

Ethical decision-making among human movement studies researchers.

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ETHICAL DECISION-MAKING AMONG HUMAN MOVEMENT STUDIES RESEARCHERS

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ABSTRACT

Recognising the potential for ethical malpractice in Human Movement Studies (HMS) research, the study sought to evaluate ethical decision-making capabilities among HMS researchers. Senior researchers (n=78) from 15 countries responded to five specially constructed, ethically problematic research proposals in nine allied/sub-discipline areas of HMS. The research proposals presented for review potentially violated several commonly accepted research ethics principles. In terms of data interpretation, primary importance was accorded to presentation in raw and percentage form. The results indicate that despite the deliberate insertion of ethical problem areas, only 1.8% of comments advocated rejection of the proposals on ethical grounds. The study reveals an asymmetry between the consequentialist ethics of most HMS researchers and the deontological orientation of ethics codes put in place to guide them. The results indicate that considerations such as informed consent, use of captive populations, potential for harm, confidentiality, privacy, need for medical screening, and cultural considerations, are not taken seriously enough in HMS research. It is argued that only a sound educative effort based on deontological principles will produce improvements.

Key words: Research; Ethics; Human Movement Studies.

INTRODUCTION

Recent decades have witnessed a dramatic increase in research in the holistic discipline of Human Movement Studies (HMS), with such research generally emanating from a positivist paradigm and having functional aims (Malloy *et al.*, 1994). This is consistent with the view that research involving human participants is important to the development of new knowledge in a variety of areas, and is influenced by both improvements in technology and society's acceptance of a "progress imperative" view of science.

Given the rise to prominence of political and social doctrines based on the principle of individual autonomy, concern has been expressed about whether HMS research has embraced utilitarian or deontological ethical practices. It has been contended (Scocozza, 1989; Brodie & Stopani, 1990) that there is little doubt that utilitarian, consequence-based considerations dominate the ethical decision-making process in HMS experimentation, and this is supported by Olivier (1995, 1996).

Preliminary investigation (Olivier, 1996) indicates that certain current research practices in HMS do not necessarily conform to the autonomy model required by, *inter alia*, codes such as the

Declaration of Helsinki. Also, even if researchers do perceive danger in their experiments, they may embrace the utilitarian standpoint that the potential benefits are sufficient compensation. It is of course recognised that the very nature of research means that results cannot be pre-determined. Risk is thus inevitable if knowledge is to proceed. However, while progress is desirable and important, it is important to recognise that it is an optional goal rather than an imperative.

PURPOSE OF THE STUDY

Recognising the potential for ethical malpractice in Human Movement Studies (HMS) research, the purpose of this investigation is to evaluate ethical decision-making capabilities among HMS researchers as measured by reviewing specially constructed, ethically problematic research proposals in nine sub-discipline areas.

METHODS AND PROCEDURES

In order to assess whether or not a sample of HMS researchers are cognisant of, sensitised to, and in fact practice commonly accepted research ethics guidelines, five ethically questionable research proposals were constructed for distribution. The five papers broadly encompassed nine allied/sub-disciplines of HMS (Sports Science, Exercise Science, Exercise Physiology, Sports Medicine, Measurement and Evaluation, Biomechanics, Perceptual and Motor Learning, Ergonomics, Movement Psychology). This was done to eliminate any bias in response that may have occurred if respondents were practitioners of only one sub-discipline. With the focus of this study being research ethics, only those sub-disciplines conducive to, and active in research were included. Whilst research undoubtedly takes place in fields such as Sports History or Sports Sociology, it is comparatively limited, and due to the nature of the research, ethical malpractices are less likely.

Four of the five papers were based on articles that have appeared in refereed journals, and the fifth on a postgraduate research project. These papers were altered in certain respects so as to make them ethically questionable in the current climate in which IRBs operate. This judgement was supported by three HMS Heads of Department who were approached as part of a pilot study to gauge the ethical acceptability of the proposals. The consensus was that each of the proposals ought to be rejected by an IRB on ethical grounds. Proposal titles and subdisciplinary areas covered were as follows:

1. Intravenous fluid administration following a marathon (*Physiological domain: Sports Science, Exercise Science, Exercise Physiology, Sports Medicine*);
2. Performance and attitudinal responses to military basic training (*Biophysical, Psycho-social and Physiological domains: Measurement and Evaluation, Exercise Science, Movement Psychology*);
3. Myoelectrical and kinematic responses to repetitive plyometric exercise (*Biophysical domain: Biomechanics*);
4. The effect of alcohol ingestion on perceptual motor skills related to driving (*Psycho-social domain: Perceptual and Motor Learning*);
5. The effect of frequency on psychophysical responses to lifting (*Biophysical, Psycho-social and Physiological domains: Ergonomics, Movement Psychology*).

TABLE 1. POTENTIAL VIOLATIONS OF COMMONLY ACCEPTED RESEARCH ETHICS PRINCIPLES AND PRACTICES AS EXEMPLIFIED BY FIVE RESEARCH PROPOSALS

Principles/Practices	Research proposals				
	1	2	3	4	5
Informed Consent	X	X	X	X	X
Coercion/captive population	X	X	X	X	X
Harm	X		X	X	X
Cultural considerations				X	
Release form				X	
Paternalism		X	X	X	X
Medical screening		X	X		X
Confidentiality		X		X	
Privacy	X				
Debriefing				X	
Deception	X			X	

Table 1 presents a simplified overview of the principles of research ethics potentially violated by the research proposals. Numbering of the proposals is consistent with that displayed above. It is considered by the author, and the independent academics approached that the alterations singly and collectively amounted to flagrant and egregious violations of commonly accepted research ethics principles. That is, they were not subtle or hidden, and should have been noted by potential supervisors. Examples include the lack of mention of informed consent, real possibilities of harm to participants, deception, etc. (Table 1). Space considerations preclude a full description of the proposals, but it is worth noting that:

- none of the proposals made either explicit or implicit reference to the informed consent process;
- proposals 2–5 exhibited elements of paternalism and the potential for coercion and/or sanction;
- proposals 1, 3, 4, 5 involved the real possibility of harm to participants;
- proposal 4 ignored cultural considerations;
- other violations included issues of privacy, confidentiality, medical screening, and the demand for a form releasing investigators from liability.

A more detailed exposition of the alterations and discussion of the ethical principles appears in Olivier (1997).

Potential questionnaire respondents were drawn from several HMS and related discipline databases, such as SA Sports Medicine Association, SA Federation for Movement and Leisure Sciences, Ergonomics Society of South Africa, their international counterparts, and, *inter alia*, conference attendance lists (Olivier, 1997). Only practitioners attached to tertiary institutions or

research centres were targeted. From this database of potential respondents a random sample selection was performed, and the five research proposals, accompanying article review sheets, a biographical questionnaire, and a covering letter were mailed to each of 193 potential research participants in 41 countries. Participants could respond to any or all of the proposals, and were invited to do so according to their specialisation in particular areas. In some cases a respondent commented on more than one proposal, depending on that individual's interest or expertise in a particular sub-discipline.

Each research proposal was accompanied by a review sheet adapted from one previously sent to manuscript reviewers for the Proceedings of the International Council for Physical Activity and Fitness Research, 1995. The sheet serves as an example of a common review tool in HMS and allied research, assessing five areas, namely: introduction and review of literature; aims of the research; methods, procedures and research design; general; acceptance/revision/rejection. To facilitate ease of the review process, only the penultimate section required an open-ended response, providing respondents with an opportunity to comment on any omissions or potential problems associated with the proposed research.

The research contained elements of deception. Deception in research is potentially problematic, and where used, must be justified against stringent criteria, including questions of harm, utility, confidentiality, post-hoc disclosure and debriefing. All these elements were carefully considered before proceeding. In this case, to disclose the nature of the research would probably have irreparably compromised the validity of responses. Issues were considered such as whether the use of deception was justified by the prospective educational and applied value of the work, and whether alternative procedures were available. The question of harm was not relevant. Further, a debriefing and information dissemination process ensured that sufficient explanation was provided as soon as possible. Thus the research did not violate deontological considerations, and satisfied criteria of utility. Lastly, the study was approved by the University's Research Committee.

ANALYSIS AND TREATMENT OF DATA

Results were simply presented as absolute numbers and percentages of respondents, and inferences were drawn from this. Open-ended questions were analysed and placed into relevant categories where possible. Sub-discipline trends were examined by categorising responses into primary areas of expertise.

For the data reported, primacy was given to analysis of raw and percentage scores. This was due to the inherent limitations of Chi-square regarding these particular types of data. Firstly, there is doubt as to the applicability of the statistic to relatively small samples and secondly, in order to utilise Chi-square to test statistical significance, the null-hypothesis needs to be formulated to take the underlying principles of the calculation into account, thus weakening the null hypothesis. For example, an ideal research hypothesis (given the reasonable expectation of adequate training) may have been: "There will be an unequal number of rejections and acceptances of ethically problematic research proposals in that all researchers will reject them." However, there was no prior literature or empirical work on which to base such a hypothesis. Therefore, the application of Chi-square to these particular data is limited. It could perhaps be reasonably expected that most reviewers should seek revision or rejection, but introducing a low expected value (for acceptance)

to Chi-square dramatically increases the chance of a significant difference, due to the computational structure of the formula. However desirable such a practice might be in terms of the conclusions of the study, this would constitute "bad science" on two grounds. Firstly, as mentioned, there was no *a priori* knowledge on which to base the low expectations and secondly, it would knowingly and deliberately predispose towards rejection of the null hypothesis, thereby introducing an unacceptable bias to an area where the utility of the statistic is open to question anyway.

In addition to the above technical limitations generally associated with Chi-square, the low numbers and skewed distribution of responses limited the utility of applying statistical procedures to the data. Further, the inclusion of the Yates correction factor when computing contingency tables serves to increase the stringency of the test, reducing the chance of rejecting the null hypothesis. This strengthened the case for presenting the raw- and percentage-data as primary, a consideration borne in mind when designing the study.

RESULTS

The results indicate that 54% of respondents occupied a professional position of Senior Lecturer or higher (82% held the status of lecturer or higher), and that 67% had achieved doctoral degrees, with a total of 85% having been awarded masters degrees. Further, the 78 respondents from 15 countries had, in the five years preceding data collection, supervised 632 postgraduate theses (mean=8.1) and published 801 refereed journal articles (mean=10.3). This indicates that respondents were, generally speaking, senior and experienced researchers and teachers, as opposed to recent graduates or professionals relatively new to HMS research. The sample comprising Senior Lecturer and higher ranks (54%) was responsible for 88% and 84% of the theses supervised and refereed papers published, respectively. The majority of research and supervision responsibility, therefore, is held by senior staff members, a fact that has implications for education and training in research ethics. The response weighted in favour of senior staff members was largely due to design, with the research attempting to evaluate current, established practices in HMS, and with the potential respondent database including conference delegates, and membership lists of professional organisations.

The majority of responses were from Africa (68%), but responses were also received from 10 countries outside Africa (USA/UK/Australia 14%, Europe 9 %, unspecified 9%). This spread of responses is important in assessment and possible generalisation regarding ethical practices of the profession as a whole, that is in addition to evaluating those practices locally. Clearly, despite the random nature of selection, the geographical bias in the response set limits inference to researchers in HMS world-wide. Nevertheless, the data provides an indication that a potential problem may exist, and that the attendant issues are worth addressing.

In terms of categorisation, 50% (n=119) of responses were related to the Physiological domain, 32% (n=77) to the Biophysical and 18% (n=44) to the Psycho-social domains. Bearing in mind that each reviewer could respond to any area of expertise or interest (up to five possible responses per reviewer), there was a distribution of responses among domains. The implication of this is that although it would have been desirable to have a larger sample size, the responses received represented several areas of specialisation within the holistic discipline of HMS. The five research proposals, encompassing nine research allied/sub-disciplines, in three broad domains,

were represented in the reviews by relatively experienced researchers. The response choice offered to participants explains the apparent anomaly of the number of responses being greater than the number of respondents.

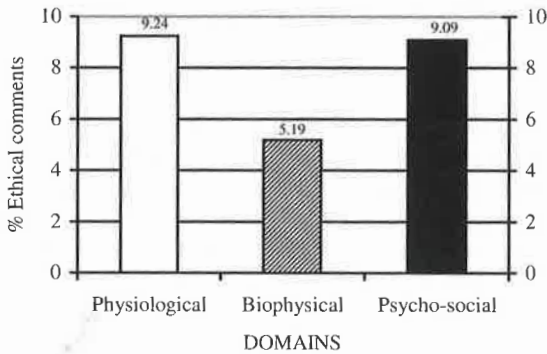


FIGURE 1. PERCENTAGE ETHICAL COMMENTS IN EACH INTER-DISCIPLINARY DOMAIN OF FIVE RESEARCH PROPOSALS

Figure 1 provides an overview of the identification of ethical problems in the five research proposals, categorised into disciplinary domains. No disciplinary domain elicited even 10% of ethical comments. Specifically, of 240 reviews, only 19 comments were elicited regarding the ethical suitability of procedures, including lack of informed consent, potential for harm, need for IRB approval, consideration of cultural factors, coercion, violations of privacy, and confidentiality. When reviewing specifically constructed, ethically questionable research proposals, fewer than 8% overall of responses in three major research domains delivered comment on the dubious ethical practices included in the project. It is worth noting here that the ethical problems in the research were of a dual nature. They were not merely problems of **omission** (for example the lack of informed consent), but were problems of **inclusion** (such as the possibility of harm to participants). This in fact seems to compound the oversights in the review process. Both the paucity of responses identifying ethical problem areas, and the relatively even distribution of such responses, make it difficult to venture any opinion regarding recognition of ethical issues within and across sub-disciplines. Table 1 shows that four of the proposals each exhibited five problem areas, with the remaining one registering nine, indicating a range of ethical irregularities across proposals/sub-disciplines, with this distribution remaining relatively consistent for responses.

Figure 2 depicts a summary of the categorisation of reviewers' responses to the five research proposals. The primary area of concern for reviewers related to methodology (26%) followed by statistics (22%), conceptual issues (21%), and the literature referred to (20%). This represents a relatively even spread of responses, and in fact makes the paucity of responses regarding ethical concerns even more marked. Ethical comments comprised a mere 8% of the total, this despite the fact that the construction of the proposals should theoretically have predisposed towards a majority of such responses. Despite the deliberate insertion of sensitive moral problems,

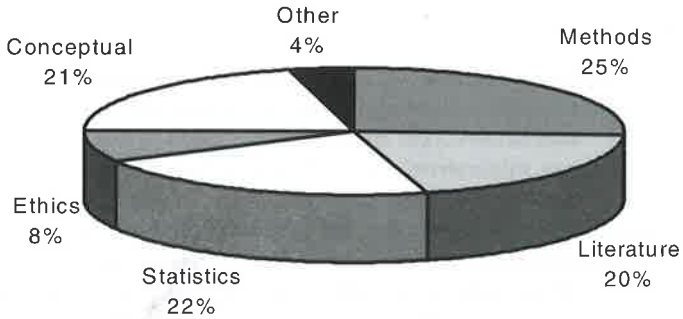


FIGURE 2. CATEGORISATION (%) OF REVIEWERS' RESPONSES TO FIVE RESEARCH PROPOSALS

the ethical issues involved in research received the least mention overall. The oversights on the part of researchers are perhaps magnified when one considers that some reviewers, whilst noting ethical issues, saw fit to still accept projects without revision. Consequently, of the 21 rejections, only four were rejected explicitly for ethical reasons. Rejections were spread relatively evenly across proposals, but the low number (n) makes any sophisticated analysis problematic. Of the 240 responses, only 2% of the comments listed ethical concerns as sufficient reason for rejection (Table 2). When considered in the light of the potential violations of ethical principles of the proposals outlined earlier, this is indeed cause for some concern.

TABLE 2. SUMMARY OF RESPONSES REGARDING REJECTION, AND REJECTION FOR ETHICAL REASONS TO FIVE RESEARCH PROPOSALS

Proposal	Rejection	Rejection for ethical reasons
1. Exercise Science	7 (12%)	3 (6%)
2. Measurement and Evaluation	7 (12%)	0 (0)
3. Biomechanics	1 (3%)	0 (0)
4. Perceptual and Motor Learning	4 (9%)	1 (3%)
5. Ergonomics	2 (5%)	0 (0)
TOTAL	21 (8%)	4 (2%)

DISCUSSION

There has been an ever-increasing demand for research to be undertaken in the sub-disciplines of HMS. In order to satisfy considerations of relevance, and our continual quest for knowledge, the vast majority of this research involves humans, with the five research proposals serving as examples. The "progress imperative" view of science has however historically resulted in experimental procedures where research participants are subjected to manipulative and even invasive procedures. The responses to the five research proposals indicate that HMS research may be no exception to this historical trend, with reviewers evincing little concern for the well-being of participants. While maleficence was presumably not intentional, it is clear that non-maleficence was not a critical factor in the acceptance of questionable research proposals. It must however be borne in mind that the response sample cannot be deemed representative of the discipline as a whole. While responses were received from 15 countries, most responses were from Africa. Nevertheless, many responses from the other continents were from commonly acknowledged leaders in the field of HMS research, and while individual data cannot be presented due to considerations of confidentiality, it is worth noting that those individuals were just as deficient at recognising ethical irregularities as their less well-known colleagues. Accepting this, it is contended that the data presented, while suffering from limitations, provide some justification for the conclusion that insufficient attention is paid to ethical issues in HMS research.

It may be that many researchers, if they consider the issue at all, view their investigation as fundamentally risk-free. This seems to be the case for reviewers of the five proposals. Risk in this sense refers to the **possibility** of injury as a result of research participation, such injury being physical, psychological or social. A case could be made that reviewers overlooked the potential for harm, as generally speaking, there are very few risks associated with HMS research, and very few injuries reported. Cardon *et al.* (1976) found that injuries were reported for 0.7% of 133000 research participants, with 80% of the reported cases considered trivial. From this they concluded that the risks of participation in non-therapeutic research may be no greater than those occurring in everyday life.

Bok (1978) points out that it is not always easy to know whether, and to what extent, research carries direct risks. The very nature of research means that while procedures may be carefully implemented and controlled, the specific effects cannot be pre-determined (Brodie & Stopani, 1990; Olivier, 1995). If they could, the proposed research would be redundant, leading to new questions. This was in fact the basis of the alterations to the published papers presented to reviewers as the five research proposals. Generally speaking, they were altered in invasive ways with injurious potential in order to possibly answer new questions.

In a matter of some relevance to the research practices inherent in the five research proposals, Scocozza (1989) has questioned whether research involving humans is based on shared interest, or whether certain areas of research contain different or even antagonistic interests. Before discussing the results of responses to the proposals in terms of a possible conflict between self-interest and virtue, it is necessary to view the proposals from a background of what ethics, and particularly research ethics, is or ought to be. Ethics investigates the fundamental principles that ought to be found in a particular field of activity (Flew, 1984), such as HMS research. It seeks to articulate general principles and rules that govern our judgements and our activities (Veatch, 1989). HMS is no exception, and the primary question then becomes one of which ethical

principles should be accorded primacy, and for what reasons. As in other professions, HMS researchers are faced with questions such as "What should I do?", and "Why should I do so?" The first is of course a normative question. It is about substantive issues and concerns the rightness or goodness of particular actions. As such, normative judgements are prescriptive, telling us what we ought and ought not do. Such judgements are justified by appealing to ethical theories, the most relevant in research contexts being utilitarian and deontological approaches.

It has been contended that current research practices in HMS are heavily skewed in favour of utilitarian ethics (Scocozza, 1989; Brodie & Stopani, 1990), which are characterised by the importance of consequences or the ultimate usefulness of acts that one performs. This viewpoint would probably be supported by Malloy *et al.* (1994) who contend that HMS research operates from a logical-positivist and functionalist worldview. Presumably this applies particularly to egoistic (otherwise unenlightened) versions of consequentialist ethics. In contrast, deontologists contend that other factors (e.g. motives) are important in determining obligations and courses of action. Generally speaking, deontology is an ethical theory of duty and obligation. Rule deontologism in particular recognises the value of the practical application of rules and standards. The principle of universalisability supports rule deontologism if one accepts that in making a particular value judgement, you are implicitly making a general one.

Do the results presented earlier lend support to Brodie and Stopani's (1990) contention that HMS research is driven by utilitarian ethical convictions? On the surface, the reviewers' responses in and of themselves give little or no direct indication of adherence to any particular ethical theory. However, the marked absence of application of deontological theory gives a fairly clear indication that, if any ethical theory drives HMS research, it is more likely to be utilitarian than deontological. The results of this study suggest that many among the researchers sampled, if they consider the issue at all, view their investigations as fundamentally risk-free. Of greater significance though is Bok's (1978) contention that others who do perceive some ethical problems inherent in research may consider the potential benefits to humanity as sufficient compensation. This is of course a utilitarian rather than deontological approach to research ethics.

Given the perceived lack of an ethical theory in terms of a guiding force in HMS research, it seems appropriate to make some recommendations. Despite the results of this study, it is likely that most researchers would agree that the application of a system of research ethics is desirable. This assumes that the ethical problems in the proposals and in current research practices were overlooked rather than ignored. Given the absence of significant benefits to mankind derived from the proposed research, the charitable assumption is that respondents were not driven by a particular research ethic when conducting their reviews. If they were driven by a theory, it would be a consequential one, with the preceding discussion highlighting the problems inherent in such an approach.

What are the implications of this lack of direction? Firstly, HMS, as a research-based profession needs to embrace an ethical theory to serve as a frame of reference for its practices. This supports Borchert and Stewart's (1986) contention that to advocate a "hands off" approach to normative issues would constitute not only an abnegation of the traditional goal of moral philosophy ("the good life"), but also an unacceptable disengagement from important moral issues. Philosophical insight in the form of ethical theory is needed to give direction on these issues. Ethical theories however need to be defensible. The theories that applied to real situations are encountered in the lived world need to be justified. The profession as a body needs to decide on a morally defensible

and applicable approach to research ethics. Space considerations preclude a discussion on the respective merits of deontological and consequentialist ethical theories.

For the purposes of this paper, it will suffice that the results of this study may provide a good case for the codification of ethical guidelines for the HMS profession, particularly in research scenarios. Whilst it is acknowledged that rules may not be sufficient, codification could be a good starting point. The fact that only 2% of respondents' comments listed ethics as sufficient reason for rejection of proposals is cause for some concern (Table 2). If the response sample permitted generalisation, it could be viewed as an indirect indictment of hypothetical research practices in HMS, with ethical concerns either not being applied or being applied inconsistently to such practices. It could of course be argued that despite the claimed holism of the discipline, the disparate sub-disciplines in fact constitute a fractured whole, leading to the inconsistencies noted. This would however only serve to strengthen the argument for an inclusive ethical codification, which would ideally be allied to a formal programme of education in research ethics. To conclude, it is often presumed that those who know what is ethical will not behave in immoral ways, but this is not necessarily so (Caplan, 1992). Rules and guidelines may be desirable and necessary, but they are not a sufficient condition to prevent abuses in research contexts.

Despite the potential problems outlined above, rule-based approaches to applied ethics continue to be popular. One of the reasons for this is that different moral dilemmas are in fact similar in several relevant respects. This is in fact the case for the five research proposals, which for example all potentially violate, *inter alia*, the principle of autonomy. A consistent rule-based approach here would hopefully simply ensure that adequate measures are taken, through the informed consent process, to attain comprehension and voluntary participation. Across the five research proposals, rules would have been useful in their universality. From a practical point of view, rules are useful in that they can provide a "moral checklist" against which to measure the ethical acceptability of a proposed research project. This saves time, assists those without the necessary expertise in ethical decision-making, and encourages consistency in moral behaviour. Ideally rules will respect the rights and interests of all persons, not just of those in the majority.

If it were necessary to accept one particular ethical theory to serve as a framework to guide research ethics, and to exclude others, this study would lean towards acceptance of a deontology-based model. However, utilitarian concerns may contribute positively towards research outcomes and should not be neglected. Ideally, when evaluating research projects for ethical acceptability, both utilitarian and deontological criteria should be applied. The results should be important (utilitarian); the benefit/risk ratio should be favourable (utilitarian); voluntary informed consent should be obtained (deontological); and considerations such as privacy, cultural factors, confidentiality, and deception, should set limits on the conduct of research. Lastly, projects should be subject to independent ethical review. As presented above, the utilitarian conditions could be viewed as necessary but not sufficient conditions for research to proceed. The unjustified absence of any of the deontological concerns may morally invalidate research that satisfies the utilitarian criteria. The practical implication of this is that in any codification of research ethics for HMS, priority ought to be assigned to principles based on duty, rights, and obligations. This deontology-loaded approach is consistent with Zelaznik's (1993) contention that the use of humans in research is a privilege, and that the rights of research participants ought to outweigh the desire of researchers to conduct research. Finally, constant review seems to be a prerequisite for research involving human participants, with such research being justified by appealing to

ethical principles and rules.

CONCLUSION

As with other disciplines, HMS has witnessed an exponential increase in research. The majority of this work utilises human participants, and accepting a "progress imperative" view of science, some potential for harm exists. Despite the limitations of a relatively small sample and geographic distribution, it is contended that the results indicate that HMS professionals may evince little concern for ethical considerations when acting as potential reviewing supervisors of research proposals. The results also provide support for the contention that if HMS research is driven by any particular ethical theory, it is likely that this is consequence-based. It is recommended that HMS, as a research-based discipline, needs to embrace an ethical theory to serve as a frame of reference for its practices. This guiding framework should be primarily deontological in nature (with overriding considerations), but certain utilitarian principles should also be invoked when making ethical decisions in research contexts.

REFERENCES

- BOK, S. (1978). Freedom and risk. *Proceedings of the American Academy of Arts and Sciences*, **107**: 115-127.
- BORCHERT, D.M. & STEWART, D. (1986). *Exploring ethics*. New York: Macmillan.
- BRODIE, D.A. & STOPANI, K. (1990). Experimental ethics in sports medicine research. *Sports Medicine*, **9**(3): 143-150.
- CAPLAN, A.L. (1992). How did medicine go so wrong? In A.L. Caplan (Ed.), *When medicine went mad* (53-92). Totowa, NJ: Humana Press.
- CARDON, P.V.; DOMMEL, F.W.; TRUMBLE, R.R. (1976). Injuries to research subjects: A survey of investigators. *New England Journal of Medicine*, **295**: 650-654.
- FLEW, A. (1984). *A dictionary of philosophy* (3rd ed.). London: Pan Books.
- MALLOY, D.C.; PRAPAVESSIS, H.A.; ZAKUS, D.H. (1994). Ethics in human movement curricula: Do they exist? *Australian Council for Health, Physical Education and Recreation*, **41**(4): 14-17.
- OLIVIER, S.C. (1995). Ethical considerations in human movement research. *Quest*, **47**(2): 135-143.
- OLIVIER, S.C. (1996). Rights, obligations, and utility in sports medicine research. *South African Journal of Sports Medicine*, **3**(3): 19-22.
- OLIVIER, S.C. (1997). Ethical issues in human movement research. Unpublished Ph.D. dissertation. Grahamstown: Rhodes University.
- SCOCOZZA, L. (1989). Ethics and medical science: on voluntary participation in biomedical experimentation. *Acta Sociologica*, **32**(3): 283-293.
- VEATCH, R.M. (Ed.) (1989). *Medical ethics*. Boston, MA: Jones and Bartlett.
- ZELAZNIK, H.N. (1993). Ethical issues in conducting and reporting research: A reaction to Kroll, Matt, and Safrit. *Quest*, **45**(1): 62-68.

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