

PSYCHOLOGICAL AND BIOLOGICAL PERSPECTIVES ON ALTRUISM

Martin L. HOFFMAN

Dept. of Psychology, University of Michigan

Received March 1978

This paper presents the case for viewing altruism as an inherent part of human nature. The argument is first made that 'inclusive fitness', the key concept in modern evolutionary biology, dictates that (a) humans are programmed not only to be egoistic but also, under certain conditions, to help another at cost to themselves; and (b) what was selected was not altruistic action but mediators of action, because this provided the necessary flexibility. Psychological evidence is then presented that complements this view. Thus (a) there appears to be a general human tendency to help others in distress, which has properties analogous to egoistic motivation and yet comes into play independently of egoistic motivation; and (b) the evolutionary requirements for a mediating mechanism appear to be met by empathy, e.g., it is reliably aroused in humans in response to misfortune in others, it predisposes the individual toward helping action and yet is amenable to perceptual and cognitive control, and its physiological basis may have been present in early humans. The social implications of a biological basis for human altruism are discussed.

Recent years have seen a surge of interest in questions revolving around the biological basis of social behavior. One notable result is an entire new field, sociobiology, which has burst on the scene, raising a host of ideological as well as academic questions (e.g., E.O. Wilson 1975; Sahlins 1976). A central issue of debate in the sociobiological literature concerns the presence or absence of a biological basis for altruistic morality in humans. The arguments used in this debate, even by psychologists (e.g., Campbell 1975), are mainly based on evolutionary biology and, to some extent, anthropology. Psychology, which ought to have something to say about human nature, has yet to make a distinctive contribution. The aim of this paper is to pull together the pertinent psychological research and show how it may complement modern evolutionary theory.

Evolutionary biology and altruism

The original Darwinian notion of survival of the fittest, with each individual competing against others and natural selection favoring egoistic, self-preserving behavior, seemed to leave little room for altruism. Evolutionary theorists now agree, however – due to accumulating evidence from fossil remains (bones, tools, weapons), observations of insects and mammals in their natural habitats, and ethnographic descriptions of primitive human groups – that during most of man's evolutionary history he lived in a highly adverse environment under constant threat from starvation and predators. Furthermore, he coped with these conditions not alone but by banding together with others in small, nomadic hunting and gathering groups. Consequently, the current views take account of the necessities of cooperative social existence, as well as individual competition. Three distinct mechanisms – group selection, kin selection, reciprocal altruism – all variants of the Darwinian model, have been advanced which suggest there may be a biological basis for altruism, as well as egoism, in humans.

The most influential mechanism is kin selection, which provides a parsimonious explanation of altruism that is also consistent with the traditional view that each organism acts to maximize its own survival. The central concept is that organisms function to maximize their inclusive fitness (Hamilton 1964, 1971), which is measured by the survival and reproduction not only of the individual and his offspring but also of other relatives who share his genes. The nearer the kin, the greater the readiness to forego a selfish act and perform an altruistic act; if the actor and the recipient are sufficiently closely related – and especially if there are multiple recipients – a net increase in the actor's genes will result.

An important extension has been made by Eberhard (1975) who shows mathematically that any small degree of relatedness can serve as the basis for kin selection as long as the relation of beneficiary to altruist is even slightly above average for the population. Furthermore, the probability of altruism is increased if the beneficiary stands to gain a great deal (e.g., in emergencies); if the cost is low (e.g., if the altruist is excluded from reproducing on his own or is in control of an abundant resource); if the donor is particularly efficient at giving aid, or if the beneficiary is particularly efficient at using it. Altruism toward very distant relatives can thus be encompassed by the concept of inclusive

fitness. If we add to this the concept of reciprocal altruism (Trivers 1971), which states that natural selection favored altruism to totally unrelated members of one's group, because such altruism will be paid back in the future and thus contribute to the propagation of one's own genes, then clearly a good case for a biological basis for altruism can be made.

The case may appear limited, however, since the actor's own genes ultimately receive benefit from his action. At the level of genes, then, altruism appears to be impossible. And indeed it is for this reason that some writers deny the possibility of a biological base for altruism altogether. According to these writers, if inclusive fitness precludes altruistic genes it must also preclude altruistic behavior (e.g., Campbell 1972; Cohen 1972). This view obviously equates the level of genes with the level of behavior. It also appears to assume somehow that 'gene selfishness' is the prime mover in evolution, and changes in bodily structures and behavioral tendencies are merely the consequences. In fact, it is the other way around. The unit of selection is the total organism. The organism, not the gene, is directly involved in the struggle for existence.¹ And, it is in the process of organisms changing and adapting to persistent ecological pressures that structures (genotypes as well as phenotypes) are selected and maintained, to become part of the biological inheritance of the species.

These structures, to be sure, contribute to the organism's genetic inclusive fitness. But some of the very same structures that contribute to the organism's genetic inclusive fitness may also lead the organism to behave in such a way as to sacrifice itself physically under certain conditions. Thus, inclusive fitness dictates the survival of structures that not only (a) contribute to propagation of one's genes but also (b) fit the behavioral definition of altruism. Humans are biologically programmed not only to be egoistic but, under certain conditions, to help others at cost to themselves – not genetic cost, but cost all the same.

¹ Also, as noted by Gould (1977), there are no particular genes for particular body parts; bodies are not unambiguous maps of their genes. Therefore, selection cannot even be said to operate directly on genes through body parts coordinated to them.

Behavioral evidence for altruism

Psychologically, altruistic behavior may be defined as behavior that promotes the welfare of others without conscious regard for one's own self interests. Interestingly, the doctrinaire view in psychology, like traditional evolutionary biology, has long been that what seems like altruism can ultimately be explained by egoistic, self-serving motives. Empirical evidence for this view has not been deemed necessary, probably because it seemed so obvious in our highly individualistic society. It is also always possible when viewing an example of human action that appears to be motivated by an interest in the welfare of others, to adduce a hidden, or unconscious motive (e.g., social approval, self-esteem) as constituting the real source of such behavior. This inference is of course plausible and it fits so well with our Western conception of man that it is easy to forget that it is just an ad hoc hypothesis and that it carries as much of a burden of proof as the altruistic interpretation – perhaps more since, as we have seen, natural selection favors altruism as well as egoism. Let us examine the evidence.

Universality of altruistic behavior

There is no clear evidence for universality because the necessary cross-cultural research has not been done. A first crude line of evidence can be found in the research showing that people of all ages, even in our highly individualistic western society, do tend to offer help under controlled conditions when they are the only witness present and the need is clear and not diffused among a number of bystanders (see reviews by Bryan and London 1970; Krebs 1970; Staub 1974). Furthermore, the percentage of those who help is quite high. Children 8–10 years of age attempted to help others in half the opportunities to help that occurred in a naturalistic setting (Severy and Davis 1971). In a laboratory experiment, half the second-to-fourth graders left an assigned task to help a crying child in the next room (Staub 1970, 1971) – which is interesting since children are usually restrained in experimental settings. Fewer sixth graders helped but half of them did when given prior permission to enter the room, as did 90% of a seventh-grade sample.

Independence of egoistic motive arousal

It is possible, as traditional psychology suggests, that this helping reflects an egoistic motive such as social approval. This is counter-

indicated, however, by the finding that people are more likely to help when there are no witnesses present (e.g., Darley and Latané 1968).

We would also expect, if approval motives underlie altruistic action, that people tend to help when approval motives are aroused; there should thus be a positive relation between arousal and helping. If, however, an independent motive underlies altruistic action, then people should help when approval needs are fulfilled rather than aroused. The latter expectation is borne out by the research. Children are more apt to help, for example, if they are popular, secure, and self-confident (Murphy 1937; Staub and Sherk 1970) or if they receive a lot of affection at home (Hoffman 1975; Mussen et al. 1970; Yarrow et al. 1973). Furthermore, helping is increased by experimentally arousing positive moods and feelings of success, and decreased by arousing feelings of failure and concerns about social approval (Berkowitz and Connor 1966; Isen 1970; Isen et al. 1973; Moore et al. 1973).

Altruism thus appears to be fostered by egoistic need fulfillment and hindered by egoistic need arousal. Egoistic needs therefore cannot be the main source of altruism, which suggests there may be an altruistic disposition that is independent of egoism.

Motivational properties

If altruism reflects a biological motive rather than, for example, a need to conform to an internalized cultural norm, we might expect altruistic action to have an impulsive quality. The research findings, which are sometimes dramatic as to frequency and speed of helping, support this expectation. Darley and Latané (1968) found that 85% of their subjects attempted to help someone they thought was having an epileptic fit, 90% of them acting within 60 sec. Piliavin and Piliavin (1972), and Piliavin et al. (1969) found helping response rates of nearly 100%, and median reaction times of five and ten sec., in two studies in which a subway rider carrying a cane collapsed and fell to the floor. All of Clark and Word's (1972) subjects rushed to help a man they heard fall and cry out in pain; the average reaction time was less than 9 sec. These short reaction times – especially impressive since the subjects were socialized in our highly individualistic society – indicate some impulsiveness in the altruistic response, which suggests that distress cues from others may often have an immediate, compelling quality. The findings thus argue for a rather powerful action tendency or motive

which is triggered by the awareness of another's distress, rather than (or perhaps in addition to) an internalized social norm.

The psychological research thus complements evolutionary theory; both support the plausibility of altruism as part of biological human nature. We may now ask what mechanism underlies altruistic action? Here too, evolution and psychology complement each other. Inclusive fitness dictates the presence of an altruistic response system and also defines certain criteria that such a response system must meet. The precise description of the system, however, is the province of psychology.

Evolutionary criteria

Natural selection requires an altruistic response system that was present in early humans and is dependable, yet flexible. These criteria rule out certain mechanisms; for example, an automatic helping response (fixed action pattern) is not tenable because it would not allow the flexibility needed for survival. The criteria suggest, rather, that there is a disposition toward altruistic action, as well as a mechanism for distinguishing when altruism or egoism is appropriate. For example, the perception of danger to a fellow group member should generally lead to an altruistic response when the potential benefit to the victim exceeds the probable cost to the self; in the absence of such danger, however, the individual's egoistic response system may be activated (e.g., in within-group competition). What therefore must have been selected is not altruistic action but a *predisposition or motive* to act which, though biologically based, is nevertheless amenable to control by perceptual and cognitive processes. Only this type of mechanism could provide the necessary flexibility and enable the most effective (in terms of inclusive fitness) determination of whether or not an altruistic act should occur.

The case for empathy

These evolutionary requirements appear to be fulfilled by empathy, defined as a vicarious affective response to others, especially to cues signifying another's distress.

Universality of empathy

Cross-cultural research is lacking but there is evidence that people of all ages respond empathically to another person in distress, regardless of the empathy index used. Thus, most 4–8 year olds give empathic verbal reports to film sequences depicting other children in happy, sad, or fearful situations (Fay 1970; Feshbach and Feshbach 1969; Levine and Hoffman 1975). Most four- to ten-year olds give empathic facial responses while watching films of people in happy or sad situations (Hamilton 1973). And adults typically give the physiological signs of empathy (e.g., palmer sweat) when witnessing another person in a physically painful situation or failing in a task (e.g., Berger 1962; Craig and Weinstein 1965; Gaertner and Dovidio 1977; Geer and Jarnecky 1973; Krebs 1975; Stotland 1969; Tomes 1964). There is also evidence for an involuntary element in empathic arousal. Simply instructing subjects to avoid experiencing the same type of emotion as someone receiving a shock or a painful heat treatment does not result in a reduction in their level of physiological arousal (Stotland et al. in press).

Physiological basis

A possible neural basis for empathy has been suggested by MacLean (1958, 1962, 1967, 1973). According to MacLean, the limbic system – an ancient part of the brain which humans share with all mammals – has two parts: one is primarily involved with the feelings, emotions and behavior that insure self-preservation; the other, with the feeling states, including empathy, that are conducive to sociability and preservation of the species. The limbic system is connected to (a) the hypothalamus, which helps integrate emotions and viscerosomatic behavior and the pre-frontal cortex, a newer formation of the brain which functions, among other things, to help integrate emotions and cognition. Thus, even very early man may have been wired in such a way that his own feelings of distress or joy were contingent not only on the direct impact of events on him but also on the impact of events on others; it may have been difficult for one individual to ignore the pain or distress experienced by another. And, with the acquisition of new brain structures and connective neural circuits, the earlier primitive empathy may have become subject to increased cognitive control. Thus, humans may

have long had a neural basis for empathic affect arousal and for the intervention of cognitive assessment prior to acting.²

Early precursor of empathy

There is evidence that one- and two-day old infants will cry in response to the sound of another infant's cry (Sagi and Hoffman 1976; Simner 1971). Furthermore, this cry is not merely a response to a noxious stimulus, since the infants do not cry as much to equally loud non-human sounds. Nor is it a simple imitative vocal response lacking an affective component. Rather, it is vigorous, intense, and in all observable respects resembles a spontaneous cry (Sagi and Hoffman 1976). In other words, exposure to a cue of distress in another infant produces distress in the newborn. The newborn's reflexive cry must therefore be considered as a possible early precursor of empathic arousal, though obviously not a full empathic response.

Later possibly innate modes of empathic arousal

There are also two types of empathic arousal that may occur in children and adults that have the earmarks of species-wide responses. In one, the observer automatically imitates the other person with slight movements in posture and facial expression ('objective motor mimicry'), thus creating in himself inner cues that contribute, through afferent feedback, to his understanding and experiencing of the other person's affect (Lipps 1906). Though ignored over the years there is recent, suggestive support for this concept. The evidence for motor mimicry comes from studies showing that people engage in increased lip activity and increased frequency of eye-blink responses when observing models who stutter or blink their eyes (Berger and Hadley 1975; Bernal and Berger 1976). The evidence for afferent feedback is that the different emotions appear to be accompanied by different degrees of tone in the skeletal muscles and different patterns of facial muscle activity, and

² Not all writers share MacLean's views in their entirety. Some, for example, see the limbic system as encompassing a larger portion of the brain and playing an important role in long-term memory. Others have raised questions about whether it plays such a direct role in prosocial emotion. There is general agreement, however, that the limbic system is much older than the neo-cortex, that it mediates the emotions, and that it is intricately connected with the neo-cortex and others parts of the brain.

that this occurs in different cultures (e.g., Gelhorn 1964; Izard 1971). Finally, it appears that cues from one's facial musculature may contribute to the actual experience of a particular emotion (Laird 1974).

The second empathic mode, based on conditioning, holds that cues of pain or pleasure from another person or from his situation evoke associations with the observer's own past pain or pleasure, resulting in an empathic affective reaction (Humphrey 1922). A simple example is the boy who cuts himself, feels the pain, and cries. Later, on seeing another boy cut himself and cry, the sight of blood, the sound of the cry, or any other distress cue or aspect of the situation having elements in common with his own prior pain experience can now elicit the unpleasant affect initially associated with that experience. Although the focus is on conditioning, which is a learning mechanism, the empathic response is involuntary and virtually automatic. Once the observer detects the relevant cues from the other person or his situation, if he has had similar experiences in the past he will respond empathically. For this type of empathy to be a species-wide response, requires that the important emotional experiences of each individual resemble the emotional experiences of others. This seems reasonable to assume, in view of the similar critical events and crises that most people have through the life cycle, especially during socialization. And, since people have the same nervous system they presumably respond to these events with similar emotions. Observing another person in distress should therefore generally evoke an empathic distress response.

Empathy and helping

The evidence thus far suggests that empathy may be a universal response to distress in others. Is there evidence that empathy leads to altruistic action? First, there are numerous studies showing that when a person is exposed to another in distress he either responds empathically or with an overt helping act, whichever is being investigated (Berger 1962; Clark and Word 1972; Craig and Weinstein 1965; Lazarus et al. 1962; Piliavin et al. 1969; Severy and Davis 1971; Staub 1970; Stotland 1969; Tannenbaum and Gaer 1965; Tomes 1964). And when data are collected on both empathy and helping, subjects typically show both responses (Murphy 1937; Darley and Latané 1968; Geer and Jarnecky 1973; Krebs 1975; Weiss et al. 1973). Furthermore, there is evidence that as the magnitude of the pain cues from the victim increases, the

observer's level of empathic arousal also increases, as does the speed with which he acts to help (Geer and Jarmesky 1973).

Aside from these correlational findings, there is evidence that empathy actually precedes and contributes to helping. I'll mention the most recent and convincing study. The subjects, female undergraduate students, observed (through earphones) a situation in which a confederate left an experimental task in order to straighten out a stack of chairs that she thought was about to topple over on her. A moment later the confederate screamed that the chairs were falling on her, and then was silent. The main finding was that the greater the subject's empathic distress (indicated by change in heart rate), the more quickly she intervened. Furthermore, the physiological arousal preceded the subject's rising from her chair to help. That is, the heart-rate acceleration occurred during the 10-sec period immediately following the confederate's scream, whereas the median latency for rising was 40 sec. Thus the intensity of arousal was systematically related to the intensity of subsequent helping action.

If empathy is a motive for helping, we might also expect empathically aroused affect to diminish in intensity after a helping act, but continue at a high level if the observer does nothing. Evidence for this exists in Darley and Latané's (1968) study in which subjects heard sounds indicating someone was having an epileptic fit. Those who did not respond overtly continued to be aroused and upset, as indicated by trembling hands and sweaty palms; those who did respond showed fewer signs of continued upset. A similar finding was obtained in Murphy's (1937) nursery school study: when children overtly helped others, their affective response appeared to diminish; when they did not help, the affect was prolonged.

To summarize, the findings suggest (a) empathic arousal precedes helping, (b) the more intense the victim's pain cues, the more intense the observer's empathic arousal (c) intensity of empathic arousal is systematically related to subsequent helping behavior and (d) empathic arousal diminishes following a helpful act. It is difficult to explain these results except to assume that empathic arousal serves as a motive for helping.³

³ As noted elsewhere (Hoffman in press), however, empathic arousal may at times be so intense as to direct the observer's attention to himself rather than to the victim, with a resulting decrease in the likelihood of an altruistic response. This effect of empathic overarousal may have been adaptive in evolution because it often occurred when the victim's situation was hopeless (reducing the benefit/cost ratio to zero). Furthermore, in preserving one's energy in these hopeless situations, one may continue to be available to help others when such action will be more effective.

Empathy, egoism, and altruism

Empathy is uniquely well suited for bridging the gap between egoism and altruism since it can transform another person's misfortune into one's own distress, which in turn can usually best be alleviated by helping that person. Because empathic distress is aversive to the actor and the aversive state is reduced by helping, some writers treat empathic distress as an egoistic motive (e.g., Piliavin et al. 1969; Gaertner and Dovidio 1977). What these writers seem to overlook is the difference between the consequence of an act and its aim. Because a person has a satisfied feeling afterwards does not necessarily mean that he acted in order to have that feeling. Indeed, when people are asked why they helped someone, the typical response is that the other person needed help and they acted without thinking or after briefly considering whether or not to go out of their way to help. Rarely do they mention their own empathic distress as a reason for their action.

More fundamentally, even if people did help in order to relieve their own empathic distress, to conclude that empathic distress is egoistic is to overlook the fact that all motives prompt action that is potentially satisfying to the actor. If a satisfied feeling afterwards characterizes all motives, then it cannot be used as the defining criterion of a particular class of motives (e.g., egoistic). If a satisfied feeling results from action triggered by empathic distress, then this cannot be reason enough to define empathic distress as egoistic. To do this would obscure certain profound differences between empathic distress and other motives. Unlike other motives, (a) empathic distress is reliably aroused by another's misfortune, not just one's own, (b) a major goal of the ensuing action is to help the other, not just the self, and (c) the potential for gratification in the actor is contingent on his doing something to reduce the other's distress. It is therefore more appropriate to designate empathic distress as an altruistic motive – perhaps, with a quasi-egoistic component – then to group it with motives such as material gain, social approval, competitive success, which are so much more clearly self-serving.

Alternatives to empathy

Are there alternatives to empathy as an altruistic mechanism? The most likely possibility is a more subtle type of egoistic motive than

those just mentioned. Psychoanalytic theory, for example, maintains that people may act altruistically to avoid anxiety or to conform to an internal ideal. Social learning theorists now argue similarly that people may act to enhance their self-image and gain self-reward (e.g., Bandura 1977), and it seems plausible that people sometimes help others for these reasons. There are problems with these formulations, however. First, there is as yet no empirical evidence for them. More fundamentally, there is nothing intrinsic about anxiety-avoidance or self-reward, as there is about empathic distress (its aversive quality that can best be reduced by helping), that should make them reliable contributors to altruism. What makes someone feel good about himself is due to the cultural norms guiding his socialization, which vary widely, and in our society self-reward is as likely to follow egoistic as altruistic action. Self reward therefore does not meet the evolutionary criterion of a reliable altruistic mechanism. Empathy, then, appears thus far to be the only reliable motive base for at least one type of altruism – helping others in distress.

There is a growing body of research on another type of altruism – sharing that suggests there may be a human tendency to allocate resources to people according to some principle other than simply granting the most to the self. It seems plausible that just as empathy may provide the motive base for helping another in distress, a disposition toward equity may provide the motive base for sharing. This is only conjecture, of course, since the existence of a disposition toward equity has not yet been examined with regard to evolutionary criteria, nor is there anything like the supportive network of empirical findings that exists for empathy. It is also possible that a person is made uncomfortable by inequity because he responds empathically to others who lack the resources he has (Hoffman 1976, in press). If so, empathy may provide the basis for a unitary theory of altruistic motivation that encompasses sharing as well as helping.

Social implications

It seems clear that if humans were totally egoistic biologically, then, assuming altruism is necessary for social life, it would probably be necessary for social institutions to be heavily repressive. The guiding model for altruistic socialization, for example, might hold that for the

sake of society the child's egoistic impulses must be discouraged. Altruistic socialization would then be a continuing struggle to control the child's egoistic impulses and to help him learn to control them himself, perhaps by punishing their expression so that egoistic action becomes associated with anxiety. If empathy is a biologically based altruistic motive, on the other hand, then the socialization agents have a built-in ally within the child – his proclivity to empathize. Altruistic socialization might then be less repressive. Nonrepressive techniques could be used effectively and the focus of altruistic socialization could be on strengthening empathic tendencies, rather than curbing egoistic tendencies. This may be done, for example, by allowing the child the normal run of distress experiences, which would help enable him to respond empathically to a wide range of distress cues from others; and by providing models who act altruistically and often express the feelings and reasons underlying their actions (due to empathy, children will be prone to emulate such models). Providing a range of role-taking opportunities should also help the child to understand what others are feeling. Finally, altruism should be encouraged to the extent that the parents provide the affectional support necessary for the child to be responsive to cues of feeling from others, rather than always absorbed by his own needs. Whether altruism has a biological basis, then, may have practical, social policy implications.

The broader question may be asked, does biology dictate human values? If any human attribute is biologically based, does this mean it is necessarily good and society should endorse it? My answer is, no, for two reasons. First, biological attributes often occur in polarities, such as egoism-altruism. To the extent that this is true, it is obviously meaningless to ask whether biology dictates values. More fundamentally, virtually all distinctive human attributes appear to have evolved over a period of 1–3 million years when the world was far different than it is now. It therefore seems absurd to assume that our biological inheritance should determine what is to be valued in our contemporary world; or even that attributes that were adaptive then are necessarily adaptive now. Some of these attributes, such as altruism, are undoubtedly adaptive, but others may not be. It therefore seems clear that the criterion for human values must be derived on other, nonbiological grounds, including perhaps an analysis of the contemporary scene. Biology may tell us what is possible in humans and it may also give clues as to how best to socialize children, for example, how to make

them more altruistic, but it cannot tell us what the values or socialization goals *should* be.

References

- Aderman, D., S.S. Brehm and L.B. Katz, 1974. Empathic observation of an innocent victim: the just world revisited. *Journal of Personality and Social Psychology* 29, 342–347.
- Alexander, R.D., 1974. The evolution of social behavior. *Annual Review of Ecology and Systematics* 5, 325–383.
- Alexander, R.D., in press. Natural selection and the analysis of human sociality. In: C.E. Goulden (ed.), *Changing scenes in natural sciences*. Bicentennial Symposium Monograph, Philadelphia Academy of Natural Sciences.
- Bandura, A., 1977. *Social learning theory*. Englewood Cliffs, N.J.: Prentice Hall.
- Berger, S.M., 1962. Conditioning through vicarious instigation. *Psychological Review* 69, 450–466.
- Berger, S.M. and S.W. Hadley, 1975. Some effects of a model's performance on observer electromyographic activity. *American Journal of Psychology* 88, 263–276.
- Berkowitz, L. and W.H. Connor, 1966. Success, failure and social responsibility. *Journal of Personality and Social Psychology* 4, 664–669.
- Bernal, G. and S.M. Berger, 1976. Vicarious eyelid conditioning. *Journal of Personality and Social Psychology* 34, 62–68.
- Bryan, J.H. and P. London, 1970. Altruistic behavior by children. *Psychological Bulletin* 73, 200–211.
- Campbell, D.T., 1965. Ethnocentric and other altruistic motives. In: D. Levine (ed.), *Nebraska symposium on motivation* (Vol. 13). Lincoln: University of Nebraska Press.
- Campbell, D.T., 1972. On the genetics of altruism and the counter-hedonic components in human culture. *The Journal of Social Issues* 28, 21–38.
- Campbell, D.T., 1975. On the conflict between biological and social evolution and between psychology and moral tradition. *American Psychologist* 30, 1102–1126.
- Clark, R.D. and L.E. Word, 1972. Why don't bystanders help? Because of ambiguity? *Journal of Personality and Social Psychology* 24, 392–400.
- Cohen, R., 1972. Altruism, human, cultural, or what? *Journal of Social Issues* 28, 39–57.
- Craig, K.D. and M.S. Weinstein, 1965. Conditioning vicarious affective arousal. *Psychological Reports* 17, 955–963.
- Craig, K.D. and J.H. Lowery, 1969. Heart rate components of conditioned vicarious autonomic responses. *Journal of Personality and Social Psychology* 11, 381–387.
- Crowell, D.H., L.B. Blurton, L.R. Kobayashi, J.L. McFarland and R.K. Yank, 1976. Studies in early infant learning: classical conditioning of the neonatal heart rate. *Developmental Psychology* 12, 373–297.
- Darley, J.M. and B. Latané, 1968. Bystander intervention in emergencies: diffusion of responsibility. *Journal of Personality and Social Psychology* 8, 377–383.
- Eberhard, M.J.W., 1975. The evolution of social behavior by kin selection. *The Quarterly Review of Biology* 50, 1–33.
- Fay, B., 1970. The relationships of cognitive moral judgment, generosity, and empathic behavior in six and eight year old children. Unpublished doctoral dissertation, University of California, Los Angeles, School of Education.
- Feshbach, N.D. and S. Feshbach, 1969. The relationships between empathy and aggression in two age groups. *Developmental Psychology* 1, 102–107.

- Feshbach, N.D. and K. Rose, 1968. Empathy in six- and seven-year-olds. *Child Development* 39, 133–145.
- Gaertner, S.L. and J.F. Dovidio, 1977. The subtlety of white racism, arousal and helping behavior. *Journal of Personality and Social Psychology* 35, 691–707.
- Geer, J.H. and L. Jarnecky, 1973. The effect of being responsible for reducing another's pain on subject's response and arousal. *Journal of Personality and Social Psychology* 26, 232–237.
- Gelhorn, E., 1964. Motion and emotion: the role of proprioception in the physiology and pathology of the emotions. *Psychological Review* 71, 457–472.
- Gould, S.J., 1977. Caring groups and selfish genes. *Natural History* 20–24.
- Hamilton, M.L., 1973. Imitative behavior and expressive ability in facial expression of emotion. *Developmental Psychology* 8, 238 (and personal communication).
- Hamilton, W.D., 1964. The genetic evolution of social behavior. *Journal of Theoretical Biology* 7, 1–52.
- Hamilton, W.D., 1971. Selection of selfish and altruistic behavior in some extreme models. In: J.F. Eisenberg and W.S. Sillon (eds.), *Man and beast: comparative social behavior*. Washington, D.C.: Smithsonian Institution Press.
- Hoffman, M.L., 1975. Altruistic behavior and the parent-child relationship. *Journal of Personality and Social Psychology* 31, 937–943.
- Hoffman, M.L., 1976. Empathy, role-taking, guilt, and development of altruistic motives. In: T. Likona (ed.), *Morality: theory, research, and social issues*. Holt, Rinehart and Winston, Inc., 124–143.
- Hoffman, M.L., 1977. Empathy, its development and prosocial implications. In: C.E. Keasey (ed.), *Nebraska symposium on motivation* 25, in press.
- Hoffman, M.L., in press. Adolescent morality in developmental perspective. In: J. Adelson (ed.), *Handbook of Adolescent Psychology*. New York: Wiley Interscience.
- Humphrey, G., 1922. The conditioned reflex and elementary social reaction. *Journal of Abnormal and Social Psychology* 17, 113–119.
- Isen, A.M., 1970. Success, failure, and reaction to others: the warm glow of success. *Journal of Personality and Social Psychology* 15, 294–301.
- Isen, A.M., N. Horn and D.L. Rosenhan, 1973. Effects of success and failure on children's generosity. *Journal of Personality and Social Psychology* 27, 239–247.
- Izard, C.E., 1971. *The face of emotion*. New York: Appleton-Century Crofts.
- Krebs, D.L., 1970. Altruism: an examination of the concept and a review of the literature. *Psychological Bulletin* 73, 258–303.
- Krebs, D.L., 1975. Empathy and altruism. *Journal of Personality and Social Psychology* 32, 1124–1146.
- Lacey, J.I., 1959. Psychophysiological approaches to the evaluation of psychotherapeutic process and outcome. In: E.A. Rubenstein and M.B. Parloff (eds.), *Research in psychotherapy*. Washington, D.C.: National Publishing Co. 160–208.
- Laird, J.D., 1974. Self-attribution of emotion: the effects of expressive behavior on the quality of emotional experience. *Journal of Personality and Social Psychology* 29, 475–486.
- Lazarus, R.S. and E. Alfert, 1964. Short-circuiting of threat by experimentally altering cognitive appraisal. *Journal of Abnormal and Social Psychology* 69, 195–205.
- Lazarus, R.S., J.C. Speisman, A.M. Mordkoff and L.A. Davison, 1962. A laboratory study of emotional stress produced by a motion picture film. *Psychological Monographs* 76 (34, Whole no. 553).
- Lerner, M.J. and C. Simmons, 1966. Observer's reaction to the innocent victim: compassion or rejection? *Journal of Personality and Social Psychology* 4, 203–210.
- Levine, L.E. and M.L. Hoffman, Empathy and cooperation in 4-year-olds. *Developmental Psychology* 11, 533–534.

- Lipps, T., 1906. Das wissen von fremden Ichen. *Psychol. Untersuch.* 1, 694–722.
- MacLean, P.D., 1958. The limbic system with respect to self-preservation and the preservation of the species. *Journal of Nervous Mental Disease* 127, 1–11.
- MacLean, P.D., 1962. New findings relevant to the evolution of psychosexual functions of the brain. *Journal of Nervous Mental Disease* 135, 289–301.
- MacLean, P.D., 1967. The brain in relation to empathy and medical education. *Journal of Nervous Mental Disease* 144, 374–382.
- MacLean, P.D., 1973. A triune concept of the brain and behavior. Toronto, Canada: University of Toronto Press.
- Mathews, K. and E. Stotland, 1973. Empathy and nursing students' contact with patients. University of Washington, Spokane, Washington (mimeo).
- McDougall, W., 1908. An introduction to social psychology. London: Methuen.
- Moore, B.S., B. Underwood and D.L. Rosenhan, 1973. Affect and altruism. *Developmental Psychology* 8, 99–104.
- Murphy, L.B., 1937. Social behavior and child personality. New York: Columbia University Press.
- Mussen, P., S. Harris, E. Rutherford and C.B. Keasey, 1970. Honesty and altruism among preadolescents. *Developmental Psychology* 3, 169–194.
- Piliavin, I.M., J. Rodin and J.A. Piliavin, 1969. Good samaritanism: an underground phenomenon. *Journal of Personality and Social Psychology* 13, 289–299.
- Piliavin, J.A. and I. Piliavin, 1972. The effect of blood on reactions to a victim. *Journal of Personality and Social Psychology* 23, 353–361.
- Sagi, A. and M.L. Hoffman, 1976. Empathic distress in newborns. *Developmental Psychology* 12, 175–176.
- Sahlins, M., 1976. The use and abuse of biology. Ann Arbor, Michigan: The University of Michigan Press.
- Severy, L.J. and K.E. Davis, 1971. Helping behavior among normal and retarded children. *Child Development* 42, 1017–1031.
- Simner, M.L., 1971. Newborn's response to the cry of another infant. *Developmental Psychology* 5, 136–150.
- Staub, E., 1970. A child in distress: the influence of age and number of witnesses on children's attempts to help. *Journal of Personality and Social Psychology* 14, 130–140.
- Staub, E., 1971. Helping a person in distress: the influence of implicit and explicit 'rules' of conduct on children and adults. *Journal of Personality and Social Psychology* 17, 137–144.
- Staub, E., 1974. Helping a distressed person. In: L. Berkowitz (ed.), *Advances in experimental social psychology* (Vol. 7). New York: Academic Press.
- Staub, E. and L. Sherk, 1970. Need for approval, children's sharing behavior, and reciprocity in sharing. *Child Development* 41, 243–253.
- Stotland, E., 1969. Exploratory investigations of empathy. In: L. Berkowitz (ed.), *Advances in experimental social psychology* (Vol. 4). New York: Academic Press.
- Stotland, E., K.E. Mathews, S.E. Sherman, R. Hansson and B.Z. Richardson, in press. Empathy, fantasy and helping. Beverly Hills, CA: Sage.
- Tannenbaum, P.H. and E.P. Gaer, 1965. Mood changes as a function of stress of protagonist and degree of identification in a film-viewing situation. *Journal of Personality and Social Psychology* 2, 612–616.
- Tomes, H., 1964. The adoption, acquisition, and extinction of empathically mediated emotional responses. *Dissertation Abstracts* 24, 3442–3443.
- Trivers, R.L., 1971. The evolution of reciprocal altruism. *Quarterly Review of Biology* 46, 35–57.
- Wade, N., 1976. Sociobiology: Troubled birth for a new discipline. *Science* 191, 1151–1155.

- Weiss, R.F., J.L. Boyer, J.P. Lombardo and M.H. Stich, 1973. Altruistic drive and altruistic reinforcement. *Journal of Personality and Social Psychology* 25, 390–400.
- Williams, G.C., 1966. *Adaptation and natural selection*. Princeton, N.J.: Princeton University Press.
- Wilson, D.S., 1975. A theory of group selection. *Proceedings of the National Academy of Sciences, USA* 72, 143–146.
- Wilson, E.O., 1973. Group selection and its significance for ecology. *BioScience* 23, 631–638.
- Wilson, E.O., 1975. *Sociobiology*. Cambridge, Mass.: Harvard University Press.
- Wipse, L.G. and J.N. Thompson, 1976. The war between the words: biological versus social evolution and some related issues. *American Psychologist* 31, 341–384.
- Wynne-Edwards, V.C., 1962. *Animal dispersion in relation to social behavior*. Edinburgh, Scotland: Oliver and Boyd.
- Yarrow, M.R., P.M. Scott and C.Z. Waxler, 1973. Learning concern for others. *Developmental Psychology* 8, 240–260.