Studies of the Upper-Extremity Amputee

VII. Psychological Factors

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the possible exception of the introductory Section I (ARTIFICIAL LIMBS, Spring 1958; Vol. 5, No. 1), the foregoing presentations in this series have in general been concerned with the biomechanical aspects of the man-machine entity in prosthetic restoration. If, however, our understanding of amputee needs and limitations is to be comprehensive, we must inquire also into the mental and emotional characteristics of the man served by the machine. Consideration of the psychological factors in amputee rehabilitation was therefore an important aspect of the Upper-Extremity Field Studies, and the results of these investigations are summarized in this three-part article. The first part, *Personality Dynamics of Amputees,* discusses a number of the psychological variables that are relevant to amputation. The second deals with *Social and Functional Factors in Prosthetic Wear.* And the final one, *Attitudes Toward Prosthetic Wear, Before and After Fitting,* describes the attitudes shown toward arm prostheses by amputees who had never before worn an artificial arm. The rationale of the study, and the data-collecting instruments here referred to as "appendices," are all to be found in Section I (ARTIFICIAL LIMBS, Spring 1958; Vol. 5, No. 1; pp. 46 through 56).

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PERSONALITY DYNAMICS OF AMPUTEES

At present no single theory, or combination of theories, encompasses all the central problems arising in man from the loss of a limb. One reason for this circumstance is that the special problems and needs of the amputee have never been defined adequately. What does an amputation mean to the amputee? What does it mean to his family, friends, and co-workers? What reaction does the amputee have to his loss? How is he affected socially, vocationally, emotionally? Does his amputation cause basic psychological changes? What major needs are frustrated? What new needs arise? Does prosthetic restoration affect personality restoration? These are but some of the questions that seem pertinent and to which answers were sought during the NYU Upper-Extremity Field Studies.

A probing of specific amputee problems was considered to be the most fruitful approach, and accordingly a set of questions was designed to elicit information about areas in which the amputee might be expected to have significant problems. By means of a 57-item, multiple-choice questionnaire (Appendix HIE), supplemented by a 9-item instrument calling for narrative answers (Appendix IIIF), nine personality variables (acceptance of loss, identification with the disabled, functional ade-

quacy, independence, sensitivity, appraisal of acceptance by others, sociability, frustration, and optimism) were identified and defined. Of 359 adult male amputees who responded in this phase of the investigation, all but 55 were currently wearing prostheses or had worn one in the past.

Each of the nine personality variables has many ramifications, and it was possible to investigate a limited number only. Moreover, a preliminary analysis indicated that the data did not differ significantly for different levels of amputation, and accordingly the responses of the three groups (below-elbow, above-elbow, and shoulder-disarticulation) were combined. The results therefore represent only an early exploration of the field with two principal purposes—first, to stimulate further inquiry, and, second, to build a more general awareness of the psychological aspects of treating and dealing with amputees. While the central concept of each variable is discussed here, emphasis has been placed on principles of theoretical and practical interest to those concerned with the management of amputees. Whenever possible, the interrelationships between a particular concept and other variables are examined, and an effort is made to bring out implications for research and practice. Vocational attitudes provided an additional area of interest, as did also the shifts in the valuation of prosthetic service.

The data presented are chiefly those gathered after the period of treatment and fitting. Although the treatment procedure produced few measurable changes of any consequence, where such changes were observed they are also discussed.

ACCEPTANCE OF LOSS

"Acceptance of loss" refers to the amputee's ability to accept the physical limitations that result from his injury, to avoid depreciating or pitying himself, and to recognize the social implications of his loss without exaggerating or denying them. This matter was explored by means of questions relating to the amputee's adaptation to his loss, his wishful thinking about the lost limb, and his reaction to the artificial one.

When the treatment period was over, most of the subjects claimed to be adapted to their loss:

TO WHAT EXTENT DO YOU FEEL THAT YOU HAVE BECOME ADAPTED TO THE LOSS OF YOUR LIMB?

Completely	42%
Almost completely	32
Considerably	16
Somewhat	5
Slightly	5

Before the treatment period, only 35 percent of the amputees said that they felt completely adapted to their loss. The increase to 42 percent after completion of the treatment program would seem to indicate that the fitting of the artificial limb had a strong positive effect upon the adaptation of at least a small number of amputees.

Although 90 percent of the amputees claimed either complete, almost complete, or considerable adaptation to their respective losses, it is doubtful that so many had really achieved it. While some may truly have accepted their physical loss and its implications, there were surely many who were trying to maintain feelings of bodily integrity and adequacy by denying the personal and social concomitants of amputation. Clearly, they preferred to de-emphasize regret and any hint of abnormality and difference. In keeping with this feeling, 86 percent of the amputees said that they rarely, very rarely, or never felt sorry about their loss:

DO YOU FEEL SORRY THAT YOU'RE AN AMPUTEE?

Most of the time	1%
Sometimes	13
Rarely	12
Very rarely	33
Never	41

But it should be noted that many amputees *do* admit that they have fantasies about the matter:

DO YOU FIND YOURSELF WISHING YOU WERE A TWO-HANDED PERSON?

Much of the time	8%
Sometimes	45
Rarely	9
Very rarely	28
Never	10

A second question also explored this phenomenon:

DO YOU EVER THINK OF HOW MUCH BETTER OFF YOU WOULD BE IF YOU HAD NOT LOST AN ARM?

Frequently	6%
Sometimes	32
Rarely	16
Very rarely	32
Never	14

Thus it appears that, although most amputees try to avoid thinking about themselves as amputees, regrets over their loss *do* come out in fantasy. Other indications of this subconscious process can be seen in the contradictory data resulting from different avenues of questioning. About half of the amputees indicated that they frequently tried to perform with their prostheses tasks which they knew would be difficult, and approximately the same number said that what bothered them most was "the inability to perform as I used to." Both of these reactions, which persisted throughout the entire period of participation in the program, seem to represent the amputee's attempt to retain his status as an active, competent, and self-sufficient person. But an amputee who frequently tries to use his artificial arm for a task that he knows will be difficult must have an unrealistic attitude toward his physical limitation. He is evidently demonstrating an unwillingness to accept the full implications of his loss.

Among the many considerations involved in the loss of an arm, the most obvious is the inability to perform at one's previous level. Others are the loss of normal appearance and the thought of not being like other people. Although 57 percent of the amputees said that performance was their most bothersome problem, while only 15 percent mentioned the other two considerations, it is difficult to accept such a response at face value. It is likely that the loss of normal appearance and the thought of not being like other people bother amputees far more than they are willing to admit.

Two factors lead us to this belief. First, we are convinced that people (and men in particular) hesitate to admit that they are concerned over their appearance or over the thought of not being like other people. An amputee probably finds it much more acceptable, both personally and socially, to seize upon the very real functional and vocational problems caused by his amputation and to use them as the "real" causes of his distress. Secondly, an amputee who admits to being bothered by his inability to perform is really also saying that he is concerned about being different from others, since performance difficulties as well as altered appearance make one "different."

Amputation has also other, less obvious aspects that are even more difficult for the amputee to accept. These involve the subconscious effects of the loss, such as the thwarting of life goals, threats to masculinity-femininity identifications, and the arousal of latent fears of castration. Although the reality and importance of these problems have repeatedly been demonstrated clinically, controlled investigation designed to explore them is exceptionally difficult and has not yet been undertaken. Hence most of the subconscious effects of amputation cannot yet be evaluated systematically, even though it seems clear that they exert a great influence upon the amputee's acceptance or nonacceptance of his loss.

In general, it may be concluded that an amputee's acceptance of loss depends upon many factors, the most important usually being beyond his own control. His ability to accept depends upon his conscious and subconscious interpretation of his status. If he feels that his amputation has relegated him to an inferior social and vocational status, that he can no longer achieve his principal goals, that he is inferior, and that he has been reduced in functional and sexual potency, he will naturally attempt to reject the implications of his loss. If he looks upon his amputation as a means of escaping from the competition of everyday life, he may accept his loss. If it justifies catering to his need to feel dependent, he may even derive satisfaction from it. But when the amputee is able to look upon his experience as primarily a major frustration that must be overcome—and that *can* be overcome by his own efforts, in cooperation with family, friends, and rehabilitation person-

nel—then the stage is set for a real acceptance of loss.

Although it seems clear that when first seen many of the participating amputees had not achieved full acceptance of their loss, experience shows that, after the early postamputation period of readjustment, and after satisfactory prosthetic fitting, most amputees *do* accept their loss to a significant degree.

IDENTIFICATION WITH THE DISABLED

"Identification with the disabled" refers to the degree to which the amputee considers his abilities, general appearance, and personality similar to those of other persons physically impaired. To a great extent this factor serves as the basis for his interaction with others.

The basic question exploring this matter was:

I THINK OF MYSELF AS A:	
physically abnormal person.	1%
normal person except for a major physical defect.	18
normal person except for a slight physical defect.	29
normal person except for a very slight physical defect.	24
completely normal person.	28

Obviously the subjects tended to describe themselves as normal persons and to deemphasize their physical defects. Of particular interest are the 28 percent who described themselves as completely normal, not even conceding a "very slight" defect.

Few of the subjects admit that amputation is of considerable consequence:

DO YOU THINK BEING AN AMPUTEE MAKES:	
a considerable difference?	7%
some difference?	31
a slight difference?	19
a very slight difference?	26
no difference at all?	17

In keeping with their expressed tendency to place the fact of amputation in the background, and to consider themselves physically normal persons, most claimed that they often forgot about their amputations:

I FORGET THAT I AM AN AMPUTEE:	
never.	7%
rarely.	4
sometimes.	21
most of the time.	61
all of the time.	7

Still tending to play down any differences, 67 percent of the subjects said that they thought amputees had about the same number of personal problems as did nonamputees. At the start of the treatment program, only 57 percent of the amputees felt that way. But even then a sizable minority (30 percent) believed that amputees did have more personal problems than nonamputees. In any case, it is noteworthy that, in an area where one might reasonably expect some expression of difference, so large a percentage of the subjects denied any difference at all. A strong tendency to reject any hint of abnormality or "difference" appears throughout the study.

In setting goals and evaluating achievements, most of the amputees would like to be considered as nondisabled persons:

IN DECIDING WHAT YOU SHOULD BE PHYSICALLY ABLE TO DO, DO YOU COMPARE YOURSELF WITH:	
very active nonamputees?	16%
active nonamputees?	53
inactive nonamputees?	2
active amputees?	28
inactive amputees?	1

Over two thirds seem to feel that their physical abilities should be comparable to those of active or very active nonamputees. In short, amputees want to be considered normal and would like to discount their physical defects. Since most arm amputees can function in society without serious disadvantage, they would seem to have a sound basis for deemphasizing their handicaps.

There is, of course, a stigma attached to those who are "different," and this circumstance also gives the amputee a strong reason for rejecting identification with the disabled. Thus he tends to maintain that being an amputee does not really "make a difference," although what is certainly implied is that he feels it *should not* make a difference. It is difficult to believe that so many can forget a

fact of such consequence as amputation. But obviously they would *like* to forget it, and many *do* forget it, at least intermittently. For them to repress the amputation completely would be to deny the loss rather than to accept it, and this would be an equally unrealistic type of adjustment. From clinical observation, we have the impression that few amputees wear their loss as a badge, but the fact of amputation does seem to underlie a good part of their behavior. Whether this results in a neurotic fixation or is viewed as one more of life's frustrations to be overcome depends upon the individual.

The fact that 30 percent of the amputees seem to feel that they have more personal problems than do nonamputees should not be taken as showing that amputees are more poorly adjusted than nonamputees. Other studies on physical handicap and amputation have indicated that, although particular problems of adjustment differ, there is generally no marked difference in adjustment between those who are handicapped and those who are not (7).

An amputee has mixed conscious and subconscious identifications both with disabled and with nondisabled groups. Whichever group he primarily identifies with provides the basis for his concept of himself, the goals he sets, the aspirations he has, and the way he interacts with others. The amputees in the NYU Field Studies overwhelmingly elected a nonamputee, nondisabled frame of reference. In such a course lie dangers for them—dangers of self-deception, of denial and distortion of reality. Yet advantages follow too. Identifying with the nondisabled provides stimulation and drive to actualize the potential that each amputee has. It helps to combat defeatist attitudes and withdrawal into lethargy and invalidism. The amputee who is able to recognize and accept his identifications with both the disabled and the nondisabled groups maintains the soundest approach to personal adjustment.

FUNCTIONAL ADEQUACY

"Functional adequacy" refers to the amputee's estimate of his level of competence in performing physical activities. Questions were asked exploring the amputee's evaluation of his physical abilities. As has already been seen, over two thirds of the amputees seemed to feel that their physical abilities should be comparable to those of active or very active nonamputees. How well did they think that they met this exacting standard? Generally speaking, they said that they were able to achieve their high goals:

AS COMPARED TO NONAMPUTEES, I AM GENERALLY ABLE TO DO:

much less.	2%
somewhat less.	35
as much.	49
somewhat more.	14
much more.	0

Only about one third conceded that they could not do as much as nonamputees. Furthermore, 68 percent of the amputees said that "very little effort" or "a little extra effort" was required to keep up with nonamputees. Ten percent even claimed that *no* extra effort was required. But 21 percent did admit that "a lot of extra effort" was necessary to keep up with others.

In response to other questions, 92 percent said that they believed their work to be as good as or better than that of their nonamputee co-workers, and 66 percent said they felt they could be employed in jobs requiring "almost as much use of the prosthesis as of the normal hand."

Comparing their present abilities with those had before amputation, 83 percent said they found doing things only "slightly more difficult now." Speaking of the things they could do before their loss, 96 percent said that they could still do "many," "almost all," or "all" of them. Only 8 percent said that being an amputee restricted their capacities "considerably." But 97 percent believed that they could do as much as, or more than, most other amputees.

Here again the optimistic responses show some increase after the treatment period, and there are still other indications that the amputee's feelings of competence are related to the use of the new type of prosthesis. After treatment, 81 percent of the amputees said that they were "very much" or "com-

pletely" satisfied with their prostheses, whereas at the beginning of the treatment program only 58 percent said so. Improved prosthetic equipment and better management procedures seem largely responsible for the favorable results.

Generally speaking, we may describe the picture as follows. The amputee sets high limits to his physical accomplishments, most often aiming to equal the nonamputee. He will sometimes concede that he can do less than a nonamputee, but more often than not he will claim that he can do as much or more. While he almost never admits to a substantial inferiority, he will acknowledge that it takes a little extra effort to keep up with nonamputees. He feels competent to handle the daily routine of living, and he expresses no deprivation associated with his functional limitations. Finally, his estimate of his own abilities increased as a result of participation in the research program.

Taken at face value, this self-picture by the amputee seems a blissful one. But experience indicates that, while some amputees do approach the ideal state, the average patient is far more concerned about his functional adequacy than the responses show. Some of the amputee's description of his high level of competence must certainly be the result of wishful thinking. Concerned with maintaining his self-esteem and confidence, he surely must often distort reality so as to diminish the gap between what he imagines he can do and what he actually can do. And his feelings of great competence may also reflect certain changes in his habits since his amputation—changes that have brought his activities more into line with his new physical abilities.

Complete analysis of functional adequacy requires both objective and subjective estimates of competence and a study of the effect that the difference between the two has upon the amputee's adjustment. In the absence of such an investigation, the data presented are best considered as the responses of people who are concerned with maintaining their self-esteem, their feelings of confidence, and their sense of adequacy. The responses show what the amputee subconsciously desires in the way of treatment from nonamputees. In effect, what we have here is the collective mask that amputees present to the public—and often to themselves. The extent to which we can accept this mask, or how we need to modify it, is a clinical problem that can be resolved only when the amputee's real and fancied achievements are considered in the light of his basic needs.

INDEPENDENCE

"Independence" refers to the extent to which the amputee can make a reasonable effort to be self-sufficient while still feeling free to call for assistance or to use help that is offered. It has been seen that the amputees in this study tend to characterize themselves as self-sufficient. When the amputee knows himself to be capable of handling a situation, he usually declines offers of help:

WHEN I KNOW THAT I AM CAPABLE OF HANDLING A TASK, I:	
never accept help.	28%
very rarely accept help.	34
rarely accept help.	12
sometimes accept help.	22
frequently accept help.	4

In keeping with this desire for self-sufficiency, almost three quarters of the amputees said that they rarely or very rarely solicit help:

HOW OFTEN DO YOU CALL FOR HELP FROM OTHERS?	
Never	5%
Very rarely	57
Rarely	14
Occasionally	23
Frequently	1

Two facts are of particular interest here. First, the course of treatment provided by the program increased from 49 percent to 57 percent the proportion of those who claimed they very rarely called for help. Secondly, none of the most physically disabled patients (bilateral and shoulder-disarticulation cases) reported frequent calls for help. In answer to other questions, only 1 percent of the amputees said that they refuse help under any circumstances. More than half said that they accept help only when it means the difference between

success or failure. About one quarter said they accept help if it makes the task easier. And 14 percent said they accept help even if it does not make the task easier.

It is clear that the amputee is vitally concerned about his sense of independence. He tends to depict himself as a self-sufficient individual who rejects offers of help whenever he can and who asks for help only occasionally. Despite the stress he places on self-sufficiency, however, the amputee almost always accepts the fact that complete independence is impossible. But he will be practically certain to reject any suggestion of serious dependence.

Why does the amputee value his independence so highly? The answer seems to lie with our society, which places a high premium on personal competence and achievement. The dependent person often finds himself assigned an inferior status in his group. The amputee, constantly faced with this prospect, feels a strong need to prove that he is self-sufficient and that he does not differ from other people. In any case, a handicapped, dependent person is seriously restricted in his ability to reach simple goals that are easily achieved by others *(6).*

Before the amputee can judge the extent of his handicap, he must go through an extensive trial-and-error period, particularly in the early stages of his loss. Depending on how realistically he views his limitations, dependency will or will not become a critical problem. At this point, three kinds of reactions are possible: he may appraise realistically his functional capacities and limitations; he may partly deny his limitations, at the same time often attempting to compensate for them; he may deny his limitations completely.[3] Underlying all three of these reactions is the basic need of all persons to maintain feelings of self-sufficiency—if necessary, by distorting reality. Thus an amputee may distort the extent of his dependence on others and exaggerate his abilities to fulfill society's demands for independence. Conversely, some amputees may distort reality in the other direction, emphasizing their loss in order to help them think of themselves as dependent, affection-seeking persons. In general, however, the amputee's ability to make a realistic appraisal of his capacities, to recognize a certain amount of dependency where it is inevitable, and to ask for help when necessary will depend above all on his feelings of basic security. The amputee who is insecure will be more likely to seek help indiscriminately or to reject it unreasonably *(4,5).*

To avoid overdrawing the negative effects of reality distortion, a distinction must be made between extreme distortion of reality and its temperate shaping. We tend to admit into our perceptions things in line with positive self-feelings and to eliminate or modify those which might cause anxiety. This is a form of adaptive, nonpathological distortion involving control of situations so that, when reality must be faced, it may be done despite the temporary pain associated with the process. Some avoidance of harsh reality is sometimes necessary in order to preserve equanimity in the face of many daily frustrations. In some cases, however, the amputee displays an extreme form of dependence that has been called "invalidism" *(2).* When this happens, the amputee exploits those about him by harping on his incapacities more than his injury warrants. He uses his handicap to avoid responsibilities. While it is true that anyone might be tempted to plead illness to avoid an unpleasant experience, in invalidism the individual employs his loss as a constant way out. Invalidism can also be an attention-getting device as well as an attempt to obtain love that the amputee is not sure of having otherwise. It is used to threaten and control other persons and sometimes provides the disabled person with the means of taking revenge upon others by limiting their freedom of action and making them anxious and guilty.

Whatever the reaction, the family plays an important role in the amputee's attempts to achieve self-sufficiency and yet to fulfill his

[3] The third reaction represents an extremely poor adjustment, for it leads to withdrawal from any situation that might point out the true extent of dependency. Typically, such amputees are characterized by sharply restricted behavior and a limited involvement in life.

needs for dependency. The attitude of the family is often thought to be at least as important as the physical injury itself in determining the amputee's reaction to his disability *(1).* The amputee's attitude toward his family is a combination of a drive for independence and a plea for aid, explicit or implicit. In the ideal family relationship, both needs will be satisfied. But the stress should be upon helping the amputee to take his place in society as a self-respecting, adequate person.

SENSITIVITY

"Sensitivity" refers to the amputee's subjective appraisal of the effect of his physical condition on others and to the feelings of self-consciousness he experiences as a result of this appraisal. Sensitivity about disability may therefore be related to two sources: perception of the negative appraisals of others, and the individual's own self-rejection. These two factors are of course not entirely independent, since an amputee's notions of what others think of him may largely determine what he thinks of himself.

The majority of the amputees in the study readily admitted concern about the opinion of others, but it is noteworthy that almost a fourth of the group refused to admit anything more than a "little" sensitivity:

HOW MUCH DO YOU CARE ABOUT WHAT OTHERS THINK OF YOU?

Considerably	53%
Somewhat	23
Little	8
Very little	9
Not at all	7

The clinical treatment program had the effect of reducing the self-consciousness admitted. Amputees who said that they never, rarely, or only sometimes felt self-conscious about their personal appearance went from 59 percent before treatment to 72 percent afterward. But 28 percent still said they felt self-conscious most of the time or almost always.

Twenty-one percent of the amputees said that they felt they looked "the same as most people," and 62 percent answered "almost the same as most people." In keeping with this attitude, most of the amputees claimed that they did not feel themselves to be conspicuous. But a significant 22 percent confessed that the idea occurred to them with some frequency:

THE IDEA THAT PEOPLE ARE LOOKING AT ME:

is almost always on my mind.	2%
sometimes occurs to me.	20
rarely occurs to me.	17
very rarely occurs to me.	38
never occurs to me.	23

The majority of the amputees said that they expected other people to discuss the disability. Only a few believed this occurred frequently, and even fewer denied its existence:

DO YOU THINK THAT PEOPLE TALK ABOUT YOUR DISABILITY?

Never	3%
Rarely	30
Occasionally	57
Frequently	9
Always	1

Most amputees (67 percent) denied that they felt any resentment over the curiosity of other people. The rest maintained a ratio of three positive reactions *(e.g.,* pride in demonstrating the prosthesis, appreciation of interest) for every negative reaction *(e.g.,* self-consciousness, resentment, nervousness). In all, reactions of annoyance caused by people's curiosity decreased significantly by the end of the treatment period.

Although 99 percent of the amputees said that they seldom or never tried to hide the fact of their amputation, the overwhelming majority said they would not tell a new acquaintance about it unless asked.

The question of whether to fit a hook or a hand is often decided on the basis of the amputee's sensitivity. Those particularly sensitive about their amputation might be expected to reject a hook because of its appearance. The majority of the amputees in this study (61 percent) said that they believed hooks to be mechanical-looking but not unsightly, while a significant additional number (25 percent) expressed a more negative attitude concerning their appearance. But only

1 percent said they would not use one under any condition:

I THINK THAT A HOOK IS:	
so ugly I would never wear one.	*1%*
50 ugly I would never wear one when I'm with other people.	2
unsightly but not enough to prevent me from wearing one.	23
mechanical looking but not unsightly.	61
as natural looking as any artificial hand.	13

The composite data indicate that, although the amputees showed considerable awareness of their appearance, they did not brood about it. When asked directly, they were much more likely to deny being sensitive than to admit being preoccupied with their condition. They were well aware that amputations and prostheses arouse curiosity, but they maintained that they (the amputees) were "normal" and so did not feel resentful toward these attentions. Amputees who do acknowledge self-consciousness are most likely to do so in situations where there is no social pressure against displaying sensitivity.

On the basis of other evidence, there seems to be considerably more indication of sensitivity and of hostility toward the curious person than is revealed by the questionnaire. This is to be expected, for clinical situations induce greater rapport and permit the amputee to express hostile feelings with less fear of social criticism. Thus, it is quite likely that the amputee's sensitivity is much greater than he is willing to admit.

The universal unwillingness of amputees to admit that they differ from others rests in part on the fact that in many respects they are indeed no different from other people. But it also may represent a "whistling-in-the-dark" attitude, an attempt to deny something that the amputee really believes to be true *(e.g.,* that he *is* handicapped or inferior), and may reflect the amputee's resistance against the social consequences of being "different."

As has already been mentioned, amputees are likely to incorporate the negative attitudes of others into their own self-concept. Most amputees recognize that nonamputees are more comfortable when the fact of amputation is not conspicuous, and they will attempt by various means to "spare the feelings" of others by trying to reduce the visual "shock" for the nonamputee. Many of the subjects are not, however, merely responding appropriately to social cues but rather are using this explanation as a rationalization for their own self-rejecting thoughts. The same self-rejection may be responsible for the denial of sensitivity, which the questionnaire data show to be characteristic of a sizable minority of the sample.

APPRAISAL Of ACCEPTANCE BY OTHERS

'Appraisal of acceptance by others" refers to the amputee's evaluation of the effect his disability has on the approval others may give him. Less than 5 percent of the amputees said that they felt they were being treated any way different from that in which they had been treated before amputation. Almost all of the subjects claimed that their amputation had had little or no effect upon their acceptance by others. They rejected overwhelmingly the suggestion that their amputation merited them either special treatment or discrimination in their job, family, or social relationships. Most of them said they did not feel that people paid them undue attention. In general, the data indicate that amputees feel they receive sufficient but not excessive attention in social situations. A small percentage admit that some sympathetic behavior is displayed consistently in their job and family relationships.

The amputee claims to be accepted by others on the same basis as anyone else, and he rejects strongly the suggestion of "different" treatment. But he will more readily admit to being favored than to being rejected. The treatment program seemed to bring a slight increase in the number of those who felt they were accepted on the same basis as other people. But little change was noted among those who claimed to be the recipients of either favoritism or antagonism. The data suggest that the treatment program was psychologically beneficial to those who were "uncommitted" on the first testing but that it had no effect on those who were convinced of their "different" status.

The cumulative evidence about the social

position of the disabled person strongly suggests that the results of the survey again represent the amputees' *wishes* rather than the actual situation, a finding supported by the fact that, when asked indirectly how they thought amputees should be treated, the majority revealed that they preferred to have little made of their physical handicap:

IF YOU WERE A NONAMPUTEE, HOW WOULD YOU REACT TO AN AMPUTEE?

I would ignore the fact that the person is an amputee.	16%
I would treat him as a normal person who just happens to have lost an arm or hand.	72
I would expect less from him physically.	6
I would be more kind and thoughtful of his feelings.	5
I would know that, as an amputee, he requires special treatment.	1

SOCIABILITY

"Sociability" refers to the extent to which the amputee seeks, and derives pleasure from, social relationships. In this connection, the subjects said that they looked forward to social functions and enjoyed them. The treatment program had the effect of increasing by about one fourth the number of amputees who said that they "always" enjoyed these functions. All but a very few of the subjects said that they had greater social confidence with their new prostheses. Neither before the treatment period nor after, however, did more than S percent confess to any lack of social confidence. Over three quarters of the amputees said that neither their amputations nor their prosthesis-wearing had caused any change in their social relationships. Those who did report changes were almost unanimous in claiming that the changes were toward greater sociability.

These results reaffirm the earlier observations that the amputee tends to deny he has any major problems of acceptance. He usually claims that he engages in social activities eagerly and freely and experiences no prejudice because of his disability. But here again it is possible to read these results as expressing not so much the real facts as the wishes of the amputee to be accepted fully into the nonamputee world. Nevertheless, the indications are clear that the amputee tends to have more social confidence after suitable prosthetic fitting and treatment, the implications being that superior prosthetic equipment provides the basis for the ability to meet others with less trepidation and with greater feelings of personal adequacy. It also confirms indirectly the significance of feelings of functional adequacy and of ability to be independent.

FRUSTRATION

"Frustration" refers to the amputee's experience resulting from his inability to achieve personal, social, and vocational goals because of his amputation. The term refers both to whatever blocks or interferes with the amputee's strivings and to his subjective feelings of annoyance, confusion, or anger when he is thwarted. While 58 percent of the amputees said they rarely or never were prevented from achieving their goals, the other 42 percent claimed to feel frustrated from time to time as a result of amputation:

DOES BEING AN AMPUTEE PREVENT YOU FROM DOING THINGS YOU REALLY WANT TO DO?

Never	20%
Very rarely	27
Rarely	11
Sometimes	37
Frequently	5

When, however, absence of a limb prevented performance of a task, a considerable proportion of the amputees (86 percent) felt annoyed. They almost unanimously (98 percent) said that they did not give up trying to do something because it was difficult, or that they gave up only after repeated failures.

As for vocational goals, a majority of the amputees refused to admit more than slight difficulties. Some 40 percent indicated that there was some substantial interference:

DO YOU FEEL THAT YOUR AMPUTATION INTERFERES WITH YOUR GETTING A JOB?

Not at all	27%
Very slightly	15
Slightly	18
Somewhat	29
Seriously	11

Here the fact that the more seriously disabled (bilateral and shoulder-disarticulation cases) responded as did the other amputees seems to suggest that the results do not accurately reflect the real situation.

The relatively small degree of frustration the amputees reported is surprising in view of the many frustrating situations they encountered. It suggests that many of the responses were given because they seemed socially desirable and because the test situation did not encourage the amputee to express freely his aggressive or negative feelings. But it is also possible that repeated experiences of frustration, together with the strong motivation to be "like anyone else," which is so characteristic of the subjects studied, can produce in many amputees a truly high level of frustration tolerance. To this must be added the active efforts to avoid situations potentially frustrating.

Any interference with goal-directed activity constitutes a frustration. But interpreting frustration in others has certain dangers because what frustrates one individual may not frustrate another. The nonamputee who fails to consider this circumstance is likely to make toward the disabled person unnecessary offers of help. The amputee may take such overtures as indicating that people believe him to be incompetent and may, consequently, feel downgraded in his status as a functioning person. In a sense, the real frustration in this particular situation is the nonamputee's lack of awareness of the amputee's competence.

The intensity of an amputee's frustration depends upon how important his thwarted goals are to him. And while he may not feel seriously deprived if he cannot accomplish some trivial task, his frustration may be great if the particular failure happens to symbolize his inability to reach some more important goal. A minor frustration may assume importance if it symbolizes a general downgrading of status. Furthermore, when frustration is chronic the setting is ripe for the development of neurotic symptoms that represent the amputee's attempt to escape from an intolerable situation. It is considerably easier for anyone to deal with a short-term frustration than to adapt to a long-term one. Amputation is permanent and hence can lead easily to chronic frustrations and to neurotic solutions for the frustrations.

The amputees in question showed two general types of reaction to frustration. One was concerned with overcoming the obstacles that interfere with the attainment of goals. In the other, the concern had more to do with preserving self-esteem and warding off anxiety than with achieving thwarted objectives. The first, or goal-directed, reaction to frustration is characterized by the amputee's ability to accept the reality of his amputation with a minimum of self-deception. In this type of reaction, the amputee seeks goals that are in line with his reduced capabilities and takes whatever steps he must to overcome the barriers imposed by his amputation. When questioned, he admits to being frustrated sometimes, but he shows a high toleration for frustration and tends to give up only when a task is clearly beyond his abilities, at which time he is willing to accept appropriate help. Besides, he will probably accept himself as a person and neither brood over nor resent his situation.

In the second, or "ego-protective," reaction to frustration, the amputee refuses to accept reality. Instead, he distorts it and tries to create situations in which he can be at ease and relatively free of anxiety. If necessary, he will go so far as to deny his disability. He tends to set such low limits for achievement that he can avoid frustration, and he often sharply restricts his involvement in life as he seeks to eliminate opportunities for frustration. Such protective action is likely to lead to neurotic symptoms—to hypersensitivity, invalidism, defeatism, somatic complaints, anxiety, social withdrawal, and so on. In an earlier publication, Siller *(8)* observed that amputees who achieved good adjustment were often strongly oriented toward compensating for their loss. They were, in other words, showing a goal-directed reaction to frustration. It was also observed that amputees who adjusted poorly often directed their efforts toward avoiding the implications of their loss, thus showing an ego-protective reaction to frustration.

As a result of the treatment program in the

NYU Field Studies, there was a small increase in the number of amputees who reported a moderate degree of frustration tolerance combined with the ability to recognize their limitations clearly. While in answering the test questions the amputees undoubtedly had a tendency to deny unfavorable feelings and behavior, the subjects as a whole still showed a rather high tolerance for frustration.

OPTIMISM

"Optimism" refers to those feelings of adequacy, of self-confidence, and of positive future outlook that the amputee experiences. The negative aspects of this personality variable are pessimism, depression, and feelings of inadequacy and inferiority. While the subjects in the study tended to stress their positive feelings of optimism and to de-emphasize their pessimistic feelings, few denied that they experienced depression at times:

HOW OFTEN DO YOU FEEL "DOWN IN THE DUMPS" OR "BLUE"?

Frequently	3%
Sometimes	29
Rarely	21
Very rarely	39
Never	8

The treatment period had the effect of increasing from 33 percent to 39 percent those amputees who answered "very rarely," and in general the fitting of new prostheses increased slightly the claims of optimism. Most of the amputees professed to be very optimistic about their future prospects, and none at all said that they expected to be unsuccessful:

DOES YOUR FUTURE PROMISE TO BE:

extremely successful?	14%
moderately successful?	66
slightly successful?	11
neither successful nor unsuccessful?	9
unsuccessful?	0

Throughout the questionnaire, the subjects tried to avoid responses indicating pessimism, depression, and feelings of inadequacy or inferiority. They were more likely to admit feelings of superiority than of inferiority, but in general they avoided admitting extreme feelings in either direction:

DO YOU EVER HAVE FEELINGS OF:

Inferiority?		*Superiority?*
38%	Never	29%
28	Very rarely	22
12	Rarely	15
20	Sometimes	30
2	Frequently	4

The amputees tried of course in their answers to place themselves in a socially favorable light—to shun answers with negative implications. But we may still estimate the feelings of the average amputee. He resists, rejects, and resents any suggestion that as a person he differs from anyone else; at the same time he acknowledges some (but not too much) physical difference and handicap. If he senses that the nondisabled people about him consider him "different" because of his loss, he may often go to extremes to deny pessimistic feelings which in a more relaxed environment he might well acknowledge.

Amputees are not alone in their desire to be placed in a favorable light. The tendency to respond in a socially desirable manner seems to be characteristic of all groups when tested under conditions similar to those of the present study. Nevertheless, when we consider the very real handicaps amputees must face, we may conclude that those studied here are for the most part maintaining an optimistic outlook.

SOCIAL AND FUNCTIONAL FACTORS IN PROSTHETIC WEAR

The attitudes of amputees toward prostheses have in the past received little systematic study. The amputee's preferences in artificial limbs, and his habits in using them, are evidently not based entirely upon his objective assessment of his functional and social needs. They are influenced also by emotional factors arising from the meanings he attaches to the wearing of artificial limbs. Little organized information is available about these attitudes, whether rational or irrational, and we know little as yet about the specific effects that an amputee attributes to his prosthesis once he has accepted and worn it. What difference does he think it makes in his daily life?

The prosthetic-reaction test (Appendix IIIG), designed to explore in a systematic way some of the attitudes and reactions underlying prosthetic wear, attempted to gauge, in various situations, the amputee's response, both when he is considered to be *wearing* an artificial arm and when he is considered *not* to be wearing one. In a series of nine different pictures, a fictitious amputee, "John," was shown in some everyday situations—some in which his sensitivities as an amputee might be expected to be aroused. Below each picture were from five to nine statements indicating possible responses that John, the amputee in the picture, might make to the situation depicted. The subjects under test were asked to select the statement most nearly describing what John might say, feel, or do in each case. The assumption, of course, was that the amputees would attribute to the imaginary John some of their own feelings and reactions. It was thought that, as the amputees thus responded to specific life situations through the medium of this other person, their attitudes might be expressed more freely than they would be through direct questioning.

The test was administered to each of the amputees three times, once at the beginning of the research program (Evaluation I) and twice at the end of the studies (Evaluation II). In Evaluation I, and at the first administration during Evaluation II, the subjects were asked to select John's response *"if he were wearing a prosthesis as he usually does."* Immediately after the amputees had completed the test for the first time during Evaluation II, they took it again but now were asked to select John's response *"if he never wears a prosthesis."* For convenience, we shall refer to these three administrations of the test as E1, E2a, and E2b. Together, the three provide data for the study of three major questions:

1. In the difficult social situations that an amputee faces daily, what are his most frequent responses and his most commonly held attitudes?
2. What changes, if any, in his attitudes and reactions came as a result of his being fitted with a new prosthesis and taking part in the research program?
3. In these difficult social situations, how does the wearing of a prosthesis affect the amputee's responses?

Each of these problems shall be taken up in turn.

The prosthetic-reaction test touches upon a number of aspects of an amputee's performance. Foremost is the general area of "security," which involves the amputee's basic acceptance of himself and others, particularly his personal adjustment to the loss of his arm. Included within the concept of security were such constructs as self-acceptance (the ability to view the loss without self-pity, exaggeration, or denial, and without resorting to maladaptive means of defending self-esteem) and reality-facing (the ability to appraise environmental situations as they are). In addition, there was evidence that several of the cartoons strongly measured a second variable, "independence," which describes the amputee's motivation to be self-sufficient and to function adequately with a minimum of assistance.

Psychologically, strivings for independence are likely to stem from the individual's feelings of security, and as such the two must be considered related phenomena. But since the need to be independent is a major concern of amputees, separate analyses of the data concerning independence were made whenever appropriate. Each statement in the test was therefore rated first for "security" and, when indicated, for "independence." Four psychologists ranked from 1 to 5 all possible responses according to the extent that the individual variables were reflected therein.[4] Personal differences in ranking were resolved through mutual discussion among the four.

Responses rated 1 or 2 were considered "high." A rating of 3 was considered "intermediate," a rating of 4 or 5 as "low," and the terms "high," "intermediate," and "low" were used as relative terms to describe the individual's position along the "security" and the "independence" scales. For example, Picture VI (Appendix IIIG) showed an amputee in a restaurant with a steak that seemed too tough for him to cut. The seven statements given beneath the picture were ranked and judged as shown in the following tabulation:

[1] Six of the nine cartoons portrayed situations not relevant to "independence" and were therefore rated for "security" only. See Table 1, page 102.

Statement	Analysis	
	Security Rating	Independence Rating
1. I'd have to have it cut for me.	2 (high)	5 (low)
2. I'd try, and if I really couldn't manage, I'd ask to have it cut.	1 (high)	2 (high)
3. I'd manage with it.	3 (intermediate)	1 (high)
4. Isn't it awful not to be able to manage? I'd like to do this alone, but I'm afraid I need your help.	4 (low)	3 (intermediate)
5. I'd try and then if it were too tough I'd ask to have it cut.	2 (high)	2 (high)
6. (I couldn't manage, John thinks to himself.) Take it back. This is much too tough.	5 (low)	1 (high)
7. My companion would feel embarrassed, but I would have to have it cut.	4 (low)	4 (low)

The prosthetic-reaction test, then, tells us how amputees appraise various social situations and what they think about the worth of artificial arms in these situations. It also gives us some indication of their feelings of independence and security, both when they are wearing prostheses and when they are not. What light does this information shed upon the three major problems already mentioned?

AMPUTEE RESPONSES TO EVERYDAY SOCIAL SITUATIONS

The most outstanding finding of this study was that the amputees overwhelmingly—in fact, almost invariably—selected the most positive responses to the situations depicted in the cartoons, particularly when the amputee was assumed to be wearing an artificial arm. For almost every situation of the series, the statement most frequently chosen was one extremely high in both independence and security. Moreover, for most of the pictures well over half the sample responded with statements that were judged "positive" *(i.e.,* high in security or independence). Even in E2b, where positive responses were considerably fewer, they still accounted for a large segment of the sample. Typical percentages of amputees showing high, intermediate, and low "security" and "independence" responses to each cartoon are shown in Table 1, where the data are derived from E2a (post-treatment) and refer to circumstances in which John was supposed to be wearing a prosthesis. For the sample as a whole, there were negligible differences between the El (pretreatment) and the E2a (post-treatment) data.

For every situation, more than 60 percent of the sample chose positive responses, and in only one instance did more than a negligible proportion choose a statement reflecting definite insecurity. As for that item, many of the respondents had not correctly interpreted the other person to be the amputee's wife. Even more striking is the fact that from a fourth to a half gave as their response the single most positive statement. It is clear, then, that the majority of the amputees wished to be viewed as functionally independent, having confidence in their ability, with a desire to demonstrate their functional achievements, and willing to accept some aid if it is found to be needed. The vast majority of the responses expressed an acceptance of the loss of the limb, a willingness to discuss the amputation with others, and a general self-assurance in social situations.

In general, the most popular responses were those which emphasize functional effectiveness, self-confidence, and lack of sensitivity about amputation. Reactions suggesting any admission that the amputee considered himself at all "different" from anyone else were extremely rare. It seems clear that the subjects readily recognized the socially desirable responses and favored them overwhelmingly. To what extent this eventuality represents the

Table 1

DISTRIBUTION OF AMPUTEES' "SECURITY" AND "INDEPENDENCE" RESPONSES

Independence (%)			Situation	Security (%)		
High	Intermediate	Low		High	Intermediate	Low
—	—	—	Amputee is confronted with an acquaintance who asks him how he likes his new arm.	79	15	6
—	—	—	Amputee is being looked at in public by a stranger.	88	7	5
—	—	—	Amputee is applying for a job.	80	8	12
—	—	—	Amputee approaches a woman at a dance.	83	9	8
—	—	—	Amputee is being questioned by children.	83	10	7
—	—	—	Amputee is meeting a woman, usually taken to be his wife, after leaving the hospital.	63	12	25
60	23	17	Amputee is being served coffee and cake at a social gathering.	74	20	6
87	2	11	Amputee is served tough steak in a restaurant with a companion.	71	27	2
65	5	30	Amputee is dressing at home in presence of his wife.	80	18	2

true feelings and behavior of the group, and to what extent it represents wishful thinking, cannot be determined from these data—a situation that reflects a weakness in the prosthetic-reaction test as currently conceived. Evidence indicates that amputees are very much concerned with conforming to the important cultural values of self-reliance and self-confidence and that they abhor any suggestion of a departure from complete normality.

CHANGES IN RESPONSES AS A RESULT OF FITTING

For the group as a whole, there were virtually no significant differences between E1 and E2a, even though the latter was administered after a considerable period of time had elapsed. This result would suggest that the treatment program had little or no effect on the expressed attitudes of the group. But when we consider separately those amputees who were being fitted for the first time and those who had worn prostheses before, some changes can be detected among the new wearers. Since the number of amputees being fitted for the first time was small (only 55), no extensive quantitative analysis can be made. Nevertheless, a few general conclusions can be drawn.

First of all, the responses after fitting indicated that new wearers were slightly disappointed in the functional efficacy of their artificial arms. While initially (on E1) a large number of these amputees revealed expectations that the prosthesis would enable them to do "almost everything," particularly in their occupational roles, the E2a responses indicated more modest attitudes. But these changes were not toward more negative responses. Rather, they reflected the fact that the amputees concerned had indulged in unrealistic expectations for the prostheses and then had adjusted to a more realistic view after some experience with their new arms. There were, moreover, indications of a greater degree of security in social situations. After fitting, some of the new wearers indicated an increased acceptance of their amputation—a greater ability to talk about it, less tendency to withdraw from situations revealing the disability, and less expectation of pity from others. Besides this, they expressed a greater readiness to ask for help without apology or embarrassment.

EFFECTS OF FITTING UPON RESPONSES TO EVERYDAY SITUATIONS

As has already been indicated, the primary aim of the prosthetic-reaction test was to evaluate the amputee's feelings about the part that an artificial arm plays in the common

difficult situations of his life. The statements the subjects chose as describing John's behavior may therefore be taken as reflecting aspects of their own behavior. Consequently, if we compare the results of E2a (in which John is considered to be *wearing* a prosthesis) with those of E2b (in which he is considered *not* to be wearing one), both tests having been administered at the end of the studies, we discover some of the effects that wearing an artificial arm has on the daily life of an amputee. Toward this end, the two personality variables, independence and security, were considered. In separate analyses of the data from the "nonprevious prosthesis wearers" (referred to as NPPW's) and the "previous prosthesis wearers" (PPW's), it was found that the two groups did not differ in their responses except as discussed specifically hereafter.[5]

A review of the E2a (prosthesis worn) and E2b (prosthesis not worn) responses follows:

SITUATION: Amputee is being observed in public by a stranger.

	SECURITY[a]	
	High	*Low*
E2a	88%	5%
E2b	70	21
Change	18	16

[a] The percentages indicated in this and related succeeding tables reflect the proportion of the total sample expressing either high or low responses. Intermediate, or neutral, responses are indicated by difference.

Greater tolerance of curious strangers is exhibited when a prosthesis is worn. In E2a the amputees appear better able to view the situation without misinterpretation, to be more sure of themselves and less likely to pity themselves or to expect pity from others. The PPW's are somewhat more secure in the E2a situation than are NPPW's, even though both groups were wearing prostheses at the time of the tests. The most reasonable explanation for this difference would seem to he in the fact that the period of prosthetic wear for the NPPW group was insufficient for feelings of conspicuousness to disappear.

[5] It should be remembered that on the average E2 was administered about six months after fitting. It is probable that, had this test been administered to the NPPW's before they received and used artificial arms, considerably greater differences between PPW's and NPPW's would have been found.

SITUATION: Amputee, applying for employment, is asked how he would handle the job.

	SECURITY	
	High	*Low*
E2a	80%	12%
E2b	63	25
Change	17	13

There is a much greater tendency for the amputee to take a positive, constructive attitude and to demonstrate his qualifications when he is wearing a prosthesis than when he is not. The PPW's also tend to see the prosthesis-wearer as less aggressive and less apologetic than do the NPPW's.

SITUATION: Amputee at a dance, wonders whether or not to ask a woman to dance and, if so, whether or not to mention his amputation.

	SECURITY	
	High	*Low*
E2a	83%	8%
E2b	75	22
Change	8	14

There is a greater expectation of rejection when the amputee is not wearing a prosthesis. An amputee who wears an artificial arm is apparently more willing to approach a strange woman without apology and invite her to dance.

SITUATION: Amputee sees children approaching and wonders what to say if they ask about his amputation.

	SECURITY	
	High	*Low*
E2a	83%	7%
E2b	62	25
Change	21	18

The subjects apparently felt that an amputee wearing a prosthesis is less likely to try to withdraw from the fact of his loss and is more able to accept his disability without self-pity. When the amputee was portrayed as having a prosthesis, almost all chose the response which explains that the hand was lost and shows how the artificial one works. Without a prosthesis, the amputee gives as his most frequent response, "I'll tell them I lost my hand," thus reflecting the prestige value of the prosthesis.

SITUATION: Amputee is meeting a woman (usually taken to be his wife) upon his departure from the hospital and wonders what to say to her.

	SECURITY	
	High	*Low*
E2a	63%	25%
E2b	53	46
Change	10	21

Interpretation of this item is difficult because, while most of the subjects understood the woman to be the amputee's wife, others did not. The specific answers make clear that the amputee who wears a prosthesis is less likely to avoid the subject of his amputation than is the amputee without an artificial arm.

SITUATION: Amputee is offered coffee and cake by a hostess who knows nothing about him.

	SECURITY		INDEPENDENCE	
	High	*Low*	*High*	*Low*
E2a	74%	6%	60%	17%
E2b	57	12	46	26
Change	17	6	14	9

Wearing the prosthesis is associated with greater functional independence and increased feelings of security (*i.e.*, by more ability to recognize the inescapable limitations inherent in the situation).

SITUATION: Amputee, in restaurant with companion, is served steak that looks too tough for him to manage.

	SECURITY		INDEPENDENCE	
	High	*Low*	*High*	*Low*
E2a	71%	2%	87%	11%
E2b	79	8	59	38
Change	8	6	28	27

Again, the amputee wearing the prosthesis is thought to be better able to handle the situation and less likely to be dependent upon others. In this instance the functions afforded by the prosthesis have a clear-cut influence on feelings of independence.

SITUATION: Amputee is at home with his wife and wants to unbutton his cuff.

	SECURITY		INDEPENDENCE	
	High	*Low*	*High*	*Low*
E2a	80%	2%	65%	30%
E2b	72	5	42	51
Change	8	3	23	21

Both PPW's and NPPW's seem to feel that a prosthesis wearer is more willing to make a reasonable effort to help himself. Those in the NPPW group also express less of a tendency to apologize for themselves when wearing the arm.

Differences between the E2a (with prosthesis) and E2b (without prosthesis) responses were considerable throughout the entire test, both for amputees who were being fitted for the first time and for those who had previously worn prostheses. We may thus conclude that the positive acceptance of prostheses reflects not merely the enthusiasm of new wearers but rather the genuine value of prosthetic wear in its own right.

The indications are clear that amputees regard a prosthesis as a definite asset in functionally demanding situations and that they think of it as something enabling them to be more independent, more secure, and more willing to accept their condition. In the potentially threatening situations that an amputee must face from time to time, a prosthesis contributes to his ability to handle himself easily and self-confidently, even in cases where the prosthesis does not have immediate functional value.

The data for "emotional" situations indicate that the amputees' positive expressions of security were definitely greater when the protagonist was wearing a prosthesis than when he was not. An artificial arm apparently gives many amputees an increased confidence in their functional adequacy. This in turn helps them to achieve a greater self-acceptance, enables them to face their disability more realistically, and lets them view the reactions of others without feeling quite so threatened.

Of the two personality variables considered, independence and security, independence appears to be the more strikingly affected by prosthetic restoration. The subjects tend to expect that the amputee who wears a prosthesis will be more effective functionally, more self-sufficient, and generally more adaptive than the nonwearer. When the matter of security is concerned, the role of the prosthesis is less pronounced. Still, most of the amputees think of prosthesis wearers as more self-accepting, less shy, and less easily embarrassed than nonwearers.

The responses to the prosthetic-reaction test strongly indicate that amputees feel there is both functional and psychological advantage in the wearing of a prosthesis. They consistently attribute more positive responses to the amputee wearing an artificial arm than they do to the nonwearer in the same situation. But of course all of these findings are merely projections upon a fictitious amputee pictured in a cartoon; we do not yet know the precise extent to which these projections reflect the actual responses amputees make in life situations. Nevertheless, it is clear that the wearing of a prosthesis has a positive effect upon the way an amputee perceives and reacts to many social situations in his daily life.

ATTITUDES TOWARD PROSTHETIC WEAR, BEFORE AND AFTER FITTING

The discussion thus far indicates that the amputee believes strongly in the importance of wearing an artificial arm. He tends to feel

that a prosthesis increases his functional capabilities and helps him to cope with social situations. He retains these beliefs, even reinforces them, after participating in the research program. To analyze still further amputee attitudes toward the wear and use of a prosthesis, additional studies were designed to seek answers to the questions *Are the expectations of nonprosthesis wearers fulfilled by a prosthesis?* and *Can the postfitting attitudes of amputees toward their prostheses be predicted on the basis of their prefitting expectations?*

As for the first of these queries, the amputee who does not wear a prosthesis holds certain preconceived opinions about the value of an artificial limb before he ever undertakes to wear and use one. If these expectations are fairly realistic, his experience with his prosthesis may be gratifying. But unrealistic expectations can interfere with the successful wearing of a prosthesis. For this reason, a study was made of the alterations in attitudes of nonwearers after they had used a new prosthesis. As for the second question, it is reasonable to expect that the opinion an amputee holds about prostheses before he receives one will be related to his opinion after he has been fitted. If these relationships are stable enough to be predicted, potential problems may be anticipated and perhaps avoided. It is well known that a negative attitude on the part of an amputee interferes with his wholehearted participation in the rehabilitation process and thus reduces the probability of success. Identifying such a situation is the first step toward correcting it.

ARE THE EXPECTATIONS OF NONPROSTHESIS WEARERS FULFILLED BY A PROSTHESIS?

Among the subjects for whom data were available in this aspect of the study were 45 amputees who had never worn prostheses before their participation in the research program. About half of them were relatively "new" amputees who at the time may not yet have had an opportunity for fitting. The other half consisted of persons who had been amputees for from one to 27 years and who were therefore considered to have had ample opportunity to obtain prostheses had they wanted to. Although it is possible that some in the latter group may have been discouraged long ago by the lack of adequate prostheses for shoulder disarticulation and for certain other types of amputation, some had stumps relatively easy to fit, and accordingly factors other than lack of prosthetic equipment seem to have been present.

Because this study was only one phase in a more general investigation of the conditions underlying the wear or nonwear of a prosthesis, use was made of a broad approach in which was collected information generally related to amputation and to prosthetic restoration. Gathered by means of a questionnaire probing prior beliefs and attitudes on a variety of matters relating to prostheses (Appendix IIIH), the data sought included sources of prosthetic knowledge and an estimate of its extent, functional expectations, opinions of the appearance of prostheses, opinions of the comfort of prostheses, attitudes toward prosthetic training, attitudes toward the general value of artificial arms, and anticipated difficulties with prostheses. Approximately six months after the fitting of a prosthesis to these patients, the questionnaire was given again to obtain postfitting attitudes.

Sources of Prosthetic Knowledge and Estimate of Its Extent

The extent of prosthetic knowledge claimed by the subjects increased only slightly after they had participated in the program. Before fitting, 95 percent said they knew little or nothing about artificial arms; after fitting 85 percent still said so. Even after some six months of having worn prostheses, only 14 percent said they knew "much" about the subject. These findings may of course only reflect restraint and modesty. If they reflect the situation accurately, the amputees are indeed poorly informed. To determine whether the sources of information had any bearing on the state of amputee enlightenment, the subjects were asked to name their principal source of information,

As can be seen in Table 2, the answers were rather diverse. Mentioned were five major sources of information before fitting. Three of these (other amputees, friends, self) are generally unreliable in matters of prosthetics.

Table 2

SOURCES OF PROSTHETIC INFORMATION

(Entries represent number of times mentioned.)

Prefitting		Postfitting
19	Physicians	3
19	Other amputees	0
14	Myself	13
13	Prosthetists	9
11	Friends	0
1	Medical personnel (PT, OT, Nurse)	18
3	No one	0

Friends and one's own self are hardly qualified without special training, and other amputees, as has been indicated already, are not necessarily well informed. Medical personnel, including physical therapists, occupational therapists, and nurses, were cited by only one amputee as a source of information. But after the amputees had participated in the program, the picture changed sharply. Then most of them mentioned medical personnel as the main source of information, while "other amputees" were not mentioned at all.

Although the extensive list of pretreatment sources of information may indicate that the amputees were alert, receptive, and inquisitive, seeking information from all quarters, it may on the contrary mean that they used all these sources because they were not given information by those most competent to provide it. The general impression is that adequate information about prosthetics is not readily available to the average amputee and that there is therefore a real need for a more thorough prosthetics education of medical personnel. We might even suggest that more attention be given to improving knowledge of prosthetics among new amputees. One approach would be to furnish literature portraying different types of prostheses—along with a sober appraisal of the utility, as well as of the disadvantages, of current prosthetic equipment. Doing so would help the patient to acquire more realistic expectations, to eliminate some of his trepidation, and to fill his individual needs more successfully.

Functional Expectations

Experience tends to modify any overly ambitious ideas the amputee may have about the value of the prosthesis. Most of the amputees in the study had more realistic expectations after they had been fitted with their artificial limbs than before:

OPINIONS OF PROSTHESES BEFORE AND AFTER FITTING

Essential		Of Some Help		Of No Help	
Prefitting	Postfitting	Prefitting	Postfitting	Pre-fitting	Post-fitting
73%	51%	24%	34%	3%	15%

The 73 percent who before fitting said they believed prostheses were essential included 21 percent who said they thought artificial arms were "as good as normal limbs." Among those who after fitting said they believed prostheses to be very important, there were still 10 percent who said they thought their prostheses were as good as normal limbs. Apparently the fitting of the prosthesis reduces the number of amputees who deny reality but does not eliminate that group completely.

Before they were fitted, the amputees tended to expect that artificial limbs would take a considerable expenditure of energy for effective operation, but experience showed them that these estimates had been too pessimistic:

AMPUTEES' ESTIMATES OF EFFORT REQUIRED TO OPERATE AN ARTIFICIAL ARM

Prefitting		*Postfitting*
78%	A great deal of effort	38%
18	A little effort	33
4	Hardly any effort	29

Those who deal with prospective wearers should make use of the general tendency among amputees to believe that prostheses are helpful. But unless the limitations as well as the advantages of artificial arms are explained, false hopes and unreasonable expectations will result.

Opinions on the Appearance of Prostheses

Judgment of appearance is a complex and subjective process. The phrase "acceptable ap-

pearance" means many things to many people because the component factors are not often defined. In this study, three factors were identified. The first relates to the appearance of the prosthesis itself—to the degree to which it resembles the natural limb. The second relates to the readiness with which the artificial limb is recognized by observers. And finally the third relates to the appearance of the prosthesis when it is actually in use by the amputee.

Roughly 75 percent of the subjects said they believed that their prosthetic arms and hands closely resembled normal limbs. Although the remainder said they found no strong resemblance, it was clear that in general the amputees accepted the appearance of their prostheses. One patient alone gave "unfavorable appearance" as the reason for not wearing a prosthesis.

At this point it is perhaps worth noting that medical personnel who see many varieties of prosthetic equipment tend to develop, out of their own experience, personal sets of standards about the appearance of prostheses and sometimes impose these standards upon an amputee. But the patient, having had very little experience with prostheses, bases his opinions on quite personal factors, and these may be at great variance with those which influence the judgment of the clinic team. We must therefore strive to fulfill the actual needs of the individual amputee rather than to satisfy our own honest but at times inappropriate standards.

Initially, most of the amputees said they expected to be recognized as amputees even when wearing prostheses, an expectation apparently confirmed by experience:

WHEN I WEAR AN ARTIFICIAL ARM, PEOPLE:

Prefitting		*Postfitting*
46%	still know I'm an amputee.	43%
45	rarely mistake me for a nonamputee.	43
4	sometimes mistake me for a nonamputee.	2
5	frequently mistake me for a nonamputee.	12
0	never know I'm an amputee.	0

These findings are especially interesting when we recall that about 75 percent of the amputees said they thought their prostheses closely resembled natural arms and hands. Yet only a few of the subjects, either before or after fitting, said that they believed they could be taken for nonamputees. It seems apparent, therefore, that more than just the physical appearance of the artificial arm was involved. A strong similarity may be thought to exist, but generally the amputee does not believe similarity alone will enable him to pass as a nonamputee.

Data from studies by Dembo and Tane-Baskin *(3,7)* on the noticeability of a cosmetic glove indicate that noticeability depends upon the "intensity" of the situation, that is, upon the closeness of the amputee's social and physical contact with others at any particular time. In view of this observation, it is clear that the inability to discriminate between situations of varying intensity keeps us from interpreting the present data any further. The amputees' responses in the study came from their experiences in both casual and intense situations, and we cannot distinguish between the two.

Ease and smoothness of operation constitute another important factor in the general appearance of the amputee. The well-trained, smoothly functioning amputee contrasts strongly with a less-trained, uncoordinated, and awkward one. Full evaluation of appearance must, therefore, also take into account the dynamic factor, the impression given by smooth, normal-appearing movement as contrasted with that given by halting, uncoordinated motions.

We see, then, that there are at least three important considerations involved in any judgment of an amputee's appearance—the actual appearance of the prosthesis apart from its functioning (the "static factor"), the naturalness with which the prosthesis is used (the "dynamic factor"), and the intensity of the amputee's situation (the "situational factor"). Treatment personnel usually place greatest emphasis on the appearance of the limb itself; the amputee may base his impression more upon the other two considerations.

Opinions on the Comfort of Prostheses

The amputees' statements about the comfort of artificial limbs did not change very much

with experience. Both before fitting and after some period of wear, about 25 percent of the subjects claimed considerable discomfort, while SO percent or better had no complaints on this score:

CHANGE IN ATTITUDES TOWARD COMFORT OF PROSTHESES

Prefitting		*Postfitting*
62%	Comfortable	50%
14	Tolerable	24
24	Uncomfortable	26

For three quarters of the prosthesis users, comfort does not appear to be an important problem, and expectations of comfort seem to be borne out by actual experience. But the 25 percent who complained about discomfort *do* represent a very significant problem because discomfort is a common cause for rejection or infrequent use of artificial limbs.

At present, research aimed at eliminating discomfort focuses on prosthetic and physiological factors, an emphasis that seems appropriate in view of the fact that the principal objective causes of amputee discomfort are related to fit of the socket and harness and to weight of the prosthesis. But the problem has several other aspects, and these might also be explored profitably. There is for example the question of education—of how to prepare the amputee to expect at least some degree of initial discomfort. Another possible factor relates to the early use of the new prosthesis unwisely and too well. The mere statement, "At first this may be uncomfortable," may be insufficient warning for the new user. This phase of orientation needs more emphasis. Otherwise there is always the danger that amputees not fully aware of the difficulty of initial adjustment may give up with the feeling that prostheses are not for them.

In addition to all these matters, there are psychological problems related to the amputee's pain tolerance. The way the amputee reacts to pain is influenced by such psychological factors as his acceptance of the amputation and his unrealistic hopes for the prosthesis. Finally, there is a need to recognize the special social attitudes that an amputee elicits when he expresses discomfort.

A Uitudes Toward Prosthetic Training

Training to operate a prosthesis effectively requires a period of time ranging from a few hours to many hours, as correctly anticipated by all but three percent of the subjects:

AMPUTEE ESTIMATES OF TRAINING TIME REQUIRED

Prefitting		*Postfitting*
72%	Many hours	70%
25	Few hours	30
3	Few minutes	0

As we have seen, the subjects of study generally knew little about the potentials of prosthetic restoration. When, on top of the amputee's functional disability, there is superimposed the unavoidably new and ambiguous situation, anxiety and feelings of dependency are created. Since at a number of points in the rehabilitation process the physical and occupational therapist is in closest contact with the patient and is offering direct functional assistance, he is one of the natural recipients of these negative reactions. It should be possible during training for the therapist to use these dependency feelings and other factors to instill in the patient an attitude of realistic independence. Moreover, the training situation offers the amputee opportunity to develop and to demonstrate his functional competence under professional guidance. Regulated training routines have many advantages. Learning is quicker and more efficient, and the number of successful experiences can be maximized while failures are held to a minimum. For the amputee, the training experience should result not only in proficiency with the artificial limb but also in a realistic functional independence and a general sense of adequacy and personal competence.

Attitudes Toward the General Value of Artificial Arms

In an effort to determine the significance that artificial arms had for the amputees, the subjects were asked to express their opinions in terms of three frames of reference—the advantages of using a prosthesis, the general functional help of a prosthesis, and the importance of the artificial arm.

Advantages. The overwhelming opinion among the amputees, both before and after fitting, was that artificial arms have more advantages than disadvantages:

OPINIONS OF ADVANTAGES OFFERED BY PROSTHESES

Prefitting		*Postfitting*
91%	More advantages	86%
5	No marked advantage or disadvantage	12
4	More disadvantages	2

General Help. The prosthesis enabled the amputees to get along better. Most of them maintained that they could get along *much* better. A few said that it hindered them slightly. No one said that it really interfered. But among the amputees who had expected to find extreme advantages, there were indications of marked changes of opinion. That the group with the highest expectations dropped from 78 percent to 59 percent illustrates the development of more realistic values through experience. The same kind of change is illustrated by the increase in the number of amputees who said they thought a prosthesis could help them to get along "about the same" or "slightly worse":

DOES YOUR PROSTHESIS PERMIT YOU TO GET ALONG:

Prefitting		*Postfitting*
78%	much better?	59%
18	slightly better?	13
4	about the same?	20
0	slightly worse?	8
0	much worse?	0

Importance. Despite a drop of 9 percent in the two most favorable categories of response, over 70 percent of the amputees said after fitting that they still believed it "very important" or "extremely important" for them to wear artificial arms. There was, however, an increase from 4 percent to 12 percent in the number of amputees who said they thought their prostheses "not at all" or only "slightly" important:

HOW IMPORTANT IS IT FOR YOU TO WEAR AN ARTIFICIAL ARM?

Prefitting		*Postfitting*
24%	Extremely important	27%
58	Very important	45
14	Somewhat important	16
4	Slightly important	8
0	Not important at all	4

It seems clear that the amputees retain favorable attitudes toward their prostheses after a period of wear. They appear to consider prostheses generally helpful, to believe that the advantages far outweigh the disadvantages, and to be convinced of the importance of artificial arms.

If these findings are accepted as showing the general feelings of the amputees, the next step is to relate these attitudes to the amputees' actual use of their prostheses. The relevant factors here are the amount and type of use, the situations in which prostheses are worn and employed, and the amputee's reasons for discarding a prosthesis.

Anticipated Difficulties With Prostheses

As regards the wearing of an artificial arm, the amputees foresaw certain difficulties. They anticipated problems in becoming accustomed to wearing the arm, in learning to operate it, in dealing with fatigue, and in avoiding awkwardness. With the exception of the second difficulty, learning to operate the arm, all of these turned out to be real problems, and some additional ones, such as mechanical failure of the prosthesis, stump pain, and excessive heat, developed.

The difficulties that amputees experience with their artificial arms range from relatively trivial annoyances to serious complications. Most of them may be placed in either of two categories—problems related directly to mechanical, functional, or medical disorders, and problems related to emotionally based preoccupation with conditions otherwise insignificant. Those in the first category disappear when the relevant conditions are corrected. Those in the second category reflect personality variations. In the interests of clarity and emphasis, these emotion-laden complaints have been classified in accordance with six hypothetical kinds of personality. Although having

no value in themselves the stereotypes thus created are not intended as "pigeon-holes," they serve nevertheless as organizing aids for identifying the problems.

The Unmotivated. The unmotivated amputee does not expend the effort necessary to overcome obstacles in using a prosthesis. The person without drive wears and uses his prosthesis so long as everything operates smoothly, but when even slight difficulties arise he lacks the motivation to continue with the limb and to expend any extra effort needed to operate it. Wear and use are thus limited. In justification of his action in discarding the prosthesis, the amputee may present many rationalizations in the form of spurious complaints about comfort and effectiveness.

The Ghost Story. Complaints derived from phantom sensation are likely to occur among amputees who are unaware of the common phenomenon and who consequently do not anticipate it. Still others, on experiencing the phantom, fall prey to misconceptions about it and fail to acknowledge the experience for fear of implying that they are disoriented or are suffering from mental disturbances. Through ignorance, such patients may attribute their phantom sensation or phantom pain to poorly fitting sockets or harnesses. Complaints usually disappear when the amputee has been well informed.

Mind Over Matter. People vary in the amount of discomfort they can accept. Since it is probably impossible to eliminate discomfort entirely, some dissatisfaction is inevitable. But this common difficulty may be reduced to some extent if, before fitting, the amputee develops realistic attitudes toward whatever discomfort he cannot escape. Forewarning the amputee may help him to avoid disappointment and exaggeration of his discomfort.

The Exaggerators. Some amputees tend to elaborate upon their complaints and to distort the situation out of all proportion to its real significance. They develop fixations about relatively unimportant details or symptoms, and they are not open to persuasion or logical argument. Most often such a complaint is based upon a personal need, as for sympathy or attention, perhaps only remotely related to the actual prosthetic condition. But until this personal need is satisfied, little success can be expected in handling the related prosthetic or medical conditions.

Motor Trouble. Difficulties associated with the actual operation of a prosthesis result from two conditions—from poor neuromuscular endowment, or from tensions and anxieties producing awkwardness and lack of coordination. In the first condition, the amputee possesses in balance and coordination basic deficiencies which together operate to reduce his functional potential. Owing to the effects of banging and twisting in awkward and erratic movements, the prospects of prosthetic maintenance tend to increase. In such a case, faults that are apparently prosthetic are really human faults.

The second condition typifies the anxious person who always anticipates something bad. He looks upon every squeak, every irritation, and every temporary malfunction as a sign that the prosthesis is falling apart or at least is in need of adjustment. He differs from the exaggerator in that his reactions are much more diffuse and not nearly so emphatic. Anxiety induces characteristic muscular tension, which interferes with function in much the same way as does an innate psychomotor inferiority. Since the latter condition offers a poorer prognosis and dictates a different course of care, it is necessary to make a distinction based upon etiology.

The Comparison Shopper. Every prosthetist knows of amputees who are always looking for something better. Sometimes such persons channel their needs constructively and make a contribution by entering the field of prosthetics development. More often, however, they dissipate their energies going from limbshop to limbshop looking for satisfaction they probably cannot get. These amputees are apt to become a matter of professional concern, for they often tend to depreciate the efforts, skill, and integrity of the art.

Recapitulation. It is likely that a single explanation runs through several of the foregoing categories, for the amputee's subconscious nonacceptance of his amputation may underlie lack of motivation, phantom sensation, over-reaction, and inability to be satisfied. The problems of phantom sensation

and of low discomfort tolerance may be accounted for physiologically, and the conditions of over-reaction and constant apprehension may be traced to personality factors more general than refusal to accept amputation. In any event, the categories can be made more useful, or at least revised constructively, if conceptual and experimental analysis is undertaken to establish the extent of each category, the etiological backgrounds, and the best manner of treatment in each case.

Two general considerations should govern the follow-up of complaints—improvement of undesirable conditions, and the identification and description of the "complainers." The first is limited only by the present state of technical knowledge and skill in the field of limb prosthetics. The second has received only casual attention in the past. Further work in this area of psychology could prove to be fruitful.

CAN THE POSTFITTING ATTITUDES OF AMPUTEES TOWARD THEIR PROSTHESES BE PREDICTED ON THE BASIS OF THEIR PREFITTING EXPECTATIONS?

As we have seen, the attitudes held by the amputees before they had participated in the program were modified by their subsequent experience with prostheses. The shift was generally toward a more realistic opinion of the results that could be obtained with prostheses. In addition to these changes, however, the attitudes of the amputees both before and after fitting showed that they placed a great deal of importance on the desirability of wearing a prosthesis. The next step, then, was to study the relationship between an amputee's attitude before fitting and his attitude afterwards. Our aim was to determine whether or not it is possible to predict an amputee's postfitting adjustment from a knowledge of his expectations before he is fitted. To this end, the question was asked: *Are the prefitting attitudes of amputees toward prosthetic restoration related to the attitudes they hold after fitting and a period of usef* Or, to put the question more specifically, will the amputee who approaches the fitting with a positive attitude about prostheses tend to maintain that attitude after he has worn and used an artificial arm, and, conversely, will the amputee who starts with a less positive, ambivalent, or negative attitude toward prostheses persist in that attitude after wear and use?

Appendix IIIH, used previously to determine the degree of satisfaction of amputee expectations, was now applied to test whether or not postfitting attitudes could be predicted from the corresponding prefitting attitudes.[6] Selected for this analysis were 42 amputees, none of whom had worn a prosthesis before participating in the program. They included 18 below-elbow, 18 above-elbow, and 6 shoulder-disarticulation cases ranging in age from 17 to 54 years, in education from none to post-graduate school, and in the year of amputation from 1916 to 1955. The group was, in short, highly diverse. According to their combined expectancy scores, the subjects were placed on a continuum ranging from high to low in prosthetic expectation and were then divided into three equal groups representing high, intermediate, and low prosthetic expectancy. For comparative purposes, only the upper third, representing high expectancy, and the lower third, representing low expectancy, are used in the following analyses.

Combined Expectancy Score of High Group Compared With That of Low Group

The first step was to determine whether the initial attitudes of the high-expectancy and low-expectancy groups were maintained after prosthetic experience or were modified by it.

[6] A measurement of prosthetic expectancy was obtained by a system of scores and ratings similar to that used in the analysis of the results obtained with Appendix IIIG. Each question in Appendix IIIH had five possible answers ranging from one that expressed very positive feelings to one expressing very negative feelings. The response reflecting the most favorable attitude was given a score of 1, that reflecting the least favorable attitude a score of 5. There was thus obtained a score for each item as well as an average score for the questionnaire as a whole (combined expectancy score). Each amputee was then assigned a rating which represented the direction and intensity of his feelings about prosthetic restoration and which was therefore a measurement of his prosthetic expectancy.

Accordingly, the attitudes of the high and low groups were compared before and after fitting,[7] as indicated in Table 3.

Table 3

AVERAGE PREFITTING AND POSTFITTING EXPECTANCY SCORES OF "HIGH" AND "LOW" GROUPS

Group	Prefitting	Postfitting
Low expectancy	2.7	2.9
High expectancy	1.9	2.2

In both instances, the difference between the average combined expectancy scores of the high-expectancy group and of the low-expectancy group was found to be statistically significant ($P < 0.05$). Moreover, the mean score for each group did not change significantly after fitting ($P > 0.05$). Thus in general positive or negative attitudes within the group were maintained after fitting.

The individual items of the questionnaire were studied in an effort to determine why within each group there was only insignificant change in the combined expectancy scores from before fitting to after fitting. Was this result owing to lack of systematic differences between evaluations? Or were gains in positive feelings toward some items canceled out by loss of positive feelings toward other items?

High and Low Group Comparisons for Individual Items

Within each group an analysis was made of the way in which the responses to individual questionnaire items changed after fitting. The opinions expressed by the high-expectancy group and by the low-expectancy group about each item before and after fitting are listed in Table 4, where it may be seen that the nine items originally used to differentiate high prosthetic expectancy from low continued to differentiate the two groups, the "high's" in every instance remaining more favorably disposed than the "low's."

Inspection of the data indicates that the lack of change from prefitting to postfitting evaluations, as measured by the combined expectancy score, does not result from the cancellation of negative changes by positive ones. The average score of both the high-expectancy and the low-expectancy groups increased (became less positive) on most items. The conclusion may thus be drawn that experience with prostheses led both groups to expect less in the way of functioning (items 1 and 2), to expect less resemblance between prostheses and natural arms (item 3), and to expect artificial arms to be more uncomfortable (item 5). On the other items, the average score either decreased or remained about the same. Both groups said that the artificial hand more closely resembled the normal hand than they had expected (item

Table 4

MEAN CHOICE FOR "HIGH" AND "LOW" GROUPS, PREFITTING AND POSTFITTING, FOR EACH ITEM ON QUESTIONNAIRE

Item	Prefitting		Postfitting	
	High	Low	High	Low
1. Functioning of prosthetic arm compared with normal arm	2.1	2.8	2.4	3.1
2. Degree of functioning to be expected in artificial limbs	1.4	2.1	1.9	2.8
3. Extent to which prosthetic arm resembles natural member	1.5	3.0	2.6	3.4
4. Extent to which artificial hand resembles normal hand	2.2	3.3	2.1	3.1
5. Estimate of comfort	1.1	1.6	1.4	2.3
6. Opinion of importance of wearing an artificial limb	2.1	3.0	2.4	2.7
7. Estimate of degree of help provided by prosthesis	1.4	2.0	1.4	2.0
8. Comparison of advantages and disadvantages of wearing a prosthesis	3.7	4.3	3.6	4.1
9. Possibility of being mistaken for a nonamputee	1.6	2.4	1.6	2.6

[7] It should be remembered that expectancy scores approaching 1 indicate favorable prosthetic attitudes, those approaching 5 indicate unfavorable attitudes.

4). The "low's" apparently found (more so than the "high's") that they had not sufficiently appreciated the advantages of wearing prostheses (item 8). Of considerable interest were the group differences in response to item 6 (the importance of wearing an arm). The "high" group showed a lessening of positive opinions, and this decrease corresponded to a decline in negative attitudes among the "low's."

Certainty of Response

Throughout the questionnaire, the amputees had been asked to indicate by code the degree of certainty they felt about each of their responses. After the initial investigation, a study was made of the certainty with which any particular response had been expressed. In the code *AS* (absolutely sure), *VS* (very sure), *FS* (fairly sure), *SU* (somewhat unsure), *VU* (very unsure), *AS* was arbitarily assigned a weight of 1; *VS* a weight of 2; *FS,* 3; *SU,* 4; and *VU,* 5. Thus was obtained an average certainty score for each person in each group. The mean certainty scores for each group, prefitting and postfitting, are shown in Table 5.

Table 5

MEAN CERTAINTY SCORES, PREFITTING AND POSTFITTING, FOR "HIGH" AND "LOW" GROUPS

Group	Degree of Certainty	
	Prefitting	Postfitting
High expectancy	1.8	1.3
Low expectancy	2.5	2.2

Amputees with high expectancy express themselves as being a good deal more certain of their responses than do the low-expectancy amputees, although both are generally quite affirmative. Since in general the amputees admit to very little prosthetic knowledge, one may wonder about the basis for such certainty. After they had acquired experience with their prostheses, both groups became even more certain in their responses, as might have been expected. But the increase in certainty among the "low's" was considerably less than the increase expressed by the "high's." There would seem to be much value in further analysis of the relationship between attitude toward prostheses and certainty of response.

Relationships Between Expectancy and Other Factors Related to Amputation

In order to learn whether or not there were systematic relationships between prosthetic-expectation level and certain other factors, the "high" and the "low" groups were compared with regard to amputation type, hand dominance, marital status, age, educational level, and age at time of amputation. Analysis indicated no statistically significant differences *(9)* between the group with high expectancy and the group with low expectancy.[8] It would appear that, for this sample, the amputees who expect considerable returns from prosthetic service and those who do not expect very much are not greatly different in the factors of amputation type, handedness, marital status, age, education, and time since amputation. The suspicion that "attitudes held by amputees about prosthetic restoration before fitting are related to the attitudes they hold after fitting and a period of use" is therefore confirmed by the data. The findings also substantiate the more specific hypothesis: *The amputee who approaches the fitting with a positive attitude about prostheses will tend to maintain that altitude after he has worn and used one; the amputee who starts with a less positive, ambivalent, or negative attitude toward prostheses will persist in that attitude after wear and use.*

It must be emphasized that these findings relate to the amputees' general attitudes toward prosthetic restoration. Any particular reaction will be a function of the general prosthetic attitude and also of the specific factor involved, whether it be that of appearance, of function, or of something else.

[8] Kolmogorov-Smirnov and Fisher Exact Probability Tests (Siegel) indicated $P > 0.05$ in all instances.

Relationships Between High and Low Expectancy and Other Attitudes of Amputees

In the course of the studies, information also was gathered describing the attitudes, experience, and expectancies of the subjects. Not all of these data were thought to be directly related to the question of what the amputees expected from prosthetic restoration. But in continuation of the study of amputee attitudes toward prosthetic service, they were examined anyway. A nonstatistical comparison, made between high-expectancy and low-expectancy groups to detect differences with respect to other reactions, uncovered the following distinctions:

1. On the whole, the group with the high expectations reported a great deal of improvement in performance. But the low-expectation group said that performance of a number of activities was impaired after prosthetic treatment. The degree of negative change reported by the "low's" was not as great as the degree of improvement reported by the "high's." Activities showing the greatest amount of change were eating, dressing, driving, and participating in sports. The "low" group expressed the most disappointment about eating, dressing, and sports activities. The "high" group reported its greatest improvements in the areas of dressing and driving.

2. The "low's" expected more difficulties than did the "high's" (18 to 12), and in the evaluations after fitting they continued to report more difficulties (19 to 14).

3. More "high's" than "low's" reported having had favorable comments made to them about the appearance of their prostheses.

4. More "low's" than "high's" admitted to negative changes in feelings since amputation.

5. Before wearing a prosthesis, four "low's" felt resentful when new acquaintances asked about the amputation; none of the "high's" expressed any negative feelings. After wear, the "high's" still did not express resentment, although three "low's" did.

6. The most outstanding difference between the "high" and "low" groups was manifest in response to the question, *If you don't consider appearance, do you think that you could get along as well without a prosthesis as with one?* Before fitting, none of the 28 subjects responded in the negative (perhaps because they were getting a free prosthesis). Three of the "high's," however, gave extremely positive responses ("The prosthesis is like a part of my body; I cannot do without it."), while the rest of the "high's" and all of the "low's" answered more temperately ("It facilitates things, increases independence."). In the postfitting evaluation, one of the "high's" said that he could do without a prosthesis, as his was not too helpful; two of the "high's" gave extremely positive replies; and the rest were more moderately positive. The "low's" presented a much more negative picture in the postfitting evaluation. Four said that they felt they could do without a prosthesis, and only one expressed himself as being oriented very positively.

The validity of the group division appears to be supported by the sample findings from the rest of the psychological data. Although we are concerned at present with establishing points of difference between the "high" and the "low" groups, it is well to add that in many other variables, such as social sensitivity and reactions to frustration, use of these measuring instruments revealed no differences.

In conclusion, then, the hypothesis was confirmed that the attitudes of nonwearers toward prosthetic restoration are related to their attitudes after they have worn prostheses. Through the use of a set of questions, it was found possible to differentiate between favorable and unfavorable attitudes. The division of the amputees on the basis of their general attitudes toward the usefulness of prostheses gave some indication of being related to other than prosthetic factors. But judging from the results, the establishment of predictive indicators of attitude toward prosthetic restoration appears to be feasible. It should be possible to develop a predictive scale which will have clinical and research utility and which at the same time can be administered and interpreted in a relatively simple way.

SUMMARY

Throughout this section a number of recurrent themes have been encountered. Chief among these has been the amputees' need for unprejudiced recognition by nonamputees. In order to gain this recognition, the amputees consistently present themselves in a manner which only partially represents their true feelings. The interpretation of the data has therefore been that the amputees utilized the questionnaires more to express their feelings about how an amputee *should* be regarded than to state how he actually *is* treated. From this point of departure the information has been handled at two levels—the first involving the assumption that the data are valid and meaningful in themselves, the second based on the premise that the responses reflect the

conscious and subconscious wishes of the subjects.

PERSONALITY DYNAMICS OF AMPUTEES

Although 90 percent of the amputees said that they were adapted to their loss, it is doubtful that so many had really achieved this result. Evidence seemed to indicate that many of the amputees were trying to maintain feelings of bodily integrity and adequacy by denying the personal and social concomitants of amputation. Any implication of abnormality was overwhelmingly rejected. Their physical defect was consistently de-emphasized, and their goals and values were those of the normal, nondisabled person.

In almost all instances, amputees portray themselves as being as able an nonamputees. While almost never admitting to being substantially inferior to nonamputees, they do acknowledge that some extra effort is necessary to keep up with them. Other evidence confirms that amputees are, in the main, correct in stressing their ability. But their consistent refusal to acknowledge limitations reflects their own self-concern. Apparently they must exaggerate to maintain a social and vocational status equal to that of nonamputees.

Considerable stress is placed upon self-sufficiency. Amputees say they resist accepting help because it is generally unnecessary. Unexpressed, but no less important, is the feeling that to accept help makes one dependent and lowers one's status.

Sensitivity about physical prowess and appearance is one of the crucial influences in the psychological functioning of the amputee. The subjects in this study readily admitted their concern about the opinions of others, but few were ready to admit any considerable amount of sensitivity. They claimed not to resent curiosity about their appearance and to expect people to look at them. Clinical experience, however, indicates that amputees are much more sensitive and hostile toward the curious person than was indicated by the data. Not infrequently such sensitivity is denied not only to others but also to themselves.

Amputees claim to be accepted by others on the same basis as anyone else, and they reject strongly the suggestion of "different" treatment. Mostly, the subjects did not feel that amputation had been a serious source of frustration. They felt they usually could do the things they wanted. When they were unable to perform because of the amputation, their usual reaction was to try all the harder.

Finally, the general tone of the amputees is to give the impression of being optimistic about their abilities, acceptance by others, and future goals.

The positive effect of the experimental treatment program on many of these variables was demonstrated. Although no radical personality changes were observed, there were consistent indications that some decrease in sensitivity and frustration resulted from the improved management procedures and from the improved prostheses. In addition, some degree of greater acceptance of loss, increased feelings of functional adequacy, and greater ease in social situations were noted.

SOCIAL AND FUNCTIONAL FACTORS IN PROSTHETIC WEAR

The prosthetic-reaction test resoundingly confirmed the data from the questionnaires. It was clear that participation in the treatment program resulted in an increase in those responses indicating greater independence and increased feelings of security. The amputees believed there was both functional and psychological advantage in the wearing of a prosthesis. They viewed prostheses as providing the wherewithal for independent functioning. Increased confidence in their functional adequacy helped them to achieve greater self-acceptance, enabled them to face their disability more realistically, and let them view the reactions of others without feeling quite so threatened. They expected nonwearers to be more shy, more easily embarrassed, and less adaptive.

ATTITUDES TOWARD PROSTHETIC WEAR, BEFORE AND AFTER FITTING

In the final phase of the investigation two questions were asked: *Are the expectations of nonprosthesis wearers fulfilled by wearing a prosthesis?* and *Can the postfitting altitudes of amputees toward their prostheses be predicted on the basis of their prefitting expectations?*

A number of avenues of approach were utilized to answer the first question. It was found that the extent of prosthetic knowledge claimed by the amputees was very small. The implications of the lack of information were discussed, with stress upon the opportunity ignorance presents for the development of unrealistic expectations (which may influence negatively future attitudes toward prostheses). Overly ambitious ideas as to the value of prostheses were modified with experience, and after being fitted most of the amputees had more realistic expectations of the advantages to be derived from prosthetic wear.

General acceptance of the appearance of the prosthetic components was clear. There was little change in opinion regarding the extent to which prosthetic arms and hands resembled normal members. Three important constituents to the final judgment of amputee appearance were identified—the static factor of the cosmetic value of the prosthesis irrespective of function, the dynamic factor of natural appearance in use, and the situational factor of the intensity of the contact.

Preconceptions regarding comfort did not change markedly with experience. Although comfort appears to be no important problem for three fourths of the amputees, the remaining one fourth found their prostheses to be uncomfortable.

The amputees retained favorable attitudes toward the prostheses after a period of wear. Prostheses were considered to be generally helpful and very important to the amputees, the advantages far outweighing the disadvantages.

With the exception of "learning to operate," most of the difficulties anticipated in wearing an arm actually developed. In addition, other problems evolved, such as mechanical failure, stump pain, and excessive heat. A number of hypothetical personality types were described to help identify complaints based upon emotional factors as contrasted with those directly related to prosthetic or medical problems.

The second question was directed toward the idea that attitudes held before prosthetic fitting may influence the valuation of prosthetic usefulness regardless of experience. Tested and confirmed was the hypothesis that attitudes held by amputees about prosthetic restoration before fitting are related to the attitudes held after fitting and a period of use. Amputees holding favorable attitudes before using prostheses tended to maintain those attitudes after wear and use; subjects negatively disposed continued to be less favorably inclined.

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