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Flowering Plants as a Therapeutic/Environmental Agent in a Psychiatric Hospital^{1,2}

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Abstract. A pilot study, of eight weeks duration, investigated the effects of flowering plants upon the behavior of hospitalized psychiatric patients. The introduction of flowering plants in the dining room setting was followed by a significant increase in vocalization, time spent in the dining room, and amount of food consumed. A transient, though not statistically significant increase in the number of social gazes occurred during the first week the flowers were present.

Scientific study of the effects of flowering plants on human behavior is lacking despite anecdotal evidence that such an effect exists. Numerous authors have suggested that plants have a strong positive influence on human behavior without quantitative substantiation of this relationship (1, 4, 7, 8, 9, 12, 15).

There are 3 implied explanations for any effect of plants on humans. The least understood is a direct, specific, positive effect as stimulus objects for which the human perceptual apparatus is specifically primed. The second is less specific, involving the more esthetically pleasing and perceptually stimulating aspects of the environment. Finally, it has been suggested (2, 6, 17,

20) that plants influence people by virtue of their dependence on human nurturing which engenders a relationship involving responsibility for another living thing.

This is a preliminary report on an extensive study designed to examine the effects of external stimuli on the social behavior of chronic mental patients. Two important findings in the early phases of the study have prompted us to prepare a report at this time. First, the data presented establish that the effect of flowering plants on humans can be quantitative and statistically substantiated; and, second, that this effect is statistically significant even in patients who are severely withdrawn.

The latter finding is particularly important since it offers a new therapeutic approach for rapidly initiating environmental contact. Mental hospitals are notoriously devoid of sensory stimuli and, perhaps, this report will stimulate others to provide a milieu more conducive to a renewed interest of the withdrawn patient in his surroundings.

Methods. The study was conducted in a 600 bed state hospital serving Manhattan. The patients were predominantly chronic schizophrenics, had been admitted often to mental hospitals, and evidenced severe psychopathology. The ward on which the observations were made was similar to others in the institution, consequently, the study

population does not represent any specific age group or diagnostic category.

All patients eating in the dining room were subjects in the experiment. Over the study's duration, 15 patients were retained and constituted the experimental group. Those patients who were discharged or transferred were eliminated from the study.

Scoring procedures. Six hundred observations were made, by a single observer, over 2 consecutive 4 week periods consisting of 20 weekdays each. The observer was familiar and visible to the patients. The nature of the study was not revealed to the subjects or the staff.

Five behavioral phenomena were recorded: speech to another (vocalization), social gazings, seating location, time spent in the dining room, and quantity of food consumed. The first 4 week period functioned as the control (Phase I), observations being made on the patients behavior within their normal dining room setting. During the second 4 week period (Phase II), flowering yellow chrysanthemum plants were placed on each table.

Vocalization and eye contact were determined by observing each patient for 5 sec every 4 min. Patients were scored 1 point for each vocalization and each eye contact observed during their stay in the dining room. A subject could receive a score greater than one during a 5 sec observation if the contact focus changed.

The dining room contained 10 tables of 4 seats each. Tables were numbered 1-10, seat location was designated 1-4. Each day the seating locations of the subjects were recorded on a floor plan.

Length of time spent in the dining room was scored by recording the time of entry and exit. The quantity of food consumed was rated on a scale of 0-20, 10 representing a full serving of food.

Results. There was no evidence of any significant increase in the no. of table locations used by patients during the period in which flowers were placed on the table.

In Table 1, the results for the 4 other parameters studied are summarized. There was a significant difference between phases with respect to vocalization ($P < 5\%$). This difference was associated with a transient increase during week 5, the first week in which flowers were introduced. Between phases I and II, 10 of 15 patients showed an increase in vocalization; 1 remained the same; and, 4 decreased.

There was also a transient, though not statistically significant, increase in

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Table 1. Response of hospitalized psychiatric patients to the introduction of flowering plants as a table decoration in an 8 week study.

Week	Table decoration	Median vocalizations		Mean social gazes		Mean time in dining		Mean food consumed ^z	
		(no./wk)	(P) ^y	(no./wk)	(P) ^x	(min/wk)	(P)	(units/wk)	(P)
1	None	0	—	6.7	—	40.7	—	39.3	—
2	None	1.5	NS	8.5	NS	43.4	NS	38.9	NS
3	None	1.5	NS	9.6	NS	38.4	NS	43.6	<5%
4	None	1.5	NS	7.1	NS	35.4	NS	38.9	<5%
5	Flowers	3.5	<5%	11.5	NS	42.1	<5%	46.1	<5%
6	Flowers	1.5	NS	6.9	NS	39.2	NS	38.9	<5%
7	Flowers	1.5	NS	8.9	NS	45.2	<1%	42.7	<5%
8	Flowers	1.5	NS	8.2	NS	49.7	NS	42.9	NS

P for between phases (wk 1-4 vs 5-8)

<5% NS <1% <5%

^z1 Unit = 1/10th of a full serving.

^yComparison with previous week based on Bross' rank t-tests.

^xComparison with previous week based on analysis of variance and Studentized range test.

the no. of social gazes during week 5.

The presence of flowers was associated with a significant increase in the amount of time spent in the dining room (P <1%). It is noteworthy that, again, a decrease occurred at week 6; however, this was followed by a further significant increase during week seven which continued through week 8. During the flower phase 11 of 15 patients spent more time in the dining room.

There was an overall significant difference between phases with respect to the quantity of food consumed (P <5%). There were fluctuating changes from week to week throughout both phases. Possibly these were associated with the palatability of meals offered.

Discussion. The complete study, of which this report covers the first 2 phases, includes 2 more control periods and a period during which Chianti bottles were placed on the tables. The results of the total study will be the subject of a detailed report when all of the analyses have been completed.

While the data presented here shed no light on the mechanism by which flowers exert their effects on mental

patients, they do establish that statistically significant effects are demonstrable with respect to vocalization, time spent in the dining room and the amount of food consumed. They also establish that the renewed interest in the environment occurs with unexpected rapidity, during the first week in which the flowers are introduced.

There was the distinct impression on the part of the observer that the presence of the chrysanthemums enhanced morale and positive feelings about working on the part of the staff. In retrospect, staff members noted that the plants had "brightened" and "cheered up" the ward, as well as making it "look more alive."

Considering the enormous difficulty encountered in affecting the behavior of chronic mental patients as evidenced by the study conducted at Bronx State Hospital (18) the results are particularly encouraging. It is hoped that this brief preliminary report will encourage other investigators to attempt reversal of the withdrawal syndrome through the introduction of sensory stimuli into the patient's environment.

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Transpiration of Snapdragon under Southern Summer Greenhouse Conditions¹

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Abstract. Snapdragon (*Antirrhinum majus*, L.) cultivars grown at various humidity, temperature, and light intensity levels during the summer differed in transpiration rates. Daily transpiration rates among the cultivars differed according to stomatal closure and leaf hydration on bright hot days. Cultivars having a low transpiration rate and a high relative leaf hydration produced higher quality cut flowers.

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Marketing of florists' snapdragon cultivars is generally limited to retail outlets located close to the source of production because the crop is difficult to ship by standard methods. Many southern florists are unable to obtain locally grown snapdragons during the summer months because growing conditions are not conducive to the production of marketable cut snapdragons. Most snapdragon cultivars (bred for northern culture) grow best at 10°C (night)/12°C (day) temp (6, 7). Some cultivars have been selected to grow in southern areas to produce marketable blooms at 15-20°C (night)/20-25°C (day) temp during long summer days. In some southern areas, however, daytime temp may reach 30-35°C, along with high solar radiation (1.0-1.5 langley/min), and high vapor pressure deficits