

STUDIES IN RESPIRATION AND PERSONALITY

2. Tentative suggestions concerning
the interpretation of respiratory patterns

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Preface

The present paper is the second one in a series of working papers entitled Studies in Respiration and Personality. It is a direct continuation of the first monograph in this series and is based in part on the same empirical material.

The present paper combines a literature review, hypothesis formulations, reports on experimentations (hypothesis-testing), and postexperimental speculations - topics which are customarily separated in scientific publishing practice. The frequent shifts in abstraction level or class of source of information, impose an extra burden on the potential reader. He has to be alert for what is experimental findings, what is experimental interpretations, what is clinical judgement, and what is hypothetical and theoretical. Having warned the reader on this point, I would like to add that he might still enjoy reading the monograph if he is interested in its subject matter and he is willing to spend some time reading about how research is actually carried out.

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B. C.

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INTRODUCTION

In an earlier paper entitled "A preliminary modification of Clausen's respiratory neuroticism scale" we started out by raising the following questions: Do mental patients breathe differently than normals? It is possible to construct a respiratory scale discriminating between mental patients and normals?

In this paper we want to go one step further, asking: Is it possible on the basis of respiratory indices not only to make inferences about psychopathology in general, but also about specific personality characteristics?

This latter question is dealt with only cursorily by Clausen (1951). At one place he writes:

"Based on clinical judgment the normal subjects have been typed introverts and extroverts, and these sub-groups have been compared in ordinary manner in terms of critical ratio. This comparison gave in no instance a critical ratio of sufficient magnitude for difference to be assumed between the two type-groups." (p. 35).

At another place he tells that he has made comparisons between various subgroups of mental patients. He writes:

"In order to see whether or not the emotional status tends to modify the respiration in a specific way, the patients have been grouped according to the main tendency in their emotional status. Based on information from the case records, the nurse's daily report, and inquiries and observations during the recordings, the total number of patients were grouped under the following headings: manic, depressive, labile and apathetic. Comparisons of these four groups resulted in no significant critical ratios. It thus appears that the differences that have been found between our various diagnostic groups are due to other characteristics in the psycho-pathological condition than the specific emotional status." (p. 41).

What is meant by this latter remark is rather difficult to ascertain since the only other systematic investigation Clausen does in this area is to compare his neurotic and psychotic subjects and here he finds no significant differences at all except a strong trend toward a higher thoracic and abdominal I/E ratio in psychotic as compared to neurotic females. Most probably, he is referring to the differences found between mental patients and normals, but these findings are not particularly relevant in the present context.

After reading Clausen's report one is left with a rather pessimistic feeling as regards the possibility of making use of

respiratory indices in describing specific personality features. Before any definite conclusion can be drawn, however, it has to be remembered that Clausen's investigations are very much restricted in terms of the number of respiratory variables being studied. The comparisons referred to above are all based on the following seven variables exclusively:

1. Mean period
2. Mean thoracic inspiration-expiration ratio
3. Mean abdominal inspiration-expiration ratio
4. Variability of thoracic period
5. Variability of abdominal period
6. Variability of thoracic I/E ratio
7. Variability of abdominal I/E ratio

Of the variables listed our own results indicate that variable no. 5, 6 and 7 are rather unreliable measures, and that variable no. 2 and 3 are highly interrelated. The fact that no variables are included referring to amplitude or to period synchronization data has to be specifically noted.

It should also be emphasized that Clausen's comparisons are done in term of single variables. In comparing mental patients and normals we repeatedly called attention to the fact that any one respiratory variable considered alone may be quite unable to discriminate between the groups in question, but that by combining variables and analyzing the respiratory pattern at large, significant differences may emerge. This very same principle might very well apply to an even greater extent when we are looking for specific personality characteristics.

Finally, we would like to mention that Clausen himself throws some doubt on the validity of his sub-sample classification. It should be remembered, he states, that our test for emotional status is not very exhaustive.

Summing up, we may say that Clausen's study is far from exhaustive and that his negative findings are not of such a conclusive nature that they should be allowed to discourage further explorations into the problem area under consideration.

* * *

Before starting to search for the psychological meaning of different respiratory variables, we would like to recall our earlier findings as regards the degree and the nature of the inter-relationships existing between the variables.

Based upon an analysis of the intercorrelations between a number of quantitative respiratory variables, we concluded that they seem to fall into two clusters that are internally consistent, but externally relatively independent of each other. In the first cluster we find the following variables:

1. Variability of thoracic period
2. Variability of thoracic amplitude
3. Variability of abdominal amplitude
4. Mean abdominal inspiratory quotient (reversed and for females only)

We have interpreted this cluster as indicating a respiratory irregularity dimension.

In the second cluster we find the following variables:

1. Mean trunk amplitude per cent
2. Thoracic amplitude quotient (reversed)
3. Mean thoracic period
4. Thoracic-abdominal dissynchronization
5. Mean abdominal inspiratory quotient (reversed and for males only)

This cluster, we have interpreted as indicating a respiratory depth dimension. High on this dimension would be subjects showing a relatively deep, slow and abdominal type of breathing.

Having interpreted the results of our cluster analysis as pointing in the direction of two rather independent dimensions, we are, schematically speaking, faced with the following respiratory types:

		<u>Respiratory Irregularity Dimension</u>	
		Low	High
<u>Respiratory Depth Dimension</u>	High	A	B
	Low	C	D

On the basis of our empirical results we would suggest that psychopathology is the more likely, the higher a subjects

'loading' on the irregularity dimension and the lower his 'loading' on the depth dimension. In other words, we are suggesting that mental patients preferably will fall in the categories denoted as B, C and D in the above table.

The following questions emerge: Is there any way possible to draw specific psychological interpretations on the basis of a subject's respiratory type? Will mental patients falling in each of the three categories have specific psycho-diagnostic features in common, features which at the same time are different from those characterizing the patients falling in the other categories?

Before proceeding to investigate this question empirically, we would like to dig into the literature in order to see if the results of previous studies do provide any leads about what to expect.

It will be recalled that Clausen in comparing personality types made use of both the mean period and the variability of the period. These two measures belong, in our opinion, to different clusters. When, in spite of this, we still find it necessary to deaccentuate his empirical results - it is reflecting our strong conviction that any one respiratory measure considered alone will turn out as a fairly unreliable measure of either of the two dimensions indicated by our cluster analysis. In order to obtain information about these dimensions we would have to make use of some sort of composite measures or scales.

After having formulated some tentative hypothesis about the psychological meaning of the two dimensions, we are going to suggest and test out a couple of such scales. In a final chapter we will try to link our respiratory hypothesis to some more general theoretical viewpoints.

HYPOTHESIS SEARCHING ON THE BASIS OF EARLIER EMPIRICAL FINDINGS

In this chapter we are going to present a survey of earlier findings. The chapter has been divided into three parts. In the first part we will discuss a number of studies which have been particularly focused on respiratory irregularities. In the second part, various studies related to the variables covered by our respiratory depth dimension will be discussed. In the third and final part, we will concentrate on the inspiratory quotient. Each part will be concluded by a brief summary in which we will try to formulate some tentative psychological interpretations concerning the dimension in question.

RESPIRATORY IRREGULARITY

We have already noted that Clausen did not find any significant difference in period variability between his neurotic and psychotic subjects and neither between patients showing different emotional status. Other researchers have paid attention to other aspects of respiratory irregularities. Quite a few of these studies have presented findings suggesting irregularities to reflect or to be associated with specific psychological features or processes.

Studying irregularities in terms of the amplitude variance under resting conditions, Jurko, Jost and Hill (1952) report that normals show more stable amplitudes than psycho-neurotic subjects, and psychoneurotic subjects more stable amplitudes than early paranoid schizophrenic cases. In this study significant differences were found between the normal and the neurotic group, between the normal and the schizophrenic group, and most interestingly, also between the schizophrenic and the neurotic group. The same results were obtained twice, both before and after the administration of a projective test.

Jurko et al. are not the first ones to point out that schizophrenic patients frequently show pronounced irregular respiration. For instance, Syz (1926) several decades ago reports that he

found paranoid schizophrenics to show more respiratory irregularities (again in terms of amplitudes) than depressed patients and normal subjects.

This being said, we have to add that far from all studies in this area have ended up with the same conclusion. In fact, some studies have arrived at the exactly opposite conclusion, namely that schizophrenic cases typically show an extreme regular type of breathing.

Perhaps the most systematic study made so far of respiratory irregularities, is Finesinger's (1943) investigation comparing various nosological groups in terms of seven different measures of irregularity (based on spirometric records). Among the different groups studied, anxiety neurotics were found to show the highest irregularities on all measures; on six of the seven variables significant differences were found with the schizophrenic group, and on four of the seven measures, with the normal group. Although Finesinger's results question whether schizophrenics show the highest regularity in all facets of breathing, the schizophrenic group was found to show a lower mean over-all irregularity score than normals, and on one measure at least, a significant lower irregularity score. Thompson and Corwin (1942), Paterson (1935), Wittkower (1934), and Thompson et al. (1937) all maintain that schizophrenic patients usually show high regularity.

From what has just been said it is apparant that schizophrenics are not a homogeneous group as far as respiratory regularity is concerned.

Further light on this question is brought out by Paterson's (1935) observations. Paterson suggests that sudden irregularities in the breathing pattern of schizophrenics may corresponded to periods of active hallucinations (an assumption not being particularly far-fetched in view of the results of recent psychophysiological studies of dreaming), and that schizophrenic patients generally show less and less irregularities the more they deteriorate into a state of complete detachment and affect poverty. Among schizophrenics hospitalized less than a year, Paterson found 38 % displaying an extremely regular form of breathing, while among schizophrenics hospitalized for more than five years, the corresponding proportion was 82 %. "The percentage of regular breathers goes up according to the length of time that the

patient has been in the hospital ... when there is considerable dementia ... the respiration is usually regular," Paterson concludes. The fact that high irregularity has been reported particularly in studies dealing with early (acute) and/or paranoid schizophrenic patients fits in with this viewpoint.

On the basis of rather extensive studies, Thompson and Corwin (1942) suggest that regular breathing is more characteristic of normal subjects with an introvert or schizoid character than of subjects with an extravert or cyclothymic character. Although the latter group shows more irregularity than the former, its degree of irregularity is moderate in comparison with most neurotic patients. In many neurotic cases, phobics, compulsives, obsessives, etc. irregularities can be found that reach the point of making their respiratory tracings appear without any discernible pattern, Thompson and Corwin state.

Granted that schizophrenia (and psychoses to an even larger degree) is not characterized by any particular level of respiratory irregularity, the same is probably true as regards neuroses. Is it possible to specify particular types of neuroses showing higher regularity than others?

It is worth noting that it is particularly anxiety neurotics that have been described in the literature as extremely irregular in their respiratory pattern. We may recall that Finesinger found anxiety neurotics to show the most pronounced irregularities. Christie (1935) suggests that respiratory irregularities is a most characteristic trait not only of patients suffering from anxiety neurosis, but also of patients with conversion hysterias and effort phobias. Discussing the respiratory tracing of a typical case of effort phobia, Christie states:

"By inspection of his thorax it was only possible to say that his breathing was rapid and shallow, but the tracing brings out several points which we believe to be even more characteristic of this condition (underlined by us): a) an irregularity of the respiratory level, b) an irregularity of respiratory depth; c) a less marked irregularity of respiratory rate." (p. 428).

Braatöy (1947) points out that according to his observations, the hysterical and anxiety state patient is usually characterized by marked respiratory irregularity.

Tentatively, we may conclude that high irregularity seems to point in the direction of mental illness, although a severe degree of mental illness may be present without necessarily being accompanied by an irregular respiration. A high irregularity seems to be associated with a hypersusceptibility to emotional stimuli, whether externally or internally anchored.

Comparisons between groups are not always particularly well suited for clarifying the psychological meaning of respiratory variables; at least, our hypothesizing would be substantially better founded if supported by the results of studies directed toward situational and intra-individual differences. To this area of research we will turn in the next section.

* * *

Halverson (1941) reports that the amount of respiratory irregularities in infants increases with the infant's level of excitation. It is higher during waking than during sleep, and it is much higher during intense excitement than during quiescence.

Lacey (1941) reports that he found the variability of the inspiratory quotient to increase reliably in adults in a frustrating situation.

Does respiration always become more irregular in states of emotion or excitation?

Without taking any definite stand on this question, we have good reason to assume that emotional stimuli have quite different respiratory effects in different types of subjects. Finesinger and Mazick (1940), and Finesinger (1944) point out that they found emotional stimuli (disturbing thoughts) to produce considerable respiratory changes in subjects suffering from hysteria, phobia and anxiety neuroses, but very little changes in compulsive neurotics, hypercondriacs and reactive depressions.

Malmo and Shagass (1949) studying respiratory responses to a stress situation arrive at somewhat similar results. They report that they found anxiety patients to obtain significantly higher irregularity scores than a normal group and a mixed patient group, and that an early schizophrenic group was found to react in a way that was much more similar to the anxiety group than to any of the others.

Stevenson and Ripley (1952) suggest that there is a tendency for breathing to become more irregular in periods of unpleasant emotions, but that the tendency in question does not apply equally to all individuals. In their own studies they found that in 45 % of their subjects only did irregular breathing invariably occur during such periods. Analyzing their data further, they suggest that respiratory irregularity is associated not with an emotional arousal generally, but with feelings of guilt and when anger and hostility is simultaneously mobilized and suppressed. It is, according to Stevenson and Ripley, ambivalences and mixed feelings rather than emotion per se, which are the crucial factors.

An investigation by Schenker et al. (1961) throws some further light on the meaning of respiratory irregularities. Having demonstrated a significantly higher irregularity (in terms of the expiratory position) in alcoholics than in control subjects, they turn to the question whether ingested alcohol (in a concealed form) has any acute effect on the respiratory irregularities in alcoholics. Although the investigators do not consider their findings conclusive, they strongly suggest that alcohol - in contrast to a control drink - does produce an improvement in respiratory regularity, specifically when the subject's baseline irregularity scores are high. In line with this finding, some additional data are presented indicating the administration of a tranquillizing drug (chlorpromazine) to alcoholics, to have a similar respiratory effect as alcohol.

* * *

To summarize, we have reason to believe that an individual's respiratory irregularity will be the higher the more susceptible he is to situational stress, the more stressful his present situation is, and the less opportunities he has to get outlet for his feelings. The first instance, would correspond to a common-sense interpretation of Finesinger's observations; the second instance, to Lacey's finding of an increased irregularity with experimentally induced stress; and the third instance, to Stevenson and Ripley's suggestion that irregularities are related to a state of suppression, guilt and ambivalence concerning affect expression. Based on these notions, we think it is reasonable in a tentative fashion at least, to interpret respiratory irregularity as an expression of psychological tension.

By so doing, we are in agreement with Schenker et al. who talk about the respiratory irregularity of alcoholics as corresponding to the recurrent and uncontrollable high tension found as a major component in the basic symptomatology of these cases. We are also in line with Braatöy (1947), who states quite explicitly, that "active conscious and preconscious tension ... is manifested in arrhythmic breathing".

* * *

Clausen points out that the respiratory pattern of normal subjects - as compared to neurotics - often appears to be more susceptible to accidental stimuli and that they often show greater fluctuations in terms of respiratory irregularities from one day to another. Keeping to our earlier interpretation we may distinguish between tension stemming from accidental or situational stimuli and from characterological sources. It is this latter type of tension we consider typical of mental patients. In making inferences concerning "pathological" tension it is important that the respiratory recordings take place in a resting, non-demanding situation, i.e. in a situation being perceived by the subject as comfortable and relaxing, and also, that the respiratory recording is sampled from a period of time of sufficient length. Confronted with a threatening or novel situation one may expect normal subjects to show no less irregularity than mental patients.

RESPIRATORY DEPTH

Under this heading we are going to discuss the following respiratory variables: the rate, the mean trunk amplitude, the thoracic-abdominal amplitude ratio, and the thoracic-abdominal period synchronization. In a concluding section we will summarize our discussion and try to formulate a common perspective as regards the interpretation of these variables.

The respiratory rate.

Clausen's and our own empirical results are not the only ones showing psychiatric patients generally to breathe faster than normals. For instance, Jones and Mellersh (1946) found neurotic patients to breathe approximately twice as fast as control subjects. Jurko, Jost and Hill (1952) report that a psychoneurotic and a schizophrenic group were found to breathe significantly faster than normals. Comparing hospitalized psychoneurotics and normals, Wenger, cited by Duffy (1962), arrives at the very same conclusion. Finally, in a study by Marks et al. (1960) data are presented suggesting a high respiratory rate in psychiatric inpatients to be significantly related to a bad prognosis.

Do psychiatric patients always show a high rate of breathing?

We may start out by considering the breathing rate reported in schizophrenics. In one of the studies just referred to, schizophrenics were described as showing a very high rate. Other studies point in the same direction. For instance, Wittkower (1934) states:

"Comparison of the findings ascertained in normal subjects and schizophrenics shows unequivocally that the schizophrenics breathe more frequently ... rates of more than 22 respirations per minute observed in schizophrenics cannot be noted in the normal subjects. Particularly distinct ... is the difference when considering women ... 15 per cent of the female normal subjects and 41.25 per cent of female schizophrenics breathe more frequently than 18 times per minute." (p. 699).

On the other hand, not all investigators in the field have arrived at similar results. Paterson (1934) states: "With regards

to patients in a more severe catatonic state, Gullotta has remarked that catatonics breathe more slowly than other schizophrenics. My own observations support this view." Kempf (1930), referring to the same type of patients, states: "The catatonic manner of respiration seems usually to be characterized by a decreased rate."

In the study by Jurko et al. referred to above, the schizophrenic group studied consisted of early paranoid cases only. Consequently, there are some reasons for assuming that schizophrenia is not a homogeneous category as far as the respiratory rate is concerned. Acutely and early schizophrenics seem to show a very fast rate, while catatonics apparently show a rather slow rate.

What about the breathing rate of neurotic subjects? Do we also here find large individual differences?

In the discussion of their findings, Jones and Mellersh mention that their neurotic subjects consisted of patients with anxiety states and effort phobias only. In the study by Wenger, it is indicated that a very large proportion of the subjects consisted of anxiety neurotics. Christie (1935), also describing the rapid rate of breathing found in neurotics, is again mainly referring to observations of conversion hysterias and anxiety neurosis.

Braatøy (1947) writes that according to his clinical observations it is the anxiety state patient and the hysterical patient in particular that show rapid breathing. In the obsessive and compulsive neurotics, the breathing pattern is usually quite different, much more of a prepared-restrictive type. Among all compulsory neurotics one finds the retentive, reserved, controlled mode of breathing, Braatøy maintains.

* * *

Turning to the question of intra-individual differences in the rate of breathing we are confronted with several studies.

A general finding is that the breathing rate tends to increase during excitement. For instance, Halverson (1941) reports on the basis of his observations of infants, that the breathing rate invariably increases with excitement and diminishes with quiescence

and relaxation. The highest rate occurs during fretting and crying, the lowest rate during sleep, and generally, the deeper the sleep, the lower the rate.

In a study by Williams et al., cited by Duffy (1962), on the respiration rate during flight training, it was found that the largest increase in rate occurred during take-off and landing.

Schultz and Luthe (1959) point out that the rate seems to be a sensitive measure of progress in autogenic training. As the subject learns to relax, as he learns to change from an active to a passive type of concentration, the respiratory rate significantly decreases. Active concentration, implies goal-directed voluntary efforts, investment of will power, an attentive attitude, and an active interest in the performance and its final result. Passive concentration, on the other hand, implies a lack of voluntary efforts, a passive and casual attitude during the performance and towards the functional result. In the former state Luthe found an average rate of about 15 cycles per minute, while in the latter, an average rate of about 11 cycles per minute only.

A couple of other investigations lend support to the same proposition. Corwin and Barry (1940) report that daydreaming is accompanied by slower breathing than directed thinking, and Paterson (1934) that respiration in a drowsy state usually is characterized by a very slow rate.

The viewpoint that the respiratory rate is related to an individual's mode of attention is strongly emphasized by Burrow (1941). Burrow distinguishes between two such modes, ditention and cotention. By ditention he refers to normal attention, to what he calls an affecto-symbolic level of adaptation. By cotention he refers to a direct, immediate, thoughtless and emphatic form of relating to the environment. As compared to an average rate of around 13 during ditention, the rate during cotention drops to around four cycles per minute, Burrow states.

It is true that an increased alertness and attention to stimuli can be accompanied by an increased rate, but the opposite may also be true. Following startle stimulation, breathing is momentary checked. Alertness and attention to new stimuli have often been found to produce a slowing down of the breathing rate (Duffy, 1962). The fact that active concentration and attention may both

increase and decrease the rate, confronts us with a very intricate problem as far as psychological interpretations are concerned.

Surveying the experimental literature on the relationship between excitation and breathing rate, Duffy states:

"Stresses of various kinds have been found to produce either increases or decreases in respiratory rate, with increases being more common ... Evidently, measures of breathing rate ... would not prove to be among the best indicators of the general level of organismic arousal." (p. 75)

Duffy's conclusion can be put into perspective by the empirical findings of Stevenson and Ripley (1952). Studying the respiratory responses of subjects being interviewed about various topics and attitudes known to be related to their main life difficulties, a situation most probably increasing their level of arousal significantly, it was found that in 67 % of the cases only did the rate invariably increase. In the remaining cases, it was found to remain unchanged, or, what was also rather frequently the case, to decrease.

How can a decrease in respiratory rate during excitation be explained?

One explanation that has been put forward is that respiratory responses to excitation will be a function of the respiratory rate prior to the new stimuli; a high habitual rate preventing, so to speak, any further increases. This viewpoint has been suggested by Jost et al. (1952). In a study comparing the rate of hypertensive and normal subjects, they found the former group to show the highest rate under resting conditions (mean rate 17.4 versus 15.8). However, under frustrating conditions, the position of the groups was reversed - the hypertensive subjects now showing the lowest rate (mean rate 16.0 versus 17.4). After the frustrating situation was over, the normals decreased their rate, while the hypertensive subjects showed an increase in rate - back to their high initial level.

To explain this finding as Jost et al. do, in terms of the hypertensives being so tense during the preliminary period that no further speeding of the respiratory movements was possible, does not take into account that the hypertensives actually decreased their rate. Neither does it take into account that neurotic and psychotic patients very often have been observed to show a rate far above the rates presented by the hypertensive subjects in this study.

Instead of considering the slowing down of the rate as a ceiling effect, it is possible to view the results as indicating that a resting condition for some subjects may be experienced as more stressful and more upsetting than a situation calling for more focused and directed mental activity. Braatöy (1954), for instance, has presented some very informative case material showing some patients to "normalize" their respiratory pattern when confronted with specific mental tasks to be performed.

Although this viewpoint to some extent may explain the findings of the study under consideration, another viewpoint is probably still more appropriate.

We mentioned previously an investigation by Stevenson and Ripley pointing to the fact that individual differences exist in respiratory reactions to provocations or unpleasant emotions. What makes this study specifically interesting is that the investigators did not stop their inquiry by counting the number of subjects showing an increase or decrease in rate, but analyzed their data one step further as to what sorts of emotions were involved and how the subjects did deal with their emotional arousal. Through this analysis they arrive at the following two propositions:

1. Increased rate is associated with anxiety, but also with anger and resentment when these feelings are openly expressed.
2. Decreased rate is associated with feelings of dejection and sadness, and with a reserved, emotionally repressive, on-guard pattern of behavior.

Consequently, we may interpret the decrease in rate found in hypertensive subjects during a frustrating situation as a reflection of a tendency in these subjects to respond to the situationally induced excitation by a guarded, cautious and inhibited pattern of behavior. Such an interpretation would fit in with the commonly held view that hypertensive subjects become more rather than less generally activated than normals under stressful conditions.

Stevenson and Ripley are not the only ones suggesting that an excitation under certain circumstances may be accompanied by a decreased breathing rate. Goldman-Eisler (1955) in her study of speech-breathing activities, ends up with a very similar hypothesis. She suggests that the amount of respiratory activity is a rough indi-

cator of the strength of affect being displayed: Easy and free-flowing affect being manifested in ample ventilation, excitement in hyperventilation, whereas repressed affect, attention, caution, and fear are revealed in inhibited breathing.

In a number of case studies (Goldman-Eisler, 1956) comparing the breathing activity and the content of psychiatric interviews she presents data supporting this viewpoint. The higher the respiratory rate, the more outgoing affect is usually present, and the lower the rate, the more restricted the subject's emotionality. At the lower end, we have inhibited, guarded, cautious, intellectual, attentive, and fearful behavior, and at the upper end, excited, unguarded, and emotionally expressive behavior. Breathing activity is a valid and objective indication of the degree of emotional intensity and the extent to which emotions are restrained or given free expression in the exchanges during an interview, Goldman-Eisler concludes.

The viewpoint just presented gets some additional support from studies of deceptive behavior. Telling a lie has been found not to increase the rate of breathing, as one would expect from the hypothesis that the rate is positively associated with excitation, but to slow down the rate. Thus Davis (1962) states that differential changes in the respiratory rate may be used (and frequently is used) in lie-detection, the rate increasing in a lesser amount in deception than in truth telling.

* * *

Summing up our discussion we may say that the respiratory rate seems to be related to an individual's level of arousal or excitation. But this is not the only factor involved. Of equal importance seems to be the individual's way of handling and coping with this arousal, whether he is restraining himself or letting himself go in a free-flowing manner. Given approximately the same level of excitation, the rate may give us information about the degree of affectosymbolic inhibition and constriction being present, and given the same amount of inhibition, the rate seems to correspond roughly with the degree of excitation.

It is our contention that the respiratory rate under resting conditions can give rise to important psychological inferences. If

the rate is very high we will rule out that the subject is in a state of quiescence and relaxation. A high rate may be considered a psychopathological sign. It would indicate the presence of a residual excitation that is outside the subject's realm of mastery. Somewhat more difficult to interpret is a low rate. In this instance we may be confronted with a genuine quiescence and relaxation, but also with inhibitory processes concealing a latent excitation. To the extent the rate is extremely low, we will assume inhibitory processes most likely to be involved. In our opinion, a cotentive state, as described by Burrow, can be considered the result of an extreme degree of inhibition leading to a total affecto-symbolic repression or deadening. In making this suggestion we are influenced by the fact that the respiratory tracings reported by Burrow as typical of a cotentive state, do show some very marked irregularities in period and amplitude, features which, according to our earlier train of thought, do indicate the presence of suppression and psychological tension.

The mean trunk amplitude.

To some extent, a functional interdependence exists between the rate and the mean trunk amplitude. If the rate is very much slowed down, the amplitude will tend to increase, and if the amplitude is very small, the rate will tend to be speeded up in order to secure an individual's physiologically-determined ventilation needs. This being said, we don't expect the negative correlation in question to be extremely high. In our own study for instance, we found the two variables to correlate only around $-.50$.

The securing of a certain necessary ventilation is probably a much more decisive factor in an individual's respiratory system than is the prevention of hyperventilation. Furthermore, the negative relationship expected between rate and trunk amplitude is probably much more pronounced in a resting condition than elsewhere.

To exemplify the latter viewpoint, we may refer to an investigation by Jones and Mellersh (1946). Comparing patients with effort phobias and normals after a short period of standard exercise, they found the former group not only to show a much faster rate, but also a much greater air volume per breath. In a subsequent resting

situation, the patients were found to continue to breathe nearly twice as fast as the control subjects, but at this time, their depth of breathing was only about half that of the control subjects'.

That the convergence between rate and trunk amplitude under resting conditions will not be complete can be illustrated by the results of another investigation. Comparing a group of psychiatric patients with a normal group, Mezey and Melville (1960) found the former group to show faster as well as more shallow breathing, but when concentrating on two sub-groups of patients, those with and those without manifest anxiety, the former subjects were found on the average to show a higher rate as well as a higher amount of mean tidal air.

Referring back to Goldman-Eisler's observations we would expect excitement and strong outgoing affects to be associated with large trunk amplitudes. A couple of studies present data supporting this hypothesis.

Color responses on the Rorschach test are usually considered an indication of affect dynamics, lack of color references pointing to emotional unresponsiveness and a flat affect life, and pure color responses to non-integrated or free-floating affects. In a study by Hughes, Epstein and Jost (1951) the question is raised whether color and non-color responses to the five color cards included in the Rorschach test are accompanied by different respiratory changes. Their results strongly indicate this to be true. Non-color responses to color cards tend to be associated with a decreased respiratory amplitude, while color responses to the same cards tend to be associated with an increased amplitude.

Thompson and Corwin (1942) present data pointing in the same direction. Concentrating on normal subjects only, they found the volume of tidal air generally to be smaller in subjects with an introvert schizothymic character, than in subjects with an extravert, cyclothymic life-style.

A number of investigators have reported the presence of very shallow breathing in schizophrenic subjects. Alexander and Saul (1940) report that shallow breathing seems to be a characteristic feature of hebephrenic patients. Kempf (1930) notes that the catatonic patient's manner of breathing is extremely shallow. Paterson (1934) concludes that "it appears that schizophrenics breathe

more shallowly ... than normals"; Wittkower (1934) states that "often the respiration of the schizophrenic is abnormally shallow ...", and Lowen (1958), that "the respiration of the schizoid character and of the schizophrenic show a characteristic disturbance ... low air intake." Thompson and Corwin (1942) too, point out that a small volume of tidal air seems to be a characteristic feature of the schizophrenic patient.

As was the case in our discussion of the respiratory rate, we have to conclude, however, that schizophrenia does not seem to represent a homogeneous group in terms of the mean trunk amplitude either. We are basing this statement upon the results of a study by Malmo et al. (1951), where it is reported that breathing is reliably more shallow in chronic schizophrenics than in psychoneurotics, normals, and in acute psychotics. We are reminded of another study by Malmo and Shagass (1949) pointing out that the early or acute schizophrenic seems to have respiratory characteristics in common with the anxiety patient, and of the study by Mezey and Melville, previously referred to, suggesting anxiety patients to show slightly deeper breathing than other neurotic cases.

It is important to note that anxiety states - although sometimes shown to breathe deeper than other neurotics, is still found by Mezey and Melville to breathe more shallowly than normals.

Christie (1935) maintains that anxiety neurotics shows many similarities in respiratory pattern to conversion hysteria, but that the latter cases show deeper breathing.

An extreme shallow type of breathing does not seem to be characteristic of chronic schizophrenic cases exclusively. Jones and Mellersch found their effort syndrome patients to breathe only half as deeply as normals. Braatöy (1947) suggests that small, relatively short amplitudes are generally present in so-called oral characters.

A rather deep form of breathing is probably found in such conditions as delusional mania and incipient and excited schizophrenia. But it is also found in subjects in a state of quiescence and profound relaxation. In this latter respect we may refer to Schultz and Luthe's (1961) findings that passive, as compared to active concentration, is regularly associated with a significant increase both in the thoracic and the abdominal respiratory amplitude.

A common feature in delusional mania and passive concentration is a lack of control, direction and binding of excitation, although the excitation level itself is very much different.

A low trunk amplitude may reflect a disturbance in the generation of psychic energies (as found in inert melancholia and catatonia), but it may possibly also reflect a state of active inhibition and binding of excitation. We are here referring to Goldman-Eisler's observations, and also to laboratory experiments of Davis (1962) showing breathing during deception to become significantly shallower than during truth telling. We are following Reich (1948), who states "that the inhibition of respiration is the physiological mechanism of the suppression and repression of emotion", although we don't want to follow him unconditionally, when he adds that "the inhibition of respiration is ... the basic mechanism of the neurosis in general." (p. 242).

Since it is likely that a low trunk amplitude can point both in the direction of a high and a low excitation level, and that the same is true with a high trunk amplitude, it appears to be extremely difficult to draw any specific psychological inference from this variable alone. From a more general point of view a low trunk amplitude can possibly be considered a sign of psychopathology, although it cannot tell us whether the excitation level is high-but-bound or pathologically low. Conversely, a high trunk amplitude may point to genuine relaxation but probably also to a pathologic high level of excitation.

The thoracic-abdominal amplitude ratio.

A high amplitude ratio implies a clear thoracic dominance in the breathing movements, and a low ratio, an abdominal dominance. In our own study, we found the thoracic amplitude quotient to be correlated .64 with the rate, and -.68 with the mean trunk amplitude. In other words, in general, an abdominal amplitude predominance will correspond to a slow rate and to a large mean trunk amplitude, and a thoracic predominance, to a fast rate and shallow breathing.

Compared to the rate and the mean trunk amplitude, the amplitude ratio has been rather infrequently studied and discussed.

According to Hattingberg, cited by Clausen (1951), a predominant abdominal breathing is typical of some neurotic patients, although most neurotic patients show a pattern of breathing being wholly or mainly thoracic in nature. Braatøy (1947) presents similar thoughts, but he also goes one step further suggesting that a habitual high costal manner of breathing is typical of patients characterized by manifest anxiety and affect lability, while predominant abdominal breathing is typical of obsessive, compulsive, intellectualizing and overcontrolled mental patients.

Lowen (1958), following the same line of thought, differentiates between two types of abdominal breathing. In the first type the chest wall is immobilized and fixated (usually in an inspiratory position). This is the typical feature of rigid-compulsive characters, Lowen states. In the second type, we also find an immobile chest wall, but the wall is soft and unfixated. This is a pattern found in some very withdrawn psychotic patients, Lowen maintains. This of course, fits in with Clausen's (1951) observation, that some of his psychotic female subjects presented a marked abdominal predominance, and also with Kempf's (1930) description of catatonic patients as characterized by "shallow abdominal amplitudes on relatively deflated lungs, with almost imperceptible thoracic amplitudes".

Halverson's (1941) investigation of infants is one of the first systematic studies dealing with the amplitude ratio as a separate variable. According to Halverson, the amplitude ratio in infants, varies with the level of excitation or organismic arousal. In strong excitement, the thoracic amplitude exceeds the abdominal one, while during quiescence and sleep, the abdominal amplitude predominates, and in deep relaxation may reach a size that is nearly twice the thoracic one.

The association noted by Halverson between excitement and thoracic predominance is supported by a study by Williams (1942) showing children regularly to react by a decrement in their abdominal breathing movements when confronted with a stressful situation - a situation inducing conflicting sets and attitudes. On the other hand, the assumption of a relation between relaxation and abdominal predominance is supported by Schultz and Luthe's (1961) empirical findings. Their data clearly indicate that both the thoracic and

the abdominal amplitude tend to increase as a subject moves from an active to a passive type of concentration, but that the abdominal augmentation is much more pronounced so that the amplitude ratio becomes significantly diminished.

Does a low amplitude ratio invariably point in the direction of deep relaxation? We have already mentioned some clinical observations indicating this not to be the case. Further support for this viewpoint is provided by Stevenson and Ripley's (1952) more systematic analysis.

On the basis of their study of respiratory changes in an interview situation, Stevenson and Ripley indirectly suggest that stress may cause the amplitude ratio to increase as well as to decrease - depending upon the way the individual subject responds to the situation. If he responds by feelings of dejection and sadness, by cautious, guarded and reserved behavior, suppressing and controlling his mobilized anger or anxiety, his thoracic amplitude will tend to decrease; while on the other hand, if he responds by manifest anxiety, or by anger or resentment - and gives air to these feelings, his thoracic amplitude will increase.

Summing up, we may say that a high thoracic amplitude dominance seems to indicate a state of unbound excitation, while a high abdominal amplitude dominance, seems to point both in the direction of relaxation and quiescence and in the direction of a repression and binding of excitation. Concerning the latter instances, we may suppose a repressive condition to be the more likely, the more the abdominal predominance is approaching monotonous abdominal breathing.

Thoracic-abdominal period synchronization.

There are innumerable transitions between a complete thoracic-abdominal synchronization and a total dissynchronization. In the latter case abdomen would expand while thorax is retracting and vice versa. A total dissynchronization probably occurs very seldomly. This does not mean that complete synchronization is very frequently found. In most subjects we find some dissynchronization. When the abdominal movements precede the corresponding thoracic ones,

we talk about a positive dissynchronization, while if the opposite is true, we talk about a negative dissynchronization.

As one may expect, the size and the direction of a dissynchronization between thorax and abdomen, seem to be related to the thoracic-abdominal amplitude ratio: a high ratio being associated with a negative dissynchronization, and a low ratio, with a positive dissynchronization. In our own study we found the correlation between dissynchronization and the thoracic amplitude quotient to be $-.58$. Furthermore, when concentrating on deviation-from-mean scores on the two variables, we found the measures to be significantly correlated ($r = .47$).

So far, very few studies have been focused on the dissynchronization variable.

Halverson's (1941) study of infants once more stands out as an important contribution. According to Halverson, an infant in an awake, relaxed state will show unisonal respiratory movements; that is, the movements of the thorax, and the abdomen will be closely synchronized in time. In deep relaxation, as found during profound sleep, both inspiratory and expiratory movements will tend to be initiated by the abdomen, and a short time lag will appear between the corresponding abdominal and thoracic movements. If excitement appears when the infant is awake, we will again be faced with a short time lag, but this time due to the respiratory movements being initiated at the chest level. As excitement increases, the latter type of dissynchronization will be more pronounced. If the excitement level becomes very high, antagonistic breathing movements may appear, that is, inspiration may be effected by a simultaneous expansion of the thorax and contraction of the abdomen, and expiration, by a simultaneous expansion of the abdomen and contraction of the thorax.

Referring to Halverson's observation we may think about a thoracic abdominal dissynchronization as a rough index of activation or excitation. If a relatively large negative dissynchronization should be found in a resting situation, we may infer that the subject is unable to relax due to residual excitation.

The assumption that a negative dissynchronization is associated with excitation gets some additional support from Lowen's (1958) observations. He reports that he has frequently seen

schizophrenics (probably in an acute state of panic or excitement) to breathe in a very peculiar way, their stomachs being sucked in during inspiration and pushed out during expiration. This of course, reflects a negative dissynchronization approaching in time approximately half a respiratory cycle.

Turning to the opposite side of the continuum one may ask if a positive dissynchronization invariably will indicate a relaxed state, and whether the degree of relaxation is greater, the larger the positive dissynchronization being present.

In Braatöy's (1947) opinion this is not the case. In a supine relaxed position, Braatöy states, the normal, healthy subject will show parallel respiratory movements in thorax and abdomen, that is, the diaphragm will push the stomach down and the abdominal wall forward at approximately the same time as the chest expands in all directions. He considers this pattern of breathing as definitely different from that frequently observed in compulsive neurotics, where the breathing pattern is modulated by a specific chest and back posture producing an abdominal type of breathing in which the chest follows sluggishly and flatly after in the respiratory movements.

Following Braatöy we may suggest that a large positive dissynchronization is not an indication of quiescence and deep relaxation, but rather a sign of bound excitation.

A brief summing up.

By now we are ready to ask how to interpret psychologically the depth dimension. Having considered the various variables making up the dimension there is a couple of relationships that seem to emerge. First of all, we may suggest that the depth dimension is roughly related to a psychological continuum having high and low manifest excitation as its opposite poles. A high rate, a high thoracic amplitude quotient, and a high negative thoracic dissynchronization, all seem to be associated with a state of high manifest excitation, while an extremely low rate, a low amplitude quotient and a high positive dissynchronization seem to be associated with a low manifest excitation. Furthermore, a low manifest excitation may or may not be associated with a genuinely low level of excitation.

Consequently, we are making a distinction between manifest excitation and excitation proper. Low manifest excitation being combined with a high level of excitation we have referred to as bound excitation.

We may suggest that the more extreme (the higher and the lower) an individual's position on the depth dimension, the higher is his excitation level. We would like to emphasize that this is a very schematic statement, since at several places we have found data indicating a genuine quiescence (a low level of excitation) to manifest itself in a pattern of breathing that seems to be rather similar to what we have suggested as characteristic of bound excitation. We may even go so far as to suggest that only in extreme cases of bound excitation would it be possible on the basis of the respiratory depth dimension alone to distinguish clearly between such a state and a state of genuine relaxation.

It should be emphasized that in our description above of the depth dimension we have left out the mean trunk amplitude. This exclusion is a consequence of our earlier contention that the variable in question does not seem to be related to the manifest excitation continuum in the same way as the remaining variables. (A high mean trunk amplitude pointing both in the direction of a genuine relaxation and high manifest excitation.) What we are suggesting is in fact, that the depth dimension is not a homogeneous dimension from the point of view of psychological interpretations. When talking about the depth dimension in later chapters we are excluding the mean trunk amplitude variable if not otherwise explicitly stated. ¹⁾

1) It may sound a little awkward that we are using the term 'depth' to denote a dimension from which the mean trunk amplitude variable has been omitted. When thinking about the dimension in terms of 'depth' we are adapting a vertical perspective, that is to say, we are primarily concerned with the breathing being lower down (more abdominal) on the vertical axis and not necessarily deeper in terms of trunk excursion or tidal volume.

THE BLACK SHEEP: THE INSPIRATORY QUOTIENT

In our empirical analysis we found this variable to be rather unrelated to all other respiratory measures when we were dealing with the total group of subjects. Dividing our sample into males and females, we found, somewhat surprisingly, the inspiratory quotient in the case of males to be related to respiratory depth (the variable correlating $-.52$ and $-.27$ with the mean period and the mean trunk amplitude respectively), and - in the case of females, to respiratory irregularity (the variable correlating $-.74$ and $-.30$ with the variability of the thoracic period and the abdominal amplitude, respectively). Since depth and irregularity were found to be rather unrelated dimensions, our results suggest that the inspiratory quotient has to be interpreted differently in males and females.

Before we start to look for a possible explanation of this sex difference, the question may be raised whether the results of earlier studies do provide any leads as regards the interpretation of the inspiratory quotient.

A number of psychophysiological investigations have paid attention to this variable.

On the basis of his observations of infants, Halverson (1941) indicates that the I/E ratio is a function of the organism's level of excitation. During sleep and quiescence the inspiratory phase is usually shorter than the expiratory one. When the excitation level increases, both the inspiratory and the expiratory phases become shorter, but the expiratory phase relatively more so than the inspiratory one.

Other observers have noted the same tendencies. For instance, Feleky (1916) considers an increased I/E ratio a typical feature of emotional arousal, and Ray (1932), an increased I/E ratio, a typical feature of anxiety. It should be added however, that some observers have questioned whether the I/E ratio invariably increases during excitation. Lacey (1941) for instance, reports that he found the inspiratory quotient to increase unreliably in an experimentally induced frustrating situation. Clausen (1951) states that although the predominant tendency observed among investigators has been that emotions increase the I/E ratio, the results of various studies have not been in full agreement.

According to Stevenson and Ripley's (1952) observations an emotional arousal may result in an increased as well as in a decreased I/E ratio. Studying asthma patients in an interview situation, they found a large majority consistently to respond to provocations by a reduced I/E ratio. Among anxiety patients, the trend was quite the opposite, a large majority responding with an increased I/E ratio. The differences between the group was most striking and highly significant. In discussing their data and their clinical observations Stevneson and Ripley suggest that a decreased I/E ratio may correspond to a defensive reaction, to indecisive, evasive and hyper-controlling behavior.

Woodworth (1938) presents, on the basis of his extensive review of the literature, the following I-fraction (or inspiratory quotient) averages:

in excitement	.60+
in the resting condition	.43
in attentive mental work	.30

The point stressed by Stevenson and Ripley is that excitement, if inhibited and controlled, may give rise to an inspiratory quotient showing some similarities to that found during active attention. This fits in very nicely with Schultz and Luthe's (1961) observation - that a change from an active to a passive type of concentration, tends to be associated with a significant augmentation of the I/E ratio. In the former state, they found a ratio at about .60. (corresponding to a quotient of .37), as compared to a ratio at about .90 (corresponding to a quotient of .47) in the latter state.

According to Schultz and Luthe, a state of passive concentration will show inspiratory and expiratory phases which are rather equal in length. Braatöy (1947) implies that the same pattern is typical of normal subjects in a resting situation. He states:

" ... the respiration curve of normal healthy people in a relaxed supine position will run as a 'sinus curve'. It will run as a recumbent S. From the peak of inspiration the curve will run smooth and well rounded as an expiratory curve in order to oscillate equally smooth in a new upward turn, and so the curve continues with steady, even crescentric oscillations above and below its middle course". (p. 230).

From the observations mentioned we may infer that a very high inspiratory quotient regularly is associated with manifest excitement, and that a low inspiratory quotient is associated with bound excitation. This, of course, is the same as saying that the inspiratory quotient seems to reflect the very same continuum as the respiratory depth dimension. This was also exactly what we found to be true in the case of our male subjects.

In the case of our female subjects, we did not find the inspiratory quotient to be related to the depth dimension at all, but to respiratory irregularity. In contrast to the male sample, where we found mental patients on the average to obtain higher quotients than normals, we here found the opposite trend, namely patients to obtain lower quotients.

The findings from our group comparisons correspond to the inconsistency noted by earlier investigators. For instance, after reviewing a number of clinical observations concerning the breathing of neurotic subjects, Clausen (1951) notes that "some of the observations point to a reduction of this (the I/E) ratio." But he also mentions Hattingberg's observation - that a curtailed expiration combined with a prolonged inspiration, is typical of neurotics.

These conflicting observations could point in the direction of neurotics showing more extreme quotients than normals. However, our own data do not confirm this hypothesis. Our male patients do not obtain higher quotients than our normal females, and our female patients do not obtain any particularly higher quotients than our normal males.

Comparing the I/E ratio in his male and female samples, Clausen concludes that women show a significantly lower I/E ratio than men. In attempting to explain this finding, he notes that a low I/E ratio is found in the same groups that show the most thoracic breathing and the sharpest inspiration-expiration transition in the thoracic curve. He suggests that the features in question may be explained by certain social norms and ideals influencing the breathing pattern of women in particular. He states:

"According to the ideal of the feminine figure the abdomen is not supposed to protrude, hence the costal type of respiration. In order to make the respiration movement as inconspicuous as possible they have a brief inspiration followed instantaneously

by expiration and this accounts for the low I/E ratio and the sharper peak of the thoracic curve. We would regard the respiration found in males as less influenced by social ideals, and therefore more primitive. The fact that the respiration in psychotic women is more like the men's ... would be the results of the psychotic women's being out of contact with social norms and ideals, and consequently having regressed to the more primitive respiratory mode." (p. 63).

Clausen maintains that the three features mentioned (he could also have added the rate as a fourth feature) "cannot be regarded as indication of neurosis or as a physiological mechanism for modification of emotion, since we have no reason to believe that normal women are more burdened with neurotic difficulties or suppress their emotions more than do men." 1)

We would like to suggest an alternative explanation of Clausen's findings. If we accept the interpretation of a high rate, a high thoracic amplitude ratio, and a low mean trunk amplitude as being expressions of unbound excitation - we would, on the basis of our own as well as on the basis of Clausen's data, suppose females to be more overtly excited than males. If we look upon the inspiratory quotient as being a function of unbound excitation (as we just did in the case of our male subjects), we would expect females to show higher inspiratory quotients than males. Since this does not turn out to be the case - in fact, we have reasons to believe the contrary frequently to be true, we may start wondering whether a low inspiratory quotient may represent just what Clausen's dismisses,

1) The validity of the latter statement can be seriously questioned in the light of recent findings. One of the most comprehensive studies made so far of emotionally determined symptom patterns in males and females (Leighton et al., 1963) concludes: "... women as a group have more symptom patterns of psychiatric significance than do men. They also tend to be more impaired ... Although the absolute number of males and females registered may vary with ... technical and methodological differences, the direction of the ratio - the greater number of women as compared to men - remains." (p. 276). It is of interest to compare this conclusion from a Canadian study to findings from a small but intensive Norwegian study of child-rearing practices. According to Eckhoff and Gauslaa (1960) mothers as well as fathers tend to be significantly warmer, more permissive, more appreciating and supporting, and less punitive and demanding in relation to a son than to a daughter - at least in the preschool years.

namely "a physiological mechanism for inhibition of excitation", a mechanism which is used particularly by females - thereby balancing off the much higher overt excitation level otherwise expected in this sexgroup.

In support of this hypothesis we may refer to our observation that female patients tend to obtain lower inspiratory quotient than normal females, and to Ripley and Stevenson's suggestion that a low inspiratory quotient reflects a special type of defensive reaction. At this point we would also like to mention that several researchers working on the problem of finding behavioral correlates to the ego-control dimension have suggested this dimension to be somewhat differently structured or patterned in females and in males. That is, the mechanisms involved in the suppression and inhibition of excitation may be differently organized in the two sexes.

The reason why we don't find our female patients to obtain inspiratory quotients significantly below our normal males, may be due to such a structural factor; it may reflect that the conception of what corresponds to a moderate and a low inspiratory quotient to some extent would have to take into account the subjects' respiratory depth. The lower the depth, that is, the faster the rate, the more thoracic the breathing, etc., the less we may demand of a inspiratory quotient in order to call it an extremely low one. In other words, because of the lower depth characterizing our female subjects, their inspiratory quotients may be considered as significantly lower than if they were obtained from male subjects.

Granted that a low inspiratory quotient in the case of females does correspond to a sex-specific excitation-inhibiting mechanism, the question may be raised what is the functionally equivalent mechanism in the case of males? Considering some of the trends emerging from our survey of earlier findings and comparing the respiratory patterns obtained from our male and female subjects, we may tentatively suggest that the parallel mechanism consists of a 'deliberate' slowing down of the respiratory rate. Although we don't want to go into these matters in any detail we cannot omit pointing out that we consider a small thoracic amplitude quotient (an abdominal amplitude predominance), a large dissynchronization (an abdominal period antecedence) and a large period (a slow rate) to correspond to potential excitation inhibitory mechanisms in both sexes, but that a

large period possessing such a function is likely to be found more often in males. In general, we would like to suggest that various excitation-inhibitory mechanisms are more highly interrelated (and integrated) in males than in females.

Summing up, we have attempted to show that the inspiratory quotient may be differently interpreted in males and females. We are still, however, confronted with a number of problems as regards the "meaning" of the inspiratory quotient, problems which can only be solved through further empirical studies.

FRAGMENTS OF A PERSONALITY THEORY

In the preceding chapter we presented a review of relevant research literature concerning different respiratory variables, and formulated some tentative suggestions regarding their psychological interpretation. We suggested that respiratory irregularity is related to psychological tension, and that respiratory depth is inversely related to manifest excitation. Furthermore, we made the assumption that a discrepancy may sometimes be present between manifest excitation and excitation proper. That is to say, we introduced the concept of excitation suppression or excitation binding.

The question confronting us at this stage is whether it is possible on the basis of respiratory data to make inferences not only regarding manifest excitation but also regarding the real amount of excitation being present. We believe such an inference to be possible. Our belief is based on a couple of assumptions. In the first place, we are assuming that the real amount of excitation represents the sum of the level of manifest excitation plus the amount of excitation being bound. In the second place, we are assuming that a relationship exists between the amount of excitation being bound and the amount of psychological tension being present. This assumption does not however, imply that we suppose tension to be exclusively related to the amount of excitation being bound.

In what follows we will try to clarify and elaborate the various theoretical constructs and relationships mentioned. By specifying the constructs and their hypothetical relationships we are taking a first step in constructing a personality theory.

The Concept of Excitation

By excitation we are referring to an energetic dimension. In recent psychological literature terms like activation and energy mobilization have frequently been introduced to denote this dimension. For instance, Duffy (1962) writes:

"The construct of energy mobilization, or activation, derives from and emphasizes the fact that a living organism is characteristically an energy-system. The process of living, in any of its aspects, requires energy release in varying degrees. Every response of the organism is fundamentally concerned with energy transformation and release ... Even growth, when thought of in its most general aspects, is a method of assimilating and transforming energy. Activity of all types, whether covert or overt, requires the release of energy. Attending and thinking, as well as locomotion and manipulation, can be shown to involve increased release of energy, or a higher degree of activation. The level of activation of the organism may be defined, then, as the extent of release of potential energy, stored in the tissues of the organism, as this is shown in activity or response ... Since psychologists are interested primarily in the arousal which is not the result of physical activity, but is rather ... "preparatory and facilitative", it may be advantageous for our purposes to define activation as the arousal which occurs in the absence of physical exertion or the arousal found when we subtract from measures of activation the effects of physical activity." (pp. 17 ff.).

Following Duffy's last remark we will define excitation not in terms of energy release generally, but as psychic energy or as an undirected psychological force, and the level of excitation - as the strength of this force or as the amount of psychic energy being activated or mobilized in a given organism at a given time.

In her discussing of the concept of activation, Duffy points out that it will usually correlate fairly closely with the intensity of overt activity or response (its behavioral manifestations), but that a discrepancy may sometimes be introduced by the intervention of inhibitory processes. We are looking at the term excitation in a similar way, that is - as a hypothetical construct which may or may not be correlated with manifest excitation. A low or moderate level of manifest excitation does not exclude a high level of excitation being present, but in this instance, that is, in the case of a manifest - latent excitation discrepancy, we would always assume inhibitory or defensive mechanisms to be involved.

It is our contention that excitation will always be present in a living organism and that it will always emerge in an intimate interaction with a controlling structure (or a control apparatus). Depending upon the nature of this structure excitation may be channelized in various directions; it may be delayed or given immediate discharge, it may be blocked from overt manifestations or blocked only from perception and 'volitional' action - bubbling through in other forms at the manifest level.

Furthermore it is our assumption that different individuals will show different habitual excitation levels, and that an individual's habitual excitation level will reflect a significant aspect of his psychic structure.

The Concept of Psychological Tension

By psychological tension we are referring to an intrapsychic accumulation of excitation. Consequently, we are supposing that the amount of tension can be fairly low in spite of a rather high level of excitation. This would be the case if excitation is being immediately and completely discharged. Of course, tension will always be fairly low if the level of excitation is low. From the opposite side - we would assume tension inevitably to emerge if the level of excitation becomes higher than the organism's psychological apparatus for action and cognition can assimilate, handle and discharge; and that tension also will emerge if inhibitory mechanisms are brought into play, that is, if the level of manifest excitation becomes significantly depressed as compared to the excitation being present.

This latter assumption needs some further explanation. It should be noted that we are here referring to inhibitory mechanisms of a specific type. We don't exclude that some inhibitory mechanisms may have the effect of directing and redirecting rather than blocking and barring discharge, and that other inhibitory mechanism may influence the level of excitation itself rather than blocking the discharge of excitation already generated.

In the last instance we may find no actual tension, although if the inhibitory mechanisms are weakened, the increased

excitation level may be accompanied by a progressive increase in the amount of tension.

It should be recalled that Braatöy in relating respiratory irregularities to tension, does not refer to tension generally - but to active and preconscious tension. By psychological tension we have consistently been (and will be) referring to active tension, but from what has just been said, we may also conceive of passive tension - the concept being defined as tension being warded off through a defensively determined low excitation level.

The Relationship between Tension and Excitation.

As alluded to above, we are supposing that a high level of manifest excitation may be associated with a large as well as with a small amount of tension, and that the same is true with respect to a low level of manifest excitation.

In the case of small amount of tension we are supposing excitation to be immediately discharged and that no discrepancy will exist between manifest and latent excitation.

In the case of a large amount of tension the picture is more complicated. This follows from the fact that we are assuming tension to emerge from two different types of conditions:

The first type consisting of active attempts on the part of the individual to suppress and inhibit his excitation level. This would give raise to a discrepancy between manifest and latent excitation; the level of manifest excitation being significantly lower than what would otherwise have been expected.

The second type of conditions is when an individual's excitation level is exceeding his capacity for discharge. This might be due to the excitation level being extraordinary high, but also to a deficiency in the individual's discharge capacity existing more or less independently of his actual excitation level. In many instances these two factors might be closely interwoven; i.e., a deficient capacity for discharge resulting in a high level of excitation, and a high level of excitation reducing even further the individual's discharge capacity.

But we might also look upon the latter condition as a special case of the former one: The individual's active and successful attempts toward control being replaced by an unsuccessful struggle in which the individual has to give in and is forced into a more passive position. While in the former instance we might talk about tension stemming from a process of excitation suppression, we might in the latter instance talk about tension stemming from an excitation overload.

We may sum up our discussion so far by formulating the following theoretical propositions:

- I. The higher the level of manifest excitation and the greater the amount of tension, the larger is an individual's excitation overload.
- II. The lower the level of manifest excitation and the greater the amount of tension, the larger is an individual's excitation suppression.
- III. The lower the level of manifest excitation and the smaller the amount of tension, the larger is an individual's excitation depletion.
- IV. The higher the level of manifest excitation and the smaller the amount of tension, the larger is an individual's excitation plethora (and the more unrestrained his excitation discharge).

We may look upon the various states as characteristic of and corresponding to various personality patterns.

Having delineated four psychological states in terms of tension and manifest excitation, our next problem is to relate these states to different modes of psychological functioning.

Further Theoretical Speculations

As a starting point we may concentrate on excitation overload and excitation suppression. These two states we may consider as opposite poles on a dimension of ego control; excitation suppression - corresponding to overcontrol - to an excessive containment of impulse and delay of gratification; and excitation overload - to undercontrol - to an inability to bind impulse and delay gratification.

In terms of behavioral manifestations the two personality types have been described by Block (1950) as follows:

An under-controller is unduly spontaneous, with enthusiasms neither held in check nor long sustained; his decisions are made (and unmade) rapidly and his emotional fluctuations are readily visible; he tends toward immediate gratification of his desires even when such gratification is inconsistent with the reality of the situation or his own ultimate goals; his grooves for behavior are not deeply ingrained and, accordingly, his actions can frequently cut across conventional categories of response in ways that are (for better or worse) original.

An over-controller is constrained and distant, with minimal expression of his personal emotions; he is highly organized and categorical in his thinking, tending to adhere rigidly to previous understandings; he can continue to work on uninterested tasks for long periods of time; he is overconforming, indecisive, and with narrow and relatively unchanging interests; he delays gratification even when pleasure is a sensible course of action, not threatening of long range interests.

Turning to American psychiatric nomenclature, the former type would correspond to "an emotional unstable personality" and to "a hysterical personality" (a personality type showing excitability, poorly controlled hostility, guilt, and anxiety, and ineffectiveness and poor judgment even under minor stress), and the latter type, to "a compulsive personality" (a personality type showing overinhibition, overconscientiousness, rigid conformity or rigid adherence to standards of conscience).

We find a parallel dichotomy in psychoanalytic writings, a distinction being drawn between a person with a fragile and a person with a rigid defense structure (Holt and Goldberger, 1961).

In linking our constructs excitation overload and excitation suppression to the concepts just mentioned we are making an

important assumption: We are assuming that different individuals show differences not only in their habitual excitation levels but also in the way they habitually deal with their excitation, and that their habitual mode of handling their excitation is reflecting an important part of their psychic structure.

We may distinguish between different ways of handling excitation: An individual may constantly control and suppress his excitation (this would probably be the less necessary the lower his excitation level), he might constantly be more or less threatened by it, experiencing himself implicitly as a passive victim of unmanageable and overpowering forces (this would be the more likely the higher the excitation and the more deficient the individual's control apparatus), and finally, he might submit himself to the excitation and give in to its spontaneous behavioral and experiential manifestations. As regards this latter alternative a further differentiation can be made, a differentiation in terms of the level of excitation characterizing the individual's unrestrained pattern of discharge.

It is important to note that by focusing upon this last perspective we are not necessarily departing from psychoanalytic theory. In fact, the energetic or economic viewpoint has always been considered an integral part of psychoanalytic thinking. In recent years it has been extensively discussed by Ostow (1962) among others.

Ostow takes as his point of departure the remarkable development in psychopharmacology. He writes:

"In describing responses to the new psychopharmaceutic agents, and in attempting to work out therapeutic indications and prognostic criteria, strength and vigour concepts have been devised and used ad hoc ... I believe that what is discerned in each case is one manifestation or another of what Freud called "psychic energy", which is the intra-psychic component of instinctual energy ... Any kind of psychiatric work with the newer drugs requires, in my opinion, the constant application of libido theory." (p. 12-13).

According to Ostow an individual's ego may be characterized in terms of its supply of libido (libido defined as the energy of the sexual instincts and also of the ego instincts) and its capacity to contain it. From this perspective he distinguishes between two diametrically different psychopathological states, libido plethora and libido depletion. By libido plethora he refers to an

ego being innervated by a quantity of libido which is too great for the ego to contain. Clinically, it is characterized by affective overresponsiveness, psycho-motor overactivity, anxiety, tendencies to project, abrogation of reality testing, etc. By libido depletion Ostow refers to an ego being under-nourished in terms of its libido supply. Clinically, we are here confronted with inertia, hypochondria, pessimism, feelings of guilt and emptiness. Nosologically speaking, we are confronted with profound catatonia, inert melancholia, and apathetic schizophrenia.

Ostow formulates a tentative behavioral scale for ascertaining an individual's level of libido supply. In this connection he makes a number of assumptions; that the degree of affective responsiveness varies directly with an individual's position on the libido range, that pursuit of objects increases directly with his libido scale position, etc. But most basic in his whole approach is the assumption that tranquilizing drugs decrease the libido content of the ego, while energizers (anti-depressant drugs) increase the ego's libido supply.

How does Ostow's ego-libido-supply dimension fit into our own conceptualizations? We want to make clear that the dimension in question does not correspond exactly to our excitation variable although their lower ends might be considered to overlap. That is to say, we might look upon an extreme low level of excitation, an excitation depletion, as being characterized by the same psychological features as a low ego libido supply. Turning to the opposite pole on Ostow's dimension, it is important to recall that he is not primarily concerned with the libido supply level as such, but with the relative amount of libido considered with respect to the strength of the ego. Consequently, his concept libido plethora seems to correspond rather closely to our term excitation overload. In both instances we are faced with a quantity of "energy" being too large for the ego to master or handle.

By distinguishing between excitation depletion and excitation suppression and between excitation overload and excitation plethora, we are making distinctions not found in Ostow's theorizing.

In order to make the distinctions more clear we might discuss briefly what we suppose to be the main differences in terms

of clinical symptomatology between overload and plethora, and between suppression and depletion.

As an example of an extreme excitation overload we may refer to an anxiety state or to an acute reactive schizophrenia. As a corresponding example of an extreme excitation plethora we may refer to the manic phase of a manic-depressive psychosis or to a state characterized by intensely elevated feelings with a dearth of inhibitory processes.

It is true that both types of psychopathology may show motoric hyperactivity to a very large extent. On the other hand, in differentiating between the conditions we are in line with clinical observations emphasizing the marked difference in the type of over-activity shown in the two states - the manic patient showing movements of an open, wide flung-out type, while the overtly anxious patient shows movements always remaining within the body silhouette - indicating the presence of deficient and weakened inhibitory processes but not the dearth of such processes.

As previously mentioned, we consider a compulsive personality a prototype of excitation suppression. In the same category we would also expect to find the paranoid personality. The main symptoms here are suspiciousness, envy, jealousy, stubbornness, and typically - a delusional system. The paranoid personality has some times been called the compulsive - paranoid personality - referring to the fact that the symptomatology shown by these cases frequently represents - to use a common expression - an encapsulation of the pathological process by a rigorous systematization of thinking and life style. Mental patients ascribed this latter diagnosis are often described in quite similar terms as the compulsive personality, i.e., as possessing a conspicuous psychological and physiological hardness and rigidity (cf. Fisher and Cleveland 1958, p. 233).

Although we would expect in the case of paranoid and compulsive personalities to find a low level of manifest excitation, we would not expect the underlying excitation to be equally low. If this should turn out to be true we wouldn't any longer talk about suppression but about a state of excitation depletion. We are supposing this latter state to be found in certain types of senile patients, in deteriorated, burned-out schizophrenics, in catatonics,

and in other cases showing a relative void of activity, energy and emotional charge (e.g. inert melancholics).

To sum up, concentrating on schizophrenic cases only we would expect acute reactive schizophrenics to show high tension combined with high manifest excitation, and catatonics and deteriorated schizophrenics to show low tension combined with low manifest excitation.

Turning to personality patterns generally, we would expect in the case of high tension, at the lower and upper end of the manifest excitation continuum, to find compulsive and hysterical personalities, and as we turn to cases showing low tension, at the lower end of the excitation continuum to find apathetic personalities, and as we pass upward the latter continuum, to find persons with markedly blunt and dull affects and with an inactive and indifferent life style, for finally to end up with persons showing a high level of energy transaction with no restraining or constricting structures, e.g. manic personalities.

Schematically, our theoretical assumptions might be summarized by the following diagram:

		<u>Manifest Excitation</u>	
		Low	High
<u>Active</u> <u>Tension</u>	<u>High</u>	Overcontrolled - rigid compulsive or paranoid personality	Undercontrolled - fragile hysterical or emotionally unstable personality
	<u>Low</u>	Energy depleted - (apathetic) personality	Energy plethoric - unrestrained (manic) personality

The question may be raised whether it is possible to go one step further and to relate tension and excitation not only to psychopathology but also to positive mental health. To this question we will turn in the next section.

The Concept of Positive Mental Health

We mentioned briefly the distinction being drawn by Holt and Goldberger between a fragile and a rigid defense structure. What is important in the present context is that both structures are considered variations of an immature ego organization, distinguishable from a well-developed mature personality structure.

Core concepts in the theoretical framework of Holt and Goldberger are primary and secondary process thinking and the relationship between these two modes of psychic functioning.

By primary process thinking is meant thinking largely directed by instinctual impulses and largely founded on ideational drive-derivatives, and by secondary process thinking - realistic, logical, efficient, goal-directed thinking.

According to Holt and Goldberger, a person with a mature ego is able on his own desires - for fun or for adaptive purposes, to abandon secondary process thinking, to experience primary process manifestations in an ego-syntonic and intrinsically controlled way, but also to revert back easily and quickly to the former type of thinking when he so wishes or when it is demanded of him. In both a fragile and a rigid defended person primary process manifestations are experienced as ego-alien, unpleasant, threatening, disruptive, anxiety and guilt-provoking. However, their likelihood of experiencing these manifestations are diametrically different. The rigidly defended person is defined as a person characterized by massive, stable and unpenetrating defenses preventing any break-throughs of primary process material even in situations encouraging and facilitating such functioning. A person with a fragile defense structure, on the other hand, is defined as a person easily subjected to the intrusion of primary process material. When intrusions do take place, he becomes passively overwhelmed, loses distance and perspective, and the capacity to handle the situation in an active and adaptive manner, in short, he is the sort of person that is almost constantly threatened by anxiety-filled break-throughs.

To sum up, following Holt and Goldberger's theoretical model we may conceive of positive mental health as a matter of psychological maturity and ego development. We might define mental

health as an individual's overall psychological capacity for functional adaptation.

Quite similar thoughts are presented by Schultz and Luthe - previously referred to. Here too the concept of functional adaptation is strongly emphasized - although these latter researchers do not restrict it to psychological processes exclusively.

According to Schultz and Luthe, an intact ability for passive concentration is equivalent with a capacity for functional adaptation. In contrast to active concentration, passive concentration is seen as a mode of functioning in which unconscious material becomes more readily available and free associations becomes significantly enhanced. It is considered as related to a lack of restraints and constrictions, to a lack of an unmanageable high excitation, but also to a lack of an affectosymbolic deadening and withdrawal.

Transformed into our theoretical model we might propose that mental health is characterized by the ability under appropriate conditions (for instance - a resting, non-demanding situation) to relax, but not to relax through a deadening and blocking of internal excitation but through an active and voluntary surrender to the excitation being present; in short, under these conditions to show a small amount of tension combined with neither a high nor an extremely low level of manifest excitation.

This latter qualification follows from the assumptions that a high level of excitation does indicate a lack of adaptiveness and that a negligible amount of tension might mean quite different things if it is combined with an extremely low and with a moderately low excitation level. It is our assumption that only if it is associated with a not-too-low level of excitation does it positively reflect an ability to abandon suppressive (or defensive) operations without at the same time diminishing or blocking internal excitation. It is, just this particular type of interplay which might be considered one of the most crucial aspects of ego maturity. It points to an intrinsic controlling discharge apparatus existing independently of whether any specific defense mechanism is brought into operation or not.

Concluding Remarks

In this chapter we have presented some fragments of a personality theory. We suggested a number of hypotheses linking the constructs of tension and excitation to various personality types. So far we have not been concerned with genetic viewpoints or with the question of why we believe respiratory variables do provide information about the constructs in question. Before turning to these problems we would like to know something about the validity of our tentative hypotheses.

HYPOTHESES TESTING AND EXPLORATIONS

We are going to examine some of the hypotheses launched in the last chapter. To a large extent we will make use of the same empirical material presented in our earlier monograph although our data analysis will go in new directions.

The present chapter has been divided into two parts. In the first part, we will - guided by our theoretical formulations, develop a respiratory ego-maturity scale and present data aiming at a tentative validation of the scale. In the second part we will continue our discussion to what extent respiratory observations may give rise to predictions about specific personality features and psychopathological processes. We are going to develop two respiratory scales for the measurement of tension and excitation respectively. Finally, we will present the results of a couple of preliminary validation studies relating the scales to behavioral observations.

THE DEVELOPMENT AND TENTATIVE VALIDATION OF A RESPIRATORY EGO-MATURITY SCALE

In the preceding chapter we suggested that a person with a well-developed and mature ego in a resting situation would be characterized by a moderately low level of manifest excitation combined with a negligible amount of psychological tension. On the basis of our earlier discussion we would expect in such a person to find a respiratory pattern showing the following features:

The thoracic period - moderately low

The thoracic amplitude quotient - moderately low

The abd.-thor. dissynchronization - moderately high

The mean trunk amplitude - high

The inspiratory quotient (in males) - low

The inspiratory quotient (in females) - high

Thoracic period variability - low

Thoracic amplitude variability - low

Abdominal amplitude variability - low

In our list of variables we have included both the mean trunk amplitude and the inspiratory quotient - in spite of the fact that these variables, strictly speaking, do not belong to the same class of variables as the remaining ones.

Our inclusion of the mean trunk amplitude is based on the assumption that a low trunk amplitude is a psychopathological sign and that it may cover up a latent irregularity (or tension). Clinical observations indicating respiratory inhibitions and irregularities to make their appearance more clearly when the respiratory movements become deeper fit into this picture. (Cf. Reich 1948, p. 263.)

Furthermore, our inclusion of the inspiratory quotient is based upon our earlier suggestions that a low inspiratory quotient in females does reflect an excitation suppressing mechanism, and a high inspiratory quotient in males - a high level of manifest excitation.

Confronted with the above list of respiratory features, the next question emerging is what is to be considered a moderately low period, a high mean trunk amplitude, a moderately low thoracic amplitude quotient, etc.?

In order to arrive at quantitative scoring criteria making it possible for us to transform our theoretical formulations into a concrete ego-maturity scale, we have turned back and surveyed the distributions of average scores obtained by the 24 subjects employed in our initial study. However, in formulating scoring criteria for our new scale we have not been exclusively or primarily concerned with finding "cut-off points" discriminating optimally between our normal and patient subjects. The criteria have been formulated in such a way as to make them optimally confirming our hypothetical notions concerning a "healthy" respiratory pattern - although within this framework, we have been constantly guided by our earlier findings.

Based on our theoretical formulations and our empirical results we want to suggest the following respiratory ego-maturity scale:

1. Thoracic period (in sec. x 100)	Under 390 2 points 390 - 529 0 point Over 529 1 point
2. Mean trunk amplitude (in per cent x 1000)	Under 100 2 points 100 - 339 1 point Over 339 0 point
3. Thoracic ampl. quotient (in raw quotient x 1000)	Under 50 2 points 50 - 249 1 point 250 - 369 0 point 370 - 749 1 point Over 749 2 points
4a. Inspiratory quotient (males) (in raw quotient x 1000)	Under 390 0 point 390 - 399 1 point Over 399 2 points
4b. Inspiratory quotient (females) (in raw quotient x 1000)	Under 370 2 points 370 - 429 1 point Over 429 0 point
5. Abd.-thor. dissynchronization (100 + raw score in sec. x 100)	Under 75 2 points 75 - 114 1 point 115 - 129 0 point 130 - 169 1 point Over 169 2 points
6. Thoracic period variability (in V-coeff. x 1000)	Under 137 0 point 137 - 149 1 point Over 149 2 points
7. Thoracic amplitude variability (in V-coeff. x 1000)	Under 200 0 point 200 - 299 1 point Over 299 2 points
8. Abdominal amplitude variability (in V-coeff. x 1000)	Under 150 0 point 150 - 199 1 point Over 199 2 points

The scale consists of the same items as the previously reported modified version of Clausen's neuroticism scale, except for the facts that we have made use of one sex-specific item only and that each item is scored according to a 2 point scale. The scale is constructed in such a way as to result in a lower total score the more an individual's respiratory movements correspond to a supposedly healthy pattern. Its potential range of scores goes from zero to 16.

Rescoring our respiratory records (average measures) in terms of the new scale, we arrive at the following distribution of scores (no. of points):

Score values:	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Patients														
Females:						1	1	1	2					1
Males:						1	1	1	1	1			1	
Normals														
Females:		1	1	2	1	1								
Males:		2	2	1	1									
All patients:						2	2	2	3	1	0	0	1	1
All normals:		3	3	3	2	1								

We find that the scale discriminates quite well between patients and normals - only one normal subject falling within the range of scores obtained by the patients, and this particular subject obtaining a scale score at the very lowest end of the patients' range of scores.

It should be emphasized that the scale to some extent is to be considered an ex-post-facto scale. Its specific scoring criteria are in need of an independent cross-validation as regards its ability to discriminate between patients and normals. This being said, we may raise the question as to what extent the scale gives results in agreement with an independent evaluation of ego maturity.

As an independent measure of this latter concept we have made use of Fisher's "over-all body image disturbance scale." This is a short, objective scale for the scoring of graphic projection material procured through the Machover Drawing-a-Person procedure. (Cf. Fisher, 1959.)

The total scale score consists of the number of penalty points derived from an examination of the subjects self-sex and opposite-sex figures. The scale consists of the following items:

1. Erasures
2. Transparency
3. Lack of any body part
4. Nose indicated only by two nostril dots
5. Mouth indicated only by a line
6. One or more arms behind back
7. Very crude or peculiar clothing
8. Lack of breasts in the female figure
9. Shading of the body
10. Lack of margins and delineating lines in the figure
11. Figure markedly off balance
12. Figure very small (less than 1/2 of page length)
13. Markedly unusual shading or elaboration of crotch area
14. Opposite sex drawn first.

The D.A.P. procedure was administered to our 24 subjects immediately after their final testing session in the laboratory.

Scoring the subjects drawings in terms of the criteria mentioned, we arrive at the following score distributions (no. of penalty points):

Score values:		0	1	2	3	4	5	6	7	8	9	10	11
Patients	Females:				1	1				1	1	1	1
	Males:					1		1	1	1	2		
Normals	Females:	1		3	1			1					
	Males:		1	1	2	1				1			
All patients:					1	2	0	1	1	2	3	1	1
All normals:		1	1	4	3	1	0	1	0	1			

Comparing the scores obtained by patients and normals we find quite a large overlap. One-half of our normal subjects obtain scores falling within the range of scores obtained by patients. On the other hand, examining the groups in terms of their means we find the scale to show a significant discriminating power. The difference between the means is 4.33. The difference gives $t=4.46$, and $p < .001$.

To what extent does our respiratory scale show a positive association with an independent measure of ego maturity? To what extent does it correlate with the body image disturbance scale?

Concentrating on our total sample, we find a correlation (r) of .75, which is significant at the 1% level. Turning to males and females separately we find correlations of .83 and .71, respectively. That is to say, we find the two scales to be slightly more highly intercorrelated in males than in females, but in both sexes to be rather highly correlated.

Because of the way our respiratory scale has been constructed the correlations reported might be spuriously high. We don't have any possibilities of checking on this point directly except by turning to a new sample of subjects. Indirectly we might throw some light on the question by examining the correlations being present in

patients and normals separately. In constructing the respiratory scale we were guided in part by the differences found between patients and normals - but we did not have any independent information concerning the variations in "health" or "egomaturity" within each of the two groups.

Concentrating on our normal and patient subjects separately, we find correlations of .51 and .43 respectively. In view of the small samples ($n=12$) each of the correlations do not obtain any high level of statistical significance. However, they both go in the same direction and most importantly, in the direction expected.

It is not very surprising to find the two scales to be less correlated in the latter groups than in the total sample since we know that the distribution of scores is significantly greater in the total sample.

Briefly, we may conclude that the correlations obtained when we analyze patients and normals separately do indicate that a real correlation probably exists between our respiratory scale and the body image disturbance scale.

It should be added that we don't believe the body image scale to represent a very reliable criterion of mental health. The positive correlation found between the scales points to a sort of mutual control and validation. But from the point of view of our theoretical framework, it does primarily represent a preliminary construct validation of the interpretation proposed for our respiratory scale.

Beside correlating our respiratory scale with the body-image-distortion scale, we did also attempt another form of validation. After the data collection was over, we asked the hospital superintendant and the hospital nurse administering the respiratory recording devices to the subjects, to sit down and jointly rank the patients in terms of ego-strength, basing their ranking on general clinical impressions and observations. We did not find this ranking to correlate significantly with the patients' rank position on the respiratory scale. Since we did not present any definition of ego-

strength it might very well have happened that this concept was not clearly understood, at least, that it was not conceived of as synonymous to ego maturity or body image adequacy. This is the more likely, since we did not find the ego-strength ranking to correlate significantly with the body-image-distortion scale either.

THE DEVELOPMENT AND TENTATIVE VALIDATION OF RESPIRATORY
TENSION AND EXCITATION SCALES

In the preceding chapter we formulated a theoretical model relating variations in terms of tension and manifest excitation to various personality types. In order to examine this model empirically, we would, among other things, have to link the hypothetical constructs to quantitative variables and observations.

As a measure of psychological tension we might use the scores obtained on items no. 6, 7, and 8 in our respiratory ego-maturity scale. The higher the total score obtained on these items, the higher would be the subjects' respiratory irregularity, and hypothetically speaking - the higher his psychological tension.

As a measure of manifest excitation we might use item no. 1, 3 and 5 in the same scale, although we would have to make some changes in the way the items are being scored. It should be recalled that in the former scale the three items are scored both with respect to positive and negative deviations from an optimal range of values. We might use the same criteria and item scores and only change the signs of those pointing to negative deviations. By summing up the points we would in this instance be confronted with a scale with a maximum range of scores going from -5 to +6. Or, we may make use of the old scores but concentrate on those pointing to positive deviations exclusively. In this instance, we would end up with a scale with a maximum range going from 0 to 6 points. In other words, we would have a scale with the same maximal score distribution as found in the other scale.

Whatever scoring system is used, we would be faced with a scale giving higher scores the higher the rate, the higher the thoracic amplitude quotient, and the lower the thoracic dissynchroni-

zation (the higher its negative values), that is, hypothetically speaking, the higher the manifest excitation.

We have excluded from the scale both the mean trunk amplitude and the abdominal inspiratory quotient (item no. 2 and 4 in the ego-maturity scale); the first item due to its supposedly lack of discrimination between a high and low level of manifest excitation, and the last item due to its different "interpretations" or "meanings" in case of males and females.

* * *

Reviewing our empirical data we find the "tension" scale to give the following score distributions:

Score values:	0	1	2	3	4	5	6
Patients:	Females:	3		1	1		1
	Males:	1	1	1	1		1
Normals:	Females:	3	2	1			
	Males:	3	2	1			
All patients:	4	1	2	2	0	1	2
All normals:	6	4	2				

As expected, we find a clear tendency for the patient group on the average to obtain higher irregularity scores than the normal group. What is important to note, however, is that a high tension score is not typical of all patient subjects - only about half of the patient group shows extremely high scores, that is, scores falling outside the range of scores found in the normal group.

Turning to the "excitation" scale - making use of a similar three-item, zero-to-six point continuum, we find the following distribution of scores:

Score values:		0	1	2	3	4	5	6
Patients	Females:			1		3	2	
	Males:	1		2		3		
Normals	Females:		3	3				
	Males:	3	2	1				
All patients:		1	0	3	0	6	2	
All normals:		3	5	4				

Again we find that the patient groups show a clear tendency to obtain higher mean scores. However, the score distributions found in the normal and the patient group are not without overlap. One, third of the patients obtains scores falling within the range of scores found among the normal subjects.

Would anything be gained by making use of negative scores on the items comprising the excitation scale, that is, by taking into account negative as well as positive deviations? Scoring our subjects in terms of this scheme we find that all normal subjects obtain scores between - 3 and +3, and that this is true for only one-fourth of the patient subjects. The eight high scoring patients continue to fall outside and above the normal range, while the patient obtaining a zero score on the old scale, now drops to -5. The three remaining patients continue to fall within the normal range. The new scale version discriminates only a little better than the old one. We have consequently decided to make use of the first version since it has the advantage of being similar to the tension scale in terms of its construction and score distribution.

The fact that this latter scale does not discriminate very well at its lower end is not a serious handicap, since we would expect low scores - reflecting not a genuinely low level of excitation but a state of excitation suppression - to be combined with rather high scores on the tension scale. We would expect most patients obtaining scores overlapping the normal range of scores on the excitation scale, to obtain scores exceeding the normal range on the tension scale. Conversely, we would expect most patients obtaining scores overlapping the normal range on the tension scale, to obtain scores outside the normal range on the excitation scale. In

other words, we are supposing that by combining the scores obtained on the two scales we would be in a position to discriminate far better between normals and patients than by examining the score distribution on either scale in isolation.

In order to examine this hypothesis we have divided the score intervals on both scales into three categories, namely into 0 points, 1-2 points, and 3-4-5-6 points, and placed our subjects in the resulting 9-cell diagram according to their scores on the two scales. By this procedure we arrive of the distribution of subjects shown below:

Scores obtained on the excitation scale

		0	1-2		3-4-5-6	
<u>Scores</u> <u>obtained</u> <u>on the</u> <u>tension</u> <u>scale.</u>	3-4-5-6	PM-3	PF-5	PM-4 PM-5	PF-6	
	1-2	NM-6	NF-1 NF-3 NF-4	NM-2 NM-3	PF-2	PM-1 PM-6
	0	NM-4 NM-5	NF-2 NF-5 NF-6	NM-1	PF-1 PF-3 PF-4	PM-2

P stand for patient, N for normal, F for female, M for male, and the number following the symbols for the subject's serial number within his particular subgroup.

Looking a bit closer at the diagram one becomes aware of a very significant finding, namely that no overlap exists between the placement (score combination) of patients and of normal subjects. All the normals fall within the fourfold table delineated by the score intervals zero and 1-2. Conversely, all patients obtain a 3-4-5-or-6 score on either or both of the two scales.

Parenthetically, it should be recalled that not a single subject obtains a 3 point score on the excitation scale, and that 3 of the 5 subjects obtaining scores above 2 on the tension scale, fall in the two extreme upper categories. In other words, the scales' discriminatory power are not maximally exploited by our classification procedure.

Mostly, for the sake of satisfying our curiosity, we have computed the average body-image-distortion-scores for the subjects falling in the various cells of the diagram described above. By so doing we arrive at the following mean values:

		<u>Excitation scale</u>		
		Low	Medium	High
<u>Tension</u> <u>scale</u>	<u>High</u>	9	6.67	11
	<u>Medium</u>	3	3.4	5.33
	<u>Low</u>	1.5	3.25	8

The small number of subjects involved, makes it quite impossible to draw any definite conclusions from the results. Nevertheless, we would like to emphasize the trend toward a lower body image distortion score, the lower an individual's excitation level and the lower his tension level, and also the trend toward higher distortion scores the more extreme an individual's respiratory deviations - granted he is characterized either by a high tension score or by a high position on the excitation scale. Of course, these trends have to be considered as hypotheses only which have to be tested in subsequent studies.

* * *

So, far we have been mainly concerned with comparing our patient and normal subjects in terms of respiratory features. Turning to the question as to what extent respiratory variables might provide data about specific personality characteristics we are not any longer burdened by the limitations imposed by the way our scales have been constructed. Looking at the 9-cell diagram presented above, we might ask: To what extent do the subjects falling in the various cells share personality characteristics in common, and if so, to what extent do they show variations in personality characteristics corresponding to our earlier theoretical formulations?

As a first step in answering these questions we have examined the type of psychiatric diagnosis being attributed to each

of our patient subjects. Using the same categories as before, we find the following distribution of diagnoses:

High excitation - high tension:

PF-6: Depressive reaction, hysterical personality.

Medium excitation - high tension:

PF-5: Schizophrenic reaction, paranoid type, schizoid personality with hysterical traits.

PM-4: Passive aggressive personality, aggressive type.

PM-5: Narcissistic personality, compulsive and hysterical features.

Low excitation - high tension:

PM-3: Schizophrenic reaction, paranoid type, infantile personality.

High excitation - medium tension:

PF-2: Manifest homosexuality, narcissistic personality, hysterical features.

PM-1: Infantile personality, weak impulse control.

PM-6: Inadequate personality, passive dependent features.

High excitation - low tension:

PF-1: Dyssocial reaction, personality trait disturbance, masochistic features.

PF-3: Schizoid personality, compliant type with somatization tendencies.

PF-4: Schizophrenic reaction, chronic, undifferentiated type, schizoid personality.

PM-2: Schizoid personality, narcissistic aloofness with dysphoric features.

Reading through the diagnostic statements under each category a few trends can be ascertained.

The only patient described as a hysterical personality is found in the HE-HT category, and the three patients ascribed hysterical features are all found in adjacent categories, that is, in either the HE-MT or the ME-HT category. Thus, our results support the hypothesis that hysterical traits seem to be associated with a rather high level of tension and excitation.

It is deplorable that our sample did not include a single patient classified as a compulsive personality proper. In other

words, our empirical data do not allow any direct testing of whether the compulsive personality actually show low excitation combined with high tension. However, our data lend some indirect support to this hypothesis.

The only patient falling in the LE-HT category is classified as a schizophrenic reaction, paranoid type. The only other patient with the same diagnosis is found in the adjacent category (the ME-HT category). This is in a sense an encouraging finding since patients ascribed this diagnosis - as noted in the preceding chapter - are frequently described in quite similar terms as the compulsive personality, i.e. as possessing a conspicuous psychological and physiological hardness and rigidity.

It is important to note that the patient ascribed schizophrenic reaction, paranoid type, falling in the ME-HT category is also described as possessing hysterical features - which might account for the higher excitation level.

Furthermore, another patient falling in this latter category is described as possessing hysterical and compulsive features - and the same argument can be applied in this instance, that is, if this patient had shown hysterical features exclusively we would have expected him to fall in the HE-HT category, and conversely, if he had shown compulsive features exclusively, we would have expected him to fall further down on the excitation continuum. On the other hand, the fact that this patient does obtain a high tension score confirms one essential part of our theoretical prediction.

The only remaining patient falling in the ME-HT category is described as an aggressive type with a basic passive-aggressive personality. The aggressive features found in this case might easily be interpreted as an over-compensation, as representing an element of constriction and overcontrol.

Our data do fit in with the hypothesis that in the case of high tension, we find a diminishing amount of hysterical features, and a successive augmentation of compensated or compulsive features as we pass down the excitation dimension. In making this statement we are taking into consideration the diagnostic labels being ascribed to the patients showing high tension, but also - and we consider this even more important - to the patients showing low tension. If no difference could be glimpsed between high and low tension patients our model would of course have collapsed completely.

As we pass down the tension dimension we are faced with hysterical features being replaced not by compulsive or compensatory traits, but by an increasing passivity, aloofness, withdrawal, emotional dullness and distance. All of the patients being described as pure schizoid personalities are found in the HE-LT category.

In the HE-MT category we find one patient with hysterical features, one patient described as possessing weak impulse control (a feature certainly also found in hysterical personalities), and one patient with passive dependent features. Furthermore, passivity or passive dependency seem to be a characteristic trait of all the patients falling in the HE-LT category. In particular we are referring to the one ascribed as a compliant type with somatization tendencies. That passivity is a predominant trait also in the two remaining patients is most likely. One of them is ascribed dysphoric features and the other one diagnosed as an undifferentiated, chronic schizophrenia.

Comparing the patients falling in the HE-LT category with those showing high tension and low or medium excitation, one is struck by the greater emotional detachment and the greater passivity which seem to be present in the former patients.

The fact that we find schizophrenic reaction of an undifferentiated type and schizophrenic reaction of a paranoid type to be located at opposite sides of the diagram is not very surprising in view of earlier findings. It fits in quite well with the results of studies showing early and paranoid schizophrenics to present respiratory features (particularly in term of irregularity) much more similar to anxiety state patients than to chronic schizophrenics.

At one point particularly our empirical data deviate somewhat from our theoretical expectations. We are referring to the relatively high excitation level found in the patients described as schizoid personalities (and particularly in the patient being described as chronic schizophrenic, undifferentiated type). According to our earlier discussion we would have expected these patients to show low tension (as they actually do) combined with a relatively low excitation level. The combination of a low tension and a high excitation we expected to be characteristic of the unrestrained, energy-plethoric personality, and the combination of a low tension and a low excitation, characteristic of the apathetic, energy-depleted

personality. In other words, we were expecting patients with a schizoid personality to fall closer to the apathetic than to the plethoric end of the scale. In the next section we are going to present some afterthoughts concerning this issue.

* * *

We would like to start out by emphasizing that what we have called the high category on the excitation scale may not be particularly high if considered in relation to the score values which might possibly be obtained by a manic patient or by a patient in an acute anxiety state. Not a single one of the four patients falling in the HE-LT category obtains a 6 point score on the excitation scale, and the only one obtaining 5 points - is the patient deviating from the rest by not having been ascribed a schizoid personality.

It may sound a little surprising that we had expected the patients with a schizoid personality to obtain lower scores on the excitation scale - since this would have implied an overlap with our normal subjects. We have to confess that we had expected a certain overlap to emerge when the 6 point excitation scale was introduced, but we hoped that this overlap would be reduced or would disappear when the previously described more extensive excitation scale was employed. That is to say, we did expect to find patients showing low tension combined with an extremely low excitation.

Reviewing our results afterwards we are not at all sure that our expectations were justified. First and foremost, our patient sample did not include any catatonics, any really apathetic, deteriorated schizophrenics or inert melancholic patients. In fact, these categories of patients might be rather difficult to find today in progressive, treatment-oriented hospitals. It is important to note however that as long as we haven't examined these types of patients an important part of our theoretical model remains without empirical support.

It might be argued that a patient with a schizophrenic reaction, undifferentiated type, most probably will show a level of energy transaction that is lower rather than higher than normal subjects, and consequently, that according to our theoretical notions

we should expect this patient to obtain a lower score on the excitation scale than our normal subjects.

At a first look, the argument stated sounds quite reasonable. However, it fails to take into account one rather important point.

An essential characteristic of normal mental functioning is a high level of elasticity, an ability to adapt to different situational demands and requirements. For instance, to take an example from psychoanalytic theory, primary process thinking might be found both in normals as well as in psychopathological cases, but a marked difference is the situational context, the normal subjects showing a larger ability to switch back and forth voluntarily, that is, a larger ability to keep the "uncontrolable" under "control". In the same way, a low excitation level might correspond to a state of self-induced quiescence as well as to a state of involuntary energy depletion.

On the other hand, a high excitation under resting conditions, i.e. under conditions encouraging and facilitating relaxation and quiescence, would definitely suggest a lack of elasticity. Although the subject might show a relatively low level of excitation generally, he is unable to diminish this level in a situation calling for a reduction in excitation. We have a parallel in the case of mental patients being unable to regress to a primary process mode of functioning even under encouraging conditions, but at the same time showing less firmly anchored secondary process thinking than normal subjects under other conditions requiring this latter mode of functioning.

The fact that we find normal subjects to obtain relatively low scores on both the tension and the excitation scales can be considered an expression of their relatively high elasticity.

To sum up, a relatively high position on the excitation scale does not necessarily indicate a high excitation level under everyday conditions. It might indicate a lack of adaptability. Conversely, a low position on the excitation scale may result from an unchangeable rather extreme energy depletion under all sorts of conditions as well as from a high habitual energy level combined with high adaptability.

Our assumption that a high positive correlation exist between a person's habitual excitation level and his position on the excitation scale, presupposes a uniform capacity or incapacity for adaptability. Our concepts of depleted-apatetic and plethoric-unrestrained personalities are to be considered within a relative framework, and most important, within a framework primarily focused upon mental pathology. This follows from the assumption that an extremely low adaptability is a characteristic feature of mental patients.

The fact that we find three patients all labeled as schizoid personalities in the high excitation category, raises another problem. If schizoid patients show a rather high level of excitation under resting conditions, how can it be explained that they simultaneously show a fairly low amount of tension? Wouldn't their high excitation provide the basis for a rather large amount of tension? We are here referring back to our previous definition of tension as an accumulation of intrapsychic excitation. Wouldn't schizoid personalities just because of their withdrawn, non-action oriented style of life, constitute a group specifically predisposed to show tension in a resting situation?

We would like to reemphasize our earlier assumption that excitation may be discharged through different channels or apparatus, that it might be discharged through overt action (through organized or unorganized action), but also through cognition or internal action. It is true that an immediate discharge of an extremely high level of excitation may presuppose overt action; that overt action, so to speak, represents a more "efficient" (a potentially larger and broader) channel of excitation discharge.

Being placed in a resting situation a person with a habitual overt action oriented mode of discharge is in a very bad position indeed. In this situation he has either to bind his excitation, to diminish his excitation or to attempt to make use of an internal channel of discharge.

It is our assumption than internal action can provide an adequate outlet of rather high levels of excitation granted that the thinking or phantasy activity involved is not too constricted or restrained. That is to say, we are supposing that autistic, idiosyncratic, drive directed thinking, the loosening up of associative

patterns and the separation of associations from experience, may provide an immediate discharge of relatively high excitation levels.

It should be added, that we don't consider incoherence of thinking and fragmentations of associations as being invariably accompanied by a relatively high level of excitation. It is quite possible that a continual "thought disorder" combined with a scarcity of social stimulations might successively diminish the excitation level itself. Consequently, we don't exclude the possibility that various forms of thought disorders might be found even in instances of an extremely low level of excitation. We would expect in these instances, however, that the level (or rate) of cognitive activity is significantly diminished. On the other hand, it is reasonable to believe that autistic, drive directed thinking initially is released as a mechanism diminishing an excitation overload and preventing the development of an overwhelming tension.

It is interesting to note that somewhat similar thoughts have been presented from the point of view of learning theory. Mednick (1964) writes:

"Process or chronic schizophrenia is seen as the result of learning to avoid stressful stimulation via avoidant associative mechanisms. During some periods of high anxiety, remote associations occur which momentarily replace anxiety-laden thought with irrelevant, less-anxiety-laden thought. This is followed by anxiety reduction which reinforces the remote, tangential, avoidant thought transition. After many such trials the tangential thought will become a conditioned avoidance response defending the individual from stimuli which might elicit anxiety." (p. 3)

One reason for preferring the energetic as compared to the avoidance-learning model, is the first model's explication of the HE-LT found in our chronic schizophrenic subject.

To sum up, we don't consider a relatively high level of excitation incompatible with an aloof, withdrawn schizoid personality. Neither do we consider a high level of excitation in such a personality incompatible with a low amount of tension. The important feature of a schizoid personality is probably not an inability to discharge excitation - but an inability (or inhibition) to discharge excitation in overt action in an interpersonal setting. The low level of tension characterizing our schizoid patients only suggest that their excitation level is not exceeding their capacity for

immediate discharge. Their schizoid reactions might in fact, represent an important element in the maintenance of their internal discharging capacity.

* * *

At this stage a remark of caution might be in order. In the above sections we have tried to show that the diagnostic statements concerning our patient subjects to a large extent do confirm our theoretical model. The question might be raised whether our reasoning has been colored by our theoretical notions to such an extent that we have found confirmations where nothing definite can be said. Psychiatric diagnostic categories don't provide very reliable information. They are often stated in rather ambiguous terms. Furthermore, we have continuously paid far more attention to those diagnostic statements fitting in with our model than to those being difficult to interpret in terms of our theoretical framework.

In order to get an independent check on this latter problem we have done a couple of supplementary studies.

We mentioned earlier that after the data gathering was over, the hospital superintendant and the hospital nurse helping us to administer the respiratory recording devices, were asked to sit down and jointly rank our patient subjects in terms of ego-strength. They were also asked to rank the patients in terms of a few other dimensions, in terms of emotional lability and sociability.

On the basis of our theoretical notions we expected in the case of a high tension level to find a positive association between excitation and emotional lability. This turned out to be true. Examining the patients falling in the high tension category we find that the patient obtaining the highest excitation score is ranked among the highest on emotional lability, and that the patient obtaining the lowest score, is ranked among the lowest on this variable. Of course, this finding does not count very much since the number of subjects involved is five only.

An interesting finding is the positive correlation obtained between tension and emotional lability. Concentrating on the patients falling in the high excitation category exclusively ($N=8$) we find a rank correlation of .76.

In order to get a more comprehensive outlook on the relationships between the variables discussed we have divided the patients into two groups - based on their rank position on emotional lability, and traced their location in terms of excitation and tension - making use of our earlier categories. We find that the two groups (the high and the low ranking subjects in terms of emotional lability) are concentrated in particular cells and that the cells having a preponderance of low ranking subjects are found in opposite corners of the diagram. See below.

		<u>Excitation scale</u>		
		Low	Medium	High
<u>Tension scale</u>	<u>High</u>	PM-3:Low	PM-4:High PM-5:High PF-5:Low	PF-6:High
	<u>Medium</u>			PM-1:High PM-6:High PF-2:High
	<u>Low</u>			PM-2:Low PF-1:Low PF-3:Low PF-4:Low

The only subject deviating from the general pattern is PF-5. As previously noted, PF-5 is the one ascribed the same psychiatric diagnosis (schizophrenic reaction, paranoid type) as PM-3.

Examining the patients rank position in terms of sociability we find exactly the same over-all pattern. That is to say, all the subjects falling in the upper half of the rank distribution on emotional lability are also found in the upper half of the rank distribution on sociability, the rank correlation between the two variables falling in the lower nineties. Although we don't know exactly how emotional lability and sociability have been defined by the rankers we have reason to believe that the two traits have been considered closely interrelated.

A challenging problem confronting us is the "phenotypical" similarity between PM-3 and PF-5 on the one hand, and the LT-HE subjects on the other. How can this "phenotypical" similarity be explained?

According to our previous reasoning we would expect the HT-LE subjects to show excitation suppression - and the LT-HE subjects to show a relative lack of suppressive mechanisms. Granted the LT-HE subjects all show a schizoid disposition, we would expect both groups to show low sociability and low emotional lability, although their underlying dynamics would be quite different. In the former group we would expect the low lability to stem from emotional constriction, suppression, and overcontrol - with low sociability being a concomitant secondary phenomena. In the second group, the low sociability might be thought of as reflecting the dynamic nucleus - the low lability stemming not from constriction but from passivity, detachment and social withdrawal, i.e. not from overcontrol but from a certain type of undercontrol facilitating cognitive activity at the expense of overt expressions of personal emotions. It wouldn't be very surprising if we should find the former group to show a relatively lower lability than the latter, and the latter group a relatively lower sociability than the former.

Looking a little closer at our empirical results we find a definite trend going in this direction. We find that the two HT-LE subjects have been ascribed the extreme lowest rank positions in terms of emotional lability, but not in terms of sociability. The fact that we find the two subjects to obtain relatively higher ranks in terms of sociability than in terms of lability and that this is not true for a single case in the LT-HE group, lend support the view the two groups are dynamically different.

This latter inference does of course correspond to our earlier review of the subject's diagnostic labels.

In order to get an additional check on the problem we have consulted the patients' psychiatric records - particularly the psychological test reports - and tried to summarize what seems to be the most characteristic feature shared by the patients falling in the LT-HE category, the HT-HE & MT-HE category, and the HT-ME & HT-LE category. We have four patients falling in each of the three groups.

Features characterizing the HT-HE and MT-HE patients.

These patients all seem to be characterized by undercontrol and emotional lability. They may all be classified as having a fragile defense structure. Characteristic diagnostic statements include the following ones:

"The patient's equilibrium is easily disrupted under the impact of affect-laden material" (PF-6); "shows an inability to postpone the gratification of his needs ... codes of behavior weakly ingrained ... mainly oriented toward defending himself against criticism ... one is impressed by his shallowness" (PM-6); "low tolerance of frustration ... experiencing insecurity, inferiority feelings and anxiety ... restlessness, impulsivity ... inability for persistency in learning, losing interest quite easily ... moody" (PF-2); "prevailing mood shifts quickly without apparent reason ... impulse control is weak ... dearth of compulsive mechanisms ... difficulty tolerating delay of immediate gratifications ... easily overwhelmed by intensive, poorly controlled, primary process thinking ... shallowness in emotions." (PM-1).

Features characterizing the LT-HE patients.

A common feature among these patients seems to be a bland aloofness, submissiveness and dependency combined with self abasement or an extremely low estimation of own self. A few diagnostic statements might illustrate the picture:

"The patient's affective responses are blocked and she appears bland most of the time ... tendencies toward overdependency, submissiveness and somatization" (PF-3); "prevailing mood is one of apparent indifference ... fearfulness of getting too close to other people ... perceives herself as lacking any kind of attractiveness ... low sense of self-esteem" (PF-1); "prevailing facade one of bland aloofness ... unexplained somatizations ... retiring unobtrusive behavior ... inner sense of shame and deprivation ... forms dependent relationships ... affect is generally flat" (PF-4); "narcissistic aloofness is a striking feature in his interpersonal relationship ... little access to affective experiences ... prevailing mood is one of dysphoria" (PM-2).

Features characterizing the HT-ME and HT-LE patients.

A common feature seems to be attempts toward consolidations or compensations through the suppression and inhibition of spontaneity and affects. The following diagnostic statements exemplify the pattern:

"The patient is struggling to maintain a rigid idea of herself as a person with dedicate and altruistic sentiments with no trace of the 'basic' instincts ... a prominent character trait is a marked streak of negativism" (PF-5); "facade very controlled, self-sufficient behavior ... marked perfectionistic ... alert, quick, bright, can judge social and ethical situations skillfully, but must squelch any spontaniety or any readiness to invest himself affectively in a person or in a task" (PM-5); "display of physical prowess and fearlessness are to some extent ego-syntonic ... facade of aggressivity ... strong need to overcompensate for feelings of inadequacy as a male" (PM-4); "defensive activity centering about repressive, inhibitory activity ... superego severe, doesn't tolerate any form of instinctual expression ... dependent attachment to parents, little attachment to others" (PM-3).

It is evident that the quotations and summary statement presented above don't represent any verification of our theoretical model. Psychiatric records as well as psychiatric diagnostic categories very often include rather ambigious personality descriptions, descriptions which might be interpreted as providing support to different viewpoints.

To sum up, we have tried to show that the inferences drawn from the diagnostic labels are consistent with clinical ranking procedures and with excerpts from the psychiatric records, and finally, that "phenotypical" similarities in terms of ranking position regarding sociability and emotional lability seems to cover up some expected differences in underlying dynamics.

* * *

The main purpose behind our data analysis has been to check and to explore some of the hypotheses launched in the preceding chapter. We have found most of the hypotheses to stand the test of sporadic empirical confrontations, although we have also found it necessary to elaborate on our initial thinking on a couple of points. We are referring particularly to our discussion of "adaptability" and of "internal excitation discharge".

As regards the relationship between tension and excitation on the one hand, and different personality patterns on the other, we don't have much to add to our earlier diagram (see page 41) besides reemphasizing that our empirical analysis has provided further indications that schizophrenia is not a homogeneous reaction pattern.

Hypothetically, the following subtypes in terms tension and manifest excitation seem to emerge:

		<u>Manifest Excitation</u>	
		Low	High
<u>Active Tension</u>	<u>High</u>	Paranoid type	Acute reactive type
	<u>Low</u>	Catatonic type (chronic - deteriorated)	Chronic - undifferentiated type

The question may be raised whether it is possible to make inferences concerning personality features not only in psychiatric patients but also in normal subjects. The results of earlier empirical studies (by Thompson & Corwin, 1942; Schultz & Luthe, 1961; and others), as well as our own empirical study on "body image adequacy", do suggest that certain inferences might be made also in the case of normal subjects - although we would like to stress that individual differences in 'adaptability' (partly on a situational basis) might prevent reliable inferences concerning the individual subject. However, we are here confronted with problems which can only be solved thorough further empirical studies.

In subsequent investigations it would be desirable not only to make use of larger and more heterogeneous samples of subjects than what was the case in our initial study, but also to consider the problem of finding more reliable methods of personality assessment. This is a problem closely related to the development of an adequate personality theory. To this question we will turn in the next chapter.

FURTHER DEVELOPMENT OF A PERSONALITY THEORY

In the preceding chapter we described a couple of studies relating respiratory variables to psychological phenomena. As intervening or explanatory constructs we made use of tension and excitation.

So far we have been much more concerned about how respiratory features are related to our hypothetical constructs, than why they are so related. What we are asking for is a more systematic theoretical framework explaining the relationships in question.

The assumption that respiratory irregularities are related to tension may not require any elaborate explanation. More difficult to grasp on an intuitive basis is the relationships suggested between thoracic and abdominal breathing on the one hand and the ego control dimension on the other. The fact that both thoracic and abdominal predominance in breathing will represent a constriction or a limitation in optimal breathing is easy to understand, but why does the former limitation point to excitation overload and the latter one to excitation suppression?

The genetic perspective would always represent an important aspect of a personality theory. After having classified subjects in terms of various personality types, the next problem is how to explain why different individuals do develop into different types.

In the present chapter we are going to present some tentative answers to the problems mentioned above. In particular, our theoretical position has been influenced by the writings of Reich (1950) and of Fisher and Cleveland (1958). In the sections to follow we will quote extensively from Reich's writing, although we would like to emphasize that we do not attempt to present an unbiased and systematic review of his various assumptions and propositions. This, we feel, is a rather complicated and somewhat wasteful task since his writing is primed with inconsistencies, ambiguities and inappropriate ideological proclamations.

Opposite Directions of Excitation Flow

Jung's distinction between the extravert and the introvert temperamental type is well known. The main assumption behind this distinction is the conception of libido flowing in opposite directions. When the general direction of the flow of libido is away from the individual, the expression extraversion is used and the individual is called an extravert. When the libido is mainly turned inwardly upon the individual himself, the condition is known as introversion and the individual as an introvert.

In Reich's writing we find a similar conception of excitation flow. Excitation can be directed outwardly, toward the world, or inwardly, away from the world. But in contrast to Jung, Reich considers only one of the directions libidinal in nature. Excitation flowing inwardly, does not represent a libidinal impulse but anxiety. Reich states: "The libidinal impulse is a flowing of excitation ... to the periphery, anxiety a flowing to the center of the organism." And at another place: "Sexuality and anxiety ... can be comprehended as two opposite directions of excitation."

In equating anxiety with a centrepetal flow of excitation, Reich takes as his point of departure some trivial everyday observations; namely, that anxiety is generally experienced as a paralysis of action and as a sudden depletion of energy at the disposal of the self.

It is important to note that Reich distinguishes sharply between anxious expectation and anxiety proper, and that his term excitation has (at least initially had) a much stronger physiological connotation than the libido concept in traditional psychoanalytic writings.

In anxious expectation, an individual's musculature is tense, ready for action, for contraction as well as for relaxation. If a danger is actually encountered, the individual may react in different ways, by fight, flight or fright. Both fight and flight involve muscular elements and motoric discharges. Both modes of reacting presupposes a centrifugal flow of excitation.

As regards fright the situation is different. The fright reaction may take one of two forms. It may take the form of an increased muscular rigidity (the organism being scared stiff) or the

form of a decreased muscular tonus (the organism being paralyzed with fright). It is this latter condition which is referred to as anxiety proper.

In the case of an increased rigidity, the anxiety will be warded off. Reich states:

"In paralysis with fright, the musculature becomes flaccid, depleted of energy while the vasomotor system, conversely, is full of excitation: palpitation, sweating and pallor. In the rigidity with fright, on the other hand, the peripheral musculature is rigid, the sensation of anxiety hardly present at all, one is "seemingly calm", but in reality one is incapable of moving, incapable of motor flight as well as vegetative flight into the self." (p. 346).

From this latter observation, Reich develops the thesis that muscular rigidity can take the place of an anxiety reaction, that the very same excitation which in the case of anxiety retreats to the center of the organism, under specific circumstances - may form a peripheral muscular armor which will prevent anxiety by absorbing its energetic basis. A peripheral armor is considered the mechanism through which anxiety and excitation (whether libidinal or aggressive in nature) becomes bound. Its psychological consequence is to make the individual less sensitive to unpleasure or pain. It works like a shell on which the knocks from the outer world as well as the inner instinctual demands rebound.

An important point in Reich's conceptualization is that a centripetal flow of excitation is associated not with excitation discharge but with an excitation stasis. In other words, anxiety is not considered a mode of discharge but an excitation accumulating response. Another point strongly emphasized is that a peripheral muscular armor and an ego armoring are functionally identical entities.

Different Types of Excitation Binding

An anxiety reaction is not necessarily a psychopathognomic response. A complete lach of anxiety regardless of the situational context may point in the direction of a pathologic rigidity. On the other hand, a high susceptibility for anxiety independent of the situational context does certainly indicate a state of psychopathology.

In a schematic way we may distinguish between a high and a low anxiety threshold, and cutting across this dimension - we may distinguish between a flexible and an inflexible threshold. For instance, it is quite conceivable that a person showing anxiety in one situation may show a profound anxiety avoidance in another situation. What we are hinting at is that individual differences exist regarding the ability to bind excitation in a differentiated manner.

According to Reich, the formation of a peripheral (anxiety protecting) armor is not in any way incompatible with mental health. What is of crucial importance is the flexibility or elasticity of the armor. In his own words:

"The armor ... operates according to the pleasure-unpleasure principle. In unpleasurable situations the armoring increases, in pleasurable situations it decreases. The degree of character mobility, the ability to open up to a situation or to close up against it, constitutes the difference between the healthy and the neurotic character structure." (p. 146).

At another place, he elaborates on the same thoughts as follows:

"Examination of (healthy or genital) characters shows that here, too, an armoring can take place, that the ability to avoid unpleasure and anxiety by the formation of a peripheral armor is present ... In the case of neurotic armoring, the muscular rigidity is chronic and automatic, while the genital (or healthy) character has his armor at his disposal; he can put it in operation or out of operation at will. What matters ... is not the fact that biopsychic energy becomes bound but in which form this takes place, whether the availability of energy is reduced or not. It cannot be the goal of mental hygiene to prevent the ability to form an armor; the goal can only be that of guaranteeing the maximum vegetative mobility, in other words, the formation of an armor which is mobile." (p. 349).

To summarize, Reich draws a distinction between two types of armoring, between a neurotic type being chronic and automatic, and a healthy type being voluntary and flexible. What are the pre-conditions for the development of an armoring, and for a healthy and a neurotic type of armoring respectively?

Preconditions for the Development of an Ego Armoring

According to Reich, a chronic and automatic armoring represents a lasting solution of a repression problem.

As a first step in explaining this proposition it is necessary to discuss briefly what is meant by repression. In order to do so we have to introduce a few theoretical assumptions.

Being confronted with frustrations an organism will have an innate tendency to aggress, that is, to become energetically activated and to direct his energy flow externally. If no relief is obtained and if the frustration continues and become progressively more threatening, the initial aggression will cease and be replaced by an anxiety response. Given such a response we are confronted with two possibilities. The organism might 'live through' the anxiety, tolerate it without breaking down, and slowly regain its previous integrity; or the anxiety might become intolerable, disruptive and overwhelming, and force the organism into a state of self surrender and self abandonment. It is the splitting up of the personality represented by this abandonment we are referring to by the term repression. What is repressed is a part of the organism's potential ego system, and what is maintaining the repression is a structural change in the remaining ego system. We might look upon this structural change as an attempt to ward off anxiety and to maintain self control and self esteem.

Looked at from the somatic point of view a repression will correspond to a muscular dystonicity, to a configuration of a simultaneous decrease and increase in the muscular tonus.¹⁾

1) This latter viewpoint bears some resemblance to Fenichel's (1945) proposition (p. 246) that pathogenic defenses always imply the blocking of certain movements, that said defenses aim at barring the warded-off impulses from mobility and the barring from consciourness is only a means of achieving this end. According to Fenichel neurotics block libidinal drives by tensing their muscles, or rather by tensing certain groups of muscles and relaxing others, thereby producing a state of dystonia in the musculature. To a persistent suppression of drives, there is a corresponding state of dystension of the musculature. The difference between Fenichel's viewpoint and the one suggested by Reich is the role played by hypotonic responses. In a recent article

A repression can be considered a simple type of neurotic armoring or more correctly, as a pre-armoring response. The reason why we cannot classify a repression as an armoring response proper, is that it doesn't really provide any lasting energetic solution or any solid anxiety protection. Affects and impulses being repressed will continue to exert their dynamic influence as free-floating energies pressing for discharge. As time passes, the pressure will increase and may 'break-through' as phobias and other types of symptoms. A repression will have a weakening impact on the organism's ego system.

From a genetic point of view we may say that a repression not only will have an ego weakening impact but that its occurrence is also strongly facilitated by a state of ego weakness. Consequently, we may postulate that a small child under equal conditions is much more susceptible to repressions than an older child, and an older child more susceptible than an adult.

A small child is very much dependent upon his immediate surroundings, his capacity for tolerating frustrations is low, his ability to channelize and focus his excitation (aggression) on to specific action patterns is restricted, and the same is true as regards his ability to tolerate anxiety.

As the child grows older he will be better able to sustain frustrations, to live through anxiety, but also to encapsulate himself without total surrender in the case his anxiety becomes too threatening. It is this encapsulating mechanism Reich refers to by the term armoring. It is a mechanism which presupposes that the child has reached a certain stage of ego maturity or ego strength; or more concretely, that he has gained, assimilated or differentiated a specific response modality in terms of holding on or holding back.

by Johnsen (1964) the psychological importance of hypotonicity is strongly emphasized: In neurotic character patterns one always find a configuration of hypertonic and hypotonic elements. The hypotonic element represents the latent content of what is repressed while the hypertonic element represents the defense against this very content. This is of course, only a rephrasing of Reich's theoretical proposition. What is original in Johnsen's article is an attempt - based upon physiotherapeutic observations - to make a systematic description of various hyper - and hypotonic qualities, and furthermore, to relate these qualities to different psychodynamic properties (conscious, preconscious, and repressed - unconscious affects).

According to Reich this is a response pattern being crystallized as an ego capacity first at the age of two or three in connection with what is customarily called the anal phase of psychosexual development. Consequently, the armoring process can be looked upon as excitation being bound by the ego, by the ego taking over so to speak, anal holding-back tendencies and utilizing them for adaptive purposes.

As previously mentioned, an armor might under certain circumstances develop a functional autonomy, that is, it might develop into a chronic and automatic energy binding process which is outside the individual's mastery and voluntary control. In a sense, we are confronted with an uncontrolled overcontrol, a self-perpetuating mechanism preventing the individual from making use of his psychobiological potentialities. How does such an uncontrolled overcontrol develop?

According to Reich's train of thought, a chronic and automatic armor does always stem from an underlying repression. It may be considered a secondary elaboration or quasi-solution of a repression problem. It implies that a simple repression is turned into a reaction formation, i.e. into a neurotic character trait. It can be conceptualized in terms of the ego taking over a certain impulse pattern which has been repressed (dissociated) and using it as a defense against other impulses. This very process leads to a compensatory unification of the personality. It leads to a certain strengthening of the ego but at the expense of a lasting limitation of the ego's motility and functional adaptability, of its capacity for pleasure and achievement. Somatically speaking, it results in a muscular dystonicity being replaced by a more generalized hypertonicity. Although it is followed by a strengthening of the ego - it is a compensatory strength, and it should also be noted that it requires a certain initial strength in order to develop.

Variations in Depth of an Ego Armoring.

A neurotic character formation serves the function of armoring the ego against the outer world and the inner instructual demands, and it serves the function of absorbing excitation, of keeping excitation from manifesting itself as anxiety.

Although a neurotic character formation represents a significant consolidation as compared to a simple repression, it might still be accompanied by an ever-increasing accumulation of excitation due to the fact that it would never be completely adapted to and provide an adequate discharge of repressed instinctual urges. Consequently, a neurotic character formation may call for a secondary solution on par with a simple repression. In order to avoid 'break throughs' and symptom formations, new protection mechanisms has to be established. These new mechanisms can be conceptualized as a progressive strengthening of the armor in depth.

As previously mentioned, a repression will always give rise to an excitation stasis. The formation of a superficial armor will serve as an excitation binding agent. However, we might think about the excitation reduction implied by this binding as primarily suppressing the amount of manifest excitation. As the armoring becomes deeper, we might expect a progressive restriction of the amount of latent excitation as well - a deep armoring impairing and blocking not only an adequate discharge of excitation but also its generation. Reich states: "Depending upon the depth of an armoring, the (manifest) rigidity may be combined with varying degrees of inner excitation."

As the prototype of a rigid and chronic armoring Reich refers to the affect-blocked compulsive character. But this is not the only character type showing a pathologic armoring. At one place he distinguishes between the following subtypes: the compulsive, the phallic-narcissistic and the paranoid-aggressive. As regards the interrelationships between these types, he has the following to say:

"(In compulsive characters) the ego takes over anal holding-back tendencies from the repressed layers and utilizes them for the defense against the anal sadistic impulses ... The phallic-narcissistic character differs from the compulsive character in the absence of reaction formations against the openly aggressive and sadistic behavior ... Aggressive be-

havior itself fulfils a defensive function ... The compulsive character ... regresses to the earlier phase of anality and there forms his reaction formations. The phallic character does not regress. He remains at the phallic stage, more than that, he exaggerates its manifestation in order to protect himself against a regression to passivity and anality ... The phallic-narcissistic character comprises most cases of ... paranoia and allied forms of schizophrenia ... In paranoia, the warded off (passive and anal) tendencies fully break through in the form of delusions." (pp. 198 ff.)

The different types mentioned may be classified according to the depth of their armoring. The compulsive and the paranoid-aggressive character are considered examples of a relatively superficial type of armoring. The same is true with respect to the phallic-narcissistic character which is considered even more superficially armored than the two former types. A relatively deep type of armoring is ascribed to melancholic patients, while the most extreme depth of armoring is considered typical of catatonic patients. "In stuporous catatonia, the muscular armoring process involve the whole (ego-) system; the discharge (and generation) of energy becomes more and more restricted."

Reich suggests a number of genetic hypotheses related to the question why different persons show different types of armoring. He also suggests that some armored characters, particularly passive-feminine characters, show a certain layering in their armor, a mixture of a superficial muscular flaccidity and an underlying rigidity. However, a further elaboration of these viewpoints is outside the scope of the present discussion.

The Concept of Non-armored Characters

A non-armored character may be defined as a person being unable to form an armor in spite of his strong wishes to do so. From a characterological point of view we are faced with a person showing a lack of excitation binding mechanisms, and consequently, with a high susceptibility to anxiety. We are confronted with a person showing ego weakness and an energetic fixation at the oral stage of development.

It should be noted that a dearth of excitation binding mechanisms does not imply that all sorts of defensive mechanisms will be lacking. In fact, we may distinguish between a number of possible defense stratagems accompanying an oral fixation. One stratagem goes in the direction of motoric restlessness, apprehension, denial, hysterical coquetry and symptoms; ¹⁾ another stratagem in the direction of overdependency, clinging, and a constant search for attention and praise (narcissistic supplies); another stratagem in the direction of masochistic whining and complaining and provocative behavior leading to castigation and humiliation (superego satisfaction); and still another stratagem going in the direction of social withdrawal and a progressive proclivity to discharge excitation through idiosyncratic and autistic thinking (wish fulfilment). ²⁾

In all of these cases anxiety might emerge for brief or protracted periods of time. We have enumerated the different stratagems according to their hypothetical relative efficiency in warding off tension and anxiety. That is to say, we believe the latter stratagem (providing the reaction basis for chronic schizophrenia) to elevate tension more efficiently than a masochistic stratagem, and

1) By subsuming the hysterical personality under oral fixation we are diverging sharply from Reich (1950). Having pointed out that the hysterical character shows "little tendency to sublimation and intellectual achievement and a much lesser tendency to reaction formation than other character types", that their libidinal excitation is neither discharged in sexual gratification nor becomes extensively bound in a solid armoring but are discharged in somatic interventions or in apprehensiveness, he makes the assumption that this is due to the fact that the hysterical character is stemming from an early genital fixation, and that "fully-developed genital excitations do not lend themselves to anything but direct gratification (i.e., cannot be bound)". Our own theoretical position is in agreement with Proctor (1958), stating: "I should like to emphasize the similarity between hysteria and schizophrenia in the factors of orality and dissociation ... There is considerable similarity in the two diseases ... there is evidence that cases formerly diagnosed as severe hysteria now tend to be called schizophrenia" (p. 403).

2) By pointing out the possibility for excitation to be discharged through internal action (fantasy, daydreaming, etc.), we are in a sense following the train of thought implied in Jung's distinction between extraversion and introversion, although we would like to add that we consider cognition and internal action not as an instance of a centripetal flow of excitation but as a variety of a centrifugal type of excitation flow.

this stratagem to elevate tension more efficiently than a passive-dependent stratagem, and so on. ¹⁾ Consequently, we are expecting the different personality types just mentioned to show significant variations in the amount of active tension. On the other hand, we would expect in most cases to find a rather high level of manifest excitation.

Consentrating on the excitation dimension exclusively, our preceding discussion can be summarized by the following table:

		<u>Manifest Excitation</u>	
		Low	High
<u>Latent</u> <u>Excitation</u>	<u>High</u>	Superficial armoring, e.g. compulsive characters, phallic-narcissistic and pararoid personalities	Ego weakness, e.g. anxiety states, hysterical and oral passive dependent personalities
	<u>Low</u>	Deep armoring, e.g. inert melancholics, catatonics	(Although it is difficult to conceive of a state showing higher manifest than latent excitation, an agitated depression seems to fall rather close to this position.)

1) A number of hypotheses have been launched concerning the importance of constitutional factors, the time, the mode and the patterning of early frustrations and deprivations for determining which defense stratagem will be chosen by the individual person. It is interesting to note that in recent years this latter problem has been dealt with also from the point of view of learning theory. For instance, in discussion the etiology of acute reactive versus process or chronic schizophrenia, Mednick (1964) hypothesizes: "... the process schizophrenia is one ... who has learned the avoidant thought mechanism early in life. This is perhaps due to his having been born into a stressful family situation which would foster avoidance learning in a sensitive child ... The reactive schizophrenic ... is born into a relatively unstressful family situation. Thus, he is not forced to learn the avoidant associative mechanisms; however, having the same predisposing characteristics (large autonomic responsiveness, slow recovery from stress, excessive stimulus generalization), he is prone to an acute breakdown if he suffers from a series of trauma." (p. 4)

A brief look at the table indicates a striking correspondence with the results obtained from our earlier empirical analysis.

Remarks Concerning Psychosomatic Symptoms

A theoretical model launched by Fisher and Cleveland have many features in common with the one described above.

According to Fisher and Cleveland human beings can be differentiated in terms of the extent to which they show a predominance in their body exterior or body interior reactivity during everyday living, during rest as well as during stressful conditions. By body exterior they refer to the skin, the striate muscles and the vascular components of those parts of the body which are in close contact with the environment or constitute elements in an individual's volitional system. By body interior they refer to those parts which are closer to the center of the body and are outside voluntary control, for instance - the heart, the intestines, the viscera, etc.

Fisher and Cleveland suggest that a characteristic predominance in the body exterior-interior reactivity corresponds to differences in psychic dispositions and to differences in socialization experiences. They suggest that a body exterior reactivity dominance is related to "ego-strength" and "to the degree to which the individual has evolved boundaries definite enough to give him a clear-out identity." They conceive of body boundary definiteness as related to self-steering tendencies, to the ability to tolerate stress, to persistence, initiative, and self-expressiveness in everyday living, although they do also suggest that a high definite body boundary without the potential for fluidity may interfere with empathic ability. The many similarities with the model described earlier are most striking. Fisher and Cleveland even introduce the idea of different directions of excitation flow. As regards the developmental perspective they suggest the following hypothesis:

"The reactivity of the body interior will customary tend to be relatively higher than that of the body exterior unless the individual's experiences have led him to assign a certain minimum degree of importance to the outer 'volitional' section of his body. One is postulating that excitation tend to flow

predominantly into body-interior response until the exterior 'volitional' body layers have been stimulated through certain socialization experiences ... Consequently, conditions which do not stimulate the 'volitional layers' would permit the body-interior reaction dominance to persist." (p. 313)

Although one may accept the idea of a developmental change from a body interior to a body exterior reactivity dominance, it is not at all certain that the stimulation of exterior layers is the only way through which socialization experiences influence the developmental process. Certain socialization experiences might very well have the effect of blocking maturational processes, they might even have the effect of producing a regression or a reversal to a body interior predominance exceeding that found in normal infants. In making these suggestions we are strongly influenced by Reich's theoretical position.

In Reich's opinion the resources and growth potentials for mental health are located solely within the individual while all potential impediments are located outside. Fisher and Cleveland take the opposite view locating growth potentials outside, with impediments lurking from the inside. In our own opinion both viewpoints are incomplete by separating the individual-society plexus. By combining the two viewpoints we end up with a more differentiated and probably more valid picture.

In a number of studies Fisher and Cleveland demonstrate in a rather convincing manner that the degree of body boundary definiteness (and indirectly: the body exterior-interior reactivity predominance) seems to be related to the locus of psychosomatic symptom formations. Being confronted with stress a person will tend to develop symptoms in that body layer which habitually shows the highest reactivity. As exterior body symptoms they refer to neurodermatitis, rheumatoid arthritis, tics and muscle spasms, and as interior body symptoms to ulcerative colitis and stomach disturbances (stomach ulcers and chronic stomach pains).

We don't want to go any further in describing the many empirical results presented by Fisher and Cleveland in support of their theoretical viewpoints. In an earlier monograph (1963) we have mentioned several of these studies and also tried to summarize some of their main findings.

Respirologic Consequences of Excitation Flow

It is worth noting that Fisher and Cleveland do not present any ideas or any data related to respiratory conditions. Neither does Reich explicitly link his conception of different directions of excitation flow to the respiratory realm, although it is possible on the basis of his theoretical assumptions to make some inferences in this direction.

According to Reich, a centrepetal flow of excitation will cause a concentration of excitation on bodily interior organs. At one place (1942) he writes:

"Up to now, we have a clear picture of the vegetative periphery. However, the place is not defined where the biological energy becomes concentrated as soon as an anxiety state occurs. There must be a vegetative center, from which ... energy originates and to which it returns." (p. 228).

Reich assumes that the center in question is the large vegetative ganglia located in the abdominal cavity. At other places - prior to his preoccupation with autonomic innervations and plasmatic currents, he emphasizes the importance of tonic tensions of postural and striate muscles. Following this train of thought we would assume a centrepetal flow of excitation to result in a decreased tonicity of peripheral muscles combined with an increased tonicity of the diaphragm muscle. The diaphragm muscle can hardly be classified as a peripheral one. Its location close to the center of the organism is most striking. Furthermore, it is functionally different from most peripheral muscles. In spite of many claims to the contrary, the diaphragm is not within an individual's direct voluntary control (Cf. Wade 1954).¹⁾

1) In a chapter called 'Somatic aspect of ego psychology' Lowen (1958) states: "The largest part of the function of the organism is unconscious. This, too, has a representation in the mind; in fact, the greater portion of the nervous system is concerned with bodily activities of which we are completely unaware. Posture, which one takes for granted, involves the control of mobility to a very high degree. Consciousness can be extended into this realm but only to a small extent. That part of the mind which is in the same relationship to these involuntary processes as the ego is to voluntary activity, Freud called the 'id' ... The analogy which is useful in

Although Reich himself does not equate a centrepetal flow of excitation with diaphragmatic hypertonicity, we find this a most reasonable assumption indicated by his theoretical position. At one place he even states: "In all neurotic individuals, without exception, one can find a tonic contracture of the diaphragm."

We are not the only ones - neither the first ones - to suggest that a close association exists between anxiety and respiratory conditions. The fact that terms like diaphragm ring, respiratory corset, etc. frequently have been used to describe anxiety attacks testifies to this point.

Discussing the relationship between anxiety and respiration, Perls et al. (1951) state:

"Anxiety is the experience of breathing difficulty during any blocked excitement. It is the experience of trying to get more air into lungs immobilized by muscular constriction of the thoracic cage ... Anxiety (from angustia, narrowness) comes with the involuntary constriction of the chest ... it occurs in neurosis as an emergency measure produced by the conflict between strong excitement and fearful self-control."
(p. 128)

Following our earlier train of thought we would agree that anxiety is accompanied by an involuntary constriction of the chest, although we would add that the constriction is not a general one but particularly related to the lower (and internal) diaphragmatic seg-

showing this relationship is the tree. The ego can be compared to the trunk and branches, the id to the roots. The demarcation occurs when the tree emerges from the earth into the light of day. Indian thinking sees the same relationship in the body itself ... The diaphragm is supposed to correspond to the earth's surface, and development beyond this zone is coordinated with the 'rising sun', the state of consciousness that has begun to leave behind the unconscious and all ties with it." (p. 23-24).

It should be emphasized that abdominal respiratory movements are not outside voluntary control. Abdominal breathing can for instance be voluntarily ceased without affecting the diaphragm movements - the abdominal movements being neutralized through vertical upward movements of the chest accompanying the downward movements of the diaphragm. We might also conceive of abdominal movements being present in the case of a partial or total diaphragmatic immobilization. This being said, we would still assume abdominal breathing in most cases (when unsophisticated subjects are involved) to correspond roughly to diaphragmatic movements.

ment of the chest cavity.

What is the functional significance of an immobilization of the diaphragm muscle? Perls et al. suggest that we are confronted with an emergency measure directed toward the blocking or suppression of excitement. According to Reich's train of thought anxiety might more appropriately be looked upon as a maladaptive involuntary emergency response, although from a genetic point of view it might be true that a diaphragmatic immobilization initially does represent an excitement blocking mechanism. Confronted with an excitation exceeding an organism's capacity for discharge - a diaphragmatic immobilization might possibly save the organism from total disorganization. We are here thinking about a situation being so overwhelmingly frustrating and threatening (painful) that the organism has no other possibility than to surrender and to abandon its self-assertive capability, i.e. its capacity for handling the situation through mobilization of voluntary or peripheral muscular layers. By directing the flow of excitation inwardly the situation may to some extent be stabilized, but at a very high cost for the organism's later psychobiological development.

We have assumed a simple repression to manifest itself as a dystonicity of peripheral skeletal muscles, as a configuration of hyper- and hypotonicity. Furthermore, we have assumed an ego armoring to correspond to a connecting and solidifying process (effected by the ego's synthetic capacity) - being reflected in a consistent and generalized pattern of peripheral muscular tonicity.

How does a chronic and automatic peripheral armoring manifest itself in the respiratory realm?

According to Reich, in the formation of an armor many different muscles may be brought into play. We might be confronted with a hypertonicity of all or most peripheral muscles of the face, the neck, the arms, the abdomen, the legs, etc. However, particularly important is considered the "armoring" of the chest. Reich states:

"The chest armoring is expressed in a chronic attitude of inspiration, shallow breathing and immobility of the thorax. The armoring of the chest is particularly important ... because it is a main part of the total armoring of the organism ... The muscles that take part in the armoring of the chest are the intercostal muscles, the large chest muscles (pectoral muscles), the shoulder muscles (deltoid muscles) and

the muscles on and between the shoulder blades. The expression of the chest armoring is essentially that of "self control" and "restraints". The shoulders, which are pulled back, literally express "holding back" ... The armoring of the chest ... is a central part of the muscular armor as an whole." (p. 376 ff.)

So sum up, we are confronted with a model assuming a centrepetal flow of excitation to be associated with a hypertonicity of the diaphragm muscle - producing a high-costal type of respiration; and a chronic anxiety-protecting binding of excitation, to be associated with a hypertonicity (and chronic inspiratory fixation) of thoracic muscles - producing a predominant abdominal type of respiration.

In the next section we will describe briefly some empirical findings which we consider particularly relevant for evaluating the 'soundness' of these theoretical propositions.

Some Relevant Empirical Findings.

We mentioned earlier William's finding that children being confronted with a conflictual situation, a situation inducing opposing sets and attitudes, tend to react with a decrement in their abdominal amplitudes. Halverson (1938) points out that anger and frustrations in infants invariably results in inhibited sucking, in a pronounced abdominal depression, and quite often in a genital erection in boys (probably due to an increased abdominal pressure).

Is the decreased abdominal amplitude to be considered a consequence of a tightening of the abdominal muscles exclusively, or does it also point to a constriction of diaphragmatic excursions? Although we don't know about any studies of children in this area, in several investigations (Faulkner 1941, Wolf 1947) making use of fluroscopic observations on adults it has been shown that the size of diaphragmatic excursions frequently tend to diminish in states of conflict and stress, and that anxiety prone patients seem to be particularly susceptible to react in this way.

Another type of studies is related to the same problem. A couple of studies (Coppen & Mezey 1960; Mezey & Coppen 1961) have demonstrated a specific form of respiratory deficiency in patients

with anxiety as a predominant symptom. Such patients have been found to require significantly more respiratory effort in order to extract a certain amount of oxygen from respired air, that is, the oxygen content of their expired air has been found to be relatively high. Several explanations have been offered. It has been suggested that the abnormally low oxygen extraction is due to circulatory changes interfering with the alveolar absorption of oxygen. It has also been suggested that it is due to a disorder in the respiratory regulation leading to a diminished tidal air. Neither of these explanations have been definitely substantiated. In a study by Mezey and Melville (1960) the low oxygen uptake of anxiety patients was found to be present even when their tidal air was relatively large. We don't pretend to have solved the problem, but we would like to mention that it might be explicable in terms of a partial diaphragmatic immobilization in anxiety patients. Thoracic breathing, as indirectly pointed out by Wade (1954), makes for a relatively inefficient type of breathing, and - as previously pointed out in this monograph - a certain tidal volume is not necessarily associated with a certain 'depth' of breathing.

Discussing the mechanics of anxiety, Braatöy (1954) refers to some observations of Roemheld - published as far back as in 1912:

"His (Roemheld's) clinical observations told him that some of these patients' complaints (heartpains, anxiety, etc.) went parallel with typical breathing difficulties. Their tense, high-costal breathing was induced - or rather, went parallel to - air in the stomach. He demonstrated this with X-ray pictures of the same patient with and without symptoms. On the picture of the patient with symptoms, the left half of the diaphragm is pushed up by a big bubble of air in the stomach. (The same symptom picture may also be called forth by gas in the intestines.) The importance of this aspect Roemheld further demonstrated by relieving the patients of their symptoms with means directed against the air under the diaphragm: medicine and dietetics, but especially respiratory gymnastics." (p. 208).

The quotation just presented doesn't imply that Braatöy supposes air in the stomach to represent the main causal factor behind anxiety states. - The important point is that air in the stomach might impose a somewhat similar restriction on diaphragmatic excursions as a hypertonic state of the diaphragm muscle itself.

Haavardsholm's (1946) investigation comparing a number of subjects in terms of their EMG potentials from above the Xiphoid process, presents some additional data regarding the significance of unrestrained diaphragmatic breathing. His empirical findings suggest that the more mentally ill a person is, the higher is the EMG's obtained during expiration, the less is the difference between the EMG's obtained during inspiration and expiration, and the higher is the respiratory rate. He also notes that the size of inspiratory circumference changes in schizophrenics seems to be smaller than in normals with approximately similar inspiratory EMG's.

Waal (1939) making use of fluroscopic observations, reports that schizophrenic patients frequently show remarkably small diaphragmatic excursions, and that significantly increased diaphragmatic excursions following convulsive shock therapy is positively related to clinical improvement.

In our review of that we consider particularly relevant studies - we would also like to mention a clinical 'rule of thumb' described by Perls et al.: A temporary relief from anxiety can often be obtained if the anxious subject can be persuaded to tighten the experienced narrowness of his chest even further instead of resisting it.

A possible explanation of the relief obtained in this instance is that the tightening of the chest indirectly forces the subject into a more diaphragmatic type of breathing. As long as the person is struggling to overcome the feeling of getting too little air into the lungs (the feeling of anxiety) through an increased voluntary activity of the thoracic muscles, the diaphragmatic spasm is left unaffected and may even increase in size or strength. The trouble is of course, that most anxiety patients are unable to understand such an instruction or to put it into effect. In the case they do follow through, we have an excellent example of a rather important point, namely that we are confronted with all sorts of intermediary positions between a thoracic and a diaphragmatic immobilization, and that the former type of immobilization may cover up or compensate for a disposition in the latter direction. Conversely, an abrogation of a thoracic fixation may produce a respiratory (and

psychic) decompensation. 1)

We mentioned earlier that an armoring, according to Reich, may include a tensening of different parts of the body, but that the chest represents "a central part of the muscular armor as a whole." A chest armoring, we learned, is expressed in an immobility of the thorax and in a chronic attitude of inspiration. Following this proposition we would expect a negative correlation generally to exist between the mean thoracic amplitude and the thoracic expiratory position, i.e. the total absolute circumference of the thorax during the expiratory phase.

We have gone back to our empirical material and examined this hypothesis. We found the relationship to turn out as predicted. That is, we found a negative correlation to be present between thoracic amplitude and thoracic circumference ($\underline{r} = -.35$, $\underline{p} < .05$), while no significant correlation was found between the abdominal amplitude and the abdominal expiratory position ($\underline{r} = -.04$). We would like to add that we found the thoracic and the abdominal mean amplitudes to be non-significantly related ($\underline{r} = .16$), a finding emphasizing the importance of specifying from where respiratory measures are obtained in making individual comparisons, while the thoracic and abdominal total circumference as expected, was found to be highly correlated ($\underline{r} = .81$, $\underline{p} < .001$).

The lack of correlation found between the abdominal amplitude and the abdominal expiratory position might indicate that a partial diaphragmatic immobilization in some instances may coincide with an armoring and depression of the abdominal wall, and in other instances, with an abdominal protrusion and flaccidity. In making this statement we are partly influenced by one of Clausen's (1951) empirical

1) Shatan (1963) remarks: "... breathing is habitually restricted in those who are constantly 'en garde'. Inhibited breathing is accompanied by restricted awareness of anxiety. When stubborn, deep-rooted tensions are abandoned and the habitual en garde attitude collapses, there is often a dramatic outburst of emotion. The immediate sensation may be an unpleasant, formless anxiety akin to the 'uncanny emotion' described by Sullivan as undifferentiated, all-encompassing, poorly distinguished, and extremely disquieting." (p. 22). It should be noted that a formless anxiety may not be referred to by the subject as an anxiety experience at all, but as a feeling of diffus hopelessness or helplessness or as something unpleasant which cannot be distinctly conceptualized. In our opinion this effect is the more likely the more insidious and the deeper the decompensation in question.

results. According to him, the respiratory feature discriminating the most between emotionally disturbed patients and normals is the considerably sharper transition of the abdominal peaks found in the former group. Clausen correctly points out that the feature in question might be caused by "a shorter period for maximal contraction of the diaphragm" (an inability to keep the diaphragm contracted long enough to make the transition from inspiration to expiration a gradual one), but also by "the conditions of the muscles in the abdominal wall" (an inability to relax these muscles as a response to the increased pressure in the abdominal cavity caused by the contraction of the diaphragm). And he concludes: "Whether the disturbance would be primarily in the diaphragm or in the abdominal musculature we have no way of telling from this study" (p. 62).

Of course, a third possibility is that the disturbance in question may be caused by the diaphragm in some cases, by the abdominal muscles in some cases, and by a combination of both factors in still other cases. Personally, we are favoring this latter interpretation. It fits into some of our earlier considerations, and it does also fit in with the fact that Clausen apparently found the feature in question to be present in patients showing different symptomatology and different breathing patterns in terms of the thoracic amplitude quotient. Generally speaking, we would expect a sharp abdominal transition and a small abdominal amplitude to be associated with a more extreme state of psychopathology, the more an individual shows signs of an abdominal hypotonicity as compared to an active abdominal depression or retraction (suggesting a trend toward a compensatory armoring).

* * *

Perhaps the most important testing ground for evaluating the theoretical model described earlier, is the model's developmental aspects. How much do we know at present about the respiratory patterns of infants and children?

We have already mentioned a few studies making use of children as subjects.

Several scholars have pointed out that the respiratory pattern of infants is different from that of children, and that the

respiratory pattern of children is different from that of adults.

Striking features in the respiration of infants are the high frequency, the marked changes in amplitude and expiratory position, the high susceptibility to internal and external influences - indicating rather immature or incomplete stabilizing mechanisms. Particularly noteworthy is the fact that an infants' respiratory pattern during periods of high excitation may "break down" and become completely disorganized - showing abrupt stops, rapid and irregular shifts, etc.

The predominant, one may even say - the unique respiratory muscle in infants, is the diaphragm. One of the main reasons for its unique position is the weakness of the bones and of the muscles of the thorax. As a result of intestinal pressure against the lungs, breathing is relatively shallow and an adequate ventilation can be provided only through a high respiratory rate. The breathing rate at birth is usually between 40 and 80; at one year it has normally dropped to between 25 and 40, as compared to rate of 12 to 15 under resting conditions in normal adults.

As the infant grows older, his thoracic muscles becomes gradually stronger and the movements of his chest gradually larger. The development in this latter area is associated with the child's motoric maturation generally. When the child assumes an erect posture, the consequent sinking of the abdominal organs and anterior thoracic wall and the increasing downward slope of the ribs, are all conducive to deeper breathing. In the second or third year do we find the first signs of a voluntary control of breathing. This is a slow and gradual process, closely related to the strengthening of the thoracic muscles. Not until the age of ten does the child's breathing movements assume the characteristics of adults.

We don't know about any systematic study being directed at the problem whether it is possible to specify a certain age level at which the child starts to immobilize his thoracic musculature when confronted with intense frustrations. As noted, we have good reasons to believe this reaction pattern to be inaccessible to infants. However, we do find spontaneous and sporadic responses of this type already in infancy. According to Halverson's (1941) observation it is not uncommon for infants during strong excitement (during fretting and crying) to inflate and stiffen their thorax for brief or protract-

ted periods of time - the response resulting in a pronounced bimodal distribution of thoracic amplitudes during such states, but - as also pointed out by the same observer - the respiratory responses of infants are rather unstabilized and may easily change and even "break down".

It is possible that recurrent respiratory 'break downs' in infants may have lasting effects. In fact, a number of recent studies do indicate quite convincingly that screaming in infancy does not provide the advantageous training function it was previously supposed to have, but still, there is quite a gap between these studies and the type of data required to test our theoretical model.¹⁾

* * *

As the model stands today, it is difficult to have any definite opinion about its ultimate validity. It does, however, provide a number of fascinating hypotheses about dynamic, structural and genetic issues. We don't want to underrate that it is presenting a nice explanatory framework for quite a few of our own empirical results. For instance, by drawing into focus the relationships between a high rate of breathing and limited diaphragmatic excursions due to intestinal pressure against the lungs in infancy, it indirectly suggest a parallel explanation (in terms of diaphragmatic immobilization) of the somewhat peculiar findings in our own study - - that the mean period shows a non-significant negative correlation ($\underline{r} = -.14$) with the size of the thoracic amplitude, but a high positive significant correlation ($\underline{r} = .65$, $\underline{p} < .001$) with the size of the abdominal amplitude.

1) It has been noted that respiration during early infancy is effected by environmental factors. For instance, Salk (1960) writes: "The data obtained ... indicates that a normal heartbeat sound presented constantly (through a loadspeaker in the nursery) during the first few days of life results in ... a significant decrease in crying, greater regularity and depth of breathing, less restlessness, and a tendency for less respiratory and gastrointestinal upset" (p. 174). Salk indirectly suggests that respiration during early infancy may have a profound effect on the degree of autonomic system stability or lability. (Cf. the importance ascribed this factor by Mednick - see footnote on page 79).

The model does also present an explanatory framework for Leighton's (1963) finding that women show more psychopathology in general, more anxiety symptoms, and a higher proclivity to gastrointestinal and cardiovascular (interior) symptoms - as compared to a higher tendency for men to show musculoskeletal and alloplastic symptoms. This is explicable from the finding of several studies indicating women generally to show faster and more thoracic breathing than men. We don't want to rule out that anatomical factors may play a certain role in this context, although we would like to recall that sex-differences seem to be present in crucial socialization areas (Cf. footnote page 29).

Summary and Conclusion

One of the problems raised in the beginning of this chapter was how to explain the relationship hypothesized between under- and over-control at the one hand, and a high and a low thoracic amplitude quotient at the other.

In the preceding sections we have presented a theoretical model relating the ego control dimension to the tensional state of skeletal muscles. We have suggested that a crucial factor in over-control is an excitation flow being chronically bound thorough hypertonicity of peripheral muscles - particularly the thoracic ones; and that a crucial factor in undercontrol is a susceptibility for excitation flow toward the center of the organism - being manifested as an increased tonicity of the diaphragm muscle. Consequently, we have suggested a model linking overcontrol to thoracic immobilization - producing a low amplitude quotient, and undercontrol to diaphragmatic immobilization - being reflected in a high amplitude quotient.

One of the main features of the theoretical model presented is the conception of a preferential proclivity to different directions of excitation flow resulting from early childhood experiences. Other important features are the distinctions being drawn between excitation discharge, excitation binding, and excitation accumulation, and between different types of excitation dis-

charge, binding and accumulation. By linking the concept of excitation to skeletal muscle tonicity the model provides leads regarding new operational definitions of tension and excitation, but it does also illuminate the question about how respiratory variables may reflect psychological states and predispositions. By linking the concept of excitation binding to childhood experiences the model introduces a genetic in addition to its structural and dynamic perspectives on various respiratory patterns.

Although we feel it is far too early to state any definite opinion regarding the model's ultimate validity, it does explain and link together previously 'unrelated' phenomena. In evaluating a theoretical model, its ability to put into order observations already procured and to point out problems for further studies have to be specifically evaluated. In our opinion, the present model does fare quite well in both these respects.

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