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The effects of Learned Helplessness on Multiple Cue Probability Learning

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Abstract

The Learned Helplessness Theory (LHT) predicts that an individual, who confronts an unsolvable task will perform poorer in a subsequent cognitive task than a naïve individual (Seligman 1975, 1976). This prediction was tested in two kinds of multiple-cue judgement tasks according to the Brunswikian paradigm. The performance of two groups of high school volunteers previously presented with an unsolvable judgement task was related to the performance of two comparable non-helpless control groups. The results were in line with the LHT. Individuals in the groups with the unsolvable task also had a significantly lower hedonic mood, which also supports the LHT. Further, individuals perform better in a task where all cues are valid than in a task where the participant has to ignore irrelevant cues.

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There is an old saying that by trying to unravel even the hardest knot, you learn to solve problems. You learn not only to handle knots but also to deal with problems in general. Some knowledge, according to the common-sense psychology illustrated by this saying, may be generalised to a more abstract level. Normally we think about learning and knowledge as something beneficial for the individual, something that expands our welfare, ability, or happiness. But there may also be situations where the content derived from the experience is that trying, or responding is meaningless. The individual learns not to act in similar situations in the future. This is rational, since the organism economises its energy (efforts), but it is also a dangerous strategy for the organism. A parallel situation is when we become bored from hearing false fire alarms and start to ignore them, or turn off the alarm equipment. Ignoring or turning off the alarm prevent the correction of our previous standpoint, by new experiences. The conclusion must be that, from a functionalistic perspective, this kind of abstract learning about the meaninglessness of action may keep the organism from trouble, but it may also potentially jeopardise the safety of the individual.

It is well documented that depressive people are not only sad, but also have less motivation and cognitive deficits. A question may be raised: Do these deficits in regard to motivation and cognitive abilities function as the turned-off alarm: The cause of depression may already have disappeared but this information is not recognised and therefore the depressive mood lasts longer than during a reactive phase.

One theory which is based on this phenomenon is the *Learned Helplessness Theory* (LHT), formulated as an integrated theory by Martin E. P. Seligman and his colleagues in 1975 (Seligman, 1976). Some aspects of LHT will be examined in this paper: Is there an abstractly learned effect, a *Learned Helplessness Effect* (LHE), that influences a person's ability to take in and utilise information? Is the ability of a person to profit from the information available in the environment inhibited by a depressive mood? If so, one might speculate about the existence of an automatic mechanism in depression. What normally creates a happier mood for a person is not perceived because of his/her depressive mood.

The purpose of this paper is to investigate some elements of this reasoning, to test for experimental support of the LHE predicted by the original LHT with induced helplessness in a multiple cue probability learning task within the Brunswikian theoretical framework.

The Learned Helplessness Theory

The Learned Helplessness Theory (LHT) was based on a number of experiments, originally all of them on infrahumans. Dogs given a series of inescapable shocks performed poorer in a subsequent situation where escape was possible (Maier & Seligman 1976, Seligman 1976[1]). The escaping response, which existed in the dogs' repertoires, did not help them to get rid of the electric shocks, but the termination occurred automatically and independent after a fixed elapsed time. The explanation is given according to learning theory: "The expectancy that

[1] *References to Seligman, M.E.P., Helplessness: On depression, development and death. San Francisco: Freeman, 1975, are made to the Swedish translation, published in 1976.*

responding will be ineffective reduces the incentive to initiate instrumental responses and disrupts later learning of response-reinforcement contingencies" (Klein, Fencil-Morse, Seligman, 1976, p. 508). There is no contingency between response and effect of response. The conditional probability of the termination effect is equal for escape response and non-escape response: p(T|ER) = p(T|—ER), in this framework called uncontrollability. Uncontrollability is defined by Abramson and Alloy (1980) as a noncontingency where "…the two events in a relationship consist of an individual's responses and some outcome" whether the broader concept noncontingency is used also about two events where no one of them is a response. Several investigations were made also on other species than dogs and an integrated theory was presented. Learned helplessness was caused by perceived uncontrollability, meaning "an *expectation* that responding and an outcome are independent" (Seligman, 1975, p. 48 / Seligman, 1976, p. 58) or ineffective and its effect was emotional disturbances and motivational and cognitive deficits.

In experiments with students (Hiroto and Seligman, 1975), Learned Helplessness Effects were found where inescapable noise caused helplessness symptoms similar to those in the infrahuman investigations. "Thus, both the response initiation deficit and the cognitive deficit that occur in helpless animals also occur in man and seem to be caused by the perception that responses and reinforcement are independent." (Klein, Fencil-Mores & Seligman, 1976, p. 508). With reservations for the method, Seligman makes an analogy comparison between Learned Helplessness and clinical depression (Seligman, 1976, p. 118*f*). There are similarities in regard to (1) symptoms, (2) aetiology, (3) cause, (4) therapy, and it is claimed that LHT can be used as a laboratory model of clinical depression (*op. cit.* also: Klein *et al*, 1976). Within the LHT there are also clues given for therapy measures based on the concept that the participant should be forced to contingent experiences. Inversely, therapy measures, e.g. pharma-therapies, designed for depressions, were shown to reduce symptoms of laboratory induced helpless animals (Maier & Seligman, 1976 p. 30 *ff*) and later, with contingency training, in induced helpless students (Klein & Seligman, 1976). LHT, with its roots in learning theory, has become a cognitive therapy model.

The original theory (Seligman, 1976), was inconsistent with newer laboratory data and theoretical reasoning. In an experimental setting (Hiroto and Seligman, 1975) with inescapable noise and college students, one experimental group was informed that the noise could be switched off by the participant, when it could not. The participants were told to try to endure the noise and only to use the terminating equipment if absolutely necessary. There was no helplessness effect in that objectively uncontrollable group.

LHT was reformulated by Abramson, Seligman, and Teasdale (1978), where a distinction between individual and universal helplessness was included. [LHT according to Seligman and his colleagues before the Abramson-Seligman-Teasdale article (1978), will be referred to as original LHT, and the theory from the latter as the reformulated theory. This is in accordance with the common terminology within this paradigm]. The reformulated LHT also includes within the theory a framework of attributions, classified by orthogonal dimensions internal-external and stable-unstable and global-specific, respectively. Within the reformulated LHT it is held that the perception of noncontingency is conscious, and also that it is subjective: Learned helplessness is the result of *perceived* uncontrollability. The reformulated LHT becomes more clinical, and there is less interest in the motivational and cognitive deficits *per se*.

Even though a great number of investigations have given experimental support to the LHT, there has also been criticism and alternative explanations of the results. Here is a short overview of some proposed alternatives to LHT, that also explain the *reduced state* of an individual by experiences in his/her *history*.

With a reduced state we mean at least one of the following states: (1) emotional impairment, (2) cognitive deficits, and (3) motivational deficits.

One concurrent cognitive theory of depression is Beck's *Cognitive-set theory* (Beck 1967, summarised in Abramson & Sackheim, 1977), which describes the depressive as in possession of a negative cognitive set, that is, a structure or inner map that makes the depressive individual prepared to interpret experiences in the interaction with the environment as an instance of failure. In a cognitive depression therapy based on Beck's theory the depressive is to be taught other, "healthier" maps. A number of studies try to combine LHT and Beck's theory (see e.g. Wortman & Dintzer, 1978, for a review of some of the earlier ones). There have also been attempts to form a unified cognitive therapy theory with elements from both Beck's theory and the revised LHT. Although it has been shown by Abramson & Sackheim (1977) that perceived, subjective noncontingency is not compatible with failure attributions and that these ecclesiastic attempts lead to a paradox, or a theoretical contradiction, such attempts seems to be the most common point of view in case reports from clinicians. There has also been studies where LHT and Beck's theories have been put in opposition to each other. Ross Rizley (Rizley, 1978) have made such comparison with result inconsistent with LHT and supporting Beck's theory. In the reformulated LHT and in later works by Abramson and Alloy, elements from Rotter´s conceptualisation of *Locus of Control* are integrated (Alloy & Abramson, 1979; Abramson & Alloy, 1980). Important criticisms of LHT have been made by Camille Wortman (e.g. Wortman, Panciera, Shusterman, & Hibscher, 1976 and Wortman & Dintzer, 1978) as well as by Charles Costello (Costello, 1978). The critique by Costello is commented by Seligman (1978). Seligman rejects Costello's and

others criticism and he claims Learned Helplessness to be viewed as a subclass of depression (*ibid.* p. 169).

With LHT incompatible theories to explain reduced states caused by the individuals history is *e.g.* Levis SR-position (Levis, 1976), and Shirley Fisher's *Stressful life event* model (Fisher, 1989) .

Hypothesis-testing or *informational explanation of helplessness* as described by Grezegorz Sedek and Miroslaw Kofta (1990) is a theory that theoretically is close to the original LHT (*ibid.* p. 739), but not to the reformulated one. According to Sedek and Kofta, in problem situations the organism forms hypotheses for problem solution. From the hypotheses he or she constructs action programs or anticipatory schemata. "When acting in a controllable situation, a person receives meaningful (consistent) informational feedback to the hypothesis considered: One hypothesis obtains gradual support while the others are increasingly disconfirmed" (*Op. cit.*: p. 730). One point where the informational explanation model differs from original LHT is about the ground for noncontingency: Seligman and his colleagues point out a voluntary *response* and outcome. According to Sedek and Kofta (1990), LHE may be induced by lack of cognitive control, also when it is not with an response and therefore objectively not noncontingency according to the established definition of that concept. They tested whether exposure to inconsistent information would cause LHE. LHT would not predict this, whereas the Information Explanation model would. The general result confirmed their research hypothesis. Participant had been conditioned to LHE, not by behavioural noncontingency but rather cognitive inconsistency. It should be pointed out that the informational approach does not contradict the fundamental propositions of LHT. "Rather, it suggests redefining uncontrollability in information-processing terms: A person is in an uncontrollable situation to the extent that he or she cannot achieve cognitive gain (reduction of uncertainty) despite long-lasting cognitive exertion.", and "….but also direct flow of inconsistent task information during problem-solving attempts, might be a powerful source of helplessness symptoms" (*ibid.* p. 739).

Social Judgement Theory

With the Probabilistic Functionalism by Egon Brunswik, the complex structure of the environment is incorporated into an ecological, psychological system. Originally describing perception, or *Wahrnehmung*, this ecological framework has been extended to cognitive psychology as well. The Brunswikian lens model describes how features of the environment, are accessible to the perceptual apparatus as cues and used by the organism to reconstruct a representation of the environment. This mechanism is held as a central ability of the organism "…so that orientation and anticipation can take place." (Tolman and Brunswik, 1935, p. 63). The model also take into account that the ecology is best described in terms of probability. Thus, this ecological framework is functionalistic and probabilistic.

Social Judgement Theory (SJT) is modelling the process of human inferences, using the Brunswikian paradigm. For a short review of SJT se Brehmer (1979).

Central to Brunswikian psychology is the concept of performance. Performance in judgement tasks, using Brunswik's lens model, has been expressed in terms of achievement, referring to the correlation between the judgement and the correct value that is to be predicted (*i.e.*, the outcome or criterion). A number of experiments have been based on a setting with cues presented to the participants in the form of one or several bars with varied height where the participant tries to predict a criterion value, before the correct criterion value is presented as feedback. A *single-cue task* uses only one bar (see e.g. Brehmer, 1978) whereas *multiple-cue tasks* use several (se e.g. Armelius, 1979). It has been shown that single-cue tasks are easier than multiple cue tasks (Brehmer, 1979). Other studies have claimed that a positive linear function between cue and criterion is the easiest cue-criterion function to learn and that a participant facing a new task begins to use a hypothesis about that function. If it doesn't work, the person continues with hypotheses about other functions. (Brehmer & Kuylenstierna, 1979). That is in line with Brunswik's and his colleague Tolman's reasoning "…an organism usually tends to bring with it to a given new environment a set of already prepared hypotheses. These hypotheses result from its innate make-up and from its previous experiences of "normal" average environments" (Tolman and Brunswik, 1935, p. 65). Among studies with multiple-cue tasks Brehmer and Almqvist, (1977) have investigated cases with *Narrow-focus task* which requires the participant to use some of the available cues and to ignore other cues compared to *Wide-focus task* where the participant has to use all cues. The Narrow-focus task was proven to be more difficult than the Wide-focus task with linear, positive validity for all cues.

Within the SJT and cue-learning paradigm a set of parameters are used to describe the relation between the system of environment and the cognitive system of the organism. Those presented below, are valid when there is a known, linear relationship between cues and criterion. (See Brehmer, 1979, Brehmer, 1988, Hammond & Summers, 1972, or for an overview of the Brunswikian psychology in Swedish: Björkman, 1978)

The overall performance is the extent of similarity between the system of the environment and the system of the organism, that is, how well the judgement corresponds to the criterion. An index of *achievement* r_a is defined as a correlation between the correct criterion value and the participants response. Achievement is also called functional validity. In a probabilistic task the performance can not mere as by chance be expected to be higher than the degree of predictability of the task. The achievement is determined by three factors, *ecologi-*

cal validity, *cue utilisation,* and *knowledge* (see Equation 1). The predictability, or the ecological validity, is expressed in R_e, defined as the correlation between the statistically optimal prediction that is possible from the available cues (the criterion value derivable from the cue-criterion function inserted by cue values, when the criterion is not distorted by chance effect) and the criterion value. The ecological validity can be seen as the upper limit of the expected achievement. Operationally R_e is defined as the multiple correlation between cues and criterion. In a non-probabilistic task R_e is equal to 1.0.

Cue utilisation, R_s is defined as the multiple correlation between cues and judgement. Cue utilisation captures the participants policy in the task, the way the participant is using the cues for prediction. Often, cue utilisation is expressed in the squared correlation, as R_s^2. Cue utilisation is also called consistency or cognitive control. In a multiple-cue task, the utilisation for each cue is calculated as r_{xi}.

A measure for the persons *knowledge* (also known as *accuracy*) can be derived if the cue-criterion function is linear, and it is symbolised by G. [The term knowledge is used by, among others, Hammond & Summers, 1972.] Knowledge is the extent to which the participant has been able to utilise the information given in the task, defined as the correlation between the linear cue-(to cue)-criterion function and the participants response. When G is 1, the participant's policy matches the ecological values of the presented cues and the cues are thus weighted in the optimal manner for the task. Note that low cue-utilisation R_s is compatible with high knowledge G, as when the participant uses the correct policy, but in an incorrect manner with trial-to-trial fluctuation. The operational definition is derived from the simple Lens Model Equation (for linear cases) (from Brehmer, 1988, p. 23):

$$R_a = GR_eR_s \qquad \text{(EQ 1)}$$

gives

$$G = R_a / (R_eR_s) \qquad \text{(EQ 2)}$$

Hypotheses

(1) Participants passing a task with random feedback (noncontingency group) will show lower hedonic mood and other mood changes relative to controls. That is a test of the emotional deficit of LHE.

(2) Noncontingency group will show performance impairment in Multiple-Cue Probability Learning tasks. That is a MCPL test of the cognitive deficit of LHE.

(3) The impairment according to (2) above will be affected by task difficulty.

Method

Participants

The investigation was conducted in 1980 with 40 voluntary recruited[2] senior high school students acting as participants. The average age was 18. Of the 40 there were 16 females. The participants were paid SEK 35 for their participation, which lasted for about one hour and a half.

Design

Two factors were systematically varied. There were two kinds of antecedent tasks, one "noncontingency-task" with random feedback and one syllable-pairs learning task, earlier proven "easy". Each antecedent group consisted of 20 participants, where 10 from each group were assigned to one of two types of multiple cue judgement tasks, described in Brehmer & Almquist, (1977a and 1977b). The alternative types were a wide-focus task with three valid cues, and a narrow-focus task, where only one of three cues was valid. This means that each combination of tasks were run by 10 participants. The result in the learning/judgement task was evaluated in four consecutive blocks. The evaluation model for he cognitive part of the hypothesis was thus a two-tailed 2*2*4 ANOVA, with repeated measurement on the third factor. The effect of antecedent task was also measured with regard on mood. The evaluation model for the emotional part was thus for each of six mood factors a two-tailed t-test. The design is summarised in Figure 1.

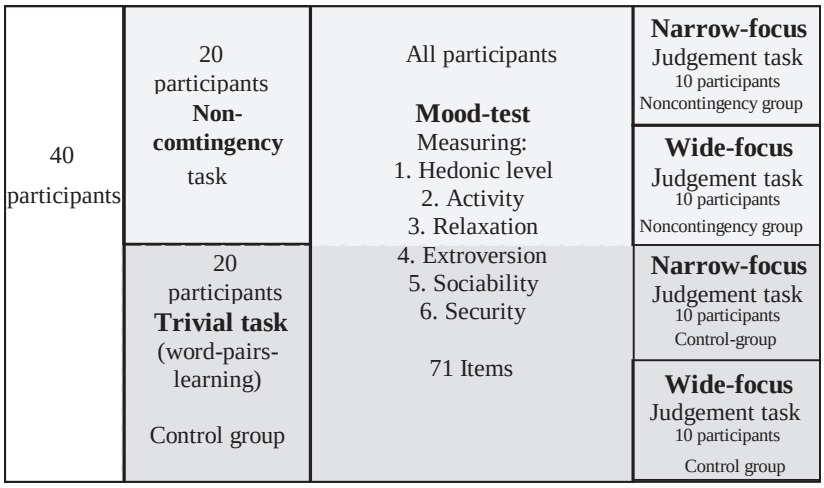

Figure 1. Summary of the experimental design. Reading from left to right corresponding to time-order.

[2] *Dr. Prof. Holsten Fagerberg kindly helped in the recruiting of voluntary participants and I want to give him, my former senior high school teacher in psychology, my reverences to express my thankfulness for his helpfulness .*

Material

The Helpless-condition task was a performance task of 100 trials with feedback after each trial. The participant was instructed that, because of the construction of the test, it was not possible to give a correct answer on every trial, but that he/she should try his/her best. Each trial consisted of a sheet with a diagram with three bars, 25 cm high, each marked up to a variable height, between 1 cm to 25 cm. The participant was told to look at the bars; and to make as good a judgement as possible of the criterion value. The criterion value was a number between 11 and 37. The participant was told to fill that in on his/her form, and turn sheet to take part of a sheet with the correct criterion value (feed back); then turn the sheet again to the next trial. The feedback was actually random. This means that the task was objectively noncontingent, and the probability for the participant to give the right answer was only random. The predictability or ecological validity R_e was less than 0,04 for every block of 25 trials and inter-cue-correlation r_{xy} < 0,02. The task thus corresponded to helplessness inducing conditions described by Seligman (e.g. in Kurlander, Miller & Seligman, 1974 and Rooth & Bootzin, 1974, both described in Seligman, 1976).

The Syllable-Pairs Learning Task was used as a warm up for the control-group to assure that all participants should have about the same active time in the experiment before the mood test. The Syllable-Pairs Learning Test consisted of a list of 100 pairs of Swedish two-syllable words, that were read slowly for the participant in groups of five wordpairs. Then the group of word pair was read again, but this time only the first word in each pair and the participant had to complete the other word in the pair on his/her form.

Mood test

After the antecedent task all participants passed a mood test[3] (Sjöberg, Svensson, & Persson, 1978), which has been proven to detect even small differences in mood and temporary mood shifts. The mood test returns statistics for six mood-dimensions. These statistics were correlated to the antecedent condition by means of a multiple regression analysis. The test differs from e.g. Beck´s Depression Inventorium (BDI) which measures more powerful changes like pathological depression and states that are more stable over time. The test contains of 71 items, each loading one of six factors: (1) hedonic tone, (2) activity, (3) extroversion, (4) relaxation, (5) social orientation or (6) security. Each factor is loaded by between 10 to 16 items with the coefficient of +1 or -1. Each of the 71 items consists of a word (adjective expression), describing different emotional states. The participant is instructed to assess for each item the extent to which the word corresponds to the current emotional state by circling one of the four fixed answer alternatives, representing : ++ definitely corresponding; + corresponding fairly; - not corresponding ; - - definitely not corresponding. Each result factor can reach a value between 0 and 4.

A learning-/judgement test constituted the experimental test of cognitive ability. It consisted of multiple-cue-3-cue-tasks as described in e.g. Brehmer, (1979) or Brehmer & Almquist (1977a). The task was to judge a criterion value based upon the values of three variables presented graphically to the participant on a sheet with a diagram with three bars. Each bar was 25 cm high and marked up to a variable height, between 1 cm and 25 cm. According to the Social Judgement Theory framework (SJT) the bars are referred to as the three cues x_1, x_2, and x_3, respectively. The participant was told to look at the bars and to make as good a judgement as possible of a criterion-value, which should be between 11 and 37. The whole cognitive task consisted of four booklets with 25 judgement trials in each booklet. Each booklet is referred to as a block, and the blocks were presented to the participants in a systematically rotated order according to a Latin square. As mentioned above there were two kinds of tasks, one narrow-focus task and one wide-focus task.. The correlation between cues and criterion in each block is shown in Table 1. In the table the blocks are referred to as A, B, C and D. The rotation means that a block, that in the evaluation is referred to as block 1, with equally probability could be block A, B, C or D. Common for both types of tasks were that the predictability for each block was R_e = 0.90 (+-0.02) and that the cue-inter correlation was low, r < 0.02. The two tasks differed in that, that in the Nar-

Table 1: Ecological validity for each cue x1, x2, x3, and the total Re in the Narrow Focus Task and Wide Focus Task respectively

	block				
	A	B	C	D	Mean
Narrow Focus					
cue x_1	-0.0231	-0.0452	-0.0485	0.0431	-0.0184
x_2	0.8978	0.9038	0.8828	0.9062	0.8977
x_3	-0.0471	0.0514	-0.0072	-0.0377	-0.0102
R_e	0.8993	0.9064	0.8842	0.9080	0.8995
Wide focus					
cue x1	0.5200	0.5186	0.5255	0.5186	0.5207
x2	0.5255	0.5200	0.5186	0.5255	0.5224
x3	0.5186	0.5255	0.5200	0.5200	0.5210
Re	0.9030	0.9030	0.9030	0.9030	0.9030

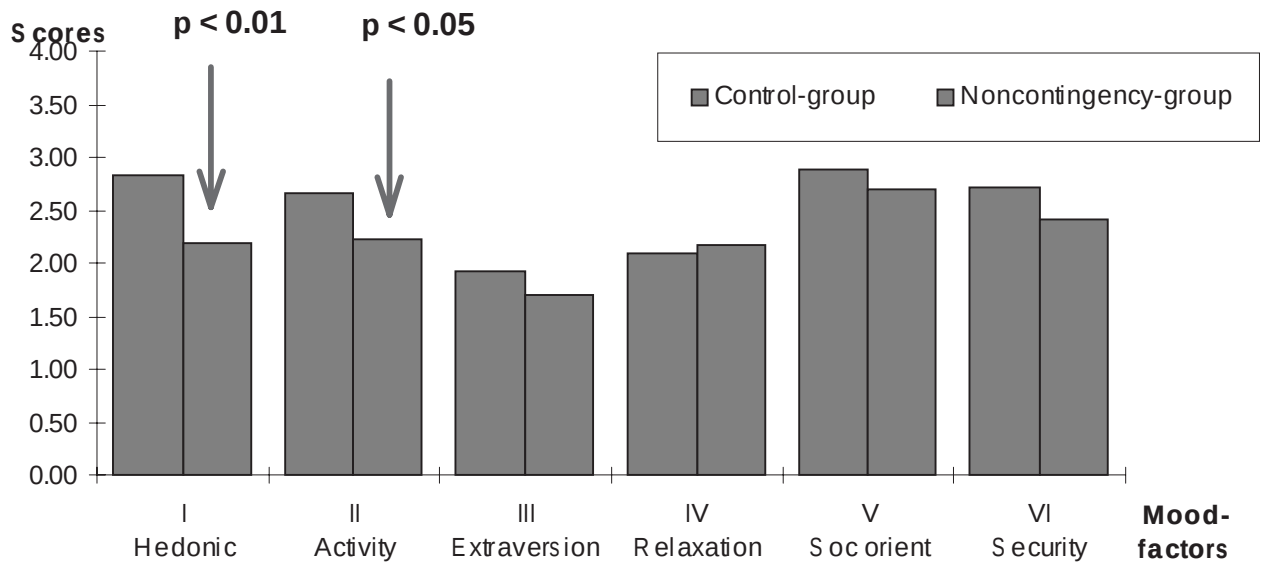

Figure 2. Mood scores, all mood factors per helpless inducing condition (noncontingency) and control group, respectively.

row-Focus condition (NF) only cue x_2 was valid but for the uncorrelated cues (x_1 and x_3) ecological validity were $|r_{xy}| < 0.05$ for all blocks. In the Wide-Focus condition (WF), on the other side all cues had about equal ecological validity, $r_e = 0.52$ (+-0.01).

Procedure

The participants participated individually. They were instructed that their participation should take approximately 1.5 hours, that it consisted of three parts, and that the second part would take only a couple of minutes to complete. This information was given to avoid a stress reaction if a participant realised that more than 0.5 hours had elapsed before the first part was completed. The participant was able to ask general questions before the first part started. All instructions were given orally, read from a manuscript.

The participants in the **control group** were instructed to try to remember combinations of two words in a wordpair. The wordpairs would be read, slowly, by the experimenter in groups of five pairs, and each group two times. Then the first word in each pair should be read and the participant's task was to complete with the second word in the pair in his/her answer form.

The instruction for the **noncontingency group** was the standard instruction for a multiple cue probabilistic learning task. It was told that it was the participant's task to predict a number between 11 and 37 and that as help for that prediction they were provided with three bars. The participant was stated that, because of the nature of the experiment, it was not possible to predict correctly each time, but that he/she should try to come as close as possible to the right answer.

The tasks were presented in four booklets, each containing 25 judgement trials. The trials were arranged so that for each trial the participant should (1) look at a sheet with cue bars, (2) write the prediction on the answer form, and (3) turn sheet and take part of the feedback criterion value. After completion of all 100 items in the antecedent task, the answer form was collected and the participant was informed that the first part was completed.

All participants then passed on to participation in the **mood test**, which

Table 2. Moodscores per each factor. Maximum score is 4.00

	I Hedonic	II Activity	III Extraversion	IV Relaxation	V Soc orient	VI Security
Noncontingency						
mean	2.19	2.24	1.69	2.18	2.69	2.42
SD	0.66	0.70	0.49	0.61	0.54	0.59
Control group						
mean	2.84	2.66	1.93	2.09	2.89	2.72
SD	0.72	0.68	0.76	0.84	0.35	0.72
All						
mean	2.52	2.45	1.81	2.13	2.79	2.57
SD	0.76	0.71	0.64	0.73	0.46	0.67

Table 3. The three measures of performance for every combination of test-conditions. The performance is displayed blockwise (each block 25 trials) and over blocks (100 trials). The measures are shown in correlation distributed r* statistics.

Condition	Focus	Measure	Block 1	Block 2	Block 3	Block 4	All trials
Non-contingency							
	Narrow						
		R_a	0.22	0.42	0.33	0.43	0.35
		R_s^2	0.36	0.48	0.46	0.44	0.44
		G	0.30	0.70	0.57	0.87	0.35
	Wide						
		R_a	0.48	0.47	0.56	0.68	0.56
		R_s^2	0.38	0.36	0.42	0.55	0.43
		G	0.88	0.87	0.93	0.92	0.72
	Both foci						
		R_a	0.36	0.44	0.46	0.57	0.46
		R_s^2	0.37	0.42	0.44	0.50	0.43
		G	0.69	0.80	0.82	0.90	0.81
Control-group							
	Narrow						
		R_a	0.45	0.65	0.61	0.73	0.62
		R_s^2	0.39	0.57	0.57	0.60	0.54
		G	0.80	0.94	0.91	0.97	0.92
	Wide						
		R_a	0.63	0.70	0.78	0.76	0.72
		R_s^2	0.52	0.60	0.64	0.61	0.59
		G	0.96	0.98	0.99	0.99	0.98
	Both foci						
		R_a	0.54	0.68	0.71	0.75	0.67
		R_s^2	0.46	0.58	0.61	0.61	0.57
		G	0.91	0.97	0.97	0.98	0.96
Both contingency conditions							
	Narrow						
		R_a	0.34	0.55	0.48	0.60	0.50
		R_s^2	0.37	0.53	0.52	0.53	0.49
		G	0.61	0.86	0.80	0.93	0.83
	Wide						
		R_a	0.56	0.59	0.69	0.73	0.65
		R_s^2	0.45	0.49	0.54	0.58	0.52
		G	0.93	0.95	0.97	0.98	0.96
	Both foci						
		R_a	0.46	0.57	0.60	0.67	0.58
		R_s^2	0.41	0.51	0.53	0.56	0.50
		G	0.94	0.92	0.92	0.96	0.92

was presented as a form with items and instructions. The same instructions that were written on the form were also read orally to the participant. It was pointed out that the participant should try to describe the attitude to each expression *independent* of the other questions, to answer about the *timely* state, and work through the form *in the order* from the first item to the last.

When the participant had completed the last item, the form was collected and the participant was informed that only the last part remained.

As the last part of the experiment, all participants completed the **learning/judgement task**. The instruction was identical with the one that participants in the noncontingency group received before the antecedent task. When the instruction was given the second time to a participant in the experimental group, it was stressed that (a) the instruction was the same one; (b) tat even if the same instruction was given it was a quite new task; and (c) that it just "happened" to be the same instruction. This information will be discussed in the discussion section of this paper.

In all tasks the participant was able to complete the tasks at his/her own speed. On average, the control group completed their antecedent task slightly faster than the experimental group. The total time for the entire experiment varied between 1.5 hour and 2 hours.

Result

Three types of analysis were done on the experimental data.

1. The effect of experimental condition on scores from mood test was analysed with t-test.
2. The effect of experimental conditions on performance in judgement was analysed with ANOVA.
3. The mood scores as a performance predictor was analysed with ANOVA and with correlation analysis.

For each participant, four dependent measures were calculated for the judgement task: achievement (r_a), consistency (R_s^2), accuracy (G), and cue utilisation (rxi) for each cue r_{x1}, r_{x2} , and r_{x3}. Aggregated measures of r_a, R_s^2, and G, for each test condition group are recorded in Table 3. Before the ANOVA the performance-results were normalised to Fisher's z-scores in order to fit the distribution demands from the ANOVA-model. The aggregated results presented are retransformed to the original r* correlation-distributed statistics and squared R* statistics for consistency.

In the mood test, three participants failed to respond on some items, comprising all together seven missed items. The scores representing mood-dimensions with missing values were transformed by multiplying the sum by a fraction i/r, where i is the number of items loading the dimension in question and r is the number of items responded to by the participant in question. In the judgement test one participant missed one trial. Since the computer program not was designed to calculate with missing data, the missing value was replaced by the criterion value. This operation has a weak tendency to overestimate the participants performance.

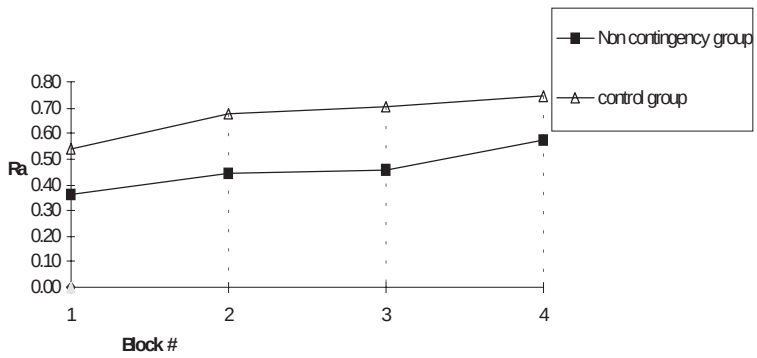

Figure 3. The learning effect in 4 consecutive blocks under noncontingent condition and control condition respectively measured in achievement R_a.

Effects of antecedent treatment measured with the mood-test

Means and standard deviation for the six mood dimensions and the two antecedent treatment conditions appear in Table 2. The means are illustrated in Figure 2. The data was tested by a t-test. For dimension I there was a $t(38) = 2.74$, $p < .01$. For dimension II $p < .05$, $t(38) = 2.07$. For the other dimensions there were no significant effects of the antecedent treatment.

Effects of antecedent treatment upon multiple-cue learning

There were significant effects in all measures except for r_{x1} and r_{x3} with regard to differences in antecedent treatment. The mean achievement was $r_a = .46$ and .67 for the noncontingency and the control groups, respectively; $F(1/36)=8.64$, $p < .01$. For consistency, the means were $r_s^2 = .43$ and .57 for the noncontingency and the control groups, with a F-fraction of $F(1/36)=6.35$, $p < .05$. The measures for accuracy also show that the noncontingency group performed poorly. Means for the noncontingency group was .81 and for the control group .96; $F(1/36)= 11.68$, $p < .01$. Cue-utilisation r_{xi} gives reliable measures only for cue x_2, which is valid for the whole experimental group whether x_1 and x_3 are valid for 20 and invalid for 20 participants. For r_{x2} there is a significant effect; $F(1/36)=10.10$, $p < .01$. Means for the noncontingency group and control group were .38 and .68, respectively.

Effects of type of focus on multiple-cue learning

The participants appear to find it easier to manage a task where all cues are relevant (so called Wide-Focus task), than if they have to ignore irrelevant cues and make their judgements on the basis of only one relevant one (Narrow-Focus task). Means for Narrow-Focus and Wide-Focus were r_a = .50 and .65, respectively and means for G = .83 and .96, respectively. The achievement differed significantly, $p < .05$, $F(1/36) = 4.19$ and likewise did G, the accuracy, $p < .01$, $F(1/36) = 8.77$. The consistency, however, did not show any significant difference. All three values for cue utilisation differed significantly, $p < .01$ (which is a rather trivial and expected result from the setting, where the cues differed in ecological validity). For the overall valid cue x_2, the cue utilisation was higher in the Narrow-Focus condition, r_{x2} = .66 compared to the Wide-Focus condition r_{x2} = .41, $F(1/36) = 6.64$, $p < .025$. For the cues invalid in the Narrow-Focus condition the utilisation, of course, was lower in that condition. r_{x1} = .09 and .41 $p < .01$, $F(1/36) = 19.82$ and r_{x3} = .20 and .38, $F(1/36) = 14.17$, $p < .01$.

Interaction effects

Interaction effects were investigated between (1) antecedent treatment and type of judgement task; (2) antecedent treatment and block; (3) type of judgement task and block; and (4) antecedent treatment and type of judgement and block. Between antecedent treatment and type of judgement task there was significant interaction effect only for cue utilisation. For r_{x1} $F(3/108) = 5.73$ ($n = 10$) $p < .05$. The effect for cue x_2 was very weak, $p < .20$ $F(1/36) = 1.71$ ($n = 10$). The numbers for r_{x3} were $F(3/108) = 7.70$ ($n = 10$) $p < .01$.

The interaction between antecedent treatment and block did not show any significant effect.

Between type of judgement task and block there are effects only in the cue utilisation measures. For r_{x2} the difference was significant $p < .01$, $F(3/108) = 4.22$ ($n = 20$) and for r_{x3} $p < .05$, $F(3/108) = 3.46$ ($n = 20$).

In the three part interaction between antecedent treatment and type of judgement task and block there were effects for r_s^2 and r_{x2}. For the consistency $F(3/108) = 1.65$ ($n = 10$) $p < .20$ and for cue utilisation, r_{x2}, $F(3/108) = 1.91$ ($n = 10$) $p < .20$, not significant.

One participant, belonging to the control group, had problems with his/her wordpairs task. The poor performance was observed by the experimenter and spontaneously reported by the participant. That participant has had poor performance in the judgement task. R_a = .21 and low scores in hedonic mood.

The question about the predictability of performance from mood scores was computed post hoc with ANOVA with the total group of participants divided in two groups with regard to their mood scores on hedonic mood factor. No significant effect was observed. Additionally for each noncontingency group and control group, correlation analysis were administered between all mood factors in relation to performance statistics of achievement for block 1 in normalised R_a. There were no mood factor that correlated higher than +- .2 with equal sign in noncontingency and control group.

Discussion

The result from this investigation clearly shows a Learned Helplessness Effect (LHE) as predicted by the original Learned Helplessness Theory (LHT) (Seligman, 1976). The LHE is supposed to appear as emotional deficits, reduced motivation and reduced cognitive abilities. This study investigated two of these three areas, namely emotional deficits as hedonic mood and cognitive abilities seen from a SJT point of view. In both areas there were significant deficits.

Although the hypothesis for the investigation was confirmed, the conclusion is not free from objections. Some of the objections that are apparent to the author, will be discussed here below. For the purpose of the presentation, they will be examined clustered in the following groups: methodological deficits of the investigation; other investigations falsifying/counterfeiting the original LHT; shortcomings with the original LHT; and alternative explanations of the present investigation.

Most of the LHT studies discuss generalised learned helplessness: The experience of noncontingency generalises from one situation to another. This will also be discussed below, but here we point out that this is also relevant with regard to the experimental setting. The antecedent, LHE-inducing, condition was of the same type as the testing condition. One might argue that this similarity means that there actually has not been any generalisation. This argument is close to the reasoning about a Schedule-Shift-effect, which William McReynolds uses towards Seligman and his colleagues' LHT-studies (McReynolds, 1980). On the other hand the emotional LHE was proven in the mood test, a situation, that is not very similar to the noncontingency situation. Note also that neither the original LHT nor the reformulated version, makes a prediction about the span or limitation of the generalised effect. It has merely been discussed by Seligman's critics. In his own writings the generalisation is mostly implicit.

Another objection is the question of chronicity. An LHE that only last for one hour would not have the jeopardising effect on the organisms well-being and survival. On the other hand the question of chronicity is a question for research. This study uses about the same timing between pre-treatment and effect measurement as most of the other reviewed studies based on laboratory inducement of LHE.

The presentation of performance prediction by mood scores as shown on page 20 give reason to comment: when interpreting the numbers it has to be remembered that the mood test

was administrated before the learning/ judgement test. That means that the numbers in e.g. block 3 column express the achievement after three blocks of learning in relation to the mood before the first block; that expresses the mean of item 51 to 75, all contingent with a ecological validity of .90. The division in blocks is used for the purpose of investigating learning effects. In this case, maybe it is better to give most attention to judgement; there the numbers for block 1 may be most informative, since that parameter shows achievement after only, in average, 12.5 contingent trials. According to the LHT, the mood differences between the noncontingency group and the control group should successively be reduced after each block where contingency is objectively present or subjectively perceived. If the interaction between mood and learning would have been focused, the design should have a mood measurement after each judgement block. The experience for future studies is that longitudinal measurements of learning is contradictory with the LHT assumptions. Future studies maybe have to choose between investigating learning or judgement.

In this context it may be noted that, in contrast to most other studies based on laboratory induced LHE, this study does not use a specific closing part with debriefing. The reasoning was that for a participant in the noncontingency group a debriefing containing an explanation that the task in fact was random would have risked the naïveté of subsequent participants. According to the theory, the fact that the judgement task was contingent should work as debriefer or "therapy" (Seligman, 1976 p. 67*ff*). Post hoc it can be inferred from the result that the assumption made in this case was ethically justified. The induced helplessness group performed more poorly but there was a learning effect: accuracy did rise from .70 in the first block to .90 in the fourth block.

Some objections could be raised about the antecedent condition for the control group. The treatment was intended to equalise the two groups in regard to familiarity with the laboratory environment during the judgement test. On average, the word test was faster, though it was not systematically recorded.

Comments should be made on the instructions to the noncontingency group participants: The information (a) that the instruction actually was identical to that of part one, was given to avoid that the participant would make efforts to find some difference in the two readings, hypothesising that the object of the experiment concerned small differences in the instructions given. The second information (b) that even if the same instruction was given, it was a quite new task, was given under the assumption that if a participant during the antecedent treatment with the uncorrelated tasks might have noticed the noncontingency and adapted to that by giving random answers, he/she should not continue that strategy, not noticing that it was now a new task.

Within SJT, studies have been performed using nominal discrimination tasks, and quantitative tasks. One type of quantitative tasks is judgement of frequency or probability. Reading LHT by words, an explicit knowledge about contingencies is necessary. However the SJT studies show that man has poor abilities in estimating probabilities and contingencies (Brehmer, 1980; Smedslund, 1963). However, a modification of LHT to allow perception of noncontingency unconsciously would not be contradictory — rather, in the authors view, necessary.

In a study of Alm and Brehmer (1980), LHT was tested be means of Single-Cue Probability Learning task. In that study no support to LHT was reported. Some comments are necessary. It was shown from verbal reports, that the participants failed to perceive a random task as random. That counterfeits Seligman's assertion that, in humans, the perception of noncontingency is conscious. Compared with the present study, Alm and Brehmer's differed with regard to the task difficulty: Single-cue tasks are proved to be easier; on the other hand in their setting there was a much lower ecological validity, .4 compared to .9 in the present. Their reasoning contains "According to Seligman the subjects' expectation about controllability of the task is what is important" (*ibid.*, p. 12). It seems that the distinction between perceived versus expected noncontingency need to be investigated.

In some writings about the LHT, e.g. when the original theory was presented, the critical cause of learned helplessness is a state of noncontingency in the phase when the helplessness is conditioned. In other research it is said to be necessary with uncontrollability, and in yet others it depends upon a subjective belief about controllability.

Let's look at an example of what the variable *uncontrollability* implies: A smith sees his fifth smithy burn down, all of them because they have been built of an incompetent bricklayer; a baker sees his fifth bakery burn down, all of them because of the lightening; a farmer sees his fifth house burn down, all of them because of carelessness with the fire. Here it is only the baker that risks learned helplessness, because the smith and the farmer were actually able to control their lives so that they had been able to avoid the disasters. But the next question must be: was the smith, the baker and the farmer aware of the causality in the ecology? In the Brunswikian terms the cause is a distal cue. But, as is noted by e.g. Wortman and Dintzer (1978), severe depression are often preceded by some rare event that is out of the persons span of control and where the question of contingency is irrelevant. The author wants to share their conceptualisation (*ibid.*): The individual sets up a number of hypotheses about the cause to an uncontrollable outcome (e.g. to a fire), and tries by various means to evaluate these "hypotheses about its cause and about the likelihood of future uncontrollability" (Wortman & Dintzer, 1978, p. 78). Christer Peterson uses a similar reasoning: "Subjects given insoluble problems learn, not that the problems

are insoluble, but that simple solutions do not suffice." (Peterson, 1978, p. 55). However, the result of one of his experiments is that hypothesis-pooling model may explain some results in LHT experiments, but not all. The hypothesis-pooling model is not incompatible with the statements about attribution, but it weakens the importance of them. Attributions are not necessary. Further, it can be noted, that an introduction of an attribution variable into the model may lead to a circularity unless the model is accurate enough to describe the direction between attribution and depressive symptoms (Also, it is not clear in what extent the attributions are conscious or if the demand for verbalisation in an experimental setting tells us the truth about the participants hypothesis: "we know more than we can tell" (Hammond 1971, cit. in Björkman 1978, p. 99).

Based on theoretical reasoning, an alternative to the LHT interpretation of the reported results is focusing the fact that the word test was "very easy" - only a few percent of the words were normally missed for each participant. The differences in performance may be effected, not by LHE, but that the participants in the control-group, after the easy task and success, perform better. Success make people happier and performing better in an subsequent cognitive task. This comment is not equivalent with the commentaries of Alloy and Abramson (1979) conclusions about depressed students: "Sadder but Wiser" even if there are similarities: The naïve person does not function very well.

Many experiments within the LHT-paradigm have involved unsolvable tasks. During the time there has been a change from focusing tasks objectively unsolvable to the concept of failure and to performance subjectively perceived or attributed. Within the antecedent task a failure (from the respondents point of view) might consist of one of the following (not exclusive classes): (1) Every response that the participant makes is "feedbacked" as wrong. (Such fake was impossible with the paper and pencil method that was used in this study.) (2) The participant perceives (subjectively) that he/she does not have decoded the algorithm behind the cue-criterion relation. (3) The participant perceives (subjectively) that she/he has not understood the task as a whole. (3b) The participant form a hypothesis about experimenter-fake but cannot get it confirmed. (4) The participant has consumed all hypotheses that he/she is able to create. (5) The participant has given an answer (a) equal to criterion or close to that on (b) a number of trials; but not close enough and/or not often enough. Explanation (5) can be calculated and defined objectively in a probabilistic setting. It can also be perceived subjectively as a failure; that perception is then consisting of a combination of the subjective apprehension of the probabilities in the task and a idea of how close and how often that is good performance. On the contrary, there might be cases when the experimenter classifies a outcome as a failure, but the respondent will not: (1) The respondent conceptualise a task as unsolvable. (2) The respondent conceptualise the task as irrelevant. (3) The respondent conceptualise the task as not being on his/her level of competence.

The results and discussion above direct us to an overall conclusion, that the original LHT contains elements that can help us understand different psychological and clinical phenomena. However, essential elements are missing to enable LHT to predict, what it claims to do. On the other hand, the reformulated LHT maybe is more effective to explain results of human learned helplessness experiences, but it is not theoretically quite consistent. If there will be further investigations in the LHT-paradigm, the elements of conceptualising and hypothesis setting would preferably be tested. The LHE should also be seen as a subset of theories about abstract learning. LHT in its broader definition, that there is an abstractly learned effect that influences preceding emotion and cognitive abilities, seems probable. In what extent that effect is generalised, seems not to be proven in quantitative terms by any study, nor the chronicity of the effect. Also is the ground for such learning unclear: whether it is caused by noncontingency, uncontrollability, failure, hypotheses testing or some other phenomenon.

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