal information.

In the present study, there are no significant relationships between openness to experience facets; fantasy, aesthetic, feelings, and ideas on one hand, and subliminal information effects on expressive behavior (or aesthetic feelings) on the other hand. These results suggested that answering Openness to Experience Questionnaire needs a high level of awareness; as in the case of other self reported questionnaires, which contrasted with the low awareness as a condition of subliminal perception and aesthetic feelings effects.

To sum up, our results showed that the first hypothesis (the subliminal information may lead to form an expressive behavior as aesthetic feelings for painting, and could shape the performance behavior in the case of solving mathematical problems) and the second hypothesis (the subliminal information which influences both expressive and performance behaviors will last for a long time) have been relied, while the third hypothesis (the intensity of the

subliminal information effects may be correlated with the openness to experience personality facets) has not received any support.

Further research studies on the effects of the subliminal auditory information on expressive and performance behaviors with subjects from different sociocultural milieus and by using different tests and scales are still needed.

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