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Exposure Effects

An Unmediated Phenomenon

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ABSTRACT

The mere repeated exposure paradigm involves repeated exposures of a particular stimulus object and observes the emerging preference for that object. Vast literature on the mere repeated exposure effect shows it to be a robust phenomenon that cannot be explained by an appeal to recognition memory or perceptual fluency. These effects are valid across cultures, species, and diverse stimulus domains. They have been obtained even when the stimuli exposed were not accessible to the participants' awareness, and even prenatally. Empirical research shows that a benign repetition experience can in and of itself enhance positive affect, and that such affect can become attached not only to exposed stimuli but to similar previously not exposed stimuli, and to stimuli totally distinct as well. A new explanation of the phenomenon is offered. Implications for affect as a fundamental and independent process are discussed in the light of neuroanatomical evidence.

The cognitive revolution of the past four decades has exerted an enormous influence not only on *what* we investigate but *how* we do it. In particular, cognitive processes came to be regarded as the major mediators of most significant psychological phenomena. For example, emotional reactions must be mediated by cognitive appraisal (Lazarus, 1982); social phobias are mediated by perceived self-efficacy; and aggression instigated by frustration is mediated by perceived provocation. A related concept is "implicit," a term that connotes an intervening process, but one of which the participant is not aware. There is thus implicit memory, implicit attitude, implicit learning, implicit perception, implicit knowledge, and several others.

An overzealous and indiscriminate commitment to mediators, however, may end up in Zeno's paradox; because if a factor z mediates between x and y, then surely there will be mediators between x and z, between z and y, and so on *ad infinitum*. Some forms of mediation, of course, are useful or necessary, but a knee-jerk appeal to mediators may introduce unwanted complexity, even indeterminacy.

https://doi.org/10.1017/CBO9780511806582.012 Published online by Cambridge University Press

REPEATED EXPOSURE AND ITS EFFECTS

A phenomenon of substantial generality and of fundamental significance – the mere repeated exposure effect – is, I will show, an unmediated process. I begin with an illustrative example. If, on the eleventh day of incubation, the narrow end of a fertile chicken egg is punctured by a syringe and injected with 0.7 ml of 2.5 percent propylane glycol water solution of U.S. certified vegetable coloring, say red, the hatchling will emerge from the shell with bright-red plumage. The same effect can be obtained with all galinatious birds, and perhaps all birds. If we then allow chicks – say, one dyed green and one dyed red – to hatch separately but after twelve hours place them together to remain in each other's company for the next twenty-four hours, these two chicks will prefer each other's companionship to that of all other chicks, even those dyed the same color and those left undyed (Zajonc, Wilson, & Rajecki, 1975). Moreover, when presented with a choice between two potential companions previously not encountered, one red and another green, the red chick will choose a green companion and the green chick will choose a red companion. These preferences can be determined simply by counting the amount of pecking – a good indicator of aggression. Figure 12.1 shows the amount of hostile pecking per minute at an "out-group" target chicken and at an "in-group" target chicken. "Out-group" here means a chicken of coloring other than the coloring that the chick was previously exposed to during its twenty-four-hour first cohabitation. Conversely, "in-group" chicks are those of the coloring to

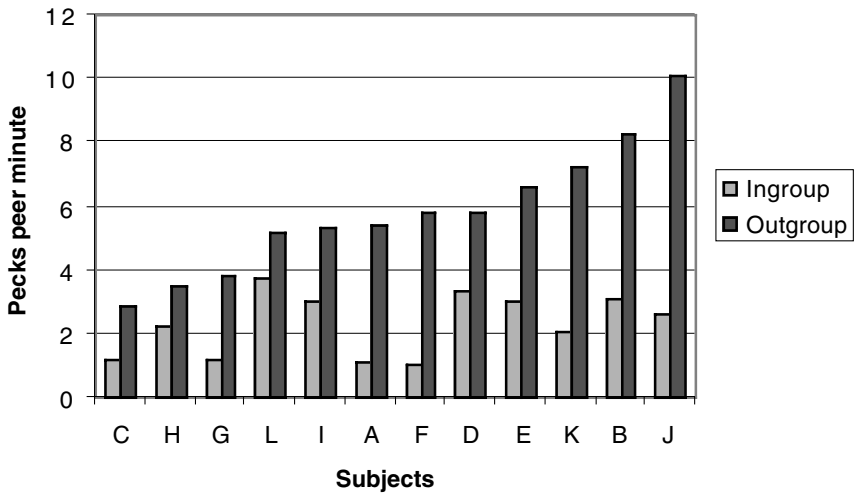


FIGURE 12.1. In-group and out-group aggression following early exposure (Zajonc & Rajecki, 1969)

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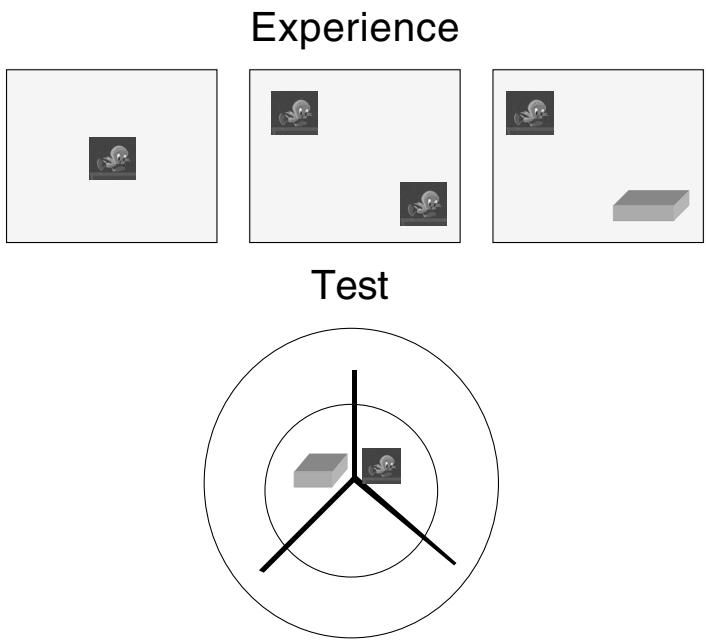


FIGURE 12.2. Exposure conditions (alone, peer, matchbox) and test of affiliative preference (arena) in the Taylor and Sluckin (1964) experiment

which the chick was previously exposed – that is, for red chicks green, and for green chicks red. Chicks of a feather don't. . . .

Many such experiments have been carried out in the days of imprinting, yielding consistent data on the formation of bonds as a function of exposure. For example, Taylor and Sluckin (1964) let newly hatched chicks be raised under three conditions: with a conspecific peer, alone, or with a matchbox (Figure 12.2). After having been so raised, the chick's preferences were recorded. The chicks, one at a time, were placed in an arena that contained three equal pie-shaped segments where the chick could explore or where it could linger: one contained a same-age chick (but not the one they lived with); another segment contained a matchbox; and the third segment was empty. The results – now expressed in measures of attraction – were quite clear. The chicks overwhelmingly preferred the pie-shaped segment that most closely resembled their immediate past experience. Even the matchbox became most attractive following exposure to matchbox, and much more attractive than a live peer (Figure 12.3).

A more dramatic and subtle effect was reported by Pratt and Sackett (1967). These researchers reared young rhesus monkeys under three different conditions. One group was totally deprived of contact (visual and auditory as well) with other monkeys. A second group was reared in separate

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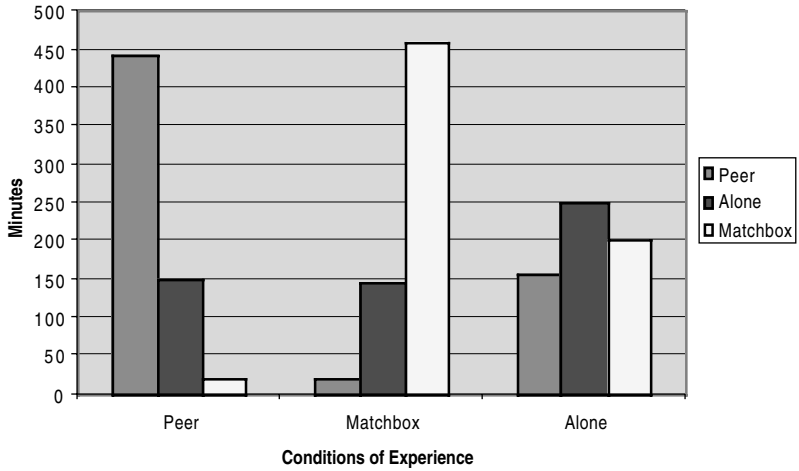


FIGURE 12.3. Time spent by chicks, alone, near peer and near matchbox in the Taylor and Sluckin (1964) experiment

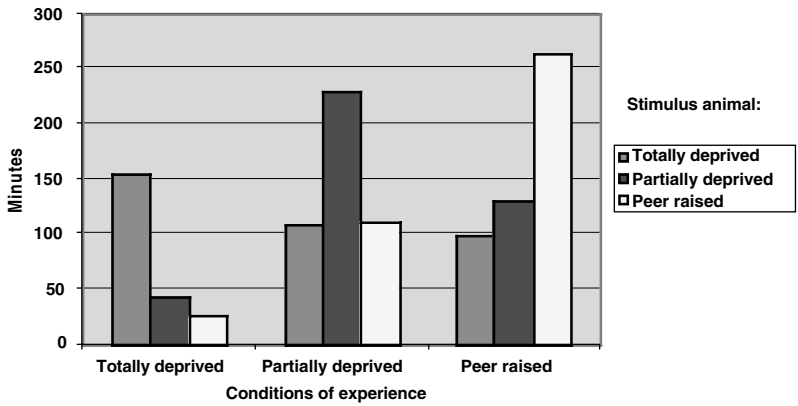


FIGURE 12.4. Time spent by monkeys near totally deprived, partially deprived, and peer-raised stimulus monkeys by subjects that were themselves totally deprived, partially deprived, and peer-raised in the Pratt and Sackett (1967) experiment

cages but in the same room; thus these animals could hear and see each other. The third group was reared in full contact, all in the same cage. As in the Taylor and Sluckin study, the time spent near a stimulus animal constituted the test of affiliation and attachment. The subjects could place themselves near a monkey reared in one of three ways. Of course, none of these monkeys was previously known to the tested subject. The results (Figure 12.4) show, again, that even these subtle behavioral differences that must have emerged in the course of the different forms of contact or

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its absence were sufficient to produce a level of familiarity sufficient for an affiliative tendency to emerge.

Grier, Counter, and Shearer (1967) exposed chicken eggs during their third week of incubation to sequences of tones. A control group was deprived of this stimulation. A few hours after hatching, the chicks were placed in an area where they could approach a speaker playing the familiar tone sequences or the unfamiliar tone sequences. Predictably, the newly hatched chicks showed strong preferences for the tones that had been played to them *in ovo*.

Exposure effects are readily found with human subjects and with a great variety of stimulus materials. The repeated exposure paradigm used with human participants consists of no more than making a stimulus object accessible to the individual's sensory receptors, without requiring that the individual engage in any sort of behavior, and without offering positive or negative reinforcement. The exposures themselves are sometimes so impoverished that the individual is not aware of their occurrence. Their effects are measured by the resulting changes in preference for the object or approach behavior.

For example, Turkish-like words are presented to subjects with varying frequencies, and following the exposures the participants are asked to judge the stimuli for positivity. They are told that the words are Turkish but are about either good or bad things. We would like, we say, the participants to guess for each word whether it has a positive or a negative meaning. Figure 12.5 shows the results of such an experiment, where the same stimulus when seen more frequently was attributed a more positive meaning.

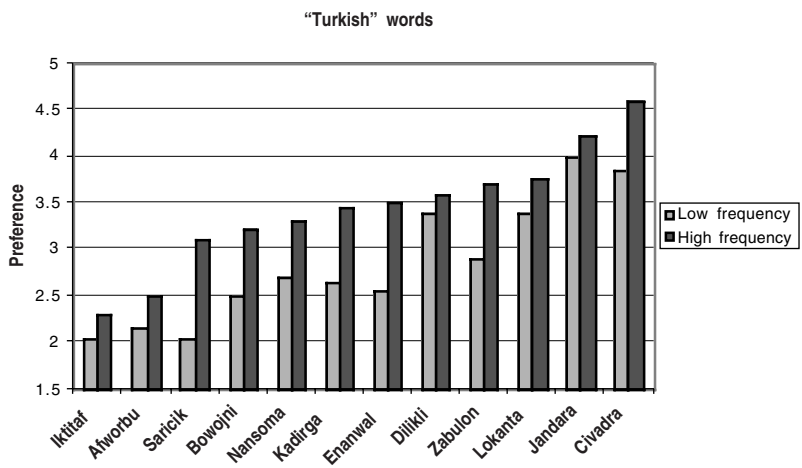


FIGURE 12.5. Preferences for "Turkish" words exposed frequently and infrequently

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The study, in fact, has been replicated under field conditions. Zajonc and Rajecki (1969) "advertised" in the University of Michigan and the Michigan State University newspapers the "Turkish" words used previously. For this purpose, a one-inch space in the classified-ads sections was purchased for several repetitions.

In these spaces, over a period of several weeks, the same Turkish-like words used in the experiment just described were printed. Of course, some words were presented frequently, others infrequently. Following the "exposure" campaign, students in various classes and faculty were sent questionnaires asking them to guess the meanings of the Turkish-like words printed in their newspapers. The results clearly indicated that the frequently presented words were attributed more positive meaning.

For almost one century, this type of effect, although not actually demonstrated, was given a mediational explanation. In his textbook, Titchener (1910) offered the explanation that frequently encountered stimuli gain in attractiveness because they are recognized as familiar. He gave an example of the pleasure one experiences in listening to a known piece of music. We enjoy the recognition of a familiar theme, we can anticipate correctly its development, and we "become one with the music."

If Titchener was right, then the stimuli that have gained in attractiveness as a result of exposure should also have gained in ease of recognition. Wilson (1979) investigated this question of whether stimulus recognition is a mediator of enhancement of attractiveness of frequently exposed stimuli. He presented his participants with sequences of tone, some of which were repeated several times. He then played two tone sequences to the subjects, one previously presented and one new, asking them which of the two they liked better and which of the two they had heard previously. Figure 12.6 shows his data, which clearly indicate that recognition of the stimuli does

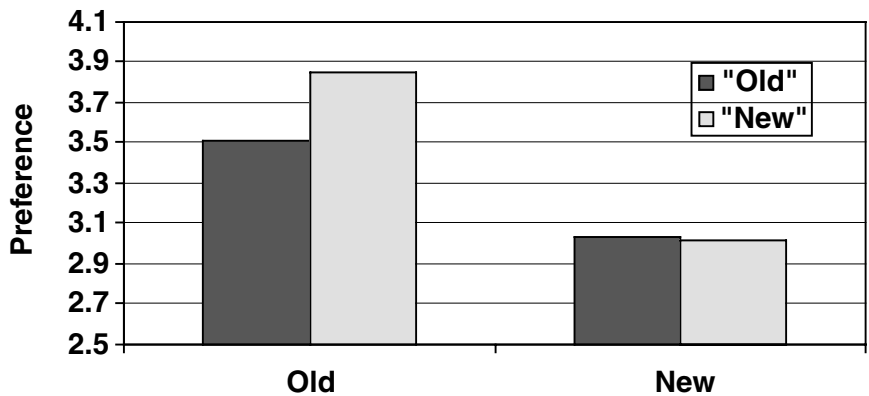


FIGURE 12.6. Preference for frequently presented tone sequences and novel ones that were judged "old" and "new" in the Wilson (1979) experiment

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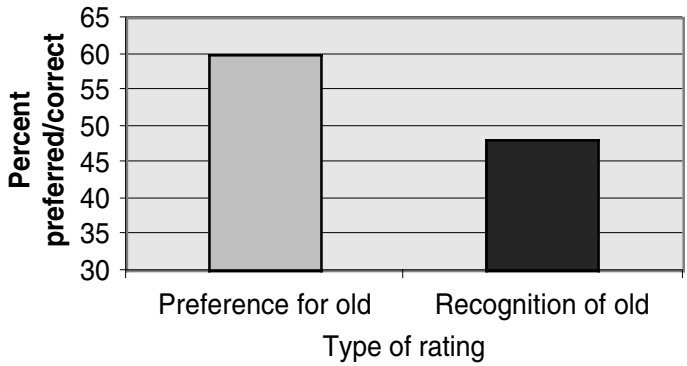


FIGURE 12.7. Preferences for and recognition memory for stimuli presented and novel ones in the Zajonc and Kunst-Wilson (1980) experiment

not mediate the gain in attractiveness. As can be seen from the data, the increased attractiveness of stimuli depends, not on the subjective judgment of familiarity – not on whether a stimulus is judged to be "old" or "new" – but on whether the stimulus was in fact historically old or new.

A more compelling experiment confirms the conclusion that the exposure effect requires no recognition as its mediator. Kunst-Wilson and Zajonc (1980) denied subjects the possibility of recognition by presenting the stimuli repeatedly but at such short intervals that no identification or recognition was possible. In fact, subsequent tests of recognition showed recognition memory to be at chance level. Yet stimuli presented frequently were liked better than stimuli not presented. The results of this experiment are shown in Figure 12.7.

Several replications of this experiment have been carried out since the original Kunst-Wilson and Zajonc study (e.g., Elliott & Dolan, 1998; Seamon, Brody, & Kauff, 1983), all confirming the proposition that recognition is not a necessary mediator of the exposure effect.

But if recognition is not a necessary mediator of the exposure effect, what might be the process whereby repeated stimuli gain in attractiveness? It became apparent from a series of experiments (Zajonc, 2000) that the affective consequence of repeated exposures is actually quite gross and diffuse. It could, therefore, be assumed that the exposures themselves cause a vague and diffuse affective state that "spills over" onto whatever stimuli happen to be in the vicinity. Since the paradigm of mere exposure requires that stimuli be made just accessible to the individual's sensory system, and that no positive or negative consequences follow exposures, the history of repeated stimuli that are neither noxious nor threatening signals that they are safe to be around, that no escape need be contemplated, that no vigilance is required, and that no special attention needs to be paid to these stimuli. In other words, we have here a form of classical conditioning

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FIGURE 12.8. Mood ratings of subjects following frequent and infrequent stimulus exposures in the Monahan, Murphy, and Zajonc (2000) experiment

where the absence of a harmful event is the unconditioned stimulus for the individual's approach behavior (Zajonc, 2001).

The following experiment revealed that the effects of exposures *in themselves* are capable of inducing a positive affective state in individuals. Monahan, Murphy, and Zajonc (2000) presented, under subliminal viewing conditions, to one group of subjects twenty-five Chinese ideographs, each shown only once. Another group of subjects were presented with five Chinese ideographs, each shown five times. The subjects were instructed to just relax but to pay attention to the screen on which, ostensibly, stimuli would appear, but at such short intervals that they would not be able to see anything. After these exposures, the participants were asked to report their overall mood. Figure 12.8 shows the average mood responses of the participants. It is clear that the repetition of an experience in and of itself is capable of inducing a diffuse mood state.

Can such a diffuse mood state become attached to particular stimuli, thus producing a specific effect? Monahan, Murphy, and Zajonc (2000) repeated the above experiment but after the exposure series asked subjects to judge the likability of three types of stimuli. One group of subjects made these liking ratings after repeated exposures (i.e., five exposures of each of five stimuli). Another group made their liking ratings following one exposure each of twenty-five Chinese ideographs. One type of stimulus to be judged was the stimulus actually shown in the series; the second type of stimulus was of the same category, that is, also a Chinese ideograph. The third type of stimulus was completely distinct. Here the subjects judged random polygons. Figure 12.9 shows that the prior experience of exposures increased the attractiveness of stimuli, whether they were the same ones as previously shown or completely distinct ones. In each of the three

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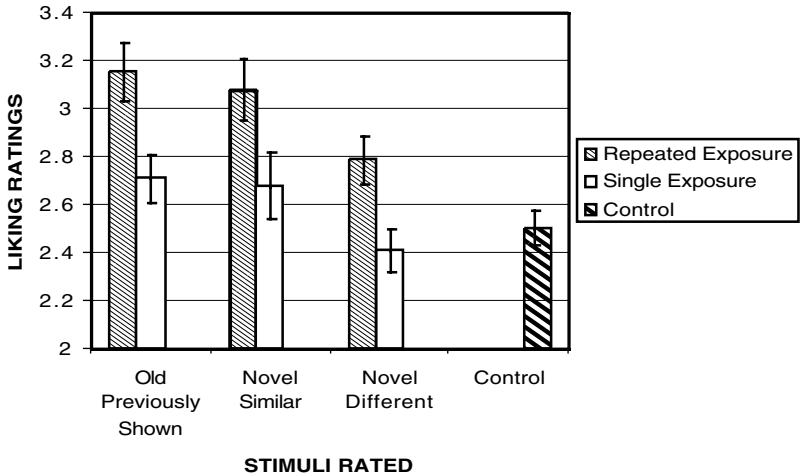


FIGURE 12.9. Preferences for stimuli actually shown, stimuli of the same category but never shown, and novel totally distinct stimuli following frequent and infrequent exposure series in the Monahan, Murphy, and Zajonc (2000) experiment

conditions, the liking for the judged stimuli was greater when they followed repeated exposures than when they followed single exposures.

CONCLUSION

The various experiments reported here and elsewhere in the literature call for a conclusion that the exposure effect does not require an assumption of recognition as a mediator. The history of experience in itself is a sufficient condition for the effect to take place. What is most intriguing about the set of results reported here is that a specific effect of exposures is obtained, not by specific stimuli being distinguished in the person's awareness, but by the diffusion of an undedicated affect. The only process that needs to be assumed is that the conspicuous absence of aversive consequences following the presentation of a conditioned stimulus is a sufficient condition for the development of an approach tendency to that stimulus. One would suppose that the effect documented here must be well known in the advertising industry.

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