

The Structure of Knowledge Production: Mapping Patterns of Co-Authorship Collaboration  
between African and International Countries.

Megan Greer

Student Number: 208517611

Submitted in partial fulfilment of the requirements for the degree of Master of Social Science  
(Counselling Psychology) in the School of Applied Human Sciences  
College of Humanities

April 2014

The University of KwaZulu-Natal

Pietermaritzburg, KwaZulu-Natal

Supervisor: Dr Michael Quayle

### Declaration

This dissertation is submitted in partial fulfilment of the requirements for the degree of Master of Social Science (Counselling Psychology), in the Graduate Programme in the School of Psychology, University of KwaZulu-Natal, Pietermaritzburg, South Africa.

I, Megan Greer, declare that

1. The research reported in this thesis, except where otherwise indicated, is my original research.
2. This thesis has not been submitted for any degree or examination at any other university.
3. This thesis does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
4. This thesis does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:
  - a. Their words have been re-written but the general information attributed to them has been referenced;
  - b. Where their exact words have been used, then their writing has been placed inside quotation marks and referenced.
5. This thesis does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the thesis and in the References section.

---

Megan Greer

---

Date

---

Dr Michael Quayle

### **Acknowledgments**

I would like to express my gratitude to the following people for their unconditional support, encouragement and assistance throughout this dissertation.

Firstly, I would like to acknowledge the huge amount of guidance and motivation that Dr Mike Quayle, my research supervisor, has provided throughout this research. I truly appreciate your commitment and patience with me as I have learned to overcome the many challenges that this topic has thrown at me. I would also like to thank you for allowing me the opportunity to collaborate with you on presenting this research at the International Congress of Psychology (ICP), 2012. I am so grateful to have been exposed to an international event of such stature.

A huge thank you is owed to my Masters class and to the staff at the University of KwaZulu-Natal's Department of Psychology for their support. To my family, friends and boyfriend, your support throughout my academic career has allowed me to pursue my dreams and achieve all I have done thus far.

### **Abstract**

This research sought to explore the patterns of co-authorship collaboration between African and international authors who have published together in journals relating to the field of social psychology. Bibliographic data was used to extract and produce social network maps of academic co-author collaborations in which one of the authors was African or affiliated to an author from an African country. These patterns of collaboration were analysed using social network analysis and it was found that, on average, African authors are poorly interconnected with other international authors in the field of social psychology and are also poorly interconnected with other African authors across the continent. It is likely that these structures of collaboration constrain the ability of African authors to produce their own relevant knowledge within the field of social psychology, in that their collaborations are limited and usually mediated by international connections. This pattern of interconnection makes it more likely that African social psychologists will operate within paradigms generated by academics in international and well-resourced countries and militates against the development of African paradigms.

*Keywords:* African authors, social psychology, bibliometric analysis, social network analysis (SNA), African collaboration, African scholarship

## Table of Contents

<b>Declaration</b> .....	2
<b>Acknowledgments</b> .....	3
<b>Abstract</b> .....	4
<b>CHAPTER ONE: INTRODUCTION</b> .....	9
1.1 Statement of the problem .....	10
<b>CHAPTER TWO: REVIEW OF THE LITERATURE</b> .....	12
2.1 The structure of knowledge production .....	12
2.1.1 Core-periphery relationships and the marginality of African authors.....	14
2.1.1.1 The core-periphery model and the dependency theory .....	14
2.1.1.2 Marginality .....	15
2.2 Barriers to collaboration .....	17
2.2.1 Truly cooperative research relationships.....	19
2.3 The state of Africa’s knowledge production.....	22
2.4 “African solutions to African problems”: The context and importance of African scholarship networks.....	24
2.5 Conclusion .....	26
<b>CHAPTER THREE: AIMS</b> .....	28
<b>CHAPTER FOUR: METHOD</b> .....	30
4.1 Research design .....	30
4.1.1 Social network analysis, bibliometrics and co-authorship networks .....	30
4.1.1.1 Social network analysis and the structure of social networks .....	31
4.1.1.2 Social network analysis: Units of analysis .....	31
4.1.1.3 Social network analysis: Metrics of analysis.....	32
4.1.2 The usefulness of understanding social structures .....	34
4.1.3 Social network analysis and bibliometrics: Conclusions .....	34
4.2 Sample.....	35
4.2.1 Ethical issues in relation to the sample .....	36
4.3 Detailed data collection procedure.....	36

Knowledge production and co-authorship collaboration patterns	6
4.3.1 Procedure.....	37
4.3.1.1 Publication extraction by Thomson Reuters Social Psychology journals search.....	37
4.3.1.2 Keyword extraction and search .....	38
4.3.1.3 Conversion and processing procedures .....	40
4.4 Data analysis .....	45
4.4.1 Quantitative analysis .....	45
4.4.1.1 Path analysis: Calculating distance to the nearest African neighbour.....	45
4.4.1.2 Social network analysis of the author collaboration network.....	46
4.4.1.3 Analysis of the sample of large multi-author publications.....	46
<b>CHAPTER FIVE: RESULTS</b> .....	48
5.1 Sample.....	48
5.1.1 Representation of co-authorship ties in the full sample .....	48
5.2 Distance.....	49
5.2.1 The influence of large multi-author publications.....	50
5.2.1.1 Distance excluding large multi-author papers.....	51
5.3 Position of African authors in the central network .....	52
5.3.1 The connectivity of African authors.....	56
5.3.2 Relative status of African authors in co-authorship collaborations .....	57
<b>CHAPTER SIX: DISCUSSION</b> .....	59
6.1 The representation, connectivity and position of African and non-African authors.....	59
6.1.1 Representation.....	60
6.1.2 Connectivity .....	61
6.1.3 Position.....	62
6.2 The social distance between collaborating authors.....	62
6.2.1 The inclusion of large multi-author papers .....	63
6.2.2 The exclusion of large multi-author papers.....	63
6.3 Conclusion .....	64
6.4 Limitations and recommendations .....	65
6.4.1 Sampling frame .....	65
6.4.2 Author name disambiguation .....	66
6.4.3 Analysing African author connectivity .....	67

**CHAPTER SEVEN: CONCLUSIONS** ..... 69

**References** ..... 71

**Tables**

Table 1: Costello and Zumla’s (2000) “Checklist to evaluate the principles of research partnership in developing countries” ..... 20

Table 2: Example of a „LinkedListWithCountry“ entry for a single publication with three authors ..... 43

Table 3: Example of an author’s details on a collaborated publication ..... 44

Table 4: Frequencies for the sample of multi-author publications ..... 47

Table 5: Table to show the nature of co-authorship between African and African authors, and African and international authors ..... 49

**Figures**

Figure 1: Proportion of universities and research bodies reporting proportion of total research funding sourced from international funding organisations ..... 16

Figure 2: Figure showing the relationship between a node and a tie ..... 32

Figure 3: A social network – the “Kite Network” ..... 32

Figure 4: Figure to illustrate the concept of distance – the number of “jumps” between nodes ..... 33

Figure 5: Venn diagram to show the selection procedure used according to the level of ambiguity of the unique keywords in relation to the field of social psychology .... 39

Figure 6: Example of a Linked List ..... 42

Figure 7: Distances to nearest African neighbour by region, including large multi-author papers ..... 50

Figure 8: Distances to nearest African neighbour by region, excluding large multi-author papers ..... 52

Figure 9: Network clusters ..... 54

Figure 10: Main cluster of authors, with African authors (red) rendered in the top layer to avoid masking ..... 55

Figure 11: African authors only, extracted from full sample ..... 56

Figure 12: African authors and their direct collaborators ..... 57

**Appendices**

Appendix A: List of Thomson Reuters Web of Science „Social Psychology“ categorized journals accessed in the sample.....	76
Appendix B: List of the top 300 of 19 733 rated keywords extracted from the records identified by the journal-based search strategy.....	78
Appendix C: Geographic continents and associated countries based on the United Nations Development Programme“s Human Development Index .....	83
Appendix D: List of 460 African local journals according to African Journals Online (AJOL), including all disciplines .....	90
Appendix E: List of 44 African journals included in the Thomson Reuters Web of Science database but not included in the African Journals Online (AJOL) database ..	104



## CHAPTER ONE

### INTRODUCTION

Academic publishing has gathered, sieved and engraved the work of researchers, disseminating their products to the corners of the globe, and thus ensuring them a place in knowledge production in a more accentuated information-driven world (Adebowale, 2001, p. 1).

Fostering links between individuals and institutions enables the transfer of knowledge, skills and resources; a phenomenon known as research collaboration (Katz & Martin, 1997). Academic collaboration is “the working together of researchers to achieve the common goal of producing new scientific knowledge” (Katz & Martin, 1997, p. 12). Analysing co-authorship relationships, where academics have published papers together (presumably as the outcome of collaboration) is the most tangible and well-documented ways of observing and measuring research collaborations (Glänzel & Schubert, 2005; Lundberg, Tomson, Lundkvist, Skår & Brommels, 2006). According to Patel (1973 in Glänzel & Schubert, 2005), co-authorship collaborations refer to authors, or “sub-authors”, who have collaborated together on an academic publication and for whom have been acknowledged for their contribution and research assistance toward such a publication within the authorship of the publication (p. 258).

Social network analysis can map the patterns of connectivity between authors who have collaborated on academic publications together, investigating probable collaborative relationships and flows of information within an academic community, and use such information to describe the collaboration network in terms of representativeness of the different authors and their attributes (such as country of affiliation, continent of affiliation, Human Development Index, number of papers published, etc.). Newman (2004) thus argues that, “a co-authorship network is as much a network depicting academic society as it is a network depicting the structure of our knowledge” (p. 5200). Such research is useful as it aims to describe patterns of co-authorship networks which assist in identifying influential paths (such as the position of key producers of knowledge) within the network through which knowledge is produced. This knowledge can be used to understand and the way that collaborations between African and international authors, and between African authors themselves, is shaping the generation of knowledge within the African continent. The

analysis of collaborations with African authors in social psychology therefore creates a platform for understanding the relationship between African social psychologists (and African social psychology) and the rest of the world. This may feed into debates about the importance of generating and distributing African knowledge both locally and across domestic and international boundaries within the framework of globalisation.

### **1.1 Statement of the problem**

Hwang (2008) argues that there is an unequal distribution of power in the production of knowledge. He states that within the production of knowledge, scientifically well-resourced countries form the „core“ collaborate with less well-resourced countries (including African countries) in the periphery. These peripheral countries are then recognised as receptors and reproducers of core country knowledge. Since networks of knowledge production constrain the types of knowledge that can be produced, psychological research is dominated by WEIRD research (Western, Educated, Industrialised, Rich, and Democratic) which cannot be generalised universally as they crystallise norms, values, and paradigms which are highly unrepresentative of the global population (Henrich, Heine & Norenzayan, 2010). Local knowledge-producing networks therefore become important for the successful exploration and production of indigenous and locally relevant social psychological knowledge and models. Knowing the current shape and state of local collaboration networks and their relationship to international networks is therefore an important preliminary step for the above.

Most research into scientific collaboration focuses on well-resourced (core) countries and little information is available on the patterns of collaboration that occur when developing countries are included in these scientific collaborations (Schubert & Sooryamoorthy, 2010). Understanding these patterns of collaboration becomes important when considering the role that African social psychologists play in the production of their own „relevant psychology“ – knowledge, methods and models that are directly produced for the benefit of Africans rather than international knowledge that is re-modelled and applied in Africa that does not directly relate to African knowledge. This has become an important goal for the South African research community and informs many of the policies of the Department of Education, National Research Foundation and South African universities (Council on Higher Education, 2009; National Research Foundation, n.d.).

The current research project thus aimed to explore the patterns of collaboration between authors and co-authors of a publication in which one or more of the authors was affiliated to an institution in an African country, in other words, these authors have published in peer-reviewed Social Psychology journals and/or have used a keyword associated to the field of Social Psychology. Social Psychology was chosen as the field of preference because the author and supervisor of the research are affiliated to a Social Psychology work group and thus decided out of interest to explore the collaboration patterns and representation of social psychologists within an international academic arena. Furthermore, the field of Social Psychology was chosen because the research methodology required a sample that could be managed and analysed within the limits of available computer software and hardware (this is explored further in the Methodology, Chapter Three). The field of Social Psychology provided a (just) manageable sample size. The author and co-author publications were used to construct social network maps of academic collaboration by using bibliographic data collected from a comprehensive academic database. A co-authorship network was plotted using the author information and the author affiliation addresses were used to extract the geographic location for each author. Patterns of collaboration were then analysed with social network analysis (SNA) in order to discuss the impact that these structures of collaboration may have on local research agendas.

## CHAPTER TWO

### REVIEW OF THE LITERATURE

This chapter of the research provides a review of the literature that framed and informed this study. The theory that informed the understanding of collaborative patterns between African and international authors is reflected through Wallerstein's world systems and dependency theories. These theories introduce and frame the core-periphery model and the concept of marginality which can be used to scaffold an understanding of the relationships that emerge and are maintained between the more developed countries and the less developed countries when applied to an academic arena driven by access to resources. The barriers to these resources and their subsequent effect on barriers to collaboration are then explored; followed by a discussion on the state of Africa's knowledge production and the importance of developing African scholarship networks. It is worth mentioning at this point that there is currently a lack of similar studies in this field, with the majority of research focussing on collaboration within Science fields as opposed to the Social Sciences. This study, as well as the literature reviewed in this chapter, speaks to the importance of developing further studies that explore the state of Africa's knowledge resources and the development of Africa's own relevant Psychology.

#### **2.1 The structure of knowledge production**

Scientific research that is produced in less developed countries is often seen as "science in the periphery" (Tijssen, 2007, p. 2). Hwang (2008) understands the global structure of knowledge production as an unequal relationship between core countries (countries that are scientifically advanced such as the United States and European countries<sup>1</sup>) and peripheral countries. These core countries account for approximately 85% of global Research and Development expenditure and contribute to approximately 90% of the publications within the global research journals (Tijssen, 2007, p. 2). Producing knowledge requires access to resources which include material resources, knowledgeable experts, and representative resources such as reputation within the field, and prestige amassed from prior publications (Hwang, 2008). The international invisibility of the research efforts of African authors (considered as less scientifically developed) has a negative effect on African science as a whole, leaving fewer

---

<sup>1</sup>Hwang's (2008) research focused on international collaboration between scientifically advanced and less scientifically advanced countries. More specifically, he investigated the collaboration patterns between Korean (less scientifically advanced) and British (scientifically advanced) scientists.

incentives for donor agencies to fund and invest in future research initiatives (Tijssen, 2007). Global patterns of research collaboration thus favour authors in well-resourced Western countries and therefore, collaborative relationships with those in this core are sought after. Peripheral countries and their authors therefore often seek collaborative partnerships with those in the centre for the purpose of gaining these resources (Mouton, Boshoff & Waast, 2009).

Although collaboration between core and peripheral countries seems favourable for gaining access to resources, this often means that knowledge that is produced in the core, more resourced, countries is implemented and applied within peripheral countries rather than the peripheral countries producing knowledge themselves to be implemented both locally and internationally (Hwang, 2008). In other cases, due to the lack of resources, peripheral countries do produce their own knowledge; but, their knowledge is not at an internationally accepted or competitive level and thus cannot be implemented and shared globally (Mouton, Boshoff, de Waal, Esau, Imbayarwo, Ritter & van Niekerk, 2008).

An example may be made of the Southern African Development Community (SADC) region. Modern science systems are composed of a multitude of scientific institutions that are dedicated to furthering scientific knowledge production, disseminations and utilisation (Mouton et al., 2008). Together these institutions form a “national mode of scientific production” (Mouton et al., 2008). Yet, as Mouton et al. (2008) further state, the SADC region is operating in a “sustenance mode” whereby knowledge is produced and applied locally for their own use and not in the efforts of global contribution. Operating within this sustenance mode renders scientific production within the SADC region ineffective within Africa and internationally due to their fragile status and susceptibility to political and military influences; their mismanagement of science governance; and the fact that the region is under-resourced (Mouton et al., 2008). There are, of course, exceptions of countries within the SADC region where well-established collaborative links exist within global research networks (Mouton et al., 2008). Such a country is South Africa who holds a 0.93% (2007 statistic) measure of research and development intensity<sup>2</sup> where the gold standard is perceived as 1% for developing countries (Mouton et al., 2008). Taking into consideration the

---

<sup>2</sup>The measure of research and development intensity is taken as the ration of gross expenditure on research and development (GERD) to gross domestic product (GDP) (Mouton et al., 2008).

entire African continent, Tunisia was the only country to reach the gold standard, achieving 1.02% in 2007 (Schneegans, 2010).

### **2.1.1 Core-periphery collaborative relationships and the marginality of African authors**

Collaboration between authors in core (centre) and periphery countries facilitates exchange and connection to resources (Scott, 2000). The following sub-sections explore the concept of the core-periphery model as well as the theory of dependency and the concept of marginality. These concepts will be applied to the current research's exploration of the relationship between African countries and international countries and how the relationship facilitates access to scholarly resources.

#### **2.1.1.1 The core-periphery model and the dependency theory**

The concept of a core-periphery model develops from Immanuel Wallerstein's world-system's theory, an adaptation of the dependency theory (Schubert & Sooryamoorthy, 2010). Briefly, the dependency theory is based on the notion that there is an unequal flow of resources from periphery (under-developed) countries to core (developed) countries (Schubert & Sooryamoorthy, 2010). Although these concepts are used to refer to the world economic system, the theory may be easily adapted to reflect insights into the relationship between African and international collaboration patterns as they seem to parallel the unequal power relations hypothesised in core-periphery relationships. What remains contentious with regard to the relationship between periphery and core countries is that core countries actively perpetuate a state of dependency on periphery countries through various means such as economic, human resources (training and recruitment), education and finance (Schubert & Sooryamoorthy, 2010).

Dependency theory may be used to explain why under-developed countries remain under-developed per se. Theotonio Dos Santos explains this as such:

“[Dependency is]... a historical condition which shapes a certain structure of the world economy such that it favours some countries to the detriment of others and limits the development possibilities of the subordinate economics... a situation in which the economy of a certain group of countries is conditioned by the development and expansion of another economy, to which their own is subjected” (as cited in Ferraro, 2008, para. 8).

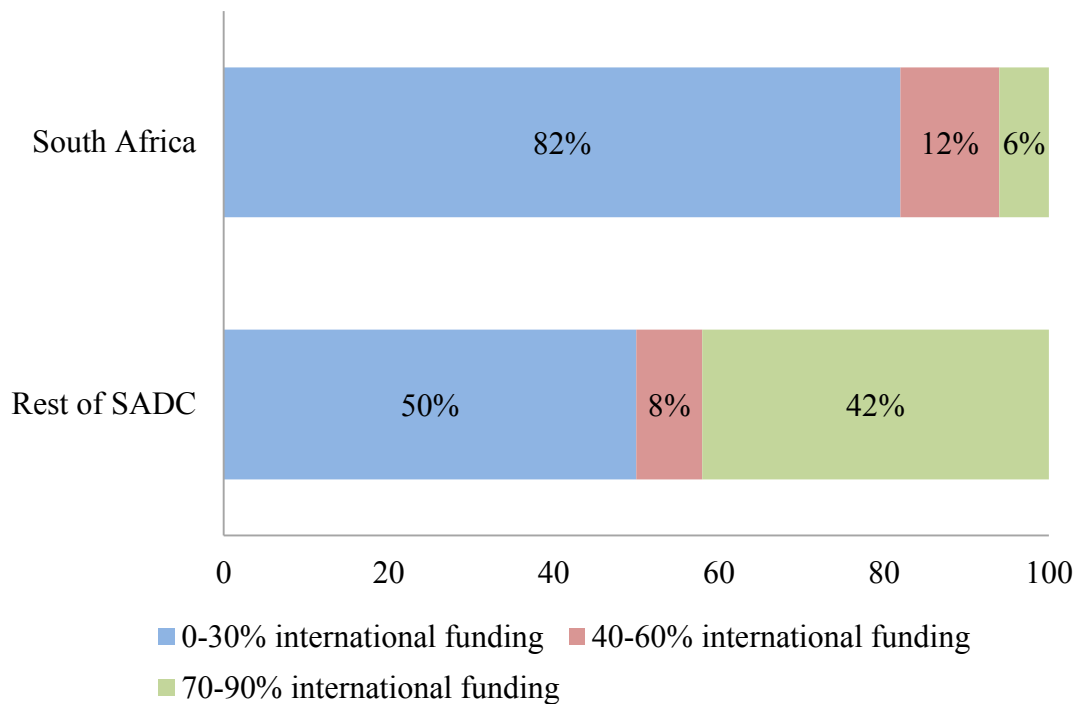
Represented within the dependency theory are three important features: (a) it is an international system comprising of two states, for example core-periphery or developed-underdeveloped; (b) external forces are of importance and influence economic activity within periphery states, and that these external forces represent any means by which core countries may represent their economic interests internationally (such as foreign assistance and/or forms of communications); and (c) dependency is an on-going process whereby relations between the two states not only reinforce but intensify unequal patterns of interaction (Ferraro, 2008). “For the dependency theorists, underdevelopment is a wholly negative condition which offers no possibility of sustained and autonomous economic activity in a dependent state” (Ferraro, 2008, para. 20).

### **2.1.1.2 Marginality**

Schubert and Sooryamoorthy (2010) draw on the dependency theory as it relates to the production and exchange of knowledge in a globalised world system. The authors adapted the dependency theory and applied it to the concept of marginality: According to the centre-periphery model, marginality is the driving concept that allows for these antagonistic world positions and enables the socio-economic order of research agendas to be maintained (Schubert & Sooryamoorthy, 2010). In other words, marginality is what maintains peripheral actors in the periphery and away from the centre, as well as maintaining core actors in the centre. Schubert and Sooryamoorthy (2010) thus argue that through marginality, peripheral actors are thus prevented from accessing core activities and resources available in the centre (i.e. not having access to funding or being able to access their research agendas within the larger scientific community); and more importantly, not having access to scientific opportunities, such as collaboration, that many central units exploit. This has important implications for potential collaboration and knowledge-exchange (attempting to gain resources and impart research agendas reciprocally with the core).

One of the most important factors impacting on international (cross-border) collaboration, and hence impacting on the marginality of African authors, is the lack of public funding available to the research and development (R&D) sectors within the African continent (Mouton et al., 2008; Mouton et al., 2009; Schneegans, 2010). Figure 1 illustrates the dependence of SADC countries on international funding agencies, showing that a high

proportion of African research institutions report a high proportion of research funding is sourced from international donors.



*Figure 1.* Proportion of universities and research bodies reporting proportion of total research funding sourced from international funding organisations. Adapted from “The state of public science in the SADC region,” by J. Mouton, N. Boshoff, L. de Waal, S. Esau, B. Imbayarwo, M. Ritter, and D. van Niekerk, 2008, *SARUA Study Series*, p. 203.

The above figure illustrates how dependent the SADC region’s researchers are (with the exception of South Africa): Forty-two percent of SADC region respondents (excluding South Africa) in Mouton et al.’s. (2008) study said that 70-90% of their total research funding comes from international funding organisations. Only 6 % of South African respondents stated that 70-90% of their total research funding comes from international funding organisation (Mouton et al., 2008).

With a heavy reliance on international funding agencies (as illustrated above), collaborative consequences ensue as African scholars seek to conduct and publish research with international researchers in order to gain access to funding resources. To demonstrate this, an example is made of the European Commission’s Erasmus Mundus Programme, Scholarships for students and academics (European Commission, 2009). The Erasmus Mundus Programme “aims at enhancing the quality of European higher education and promoting dialogue and



understanding between people and cultures through cooperation with third countries” (European Commission, 2009). When scholars in „third countries“<sup>3</sup> are granted Erasmus Mundus scholarships and partner with European Union countries, they do not have equal partnership status with their European partner. For example, the European Commission holds responsibility for the Programme such that “it manages the budget and sets priorities, targets and criteria for the programme. Furthermore, it guides and monitors the general implementation, follow-up and evaluation of the Programme at European level” (European Commission, 2009). As the example shows, although funding opportunities are available for African country authors, the funding agencies fulfil an empowered managerial role by stipulating the conditions of the research and thus stipulating the research agenda. This leaves African scholars as receptors of this core knowledge and as peripheral players (Schubert & Sooryamoorthy, 2010).

## **2.2 Barriers to collaboration**

The socio-economic status of developing countries has a major influence on the research and development that takes place within these nations (van Helden, 2012). Due to developing countries’ low per capita income status and the lack of budgeting directed toward research, academic facilities and their research aims are not able to flourish without steady and realistic funding and support (van Helden, 2012). According to van Helden (2012, p. 395), academic and institutional research agencies in developing countries “face a twofold funding crisis” because developing nations experience high research costs and have to conduct this research with generally lower amounts of funding available. An important point is further raised by van Helden (2012) in which he states that, “Another consequence of this problem is that reviewers of grant applications for funding agencies in the developed world are critical of budget requests that appear overpriced” (p. 395).

In addition to cross-border author collaboration due to a lack of available research funding, authors also collaborate with international agencies to compete for international funding (Mouton et al., 2008). On the contrary, South African authors and researchers are less reliant on international funding and are thus involved in fewer joint activities (Mouton et al., 2008). Furthermore, international collaboration is seen as an opportunity to strengthen the capacity

---

<sup>3</sup>“The term „third country“ has to be understood in a cooperation context where the countries concerned act as „third parties“ in an agreement between the European Union and the European countries. This term is by no means related to the so-called „third world“” (European Commission, 2009).

of research institutions and as a foundation for professional networking (Mouton et al., 2008). South Africa thus sits in a paradoxical position with regard to their publishing status as they are seen as “a dwarf internationally and a giant on the African continent”; operating as Africa’s leading scientific nation (Gevers, 2006, p. 1; Tijssen, 2007).

Katz and Martin (1997) have argued that the social proximity of authors is of importance when researchers consider collaboration, because: (a) if there is a clear division of labour whereby particular skills are required from expert partners, only then may authors seek the scientific input of experts; and (b) qualitative studies have found that collaboration begins informally through conversation between academics, especially between peers or teacher-student partnerships. Onyancha (2008) identified similar factors that influence collaboration, namely: (a) personal reasons including trust, expertise, personal compatibility, etc.; (b) resource-related factors including support from funding agencies, literature, scientific publishing, time, students, etc.; (c) motivational factors including learning and teaching, discoveries, and external rewards; and (d) “common ground” factors including physical proximity, discipline-specific languages, research organisations, etc.

As a result, even when African authors collaborate internationally, for a vast majority of joint publications the first authors are not from the SADC region and do not hold the “locus of decision-making” (Mouton et al., 2008, p. 274). Again the exception lies with South African researchers, where 90% of these authors state that they take responsibility for the writing of articles and decide in which journal to publish (Mouton et al., 2008, p. 274). Subsequently, the politics of connection(a) often result in exploitative relationships with developing world authors whereby authors from well-resourced countries either have first-author status on joint author publications, or develop relationships with multiple developing world authors in order to advance their own research agendas (self-interests) (Leydesdorff & Wagner, 2008); and (b) that connectivity between authors across Africa is facilitated by central authors in developed countries whereby developing world authors are more likely to connect with one another if connected with developed world authors than with other African country authors through international funding agendas or large-multi author papers (Boshoff, 2009). In Boshoff’s (2009) study on South-South collaborative patterns within the SADC region, he reported that, “The few instances of intra-regional and continental collaboration in the SADC are largely a product of North-South collaboration. Authors from high-income countries are included in

60% of intra-regional co-authored papers and in 59% of continental co-authored papers” (Boshoff, 2009, p. 481).

Wagner & Leydesdorff (2005) describe such power dynamics and growth patterns within research collaboration as „network effects“ (self-interested strategies within complex adaptive systems): A self-organising phenomenon based on preferential attachment within networks of co-authors. This assumes that such self-interest patterns of collaboration appear because there is no strict system of governance constraining research collaboration beyond the efforts of large funders to direct collaboration through grants and awards (Leydesdorff & Wagner, 2008). This has been found within the SADC region whereby a lack of sufficient funding has resulted in ineffective national research agendas as governments in the region are unable to direct research in a significant way; and consequently local research priorities are shaped by the research priorities of international funding agencies (Mouton et al., 2008). As a result, these research programmes are also reactive and short-term: “Donor funding – even if it is well meant and properly used – does not help to build an indigenous scientific infrastructure and capacity” (Mouton et al., 2008, p. 204). Thus, in order for the SADC region to overcome their existing dependencies and strive for the sustainability and growth of their own research activities, long-term stable and self-directed funding is required for equal cooperation to ensue (Mouton et al., 2008).

### **2.2.1 Truly cooperative research relationships**

Costello and Zumla (2000) offer four overarching principles upon which cooperative research collaborations should rest: “(a) mutual trust and shared decision making, (b) national ownership, (c) emphasis on getting research findings into policy and practice, and (d) development of national research capacity” (p. 827).

Table 1

*Costello and Zumla's (2000) "checklist to evaluate the principles of research partnership in developing countries"*

Principle	Criteria
Mutual trust and shared decision making	<p>Do the partners know each other well and do they trust one another?</p> <p>Do the partners have regular and easy communications?</p> <p>Do the partners have good access to databases and information from international organisations?</p> <p>Who proposed the research programme?</p> <p>Do all participants understand it?</p> <p>Did people who will be affected by the research participate in developing the research theme?</p> <p>Were users consulted?</p> <p>Are the likely beneficiaries of the research clearly defined?</p>
National ownership	<p>Do national partners have overall administrative responsibility and responsibility for scientific supervision?</p> <p>If not, why not?</p> <p>Is there transparency, with equal access of partners to scientific and budgetary documents and fund allocation decisions?</p> <p>Do the national partners have adequate training and audit systems to take full responsibility for programme implementation?</p> <p>Are there clear and fair rules about who has authority over financial decisions?</p> <p>Will the partners share equally in any findings or potential commercial value, and has an agreement been made?</p>
Early planning for the translation of research findings into policy and practice	<p>Does the research give due consideration to the social, political, economic, and technical situation of the partners?</p> <p>Is traditional knowledge and custom incorporated into the</p>

	research plan?
	Is there a dissemination plan? Does this include publications or reports for the people directly affected by the research and by a wider audience than the scientific community?
	What is the plan about targeting governmental and non-governmental policymaker, stakeholders, and opinion leaders?
	Is authorship of scientific publications balanced?
	What steps are being taken to ensure that research findings will quickly be put into practice?
Development of national research capacity	Does the research fit into national or regional research policy?
	Is the collaboration being monitored and evaluated both internally and externally?
	Are national partners properly represented in evaluations?
	How will the partnership develop local research capacity in the field of interest?
	Who will receive training, where, and for how long?
	How will South-to-South collaboration be promoted?
	What will happen to staff when existing research projects finish?
	Will the research partnership reduce the migration of researchers to the developed world or into the bureaucracies of international agencies?
	How will the partner institution sustain research and continue research after the programme has finished?

---

*Note.* Adapted from “Moving to Research Partnerships in Developing Countries,” by A. Costello, and A. Zumla, 2000, *British Medical Journal*, 321, 829.

The reviewed literature has argued thus far that collaborative research partnerships between African and international countries are often characterised as unequal relationships. Although there are a number of programs that attempt to reduce the differences in favour of developing countries, the partnership often remains an unequal one as the contribution of resources by

one party to the partnership evokes a power differential; as Green, Daniel & Novick (2001) state, “The resources each brings to the partnership will predict in many ways the roles that each organisation, or the individuals representing it, will play and the degree of control each may expect to exert” (p. 24). As much of the motivation for partnering with international institutions is funding grants and other resources, the international partner needs to consider replacing this motivation with something that is more closely related to the values of the partnering or developing country (Green et al., 2001). This will establish and sustain collaboration, enabling stronger research partnerships that allow African authors to infiltrate the international research arena and, also enable African researchers to direct the research to intrinsic needs that enables the production of knowledge that is relevant to Africans.

The main constituent towards successful collaborative partnerships seems to be that the collaboration needs to be based on a strong mutual interest and that both partners can gain from the relationship (Gaillard, 1994). Gaillard (1994) states that, “Developing country scientists should have the courage to refuse collaboration when the proposed project is not in their scientific interest” (p. 57). Unfortunately this is not often possible given the context of African research and research institutions. There is a push toward a participatory approach to research collaboration that points to listening to local voices as a prerequisite for success (Krull, 2005). Krull (2005) further states that in order for the needs of the masses to be catered to, local knowledge is key: “researchers as well as funding organisations should interact with „local“ experts to find out what kind of funding they need instead of telling them from a European, or American, perspective what they have to do” (p. 119).

The above table (Table 1) proposes that those involved in research collaboration be made aware of the possible power differentials involved in North-South partnerships and that all elements of the research are monitored, ensuring that the purpose of the research is not withheld and knowledge is transferred between both collaborators.

### **2.3 The state of Africa’s knowledge production**

Kanyengo (2006) reviewed that there appears to be an increase in Africa’s publishing and research output within the continent’s own journals and publication platforms. A survey done by Alemna et al. (as cited in Tijssen, 2007) found that African university researchers strongly regarded key international journals as important for publishing their own research, but

acknowledged and supported local journal publications to ensure that the research they were conducting contributed to and were embedded in local agendas (Tijssen, 2007).

Although Kanyengo (2006) reports that there is a steady increase in Africa's own publication output, there is a decline in Africa's output within an international context. Tijssen (as cited in Mouton, 2010) found that sub-Saharan African has decreased their global research production and contribution from 1% in 1987 to 0.7% in 1996 – “with no sign of recovery” (p. 63). South Africa is once more the exception, producing about half of all the publication output in the social sciences within sub-Saharan Africa (Mouton, 2010). The various barriers to collaboration that were reported above also extend to barriers to research output, leaving a very dismal picture of Africa's production of knowledge. Gaillard et al. (1996) suggest a number of socio-economic factors that may be contributing to this, such as poor working conditions, low salaries and wages, restricted budgets, lack of research equipment, poor and career opportunities and prospects – leading to scientists emigrating to industrialised core countries and impacting on the high levels of brain-drain (as cited in Tijssen, 2007).

Furthermore, African publication output has reached a state of „levelling off“ whereby their output rate is much slower than international publication growth rates (Tijssen, 2007). This also has implications on the status of African scholars in the global research community where performance assessments are measured according to publication achievements on an international level (Tijssen, 2007). This push for international recognition stifles scientific output within local journals and thus shifts research focus away from locally relevant research agendas as scholars shift the focus of their research to suit the requirements of international journals (Tijssen, 2007).

Similar to the arguments made by Mouton et al. (2008) and Henrich et al. (2010), Tijssen (2007) states that international scientific and scholarly journals tend to focus on mainstream science that is relevant to more scientifically advanced countries. Furthermore, this international research does little to contribute to the science often published in less advanced, local journals (Tijssen, 2007). Mouton (2010) refers to less-advanced local journals as „academic science“ (p. 65). This is underfunded research that is mostly published in local journals that are excluded from international scholarly journals. Due to the lack of research infrastructure, the scholarly work that is being produced by these researchers within academic science does not do much to contribute to institutional capacity or to society (Mouton, 2010). Furthermore, because academic science research tends to be individualistic, it does not tend

to attract the attention of large scholarship and funding networks and consequently carries low influential status (Mouton, 2010). Of the articles sampled through this research, the most dominant trends reflected keywords including „Identity“, „Stereotypes“, „Group“, „Individual“, and „Categorisation“. The visibility of local African journals within the international scholarly literature is thus important in order to ensure that local knowledge is included in global research models by attracting international collaborators who invest in African knowledge.

Despite the above barriers that African researchers face with regard to publication patterns, there are non-governmental and non-profit organisations that aim to improve the networking and the advancement of social science research in Africa. Such organisations include the Organisation for Social Science Research in the Eastern and Southern Africa (OSSREA) and also the Council for the Development of Social Science Research in Africa (CODESRIA). Some of CODESRIA’s objectives include “combating the fragmentation of knowledge production”, “promoting the publication and dissemination of research results undertaken by African scholars, and “...actively encouraging cooperation and collaboration among African universities, research organisations and other training institutions” (CODESRIA, n.d.). Similarly, OSSREA focuses on “promoting collaborative research and facilities for scholarly exchange...”, and “to work in close cooperation with other individuals and institutions in Africa and elsewhere in the world engaged in the study of the social sciences” (OSSREA, 2006).

#### **2.4 “African solutions to African problems”: The context and importance of African scholarship networks**

The Secretary-General of the United Nations, Kofi Annan, addressed the issues of resource inequality that contribute toward a biased production of science and knowledge:

The number of scientists in proportion to population in the developing countries is 10 to 3 times smaller than in developed countries. 95% of the new science in the world is created in the countries comprising of one-fifth of the world’s population. And much of that science – in the realm of health, for example – neglects the problems that afflict most of the world’s people (as cited in Krull, 2005, p. 118).

Africa is an important context for social psychological research for two reasons. First, Africa has roughly the same population as Europe and North America combined. Between Cairo in



the North and Cape Town in the South the continent has incredible cultural and linguistic diversity. Therefore, if researchers want to understand social psychological phenomenon in global terms, Africa is a very important context for research (Henrich et al., 2010). Henrich et al., (2010) argue that the vast majority of research is based on population samples from Western, Educated, Industrialised, Rich and Democratic (WEIRD) societies; and that these samples are the least representative in terms of generalisability to other societies. The picture of the human race being drawn by scientific research is therefore tightly constrained by historical, geographical and cultural context. Therefore research in the behavioural sciences needs to be restructured to overcome the challenges in the universal applicability of research conducted by and through institutions based in WEIRD societies.

African scholarship networks provide a significant context within which academic research strategies should be aimed. By refocusing research agendas to more diverse contexts, the applicability of research findings shall be more diverse. Given the diversity of cultures and contexts within the African continent, Africa provides a good platform for such restructuring. Additionally, Africa has an abundance of economic and social challenges, and many of these may be amenable to the application of existing social psychological theory and practice. There is much value in exploring different groups of people and using different cultural analogies as starting points by which to do so. This was recognised by Arnett (2008) who argues that psychological research published in the American Psychological Association's journals are narrowly concentrated on the American (United States) population which only comprises of 5% of the world's population. Thus, Arnett (2008) states that the psychology that is represented in these highly influential journals does not adequately account for an accurate representation of humanity. Arnett (2008) emphasises that the cultural contexts within which psychological knowledge is produced needs to be extended; thus, having a greater understanding and knowledgeable perspective of psychology as the study of human behaviour.

Thus African-international collaboration is also important for the dissemination of knowledge and practice from the WEIRD to the non-WEIRD countries. This research argument acknowledges that non-WEIRD (African) countries cannot simply disregard all non-local knowledge (throwing babies out with the bathwater) simply because it was developed in WEIRD contexts. Rather, it argues for the restructuring and the enabling of social science

research through local support from governmental and non-governmental organisations given the current context within which African scholars are producing knowledge.

## 2.5 Conclusion

The current research aimed to investigate the patterns of interconnection between African social psychologists and their colleagues in Africa and the other continents. This was explored in light of pertinent power dynamics evident between those countries considered as highly resourced „core“ entities and those considered as less scientifically advanced „periphery“ countries (considered within Africa).

Mkandawire (1998) stated that:

One feature of the unequal relations we [African scholars] were involved in is that the ignorance about each would necessarily have to be asymmetric. While scholars in the North can afford not to know our scholarship, we cannot. They can afford to have anecdotal knowledge about us, we cannot. Indeed, as citation demonstrates, they can establish vast amounts of material without reference to our scholarship but we cannot (as cited in Adebowale, 2001, p. 9).

African-international collaboration is thus two-fold: It would appear as if African researchers seek collaborative partnerships with international authors and funding agencies in order to gain access to resources, and consequently accepting the research agendas of these international partners and receiving lower author positioning; but if researchers would like to publish within their own interests, that are relevant to African agendas and issues, this would take place in local journals that are invisible within international scholarship and hence do not contribute to the development of African knowledge by international agencies“ recognition and subsequent investment. Collaboration between African authors and non-African authors is important because of its value in the transfer of expertise and resources. However, this transfer of expertise has a sinister edge if it results in African social scientists merely applying and regurgitating models developed elsewhere. To develop local African knowledge it is important to foster and develop international links between African scholars in different African countries in order to promote the development and dissemination of regionally relevant theories, models and methods. This also needs to be extended between African and

international researchers to ensure full integration of African knowledge into global knowledge networks. This seems to only be achievable through local government support and investment.

International collaboration is not argued against – it is favoured within the African context. This research thus sought to elucidate the current circumstances under which research collaboration between African and international authors is operating, particularly with regard to support for the development of African research and researchers, and more importantly, whether African authors can adopt first and second author status given the context of African research and development within the social sciences.

## CHAPTER THREE

### AIMS

This research aimed to explore the patterns of collaboration between African authors and international authors so as to gain insights into the types of collaborative relationships that African authors are connected to, and, to begin to shed light on the state of knowledge production within Africa. Within this main aim, specific objectives were identified in order to best explore the aims; these were:

- a. To identify global continents and countries by the use of the Human Development Index (HDI) in order to categorise and compare each author by their relative continents and countries of affiliation;
- b. To identify the authors of collaborative publications that include African authors (authors and co-authors) in the field of social psychology in the time period 2000 to 2010 and to identify their institutional affiliations and countries of origin;
- c. To map the social networks of collaboration in psychological research published by or with African authors;
- d. To establish the clusters of authors in the network collaborating with one another;
- e. To describe the patterns of collaboration within the field of social psychology for the time period 2000 to 2010; and
- f. To discuss the potential impact of these networks of collaboration on indigenous knowledge production within the African continent.

With these aims identified, a number of research questions were developed to define, elaborate and guide the purpose of the research. In identifying African and international authors who have collaborated together, the research endeavoured to explore the smallest number of ties that would need to be traversed through the network to reach the nearest African author. This would enable the researcher to establish how closely connected African authors are to other African authors, and how closely connected international authors are to African authors. Secondly, if large multi-author publications were included in the sample, what effect would this have on the network structure? Because large multi-author papers may include multi-national research activities such as data collection across a number of countries, would this affect the pattern of connectivity between African authors? Thirdly, African authors are considered as peripheral, “developing” country authors and therefore, their

likelihood of being represented outside the main network cluster was questioned. And lastly, if the research were to exclude all international authors from the network structure, what would the direct connectivity of African authors be across the continent?

This would provide an illustration of the collaborative patterns of African authors to one another and provide a glimpse into whether African authors are collaborating with one another in the efforts of producing their own knowledge relevant to the African context, to be implemented within the African context, and eventually, to be implemented across the globe through first and second author collaboration with international authors.

## CHAPTER FOUR

### METHOD

#### 4.1 Research Design

The purpose of the research aims to achieve insight into the patterns of scientific co-author collaboration within the field of social psychology among African and international countries; and how these collaboration patterns are shaped by globalisation and influence the production of knowledge. Since no similar previous studies could be identified exploring inter-African and international collaboration within a specific discipline, an exploratory approach was adopted specifically as “exploratory studies are used to make preliminary investigations into relatively unknown areas of research” (Terre Blanche, Durrheim & Painter, 2006, p. 44). The primary purpose of this type of research is that it may be used for later in-depth investigation (Aston, 2006). Through the use of an exploratory approach to the study, further hypotheses may be drawn for future investigation and insight into this field of research.

In brief, this research made use of bibliometric social network analysis to map patterns of collaboration between African and international authors in the discipline of social psychology. To do so, the Thomson Reuters Web of Science database was used to identify all publications within the discipline of social psychology within in the period of interest (2000 – 2010). From this corpus of publications, the author affiliation details were extracted allowing inferences to be made regarding their country of affiliation. The sample of papers was then identified that featured at least one African author and one or more co-authors (since single author publications are useless in co-authorship analysis). Author information was then extracted from this sample of papers, and social network analysis was used to map the authors and their patterns of connections to one another using the bibliometric data collected from the database. Each unique author constituted a node and each collaboration on a single paper constituted a link. In the next subsections, the method of using bibliometrics and social network analysis will be described in more detail with regard to the current research.

##### 4.1.1 Social network analysis, bibliometrics and co-authorship networks

Social network analysis and bibliometrics are used within bibliometric mapping in seeking to “find representations of intellectual connections within the dynamically changing system of scientific knowledge” (Small, 1997 as cited in Cobo, López-Herrera, Herrera-Viedma &

Herrera, 2011, p. 1382). Bibliometrics refers to the source of where the data can be retrieved, whereas network analysis refers to the process of performing statistical analyses of the generated network maps (Cobo, et al., 2011). This section describes the method of investigation used, the concepts in social network analysis that pertain to the current research and the usefulness of these methods to understanding social structures and the interconnections of collaborating authors.

#### **4.1.1.1 Social network analysis and the structure of social networks**

Social network analysis maps the patterns of connections between individuals in a setting. These connections describe features of the setting that are critical for the flow of information, resources and power within the system (Otte & Rosseau, 2002). In academic disciplines, co-authorship networks make visible the patterns of close collaboration between colleagues, students and their supervisors, mentors and their mentees. People who collaborate on publications must have been able to agree on paradigms, research questions, method, analysis, and conclusions; at least to satisfy their qualms about permanently publishing on academic publications with their names jointly on it. Such ties facilitate exchange and connection to resources (Scott, 2000). The co-authorship network therefore makes visible particular networks of knowledge and power within a framework of globalisation (Newman, 2004). Indeed, it has been argued that “the co-authorship network is as much a network depicting academic society as it is a network depicting the structure of our knowledge” (Newman, 2004, p. 2).

#### **4.1.1.2 Social network analysis: Units of analysis**

Wetherell, Plakans and Wellman (as cited in Otte & Rosseau, 2002) describe social network analysis as enabling a social structure to be depicted as a network which has „ties“ (Figure 2) connecting members and directing resources. This research depicts a „tie“ as any collaboration on a single publication. The „ties“ connect members, or authors noted on a publication, which are represented by a „node“ (Figure 2). Secondly, social network analysis focuses on the characteristics of the ties as much as on the properties of the individual members (Wetherell, Plakans and Wellman as cited in Otte & Rosseau, 2002). Furthermore, a social network also depicts the relationship between the ties that connect individuals to one another, and assumes that such relationships are fostered, maintained and used by other individuals in the network (Otte & Rosseau, 2002). Thus, social network analysis focuses on social structures and relationships between individuals forming a structured group.

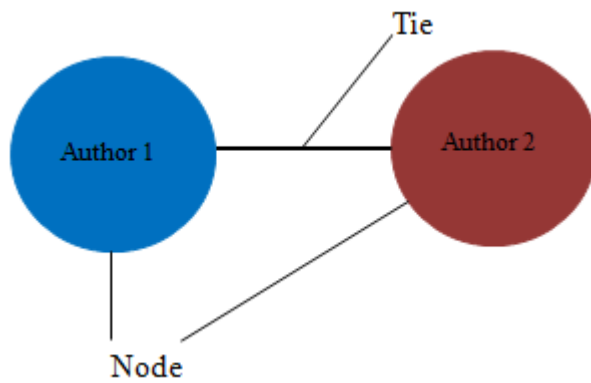


Figure 2. Figure showing the relationship between a node and a tie.

#### 4.1.1.3 Social network analysis: Metrics of analysis

Much research has been conducted into the investigation of the structures of research collaboration networks and in describing and theoretically analysing the patterns that such networks involve. Such research is useful within social psychology as it aims to describe patterns of co-authorship networks created as a response to the generation of knowledge and power within a framework of globalisation (Newman, 2004). In investigating probable flows of information within an academic community, social network analysis is at the forefront of researching co-authorship collaboration structures. Co-authorship of an academic paper may be defined as “documenting collaboration between two or more authors, and these collaborations form a „co-authorship network”” (Newman, 2004, p. 2). In Figure 3 below, each network node represents an author. Lines (ties) connect authors together if they have co-authored one or more papers together.

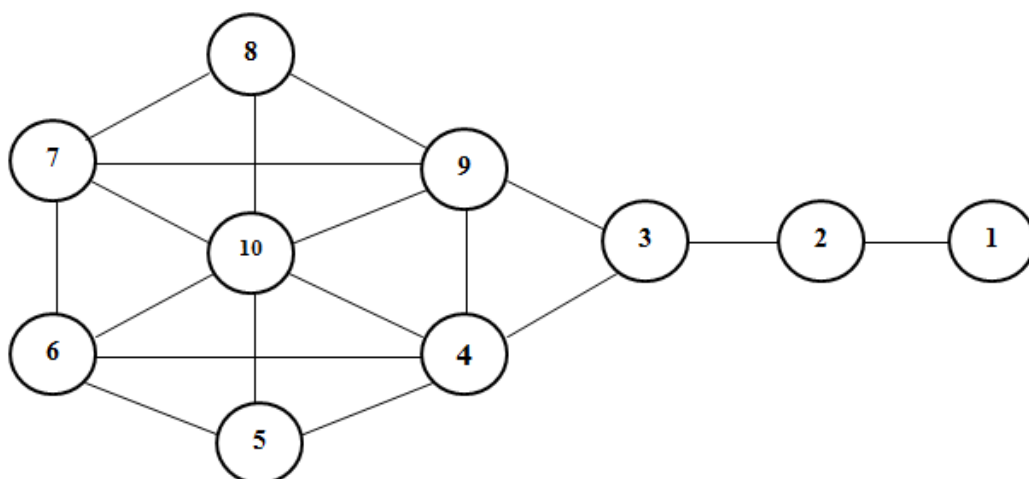
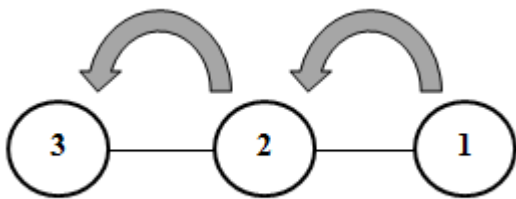


Figure 3. A social network - the “Kite Network”. Adapted from “Social Network Analysis, A Brief Introduction,” by V. Krebs, 2011, [www.orgnet.com/sna.html](http://www.orgnet.com/sna.html).



In Figure 3, a number of network measures are addressed that are used in understanding networks and role-players within networks; and aids in establishing who is at the core and who is in the periphery of a network. The following are measures or terms used in social network analysis that will be used within this research:

- Degree centrality: this is the number of direct connections (ties) that a node has. A node with high degree centrality is also referred to as the “connector” or “hub” in a network (e.g. node 10). The more ties that a node has to other nodes in a network, the more advantageous they may be as they have many options through which resources may be accessed (Hanneman & Riddle, 2005);
- Closeness centrality: This concept describes the distance of a node from the others nodes in a network and describes the ability of a node to access all the nodes in the network quickly; the number of ties that must be traversed in the network to reach someone in the target category (Krebs, 2011; Mishra, Schreiber, Stanton & Tarjan, n.d.). In other words, how “close” is one node to another in terms of the distance or number of “hops” between them. This concept is also referred to as the shortest path. For example, between node 1 and node 3 there is a social distance of 2; it takes 2 “jumps” to get from node 1 to node 3, as shown in Figure 4 below.



*Figure 4.* Figure to illustrate the concept of distance – the number of “jumps” between nodes.

- And lastly, a cluster: This is a collection of nodes in a network that are close to one another and will contain a very large proportion of the total number of ties in a network, forming a dense “cluster” of nodes that are connected through short distances (nodes 3 to 10 form a cluster) (Hanneman & Riddle, 2005).

The closer the connection and the larger the network, the higher the speed and the range of information will be transferring between and within the scientific community (Newman, 2001

in Kretschmer, 2004). This chain of connectivity indicates “mutual scientific influencing of authors”, as described in the example provided by Kretschmer (2004, p. 410):

If one assumes that the exchange of information between two co-authors, A and B, is particularly extensive and deep because of personal contacts, one can further presume that a part of this information also reaches another author C, if B is in co-authorship relationship with C, even if C is not a co-author of A. The same also holds good for the information flow in the direction of another author, D in the case of co-authorship between C and D.

Furthermore, Kretschmer’s (2004) study reported that authors with shorter paths (or distances) to one another are more productive and have greater influence on the entire scientific community or network of authors. Because these highly-productive authors are more closely connected to one another, they are predominantly found within the main network cluster, whereas low-productive authors are usually located in the smaller clusters or dyads (Kretschmer, 2004).

#### **4.1.2 The usefulness of understanding social structures**

Network analysis is thus a quantitative paradigm that details the ways in which networks of ties develop between people through a “continual iteration of actions” (Carrington & Scott, 2011, p. 5). This research may provide further indication of the systems of knowledge production and patterns of resource distribution between core and peripheral countries as understood through social network mapping and analysis (Glänzel & Schubert, 2005).

#### **4.1.3 Social network analysis and bibliometrics: Conclusions**

Bibliometrics and social network analysis can therefore reveal important influences on the research endeavour in terms of global systemic motivations which may include factors such as geographical proximity (intra-national level); the historical, cultural and linguistic proximities (on a national level); or, the economic or political dependence between countries (international level) (Glänzel & Schubert, 2005). Fundamentally, social network theory rests on the assumption that seemingly independent and separate individuals are ultimately interconnected by social relations and interactions (Brandes, Freeman & Wagner, 2005). Thus, networks of authors are connected to each other through formal and informal relations and interactions. This research, therefore, aimed to map these connections to determine the interrelatedness of African authors and non-African authors.

## 4.2 Sample

The time period chosen for the sample was the years 2000 to 2010 and was selected arbitrarily. In selecting the time period for the sample it was acknowledged that too short a time period would result in the extracted network having too few connections; as the academic publication cycle takes some time. And, too long a time period would result in a network that is unmanageably large and dense. Thus in this study, the timeframe 2000 to 2010 was selected as an appropriate time period.

The population of authors used for the research was drawn from the Institute for Scientific Information (ISI) database, now known as Thomson Reuters Web of Knowledge. This database was selected because: (a) it has very good international coverage of journals in the social sciences; and (b) it allowed the exporting of full author affiliation data for each individual author, rather than for the corresponding author only, as allowed by other databases such as PsycINFO.

The Thomson Reuters Web of Knowledge database contains 23 000 journals, which includes 4 571 social science journals across 55 disciplines within their Web of Science database. The Web of Science database categorises journals according to academic discipline (e.g. social psychology). The categorised journals listed within the field of social psychology in the Web of Science database (Appendix A) were used to extract a preliminary list of publications. All articles in the relevant time period were extracted from these journals.

However, since many articles relevant to the discipline are published in journals not specifically devoted to social psychology (for example, in generalist journals such as *American Psychologist*) the search was extended by extracting all keywords used to describe the papers in this discipline-specific sample. This list of keywords contained general keywords (such as „cognitive“) and discipline-specific keywords (such as „intergroup conflict“). The discipline-specific keywords were extracted from the full list of articles and then used to search the complete Web of Science database for the period of interest. Please refer to Appendix B for the list of the top 300 of 19 733 rated keywords used in the keyword extraction for the sample.

Thus, authors within the field of social psychology were identified by a combination of: (a) *discipline-specific journals*: searching for all articles published in journals categorised by the Web of Science as relating to „social psychology“; and (b) *discipline-specific keywords*: searching for publications across all the journals in the Web of Science database which included a keyword specific to social psychology (where keywords were identified from publications in discipline-specific journals identified in the first search).

Although this method of sampling generated a large number of authors categorised within the field of social psychology, it is acknowledged that a certain amount of *false positives* (authors who would not consider themselves as social psychologists but were identified in the sample) and *false negatives* (authors who would consider themselves as social psychologists but were not identified in the sample) must have been generated through the sampling procedure. Unfortunately it is not possible to quantify the degree of false negatives and false positives in the sample.

Furthermore, the sampling procedure may have also resulted in geographic biases such that not all African journals are indexed through Web of Science and therefore some African social psychologists may not have been identified as they are not published within the journals used in the sampling frame. These absences are most likely to have excluded inter-African collaborations from the data since the number of international authors publishing in African journals is very low. Despite these problems, the Thomson Reuters Web of Knowledge database was the most suitable database to access since it had the widest coverage of journals and the most suitable export format to allow author nationality to be extracted and analysed.

#### **4.2.1 Ethical issues in relation to the sample**

The sample of publications used for this research was accessed through a database, Thomson Reuters Web of Knowledge. Since no human subjects were used in the research and only archival data was accessed, ethical clearance was not strictly required. Nevertheless ethical clearance was applied for and granted by the University of KwaZulu-Natal (UKZN) social sciences research ethics committee (HSS/0327/012M).

### **4.3 Detailed data collection procedure**

Bibliographic data was collected from the Thomson Reuters Web of Knowledge, a large database covering the highest impact journals worldwide and indexing research in the sciences, social sciences, arts, and humanities (Thomson Reuters, 2013). More specifically, three of the Web of Science databases were accessed: (a) Science Citation Index Expanded (SCI-Expanded), specialising in mathematics and medicine; (b) Social Science Citation Index (SSCI), specialising in social science; and (c) Arts and Humanities Citation Index (AHCI) (Thomson Reuters, 2013). This provided access to over 12 000 journals within this Web of Science database. Specific search strategies will be discussed below. Raw bibliographic records data was exported and saved in text file (.TXT) format.

The raw text files were then imported into the Science of Science (Sci<sup>2</sup>) software tool, “a modular toolset that provides several methods to deal with bibliometric data, to prepare it for later analysis” (Cobo, et al., 2011, p. 1389). This allowed the cleaning of data (e.g. removing duplicate entries) and conversion to Comma-Separated Variables (CSV) format to allow for importing into Microsoft Excel. A Visual Basic (VB) script was then written to extract individual authors with individual affiliation references. This processed data was then exported in CSV format and imported into Visone (Visone, 2011) for social network analysis. IBM SPSS Statistics Base 19 – Statistics Package for the Social Sciences was used for statistical comparisons not available in Visone. This procedure will now be discussed in detail.

#### **4.3.1 Procedure**

As part of the data collection procedure a timeframe for the sample was established. This was decided upon according to the manageability of the data with regard to the available Random Access Memory (RAM). A period of 10 years was used, from 2000 to 2010, which enabled enough collaborative ties to be captured without resulting in unmanageable amounts of data.

##### **4.3.1.1 Publication extraction by Thomson Reuters social psychology journals search**

Thomson Reuters Web of Science database was accessed through the University of KwaZulu-Natal’s institutional subscription and was used to extract all publications in journals listed in the Thomson Reuters category „Social Psychology“ refined from the Web of Science *Topic* search, „Psychology“ (<http://ip-science.thomsonreuters.com/cgi->

bin/jrnlst/jlresults.cgi). This strategy assumes that all papers published in journals categorised as „Social Psychology“ by the ISI are related to social psychology. The list of journals accessed in this manner is listed in Appendix A.

The journals were entered in to the Web of Science database *Publication Name* search with the Boolean operator “OR” to separate each journal title. The search was conducted for the years 2000 to 2010. The search resulted in 29 162 publications. The output list of search results were then saved by applying the following steps: (a) 500 publications at a time (the maximum amount stipulated by Thomson Reuters), (b) the „Full Record“ only („plus Cited References“ was not selected), and (c) „Save to other Reference Software“ was selected. The files were then saved in TXT format, and once all records were saved, the TXT files were combined into a single TXT file. This combined TXT file was then converted to CSV format using Science of Science (Sci<sup>2</sup>) Tool as described previously to remove duplicate entries and to convert the data to a format recognised by Microsoft Excel.

#### **4.3.1.2 Keyword extraction and search**

It was acknowledged that there is a possibility that social psychology authors may be publishing in journals other than the 52 journals identified in the publication extraction by journal search procedure described above. Therefore, a second search was undertaken in the Web of Science database that would enable a more inclusive sample of social psychology authors that may be collaborating, and hence publishing, in other journals. A keyword search was then used to extract further social psychology authors that may be publishing in other journals related to the field of social psychology as follows.

To identify relevant keywords, first all keywords were extracted from the records identified by the previous journal-based search strategy and duplicate keywords were removed. This resulted in a list of 19 733 unique keywords. These were then ranked according to the frequency that each keyword had been used within the sample of articles. The most common 300 “unique keywords” were then ranked by the author and supervisor of this project according to their relatedness to the field of social psychology (1 = not closely related; 2 = moderately related; 3 = highly related to social psychology). Keywords were also considered according to their level of ambiguity. For example, the keyword “cognitive” appeared with some frequency, but describes work across several psychological sub-disciplines, as illustrated in Figure 5:

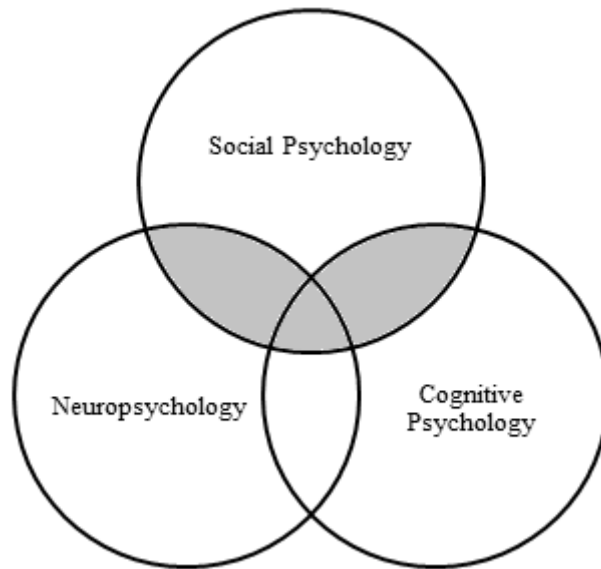


Figure 5. Venn diagram to show the selection procedure used according to the level of ambiguity of the unique keywords in relation to the field of social psychology.

Keywords were considered as highly related to social psychology if, when entered in to the Thomson Reuters Web of Science database, they would extract records exclusively related to the field of social psychology with few records related to other subfields of psychology. Thus, keywords were selected if they would extract a greater proportion of social psychology articles and a lesser proportion from other sub-disciplines, such as neuropsychology or cognitive psychology. For example, keywords that were considered suitable for extracting records exclusively related to the field of social psychology (as well as a few records related to the subfields of social psychology) were: prejudice, race, stereotypes, and intergroup relations; whereas a few examples of keywords that were considered to not extract records that would be exclusively related to social psychology due to their generality to other psychology disciplines or ambiguity were: humans, anorexia, sexual abuse, breast cancer, and adult attachment.

After the above was carried out, 66 unique keywords ranked as *highly related to social psychology* were selected and used in the expanded search in the Thomson Reuters Web of Science database (Appendix B).

Once entered in to the search for the years 2000 to 2010, 2 480 116 publications were listed. This was refined by articles only and resulted in 2 146 880 articles, which was far too many to be processed using the computing facilities available. These articles were therefore further

refined by filtering to select only those from the following Web of Science categories: Sociology; Behavioral Sciences; Psychology Developmental; Psychology Clinical; Political Science; Social Sciences Interdisciplinary; Psychology Experimental; Psychology; Psychology Multidisciplinary; Psychology Social; Psychology Applied; Ethnic Studies; International Relations; Women's Studies; and Social Issues. This resulted in a total of 70 215 articles.

The results list output records were then saved following the 3 step process described in the previous section and the TXT files were also combined using Microsoft Office Word to make one TXT file. This TXT file was then combined with the TXT file containing the output records of the 29 162 publications identified in the first journal-specific search strategy. The final sample contained 99 377 publications.

#### **4.3.1.3 Conversion and processing procedures**

The following procedure was followed for converting the combined journal and keyword search TXT file to a format that could be recognised and used by quantitative data analysis and social network analysis software:

- a. The TXT combined journal and keyword search file containing all the raw data records was imported into the Science of Science (Sci<sup>2</sup>) Tool to remove duplicate records and convert the combined dataset to CSV format so that it may be opened as a Microsoft Excel spreadsheet: (i) the Science of Science Tool program was opened, (ii) the TXT file was opened in Sci<sup>2</sup> and loaded using ISI Scholarly Format, (iii) duplicates entries were removed, and (iv) the file was saved in CSV format.
- b. The CSV file was opened in Microsoft Excel.
- c. A custom-written VB script was then run on the data that: (i) extracted each author from each bibliographic record in surname, initial format<sup>4</sup>; (ii) extracted the affiliation data for each author where the format of the ISI record allowed (a small proportion of records

---

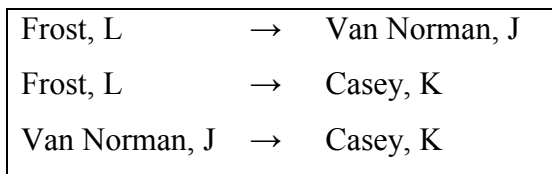
<sup>4</sup> Note that the ISI database is not consistent in recording full names for each author: for authors with multiple records, their name sometimes appears in author-initial format; sometimes in full surname, firstname format and sometimes in surname, firstname, initial format. Therefore the algorithm has to choose between two evils: accidentally treating one author of two publications as different authors when their name appears in different formats in the database; or accidentally treating two authors with the same surname and first initials as the same author when only surname and initial are recorded. In this instance many highly published authors appeared with multiple name formats, and it was decided to convert to surname-initial format despite the risk of accidentally combining papers by multiple authors with the same surname-initial combination into a single author record.



used an older version of the ISI format that did not allow affiliation data to be extracted for every author on publications with more than two authors); (iii) extracted the country information from the affiliation record for each author; (iv) wrote the author and affiliation information for each author to an “author properties” table; (v) ran through the author properties table and removed duplicate entries, saving only the most recent country location for each author and wrote to the table details of each author including:

- The continent in which the authors’ country of affiliation is located; categorised according to the United Nations Development Programme’s Human Development Report (UNDP, 2011) (Appendix C),
- The mean number of authors on the papers in which they appeared as authors or co-authors,
- The authors’ mean author position,
- The authors’ mean correspondence author status (where an author who is routinely listed as first author would have a mean author position of 1 and someone routinely listed as the last author would have a much higher mean author number),
- The authors’ mean homogenous country collaboration indicator (where papers with authors from only one country are coded as „1“ and papers with authors from more than one country are coded as „0“; and the mean averages this score across all the papers authored by the individual),
- The mean intra-African collaboration index (coded as „1“ if at least one pair of authors is located in the same African country and „0“ if not) ,
- The inter-African collaboration index (coded as „1“ if at least one pair of authors comes from two different African countries and „0“ if not),
- The international-African collaboration index (coded as „1“ if at least one authors comes from an African country and another author comes from a non-African country and „0“ if not), and
- The total number of papers published by an author.

And lastly, (vi) wrote entries in a linked-list table (Table 2) connecting each author-pair for the co-authors of each paper in the database. Figure 6 provides an example of a linked list:



*Figure 6.* Example of a Linked List: Three authors collaborating on a publication, namely: Frost, L., Van Norman, J., and Casey, K.

Table 2

*Example of a „LinkedListWithCountry“ entry for a single publication with three authors*

Author A	Author B	Author A Country	Author A is African	Author B	Author B is African	Either Author African	Author Pair Country 1Homogenous 2Heterogenous	Intra- African Tie	Inter- African Tie	African- International Tie
Frost, L	Van Norman, J	USA	FALSE	USA	FALSE	0	1	FALSE	FALSE	FALSE
Frost, L	Casey, K	USA	FALSE	USA	FALSE	0	1	FALSE	FALSE	FALSE
Van Norman, J	Casey, K	USA	FALSE	USA	FALSE	0	1	FALSE	FALSE	FALSE

Table 3

*Example of an author's details on a collaborated publication*

id	Address	country	Mean No. of Authors	Mean Author Position	Mean Correspondence Author	Total Papers	Mean Homogenous Country Collaboration	Mean Intra-African Country Collaboration Index
Broad, R	American Univ, Washington, DC 20016 USA.	USA	2	1	1	1	1	0

Table 3 continued

*Example of an author's details on a collaborated publication<sup>5</sup>*

Mean Inter-African Country Collaboration Index	Mean International-African Collaboration Index	Mean International Collaboration Index	LastCountryContinent
0	0	0	North America

<sup>5</sup>The columns displayed in this table (Table 3 continued) continue from the columns displayed in the previous table (Table 3). In other words, „Table 3“ and „Table 3 continued“ form part of the same table whereby the far left column of „Table 3 continued“ joins to form the next column after the far right column of „Table 3“.

The above information was extracted from each author's address field in order to process the country that they are affiliated to, thus enabling the authors to be coded according to their relative country's continent for analysis of African and International ties.

#### **4.4 Data Analysis**

This section of the Method chapter outlines the quantitative data analysis procedures used in order to meet the aims and objectives of the research.

##### **4.4.1 Quantitative analysis**

The quantitative data analysis section is divided into three subsections: (a) path analysis: calculating the distance to the nearest African neighbour; (b) social network analysis of the author collaboration network; and (c) an analysis of the authors' country's relative development in relation to their production of knowledge.

###### **4.4.1.1 Path analysis: Calculating distance to the nearest African neighbour**

The most important social network metric calculated was the distance between each author and their nearest African neighbour, where "nearness" refers to the tie-distance, or the number of links that needed to be traversed through the network to reach the nearest African author. For authors from African countries this metric was calculated to represent the tie-distance to the nearest author in a *different* African country.

The procedure for accomplishing this in Visone used the "Distance from selected" algorithm which calculates the distance for each node to the nearest member of the selected set or category of nodes. To do so, first all of the African nodes were selected and "Distance from selected" was calculated. This coded each non-African node with the distance to its nearest African neighbour. Then, for African authors the following procedure was repeated for each African country: (a) all African authors were selected, (b) all authors from the present country were removed from the selection, and (c) the "Distance from selected" algorithm was run and saved as a new variable. The distance metric for authors from each African country was then manually merged with the variable representing distance to the nearest African neighbour for international authors. This procedure calculated the distance of each African author from another African author in a *different* African country, thus reflecting levels of network collaboration between African countries rather than within African countries. IBM

SPSS Statistics Base 19 (Statistics Package for the Social Sciences) was then used to perform multiple comparisons for the distances between African and international authors.

#### **4.4.1.2 Social network analysis of the author collaboration network**

The linked list and author-property files processed as described above were imported in to Visone, “an open source social network analysis platform”, to allow the visualisation and analysis of the co-authorship network (Visone Team, n.d., [visone.info/index.html](http://visone.info/index.html)).

Specifically, the social network graph was analysed in terms of: (a) degree centrality, (b) clustering. In order to understand the networks and their participants, these metrics were used to evaluate the location of actors in a network, providing insight into the roles and groupings of core and periphery authors and collaborations of the network.

Visone was used to produce analytic visualisations of the co-author collaboration patterns for the research sample whereby each author was represented as a node, each co-authorship collaboration was represented as a tie, and each node was colour-coded by continent. This allowed the collaboration network to be described in terms of dominant continents, their influence on ties of collaboration, and their connectivity to other nodes, and the network as a whole – providing a general interpretation of which authors and their respective continents enable communication patterns and flows of knowledge. Visone was then used to calculate key social network metrics. IBM SPSS Statistics Base 19 (Statistics Package for the Social Sciences) was then used to perform significance analyses to test the significance of an African authors’ representation within the main network cluster of authors; in other words, whether African authors would be represented within the core or the periphery of the author network.

#### **4.4.1.3 Analysis of the sample of large multi-author publications**

During analysis it was noticed that relatively few papers with large numbers of authors (some with more than 100) were having a dramatic effect on the network. Therefore quantitative analyses were repeated with and without these publications in the dataset where appropriate. When publications with more than 10 authors were filtered out of the data, the dataset had 52 051 authors, which is 20 941 authors less than the original dataset. From the sample, 96 publications contained more than 10 authors. The following table shows the frequencies for this sample of authors from the 96 publications.

Table 4

*Frequencies for the sample of multi-author publications*

Descriptive	
Statistic	Value
n	20 941
Mean	20.8
Median	12
Mode	11
Std. Deviation	24.33638
Variance	592.2595
Range	120

*Note.* Descriptive statistics (mean, median, mode, standard deviation and variance) represent the number of authors per publication.

## CHAPTER FIVE

### RESULTS

#### 5.1 Sample

The full sample included 52 440 authors connected by 176 270 co-authorship ties. These totals included 6 865 authors whose country could not be resolved from the available information in the ISI database. Of the remaining 45 575 authors, 40 055 (87.8%) were from either North America or Europe. Thus, 5 520 (12.1%) authors were from Africa, Asia, Australia, South America, or Oceania.

Within the full sample there were 466 authors (.9%)<sup>6</sup> represented from 29 African countries. African authors represent 1% of the resolvable authors. The highest proportion of these were from South Africa (N = 244; 52.4%) followed by Nigeria (N=47; 10.1%), Kenya (N = 37; 7.9%), Uganda (N = 16; 3.4%) and Egypt (N = 14; 3%) with other African countries comprising of fewer proportions.

#### 5.1.1 Representation of co-authorship ties in the full sample

Of these 466 African authors, 357 (76.6%) were not connected to authors from other African countries by any path (including extended paths via international collaborators). Of the 51 975<sup>7</sup> non-African authors represented in the search, 28 219 (54.3%) did not have connections to authors from African countries by any path. Hence, a greater proportion of international authors had extended network ties to African authors than African authors had extended ties to fellow African authors from other African countries (45.7% of non-African authors had extended network ties to African authors in comparison to 23.4% of African authors). This is displayed in Table 5 below. This trend is partially related to the lower mean number of papers published (and hence smaller social networks) for African authors ( $M = 1.29$ ,  $SD = .967$ ) compared to non-African authors ( $M = 2.24$ ,  $SD = 3.328$ ) during the time period 2000 to 2010. A Mann-Whitney comparison of total papers by origin was significant ( $z = -9.063$ ,  $p < .001$ ), with non-African authors writing significantly more papers during the period (mean rank = 20871.04) than African authors (mean rank = 26268.46).

---

<sup>6</sup>This percentage includes the authors whose countries could not be resolved from the database.

<sup>7</sup> This figure includes the authors whose countries could not be resolved.



Table 5

*Table to show the nature of co-authorship between African and African authors, and African and international authors*

Author	Nature of co-authorship	Total representation of authors in full sample	Total connected ties to African authors	Proportion of network ties to African authors
African authors	Africa-Africa	466	109	23.4%
International authors	Africa-International	51 975	23 756	45.7%

## 5.2 Distance

After 6,866 authors with unresolvable country information were filtered out, the tie distance between each author and their nearest African neighbour was calculated. This distance represented the smallest number of ties that would need to be traversed through the network to reach the nearest African author. For African authors, the distance between each author and the closest author from *another* African country was calculated as described in Chapter Four above. The distance score for African authors therefore reflects levels of network collaboration between African countries rather than within African countries. Note that authors with no path at all to an African author or, for Africans to an author from another African country are treated as missing data in this distance analysis. The average mean distance from African authors differed significantly by region ( $F(6, 20371) = 17.777, p < .001$ ), with Tukey's post-hoc tests revealing significant differences between Africa and all regions except Asia and South America. The figure below shows the distance of African authors to their nearest neighbour by region with the inclusion of large multi-author papers (Figure 7).



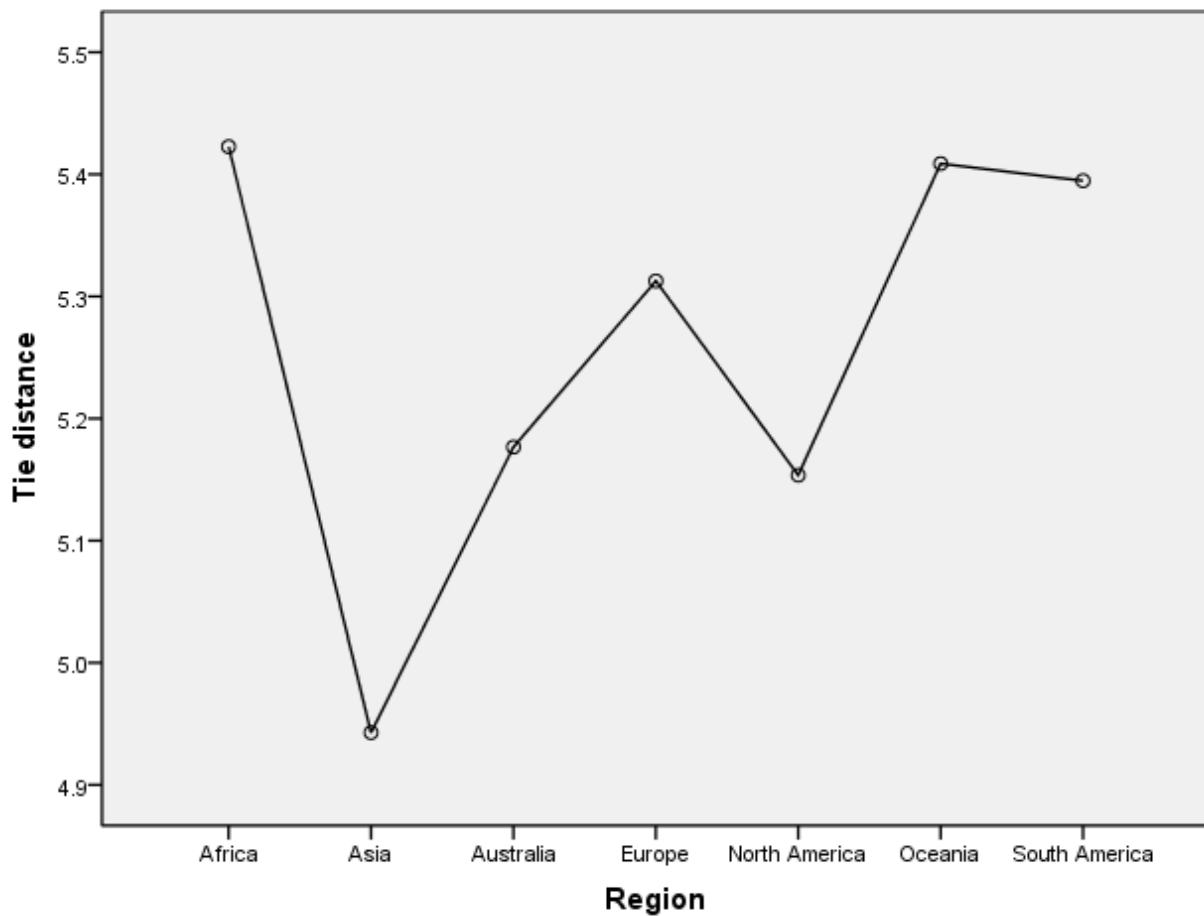
records and 452 (.9%)<sup>8</sup> authors were from African countries. Again, the highest representation of African authors was from South Africa (N= 244; 54%) followed by Nigeria (N= 46; 10.2%), Kenya (N = 36; 8%), Uganda (N = 16; 3.4%) and Egypt (N = 14; 3%) with other African countries having lower representation. Note that the inclusion of the 96 papers authored by large groups increases the number of authors in the sample by only 798 authors (N = 52 411; 1.5%), but increases the number of ties by 44 079 (33%), so it is clear that large multi-author papers have a very large impact on the connectivity of the co-authorship network. Of the 452 African authors represented in the sample excluding multi-author publications, 358 (79.2%) were not connected to African authors from other countries by any path. By comparison, of the 51 191 non-African authors represented, 26 165 (51.1%) did not have connections to authors from African countries by any path. This difference is larger than in the sample including multi-author papers, suggesting that the multi-author publications increase the inter-African connections in the network. However, given the relatively low status of Africans within the multi-author publications, it is likely that the inclusion of these papers artificially inflates the connectivity of African authors in the network of social psychology authors.

#### 5.2.1.1 Distance excluding large multi-author papers

Distance was calculated as for the larger sample, described above. Once again, an ANOVA revealed significant differences in distances to the nearest African neighbour by region ( $F(6,19785) = 11.278, p < .001$ ). Although Levene's Test of Equality of Error Variances was significant ( $F = 21.621, p < .001$ ) indicating that the assumption of homogeneity of variance was violated, the same result was achieved with a more robust Kruskal-Wallis H test,  $\chi^2(6, N = 19792) = 68.25, p < .001$ ) suggesting that the violation of the assumption did not impact on the outcome. The results of the ANOVA have been reported here to allow *post-hoc* tests to be reported. The results thus show that it is Africans who are most distant from authors in other African countries (see Figure 8). Furthermore, Tukey's *post-hoc* tests show that Asia is significantly closer to African authors than any other region (including Africa), and Africans have similar distance to authors from other African countries as Australians, Europeans, North Americans and authors from Oceania.

---

<sup>8</sup>This percentage includes the authors whose countries could not be resolved from the database.



*Figure 8.* Distances to nearest African neighbour by region, excluding large multi-author papers.

Although these multi-author papers clearly have a dramatic impact of the connectivity of African authors in the field as a group, the aim of this paper to explore the connectivity of independent African social psychologists, and it is unlikely that authors publishing in these large multi-author groups are able have much independent “say” in the outcome of these papers. Therefore the balance of this analysis will use the restricted sample excluding articles with 11 authors or more. This has the practical advantage of reducing the computer memory and processing resources required to visually represent the social network.

### **5.3 Position of African authors in the central network**

The social network that emerged was characterised by one very large interconnected cluster of 37 313 authors (containing 175 of the 452 African authors) and a large number of disconnected dyads and groups of ten authors or less (including 14 300 authors, of whom 277

were African) (see Figure 9). In other words, 72.3% of the international authors were part of the core network compared to just 38.7% of the African authors. The very dense main cluster is displayed in Figure 10. It is interesting to note that this pattern of a single large cluster and a number of smaller clusters is structurally consistent with other bibliometric networks (Newman, 2004; Genest & Thibault, 2001 in Kretschmer, 2004). Kretschmer suggests that “it is possible that this could denote a general rule in any co-authorship network” (2004, p. 414).

The above proportions suggest that African authors are less likely to be represented in the main cluster and more likely to be represented in disconnected peripheral clusters. This was confirmed by a significant chi-square analysis ( $\chi^2(1, N = 52411) = 266.463, p < .001$ ).

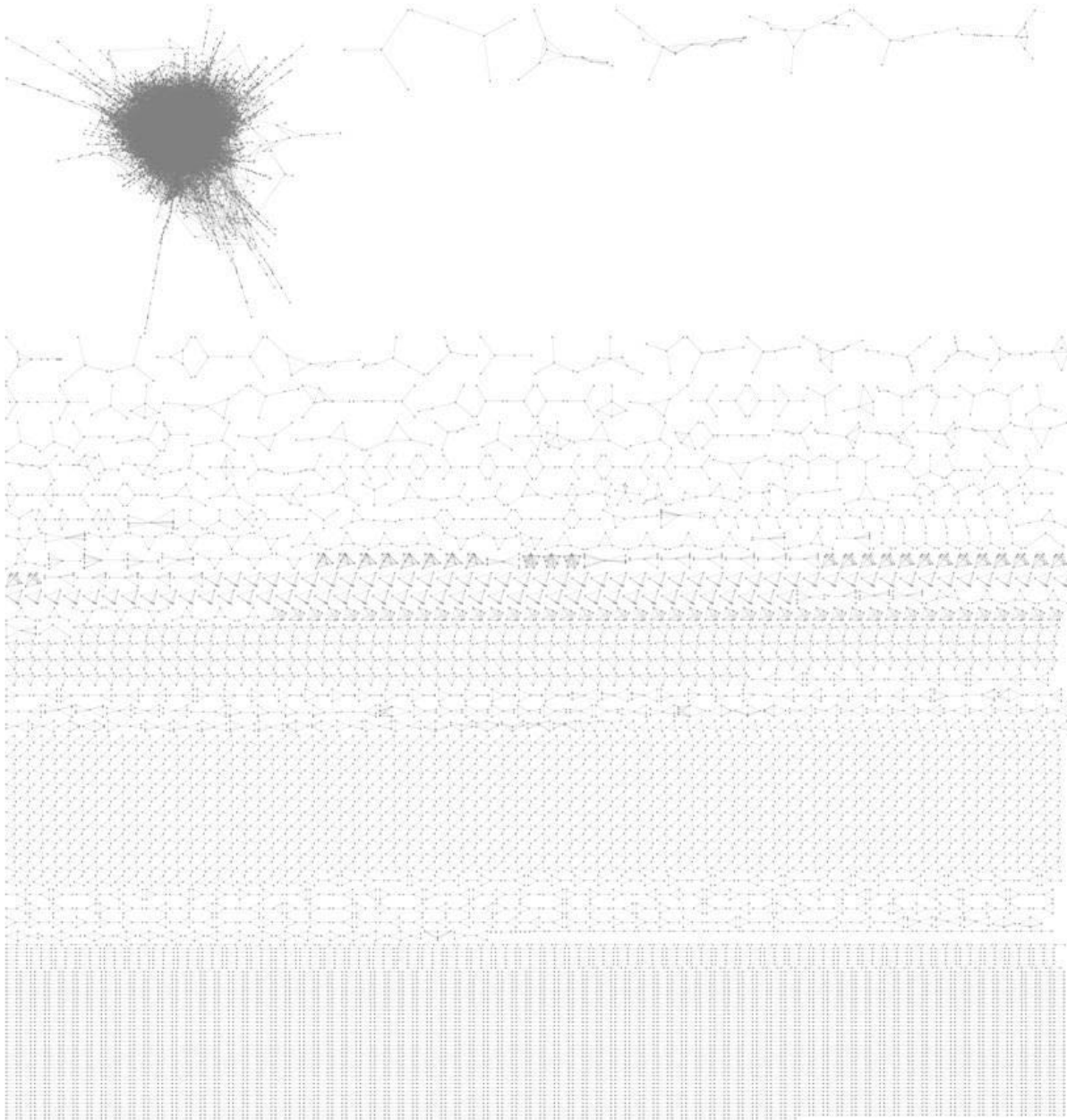


Figure 9. Network clusters

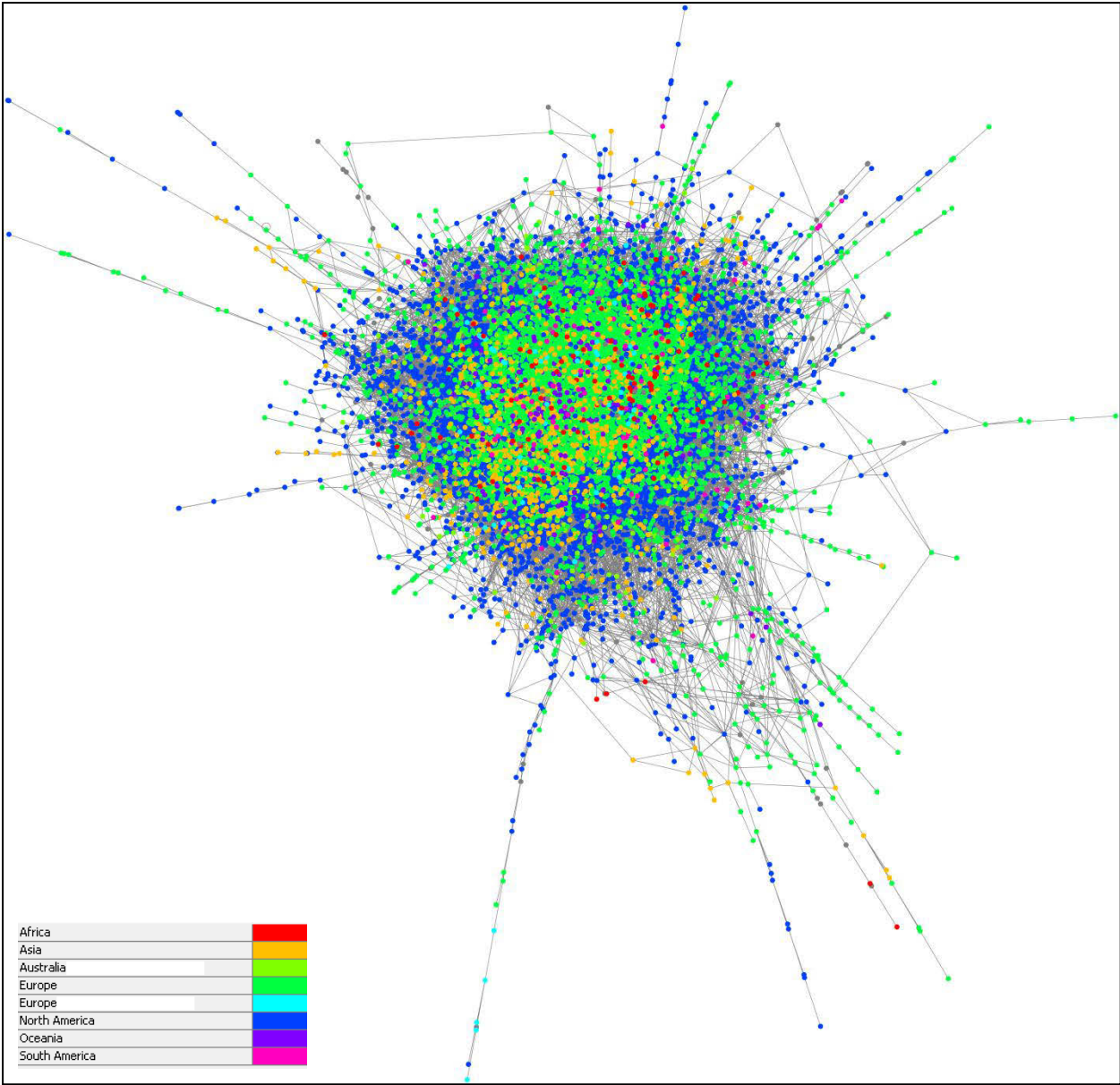
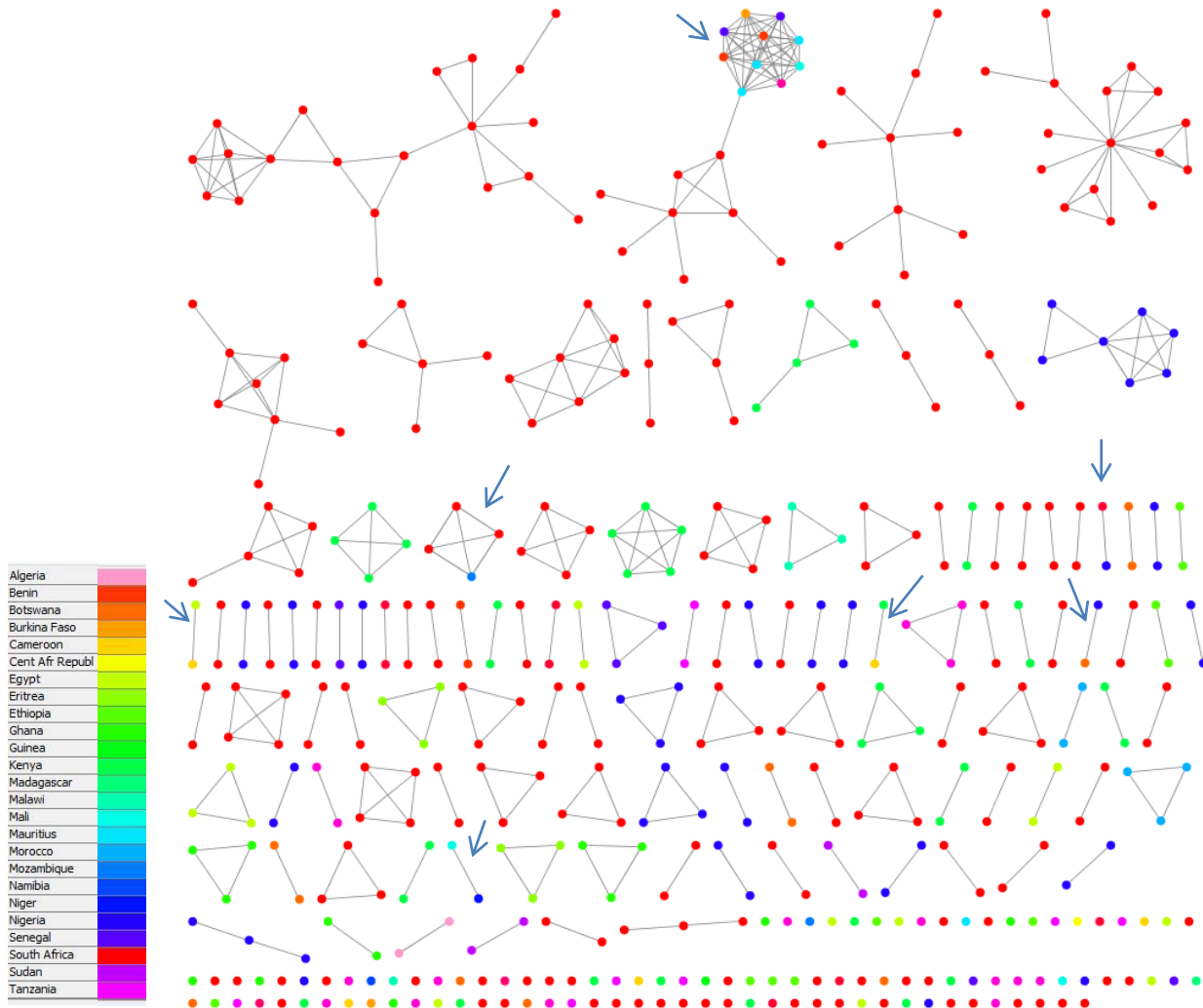


Figure 10. Main cluster of authors, with African authors (red) rendered in the top layer to avoid masking.



Note: Arrows are used to mark the collaboration networks in which African authors have collaborated with authors from another African country.

Figure 11. African authors only; extracted from full sample.

### 5.3.1 The connectivity of African authors

When non-African authors were removed from the whole network comprising of the full sample of authors, the unmediated connectivity of African authors by a non-African author across African countries was extremely low. Note: Arrows are used to mark the collaboration networks in which African authors have collaborated with authors from another African country.

Figure 11 displays the African authors and their co-authorship ties once all non-African authors are selected out with each country represented in a different colour. Only 7 of the 119



(see arrows in Figure 11) co-authorship groups or dyads had cross-national African collaboration (5.8%). The isolates (unmatched authors) are all African authors who collaborated only with non-African authors as all authors included in the sample originally had a collaborating author partner. Therefore, these isolates are not directly tied into the inter-African scholarship network without mediation by foreign collaborators.

### 5.3.2 Relative status of African authors in co-authorship collaborations

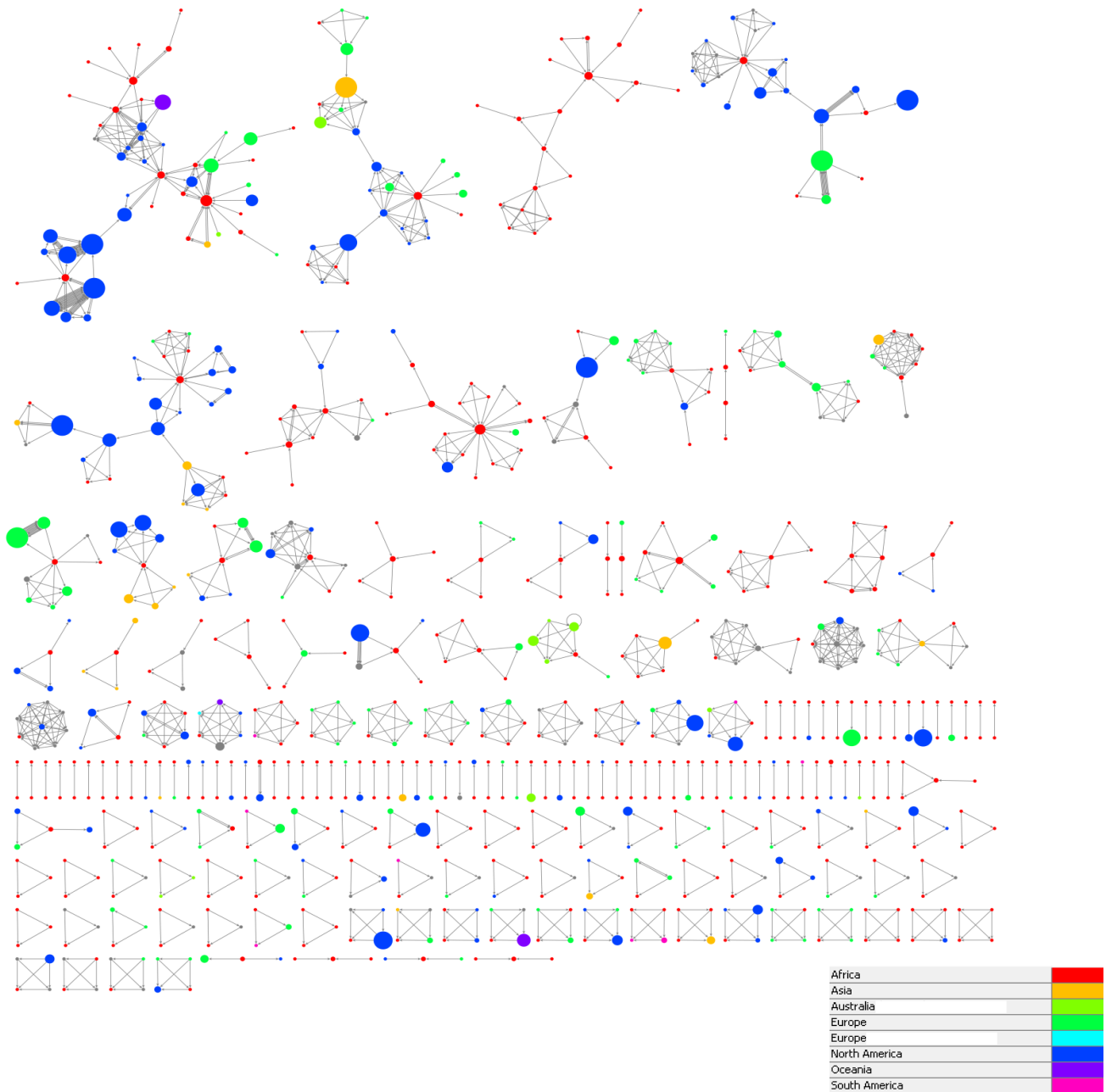


Figure 12. African authors and their direct collaborators; node colour reflects continent and node size is proportional to the total number of publications during the time period 2000 to 2010.

When African authors and their direct collaborators (being from either an African country or an international country) are retained, the network is predictably much more integrated and interconnected than when only African authors are retained (displayed in Figure 12). In the network of Africans and their direct collaborators, visually it is clear that non-Africans dominated in terms of publication output (represented by node-size in the diagram). These visual observations were confirmed by *t*-tests: there was a significant difference in the number of papers published by African ( $M = 1.279$ ,  $SD = .973$ ) and non-African ( $M = 5.543$ ,  $SD = 9.969$ ) authors ( $t = 9.036$ ,  $df = 761$ ,  $p < .001$ ), but no significant difference in the order of authorship or the likelihood of African or non-African authors being listed as the author for correspondence.

Furthermore, it seems that Africans were well positioned in these collaboration networks in other ways. When examining the clustered networks visually in Figure 12 above, African authors (red nodes) tend to occupy positions of both degree centrality (as hub authors connecting many different authors to one another) and betweenness centrality (as connecting two networks to one another).

## CHAPTER SIX

### DISCUSSION

Much research has been done into investigating the structures of co-author collaboration networks and their patterns of connectivity. Newman (2004) states that, “a co-authorship network is as much a network depicting academic society as it is a network depicting the structure of our knowledge” (p. 5200). Connectivity between authors enables information flow and access to resources, but also enables the ability to produce knowledge that is relevant to one’s culture and society rather than adapting and repeating other societies’ models. Hwang (2008) argues that there is an unequal distribution of knowledge production whereby core countries, through their abundant availability of resources, hold power in terms of their ability to produce knowledge more efficiently. Furthermore, these core countries are dominated by what Henrich et al. (2010) call WEIRD research that is not universally generalisable. Thus, if these core countries are the producers of knowledge and their models are seemingly least representative of the population, it becomes pertinent that African authors seek to produce their own knowledge through asserting their research agendas into the global knowledge network. There are, of course, barriers to such collaborative patterns mainly founded in lack of access to funding; therefore, careful monitoring of research partnerships that promote true collaboration is necessary.

This research therefore aimed to identify, map and describe patterns of collaboration between African authors and their co-authors within the field of social psychology within the time period 2000 to 2010 across African and international borders. This would offer further insight into describing co-authorship patterns of developing country authors (Schubert & Sooryamoorthy, 2010). The findings support the literature reviewed; and this will be discussed according to (a) the representation, connectivity and position of African and non-African authors; and (b) the social distance between collaborating authors.

#### **6.1 The representation, connectivity and position of African and non-African authors**

The analysis demonstrates a number of findings with regard to how African and non-African authors are represented and how they are connected to one another. This has important implications for how African authors are therefore positioned within this network of social psychology authors.

### 6.1.1 Representation

Firstly, the number of African scholars publishing within the field of social psychology is extremely low. African authors represent 1% of all the (resolvable) authors publishing in the sampled ISI journals for the time period 2000 to 2010. Generally, the „gold standard“ for a country’s research and development intensity is 1% (Mouton et al., 2008). As a point of reference, there are more publishing social psychologists in Norway alone (485 authors) than on the entire continent of Africa (466 authors). Furthermore, North America and Europe hold the greatest number of publishing social psychologists, nearly 88%. With the majority of social psychology authors publishing from developed, core countries, it may be assumed that the knowledge that is being produced is relevant to these developed countries and does not focus on social psychological issues pertaining to Africans, for Africans (cf. Henrich et al., 2010). In addition, the Thomson Reuters Web of Science database that was accessed for the research sample further demonstrates the invisibility of African social psychologists within the global network of high impact scholarly literature (Tijssen, 2007). This is consistent with Hwang’s (2008) theory that argues that there is an unequal distribution of knowledge that is held within resourcefully developed core countries that marginalises less-developed countries as receptors of „core“ knowledge. It must also be acknowledged that there were African authored publications that may not have been accessed in this research because of the biases in the scope of the Thomson Reuters Web of Science index, for example the *Journal of Psychology in Africa* is included (although not in the sample accessed in this research), but the *Nigerian Journal of Clinical and Counselling Psychology* is not. The results from the research clearly show this unequal distribution of core authors contributing to the body of social psychological knowledge.

Within the African continent, South African authors were the most represented. More than half of the authors from the African continent were South African. This is again consistent with the literature which states that South Africa holds the most connected position within the SADC region: “a dwarf internationally and a giant on the African continent” (Gevers, 2006, p. 1; Mouton et al, 2008). Interestingly, Mouton et al. (2008) reported that Tunisia was the only country in Africa to obtain the gold standard in their measure of research and development (as described in Chapter Two). From the results of this study, Tunisian authors were not represented in the top five most authored countries for social psychology. It could be considered, though, that Tunisian authors are more represented within another field of scientific knowledge other than social psychology.

### 6.1.2 Connectivity

Secondly, the connectivity between African social psychologists is poor. Three-quarters of African social psychologists are not connected to scholars in other African countries by co-authorship ties at all, including through international author ties. This is an interesting finding as the literature reports that, in terms of the politics of connection, connectivity between authors across Africa should be facilitated by authors in developed countries such that developing world authors are more likely to be connected to one another if connected through developed world authors (Boshoff, 2009; Leydesdorff & Wagner, 2008). Furthermore, Leydesdorff and Wagner (2008) report that it is well-resourced developed world authors who publish with less-developed authors in order to satisfy their own self-interests. Mouton (2010) acknowledges that African authors tend to publish in local journals that do not contribute to global knowledge production, but that these publications seem to fulfill local authors' research interests in that they do not have to redirect the focus of their studies to suit the international journals' agendas. The majority of these local journals are not featured within the Thomson Reuters Web of Science database and so the network of social psychologists would be under-represented within this sample.

The International Network for the Availability of Scientific Publications (INASP) has been attempting to redress the invisibility of local African knowledge through African Journals Online (AJOL) (Mouton, 2010). Within the 460 journals available through AJOL, 32 journals (7%) were included within Thomson Reuters Web of Science (Appendix 4). A further 44 journals are included within the Web of Science database that do not feature in AJOL (Appendix 5). Together, these 76 local African journals comprise of 0.6% of the Web of Science database. This is consistent with Tjissen's (as cited in Mouton, 2010) finding that sub-Saharan Africa contributes about 0.7% of the production of world science, and that this is unlikely to recover (1996 figure). These figures, together with the results of this research, confirm the invisibility of local African knowledge and provide insights into why initiatives directed at increasing the exposure of these local journals is so important (Mouton, 2010).

Although more than half of the international social psychology authors represented did not have any connections to African authors, still, a greater proportion of international authors had connections to African authors than African authors had connections to other African authors. It must be considered within this result that African authors do have a smaller co-

authorship network because international authors publish significantly more papers. Nonetheless, this greater proportion of international authors connected to African authors could be because (a) African authors rely heavily on donor funding from international agencies (Mouton et al., 2008) encouraging collaboration with developed countries; and (b) there may still be „network effects“ that exist which shows a preferential attachment of African authors to non-African authors because there is no strict system of governance that makes research collaboration beyond the efforts of large funders possible (Leydesdorff & Wagner, 2008). This was further explored through examining the relative position of African authors within the main network cluster, as well as through examining the network of African authors only.

### **6.1.3 Position**

African authors in social psychology are mostly connected to one another outside of the main network cluster of authors, and are thus positioned outside this main hub of connectivity. This main network of interconnected authors represents access to shared resources; both material resources and knowledge resources. This is described by Kretschmer (2004) as “mutual scientific influencing of authors” (p. 410). Through the connectivity of authors, information disseminates via chains of connectivity between co-authors in both directions (Newman, 2001 cited in Kretschmer, 2004; Scott, 2000). In addition, authors located inside the main cluster are also reported to be more productive and have shorter distances of connectivity between other authors (Kretschmer, 2004). Thus, with the majority of African authors positioned outside the main network cluster, they are more likely to be less productive and have less access to information flows. This confirms Schubert and Sooryamoorthy’s (2010) problem of the marginality of peripheral countries who are excluded from scientific activities taking place within the main network of collaborating authors from core countries by not having access to funding and being able to disseminate their research agendas to this larger scientific community.

### **6.2 The social distance between collaborating authors**

This sub-section discusses the closeness centrality of authors to one another across regions and within the African continent based on the results of the study. This analysis also takes into consideration the inclusion and exclusion of large multi-author papers and the effect that these publications have on the number of ties that connect African authors to one another, as well as to non-African authors.

### **6.2.1 The inclusion of large multi-author papers**

The inclusion of large multi-author publications into the analysis yields interesting results for the influence of connectivity between African authors. When including these large multi-author papers in the analysis of the tie distances between African authors to other African country authors and international authors, African authors are an average of four ties away from their nearest neighbor from another African country. African authors were significantly closer to other African country authors than to authors from Europe, North America, Oceania and Australia. In other words, African authors were significantly further away in terms of tie distance from these international authors. It must be considered though whether these large multi-author papers do represent truly cooperative collaboration partnerships as the extent to which all these authors communicated with and contributed to the research agenda is undeterminable. It seems very unlikely that all authors on a publication with 123 authors have equal power in determining the topic, methods and outcomes of an investigation. It seems more likely that developing-world partners would primarily be engaged in data-collection activities supporting the research agenda of the primary developed-world authors. This interpretation is supported by the fact that the three publications with the most authors all had the same American first author. An interesting pattern emerges when these large multi-author papers are excluded from the analysis.

### **6.2.2 The exclusion of large multi-author papers**

If the large multi-author papers are excluded then, on average, African authors are more than five ties away from their nearest neighbours in other African countries. In other words, African scholars are as distant from African scholars in other African countries as Europeans and North Americans are distant to African scholars in general. Indeed, Asians are closer to African authors in terms of tie distance than African authors are to other African authors. The analysis found that African authors (who are more likely to be located outside the main network cluster) have a further tie distance from one another than any other international author. This confirms Kretschmer's (2004) findings that authors who are located outside the main network cluster of authors have a further social distance from other authors. The research found this to be true for African authors who showed to have a further social distance from other African authors as well as from international authors. Thus, not only are African authors less productive and have less access to information flows within international collaboration networks, but also within African collaboration networks.

In addition, it would appear as if collaboration is favoured with authors from core well-resourced countries such as Europe and North America as these countries dominated the publication arena of social psychology both in amount of authors publishing in the field, and in amount of publications (Hwang, 2008). Because authors in peripheral countries seek collaboration with authors in core countries for the purpose of gaining access to resources, one would expect that African authors would be more closely connected to international authors than to other African authors (Hwang, 2008; Mouton et al., 2008). Yet, African authors are as distanced from one another as international authors, which may explain the poor representation and connectivity between African authors operating within what Mouton et al. (2008) call a sustenance mode – producing and applying knowledge locally and not for the contribution to global knowledge.

Although African authors are poorly represented within these network structures, those that are represented do seem to occupy important positions within the network that boost their access to resources by connecting with authors who are well connected in other networks. Thus, although few African authors are represented in the main cluster, they have been able to position themselves strategically so as to gain access to important flows of information. Most of these African authors were from South Africa, and this may explain the status that South Africa occupies as a semi-peripheral country (Gevers, 2006; Mouton et al., 2008). It must further be noted that the journals represented in this sample are high impact global journals and that the African authors represented within this sample would be authors that are – in local terms – well developed within their field, most productive, and with probable interests within international research trends.

### **6.3 Conclusion**

What does this mean for the state of the field of social psychology? Firstly, the African perspective is likely to be poorly represented within this field. This has implications for social psychology in Africa such as continued reliance on models developed elsewhere that poorly reflect local conditions; and theoretical implications for social psychology as a science in that Western perspectives continue to be considered universal despite the important contributions to theory that can be made by work in other cultures (Henrich et al., 2010). Thus, international collaboration is favoured, as the results show and what this research argues for – but, it is of utmost importance that this collaboration has equal sharing of information flows



(Kretschmer, 2004). Inter-African collaboration is important in producing and strengthening relevant psychology for Africans. Currently, the barriers to such collaboration need to be addressed by prioritising the development of science and economic policies that favour and encourage inter-African collaboration. Through gaining government support and resources, changing the current modes of scientific work, re-establishing social science as a profession, and addressing the brain drain; the invisibility of African publications may begin to be redressed (Mouton, 2010).

The current imperial state within which African scholarship is embedded is two-fold: On the one hand, the dissemination of the paradigms of knowledge flow from WEIRD to non-WEIRD countries and is structured in such a way that it militates against the development of indigenous knowledge (Henrich et al., 2010; Mouton, 2008). This is true to an extent, but, it must also be acknowledged that many of the economic challenges that African (and other non-WEIRD) countries face can benefit from the knowledge that is disseminated through such imperial channels. On the other hand, African countries (and other non-WEIRD countries) have a diverse platform from which perspectives and models can be developed and disseminated for Africans and also the rest of the world (Arnett, 2008). As Arnett (2008) eloquently states, “The central challenge for American psychologists in the 21st century is to cross our borders as never before, not only geographically but intellectually, in pursuit of making psychology a fully human science” (p. 613).

#### **6.4 Limitations and recommendations**

This sub-section of the Discussion chapter outlines the limitations to the research. Specifically, with relation to (a) the sampling frame, (b) author name disambiguation, (c) and analysing African author connectivity. With regard to these three limitations, recommendations for their improvement are relevantly discussed. At the end of this section certain recommendations for further development of this research are addressed.

##### **6.4.1 Sampling frame**

The most serious limitation of this study relates to the adequacy of the sampling frame and the way that the domain of “social psychology” was defined within that frame. The scope of publications in this analysis was limited to those indexed in the Web of Science database. If journals exist that specialise in disseminating the work of African scholars but that are not listed in the Web of Science index, then they would not have been included in this analysis. It

is fair to say that Web of Science coverage of African journals is uneven with regard to the journals that are included in the database as described above and shown in Appendix D and Appendix E. The coverage of the study is therefore biased towards established journals in Western countries reflecting the bias of the database from which the data was extracted.

The scope of “social psychology” was defined by first extracting all articles from all journals in the Journal Citation Reports (JCR) category PSYCHOLOGY–SOCIAL during the period of interest, extracting the 100 most popular keywords from these papers, excluding those keywords that were not centrally relevant to social psychology, and then searching the entire Web of Science database for any articles with the remaining 66 keywords. This procedure meant that the scope of the field was defined from the perspective of those authors publishing in the “core” journals in social psychology during the period, which inevitably will exclude African authors working in areas that do not fit neatly into this frame. However, (a) this procedure extracted a dataset at the limits of the available computing facilities that could not practically be extended further; and (b) there is no easy way to develop a sampling strategy that favours African interests, since the Web of Science database does not allow easy searching on authors’ affiliation.

#### **6.4.2 Author name disambiguation**

Due to the inconsistency over the time period of Thomson Reuters bibliographic formatting, observations were made that indicate author name homonymy due to common surnames and initials, or listings of the same author under different formats that distorted the co-authorship network and their structures. Since the Web of Science database is inconsistent, sometimes recording authors’ full firstnames, sometimes multiple initials and sometimes only the first initial, it will always be impossible to perfectly identify authors and their publications. A choice had to be made to use full author information (firstname, surname); in which case publications where the Web of Science database has recorded only the author’s initials was treated as if they were written by a different author. Alternatively, the author information can be routinely stripped to „First Initial, Surname“ format; in which case different authors with the same surname and first initial would be treated as the same entity. Given the reasonably high proportion of records using only initials and surname, the latter procedure was followed in this study.

### 6.4.3 Analysing African author connectivity

Further social network analysis is needed to deal with the empirical question of measuring the effects of the mean number of ties in *papers* by other variables of interest, for example, the number of ties in papers by South Africa in relation to the number of ties in papers by North Americans. As the current network stands (including all co-authored papers), it would seem as if Africans are more connected to one another as a result of some „quirk“ of publishing (i.e. African co-authors used as head researchers in collecting data in their respective countries; or through their cross-cultural work); and so this would need to be a covariate in further analysis. The software that has been used in the current research uses each tie as a unit of analysis and thus the links between each ties“ association to a publication is inaccessible in the data“s current form. In addition, the ties in the data have been coded by weighting the ties by the number of papers that each pair of authors has collaborated on. Thus, because Visone is not a bibliometrics software package, there has been no attempt to link a tie to a publication paper.

This may further be elaborated on through the Visone software whereby each paper is manually labelled and imported as an attribute. A network analysis could then produce on the labels depicting the ties between papers instead of on the ties between individuals. This has not been analysed in the current research as one cannot assign a paper to a country and thus does not address the current research questions. Once large multi-author publications have been removed from the analysis, a very different result is reached which partially addresses the effect of Africans appearing more connected to one another as described above.

In addition to the limitations and recommendations discussed above, further qualitative ethnographic field studies are also recommended to enrich and further inform this interpretation of large-scale co-authorship networks. This may also provide further insight into authorship practices and preferences, and how these are reflected in the structural features of specific identified network clusters (Velden, Haque & Lagoze, 2010). Once identifying and locating hub authors, qualitative methods could be used to understand the authors“ institutional ranking, their research interests and projects, the nature of their research, their scientific neighbourhood, and their institutional and funder stipulations with regard to collaborations with other institutions and authors. In addition, qualitative investigations could be made into identifying and contextually understanding how the African authors represented in this network of social psychologists were able to position

themselves as such and the implications of having access to this international network of knowledge.

## CHAPTER SEVEN

### CONCLUSIONS

Academic publishing in Africa developed to offer an avenue for Africans to contribute their voices to the compendium of human voices, to be part of the richness of humanity and human endeavour. It evolved out of the understanding that we should not expect that others can and should be relied on to make the utterance on our behalf (Adebowale, 2001, p. 12).

The research presented set out to explore the patterns of co-authorship collaboration between African and international authors within the field of social psychology in which the status of African authors' collaborative patterns could be illustrated. The literature addressed a number of interconnected issues that social science (and particularly social psychology) faces within Africa and the consequences that these have on social psychologists who wish to publish within the field. These barriers to collaboration have dire consequences on producing relevant knowledge that address issues that face Africans. This often leads to international research agendas and authors taking priority, leaving African social scientists as merely applying and regurgitating models developed elsewhere as a result of attempting to gain access to resources via chains of collaboration. Social and psychological research in Africa is therefore an important scientific objective. It has value for Africans, because local perspectives will be better embedded in the knowledge that is produced by social science research, and also has value for the global community, because including African perspectives and paradigms will help us to develop a more universal social psychology. To develop local African knowledge it is important to foster and develop international links between African scholars in different African countries in order to promote the development and dissemination of regionally relevant theories, models and methods.

The results from this study indicate that African social psychology authors are not well represented and integrated within international scholarship networks. They are less productive than their international counterparts and have less access to important information flows. Tijssen (2007) states that, "The relative isolation of African science in international research communities, and the modest research infrastructures they have to work with, renders it particularly important for talented and ambitious researchers to become more integrated into the world community of scientists and scholars" (p. 17). But, not only are

African scholars poorly connected to international authors, they are also as poorly connected to other African authors. If local perspectives in social psychology are to be developed, it seems important for African regional collaborations to be fostered. There is clearly a need for government organisations to redress the state of social science through policy within Africa so as to promote the production and dissemination of knowledge that is relevant to the advancement of institutional capacity as well as the people of Africa who are the beneficiaries of this knowledge.

## REFERENCES

- Adebowale, S. A. (2001). The scholarly journal in the production and dissemination of knowledge on Africa: Exploring some issues for the future. *African Sociological Review*, 5(1), 1-16.
- Arnett, J. J. (2008). The neglected 95%: Why American psychology needs to become less American. *American Psychologist*, 67(7), 602-614. doi: 10.1037/0003-066X.63.7.602
- Aston, S. (2006). *A qualitative bias review of the adaptation of the WAIS-III for English-speaking South Africans* (Unpublished master's thesis). Nelson Mandela Metropolitan University, Port Elizabeth.
- Boshoff, N. (2009). South-South research collaboration of countries in the Southern African Development Community (SADC). *Scientometrics*, 84, 481-503. doi: 10.1007/s11192-009-0120-0
- Brandes, U., Freeman, L. C., & Wagner, D. (2005). Social networks. In J. C. Scott, (Ed.), *Social network analysis: A handbook* (pp. 803-837). London: Sage.
- Carrington, P. J., & Scott, J. (2011). Introduction. In J. Scott & P. J. Carrington, (Eds.), *The Sage handbook of social network analysis* (pp. 5-17). London: Sage.
- Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., & Herrera, F. (2011). Science mapping software tools: Review, analysis, and cooperative study among tools. *Journal of the American Society for Information Science and Technology*, 62(7), 1382-1402.
- Costello, A., & Zumla, A. (2000). Moving to research partnerships in developing countries. *British Medical Journal*, 321, 827-829.
- Council for the Development of Social Science Research in Africa. (n.d.). *Mission statement*. Retrieved May 13, 2013 from [www.codesria.org/spip.php?article1&lang=en](http://www.codesria.org/spip.php?article1&lang=en)

- Council on Higher Education. (2009). *Higher education monitor: The state of higher education in South Africa*. Retrieved August 3, 2013 from Council on Higher Education and Higher Education Quality Committee: <http://www.che.ac.za/documents/d000201/>
- European Commission. (2009). *Education and training: Erasmus Mundus – Scholarships and academic cooperation*. Retrieved August 5, 2013 from [ec.europa.eu/education/external-relation-programmes/mundus\\_en.htm](http://ec.europa.eu/education/external-relation-programmes/mundus_en.htm)
- Ferraro, V. (2008). *Dependency theory: An introduction*. Retrieved August 18, 2013 from <https://www.mtholyoke.edu/acad/intrel/depend.htm>
- Gaillard, J. F. (1994). North-South Research Partnership: Is collaboration possible between unequal partners? *Knowledge and Policy: The International Journal of Knowledge Transfer and Utilisation*, 7(2), 31-63.
- Gevers, W. (2006). Introduction and background. In ASSAf, *Report on a strategic approach to research publishing in South Africa* (pp. 1-8). Pretoria/Tshwane: Academy of Science of South Africa.
- Glänzel, W., & Schubert, A. (2005). Analysing scientific collaboration through co-authorship. In H. F. Moed., W. Glänzel., & U. Schmoch (Eds.), *Handbook of quantitative science and technology research* (pp. 257-276). Dordrecht: Kluwer Academic Publishers.
- Green, L., Daniel, M., & Novick, L. (2001). Partnerships and coalitions for community-based research [Supplementary material]. *Public Health Reports*, 116(1), 20-31.
- Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods*. Retrieved August 17, 2013 from <http://faculty.ucr.edu/~hanneman/>
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioural and Brain Sciences*, 33, 61-135. doi: 10.1017/S0140525X0999152X



- Hwang, K. (2008). International collaboration in multi-layered center-periphery in the globalisation of science and technology. *Science, Technology and Human Values*, 33(1), 101-133. doi: 10.1177/0162243907306196
- Kanyengo, C. W. (2006, September). *Managing digital information in Africa: Preserving the integrity of scholarship*. Paper presented at the Conference on Bridging the North-South Divide in Scholarly Communication in Africa, Netherlands.
- Katz, J. S., & Martin, B. R. (1997). What is research collaboration? *Research Policy*, 26, 1-18.
- Krebs, V. (2011). *Social network analysis: A brief introduction*. Retrieved March 14, 2012 from [www.orgnet.com/sna.html](http://www.orgnet.com/sna.html)
- Kretschmer, H. (2004). Author productivity and geodesic distance in bibliographic co-authorship networks, and visibility on the web. *Scientometrics*, 60(3), 409-420.
- Krull, W. (2005). Helping to create symmetric partnerships: A new approach to supporting research in Sub-Saharan Africa [Editorial]. *Tropical Medicine and International Health*, 10(2), 118-120.
- Leydesdorff, L., & Wagner, C. S. (2008). International collaboration in science and the formation of a core group. *Journal of Informetrics*, 2(4), 317-325.
- Lundberg, J., Tomson, G., Lundkvist, I., Skår, J., & Brommels, M. (2006). Collaboration uncovered: Exploring the adequacy of measuring university-industry collaboration through co-authorship and funding. *Scientometrics*, 69(3), 575-589.
- Mishra, N., Schreiber, R., Stanton, I., & Tarjan, R. E. (2007). Clustering social networks. In A. Bonato, & F. R. K. Chung (Eds.), *Lecture Notes in Computer Science* (pp. 56-67). doi: 10.1.1.100.9786
- Mouton, J. (2010). The state of social science in sub-Saharan Africa. In UNESCO, *World social science report: Knowledge divides* (pp. 63-67). Paris: UNESCO.

- Mouton, J., Boshoff, N., & Waast, R. (2009). *Scientific mobility and institution building in science in developing countries*. Paper prepared for ResIST under Priority 7 of the 6<sup>th</sup> Framework Programme: Citizens and Governance in a Knowledge-Based Society, University of Oxford.
- Mouton, J., Boshoff, N., de Waal, L., Esau, S., Imbayarwo, B., Ritter, M., & van Niekerk, D. (2008). The state of public science in the SADC region. In P. Kotecha (Series Ed.), *SARUA Study Series 2008: Towards a common future: Higher education in the SADC region* (pp.197-302).
- National Research Foundation (n.d.). *Overview*. Retrieved August 3, 2013 from <http://www.nrf.ac.za/risa.php?fdid=13>
- Newman, M. E. J. (2004). Coauthorship networks and patterns of scientific collaboration [Supplementary material]. *Proceedings of the National Academy of Sciences, USA*, *101*(1), 5200-5205. doi: 10.1073/pnas.0307545100
- Onyancha, O. B. (2008). Changing patterns and trends in author co-authorship networks of HIV/AIDS research in Eastern and Southern Africa. *Mousaion*, *26*(2), 59-78.
- Organisation for the Social Science Research in Eastern and Southern Africa. (2006). *Background*. Retrieved May 13, 2013 from [www.ossrea.net/index.php?option=com\\_content&view=section&layout=blog&id=4&itemid=28](http://www.ossrea.net/index.php?option=com_content&view=section&layout=blog&id=4&itemid=28)
- Otte, E., & Rousseau, R. (2002). Social network analysis: A powerful strategy, also for the information sciences. *Journal of Information Science*, *28*(6), 441-453.
- Schneegans, S. (Ed.). (2010). *The current status of science around the world* (UNESCO Science Report 2010). Paris: UNESCO.
- Schubert, T., & Sooryamoorthy, R. (2010). Can the centre-periphery model explain patterns of international scientific collaboration among threshold and industrialised countries?

The case of South Africa and Germany. *Scientometrics*, 83, 181-203. doi: 10.1007/s11192-009-0074-2

Science of Science (Sci<sup>2</sup>) Tool [Computer software]. Indiana: Indiana University and SciTech Strategies.

Scott, J. (2000). *Social network analysis: A handbook* (2nd ed.). London: Sage Publications.

Terre Blanche, M., Durrheim, K., & Painter, D. (Eds). (2006). *Research in practice: Applied methods for the social sciences* (2nd ed.). Cape Town: UCT Press.

Thomson Reuters. (2013). *Web of Science*. Retrieved November 28, 2013 from [thomsonreuters.com/web-of-science/](http://thomsonreuters.com/web-of-science/)

Tijssen, R. J. W. (2007). *Best of both worlds? Domestic relevance vs. international visibility of local science journals in developing countries*. Unpublished manuscript, Centre for Science and Technology Studies, Leiden University, RB Leiden, Netherlands.

United Nations Development Programme. (2011). *Human development report 2011: Sustainability and equity: A better future for all*. Retrieved May 15, 2013 from [hdr.undp.org/en/reports/global/hdr2011/download/](http://hdr.undp.org/en/reports/global/hdr2011/download/)

van Helden, P. (2012). The cost of research in developing countries. *European Molecular Biology Organisation Reports*, 13(5), 395. doi: 10.1038/embor.2012.43

Velden, T., Haque, A., & Lagoze, C. (2010). A new approach to analysing patterns of collaboration in co-authorship networks – Mesoscopic analysis and interpretation. *Scientometrics*, 85(1), 219-242. doi: 10.1007/s11192-010-0224-6

Visone (Version 2.7) [Computer software]. Konstanz, Germany: Visone Team.

Wagner, C. S., & Leydesdorff, L. (2005). Network structure, self-organisation and the growth of international collaboration in science. *Research Policy*, 34(10), 1608-1618.

## Appendix A

*List of Thomson Reuters Web of Science „Social Psychology“ categorised journals accessed in the sample.*

1. Advances in Experimental Social Psychology
2. Asian Journal of Social Psychology
3. Basic and Applied Social Psychology
4. British Journal of Social Psychology
5. Child Abuse & Neglect
6. Cultural Diversity & Ethnic Minority Psychology
7. Cyberpsychology Behavior and Social Networking
8. Deviant Behavior
9. European Journal of Personality
10. European Journal of Social Psychology
11. European Review of Social Psychology
12. Group Dynamics-Theory Research and Practice
13. Group Processes & Intergroup Relations
14. Gruppendynamik und Organisationsberatung
15. International Journal of Intercultural Relations
16. Journal for the Theory of Social Behaviour
17. Journal of Applied Social Psychology
18. Journal of Community & Applied Social Psychology
19. Journal of Cross-Cultural Psychology
20. Journal of Experimental Social Psychology
21. Journal of Health and Social Behavior
22. Journal of Individual Differences
23. Journal of Language and Social Psychology
24. Journal of Loss & Trauma
25. Journal of Nonverbal Behavior
26. Journal of Personality
27. Journal of Personality and Social Psychology
28. Journal of Personality Assessment
29. Journal of Psychosocial Oncology
30. Journal of Research in Personality

31. Journal of Social and Clinical Psychology
32. Journal of Social and Personal Relationships
33. Journal of Social Psychology
34. Kolner Zeitschriftfur Soziologieund Sozialpsychologie
35. Law and Human Behavior
36. Motivation and Emotion
37. Nebraska Symposium on Motivation
38. Organizational Behavior and Human Decision Processes
39. Personal Relationships
40. Personality and Individual Differences
41. Personality and Social Psychology Bulletin
42. Personality and Social Psychology Review
43. Political Psychology
44. Research on Language and Social Interaction
45. Self and Identity
46. Sex Roles
47. Small Group Research
48. Social Behavior and Personality
49. Social Cognition
50. Social Justice Research
51. Social Psychology
52. Social Psychology Quarterly

## Appendix B

*List of the top 300 of 19 733 rated keywords extracted from the records identified by the journal-based search strategy. The bold keywords represent the top 66 keywords with a rating of „highly related to social psychology“ used in the data collection procedure for keyword extraction and search.*

5-Factor model	Attention
Ability	<b>Attitudes</b>
Abuse	Attraction
Accessibility	Attractiveness
<b>Acculturation</b>	<b>Attribution</b>
Accuracy	<b>Attributions</b>
Achievement	<b>Authoritarianism</b>
Activation	Autonomy
Adaptation	Avoidance
Adjustment	Behavior
Adolescence	Behaviors
Adolescents	<b>Beliefs</b>
Adult attachment	<b>Benevolent sexism</b>
Adults	Bias
Affect	Big 5
African-Americans	Big five
Age	BREAST-CANCER
<b>Aggression</b>	<b>Categorization</b>
Alcohol	Child abuse
American	Childhood
Anger	Children
Antecedents	Choice
Anxiety	<b>Close relationships</b>
<b>Appraisal</b>	Cognition
Arousal	<b>Collectivism</b>
<b>Assimilation</b>	COLLEGE-STUDENTS
ASSOCIATION TEST	Commitment
Attachment	Communication

**Community**

Competence

Confidence

**Conflict**

Consensus

Consequences

Consistency

CONSTRUCT

Construction

CONSTRUCT-VALIDITY

Context

**Cooperation**

Coping

Couples

**Culture**

Deception

Decision making

Decisions

Delinquency

Depression

Depressive symptoms

Determinants

Dimensions

**Discrimination**

Disorder

DISORDERS

Distress

**Diversity****Dominance**

Efficacy

Emotion

Emotion regulation

Emotional intelligence

Emotions

**Empathy**

Enhancement

Esteem

**Ethnicity**

EVENTS

Expectations

Experience

Experiences

Exposure

Expression

Extraversion

Extroversion

Facial expressions

Failure

Fairness

Family

Fear

Feedback

**Gay men****Gender**

Gender differences

**Gender stereotypes**

Goals

**Group identification**

Guilt

Happiness

Health

HYPOTHESIS

**Identification****Identity**

Ideology

Impact

Implicit

**Implicit association test**

Implicit theories

**IMPRESSION-FORMATION**

Impulsivity

Individual differences

**Individualism**

INDIVIDUALS

Information

**IN-GROUP**

Inhibition

Integration

Intelligence

Intentions

**Intergroup contact**

**Intergroup relations**

Intervention

Intrinsic motivation

Inventory

Involvement

JOB-PERFORMANCE

JOB-SATISFACTION

Judgment

Judgments

Justice

Knowledge

Language

**Leadership**

LIFE

Life events

Life satisfaction

Love

Maltreatment

Management

Marital satisfaction

Marriage

**Masculinity**

**Mediation**

Memory

Men

MENTAL-HEALTH

METAANALYSIS

Model

Models

Mood

Mortality salience

Mothers

Motivation

Motives

Narcissism

Need

Negative affect

Neglect

Negotiation

Neuroticism

**Norms**

Optimism

Organizations

ORIENTATION

Others

Outcomes

Out-group

Parents

Participation

PATTERNS

PEOPLE

Perception

Perceptions

Performance

**Person perception**



Personality  
 PERSONALITY-TRAITS  
 PERSPECTIVE  
**Persuasion**  
 Physical abuse  
**Physical attractiveness**  
 Planned behavior  
 POPULATION  
 Positive affect  
 Positive illusions  
 POSTTRAUMATIC-STRESS-  
 DISORDER  
**Power**  
 Prediction  
 Predictors  
 Preferences  
**Prejudice**  
 Prevalence  
 Prevention  
 Priming  
 Psychological distress  
 Psychology  
 Psychometric properties  
 Psychopathology  
 Psychopathy  
 Punishment  
 Quality  
 Quality-of-life  
 Questionnaire  
**Race**  
**RACIAL-ATTITUDES**  
**Racism**  
 Recall  
 Recognition  
 Regulatory focus  
 Rejection  
 Relationship satisfaction  
 Reliability  
**Representations**  
 Responses  
 Responsibility  
**Right-wing authoritarianism**  
 Risk  
 RISK-FACTORS  
 Romantic relationships  
 SAMPLE  
 Satisfaction  
 Scale  
 SCALES  
 Schizophrenia  
 School  
 Selection  
 Self  
 Self-concept  
 Self-control  
 Self-determination  
**Self-determination theory**  
 Self-efficacy  
**Self-enhancement**  
 Self-esteem  
 Self-regulation  
 Sensation seeking  
 Sex  
 Sex differences  
 Sexual abuse  
 Similarity  
**Social categorization**  
**Social cognition**

**Social desirability**

**Social identity**

**Social judgment**

**Social support**

**SOCIAL-DOMINANCE-  
ORIENTATION**

**Socialization**

**SOCIAL-PERCEPTION**

Stability

**Stereotype activation**

**Stereotype threat**

**Stereotypes**

**Stigma**

STRATEGIES

Stress

Students

STYLES

Substance use

Success

Support

Symptoms

TASK

Temperament

**Terror management theory**

**Threat**

Time

Traits

Trauma

Trust

Uncertainty

UNITED-STATES

Validation

Validity

Values

Victimization

**Violence**

Vulnerability

Women

Work

Working models

YOUNG-ADULTS

Appendix C

*Geographic continents and associated countries based on the United Nations Development Programme's Human Development Index (UNDP, 2011)*

**AFRICA**

Algeria

Angola

Benin

Botswana

Burkina Faso

Burundi

Cameroon

Cape Verde

Central African Republic

Chad

Comoros

Congo

Congo, Democratic Republic of the

Côte d'Ivoire

Djibouti

Egypt

Equatorial Guinea

Eritrea

Ethiopia

Gabon

Gambia

Ghana

Guinea

Guinea-Bissau

Kenya

Lesotho

Liberia

Libya

Madagascar

Malawi  
Mali  
Mauritania  
Mauritius  
Morocco  
Mozambique  
Namibia  
Niger  
Nigeria  
Rwanda  
São Tomé and Príncipe  
Senegal  
Seychelles  
Sierra Leone  
South Africa  
Sudan  
Swaziland  
Tanzania, United Republic of  
Togo  
Tunisia  
Uganda  
Zambia  
Zimbabwe

**ASIA**

Afghanistan  
Armenia  
Azerbaijan  
Bahrain  
Bangladesh  
Bhutan  
Brunei Darussalam  
Cambodia  
China

Georgia  
Hong Kong, China (SAR)  
India  
Indonesia  
Iran, Islamic Republic of  
Iraq  
Israel  
Japan  
Jordan  
Kazakhstan  
Korea, Republic of  
Kuwait  
Kyrgyzstan  
Lao People's Democratic Republic  
Lebanon  
Malaysia  
Maldives  
Mongolia  
Myanmar  
Nepal  
Occupied Palestinian Territory  
Oman  
Pakistan  
Philippines  
Qatar  
Saudi Arabia  
Singapore  
Sri Lanka  
Syrian Arab Republic  
Tajikistan  
Thailand  
Timor-Leste  
Turkmenistan  
United Arab Emirates

Uzbekistan

Viet Nam

Yemen

## **EUROPE**

Albania

Andorra

Austria

Belarus

Belgium

Bosnia and Herzegovina

Bulgaria

Croatia

Cyprus

Czech Republic

Denmark

Estonia

Finland

Former Yugoslav Republic of Macedonia

France

Germany

Greece

Hungary

Iceland

Ireland

Italy

Latvia

Liechtenstein

Lithuania

Luxembourg

Malta

Moldova, Republic of

Montenegro

Netherlands

Norway  
Poland  
Portugal  
Romania  
Russian Federation (Russia)  
Serbia  
Slovakia  
Slovenia  
Spain  
Sweden  
Switzerland  
Turkey  
Ukraine  
United Kingdom

**SOUTH AMERICA**

Argentina  
Bolivia  
Brazil  
Chile  
Colombia  
Ecuador  
Guyana  
Kosovo  
Paraguay  
Peru  
Suriname  
Taiwan  
Uruguay  
Venezuela

**OCEANIA**

Fiji  
Kiribati

Micronesia, Federated States of

New Zealand

Palau

Papua New Guinea

Samoa

Solomon Islands

Tonga

Vanuatu

## **NORTH AMERICA**

Antigua and Barbuda

Bahamas

Barbados

Belize

Canada

Costa Rica

Cuba

Dominica

Dominican Republic

El Salvador

Grenada

Guatemala

Haiti

Honduras

Jamaica

Mexico

Nicaragua

Panama

Saint Kitts and Nevis

Saint Lucia

Saint Vincent and the Grenadines

Trinidad and Tobago

United States



**AUSTRALIA**

Australia

## Appendix D

*List of 460 African local journals according to African Journals Online (AJOL), including all disciplines. Journals in bold font represent journals included in the Thomson Reuters Web of Science database.*

Abia State University Medical Students' Association Journal

Acta Structilia

Acta Theologica

Africa Development

Africa Insight

African Anthropologist

African Crop Science Journal

African Environment

African Health Sciences

African Journal for Physical, Health Education, Recreation and Dance

African Journal for the Psychological Study of Social Issues

**African Journal of AIDS Research**

African Journal of Anaesthesia and Intensive Care

African Journal of Applied Zoology and Environmental Biology

**African Journal of Aquatic Science**

African Journal of Biomedical Research

African Journal of Biotechnology

African Journal of Chemical Education

African Journal of Clinical and Experimental Microbiology

African Journal of Cross-Cultural Psychology and Sport Facilitation

African Journal of Drug and Alcohol Studies

African Journal of Economic Policy

African Journal of Educational Studies in Mathematics and Sciences

African Journal of Endocrinology and Metabolism

African Journal of Environmental Science and Technology

African Journal of Finance and Management

African Journal of Food and Nutritional Security

African Journal of Food, Agriculture, Nutrition and Development

African Journal of Governance and Development

African Journal of Health Professions Education  
 African Journal of Health Sciences  
 African Journal of Infectious Diseases  
 African Journal of International Affairs  
 African Journal of International Affairs and Development  
 African Journal of Library, Archives and Information Science  
 African Journal of Livestock Extension  
**African Journal of Marine Science**  
 African Journal of Neurological Sciences  
 African Journal of Oral Health  
 African Journal of Oral Health Sciences  
 African Journal of Paediatric Surgery  
 African Journal of Physiotherapy and Rehabilitation Sciences  
 African Journal of Political Science  
**African Journal of Psychiatry**  
**African Journal of Range and Forage Science**  
 African Journal of Reproductive Health  
 African Journal of Science and Technology  
**African Journal of Traditional, Complementary and Alternative Medicines**  
 African Journal of Tropical Hydrobiology and Fisheries  
 African Journal of Urology  
 African Journal on Conflict Resolution  
 African Research Review  
 African Review of Economics and Finance  
 African Safety Promotion: A Journal of Injury and Violence Prevention  
 African Sociological Review/Revue Africaine de Sociologie  
 African Studies Monographs  
 Afrika Statistika  
 Afrimedical Journal  
 Afrique Science: Revue Internationale des Sciences et Technologie  
 Agricultural and Food Science Journal of Ghana  
 Agro-Science  
 Agronomie Africaine  
 Agrosearch

Alexandria Journal of Medicine  
 Animal Production Research Advances  
 Animal Research International  
 Annales Aequatoria  
 Annales des Sciences Agronomiques  
 Annals of African Medicine  
 Annals of African Surgery  
 Annals of Biomedical Sciences  
 Annals of Ibadan Postgraduate Medicine  
 Annals of Medical and Health Sciences Research  
 Annals of Nigerian Medicine  
 Annals of Pediatric Surgery  
 Arab Journal of Nephrology and Transplantation  
 Archives of Ibadan Medicine  
 ATBU Journal of Environmental Technology  
 Bayero Journal of Pure and Applied Sciences  
 Benin Journal of Postgraduate Medicine  
 Bio-Research  
 Biokemistri  
 Botswana Journal of Economics  
 Botswana Journal of Technology  
 Bowen Journal of Agriculture  
 Bulletin of Animal Health and Production in Africa  
 Bulletin of the Chemical Society of Ethiopia  
 Cameroon Journal of Agricultural Science  
 Cameroon Journal of Experimental Biology  
 Central African Journal of Medicine  
 Clinics in Mother and Child Health  
 Communicate: Journal of Library and Information Science  
 Contemporary Journal of African Studies  
 Continuing Medical Education  
 Counsellor (The)  
 Creative Artist: A Journal of Theatre and Media Studies  
**Critical Arts**

Current Writing: Text and Reception in Southern Africa

Dar Es Salaam Medical Students' Journal

Democracy & Development: Journal of West African Affairs

Discovery and Innovation

East African Agricultural and Forestry Journal

East African Journal of Peace and Human Rights

East African Journal of Public Health

East African Journal of Sciences

East African Journal of Statistics

East African Medical Journal

East African Orthopaedic Journal

East and Central African Journal of Pharmaceutical Sciences

East and Central African Journal of Surgery

Eastern Africa Journal of Rural Development

Eastern Africa Social Science Research Review

Ebonyi Medical Journal

Economic and Policy Review

Edo Journal of Counselling

Egyptian Journal of Biochemistry and Molecular Biology

Egyptian Journal of Biology

Egyptian Journal of Biomedical Sciences

Egyptian Journal of Biotechnology

Egyptian Journal of Medical Human Genetics

Egyptian Journal of Medical Laboratory Sciences

Egyptian Journal of Natural History

**English in Africa**

ESARBICA Journal: Journal of the Eastern and Southern Africa Regional

Branch of the International Council on Archives

Ethiopian Journal of Biological Sciences

Ethiopian Journal of Development Research

Ethiopian Journal of Economics

Ethiopian Journal of Education and Sciences

Ethiopian Journal of Environmental Studies and Management

**Ethiopian Journal of Health Development**

Ethiopian Journal of Health Sciences  
 Ethiopian Journal of the Social Sciences and Humanities  
 Ethiopian Pharmaceutical Journal  
 Ethiopian Veterinary Journal  
 FUTY Journal of the Environment  
 Gender and Behaviour  
 Ghana Journal of Agricultural Science  
 Ghana Journal of Development Studies  
 Ghana Journal of Forestry  
 Ghana Journal of Linguistics  
 Ghana Journal of Science  
 Ghana Library Journal  
 Ghana Medical Journal  
 Ghana Mining Journal  
 Global Approaches to Extension Practice: A Journal of Agricultural Extension  
 Global Journal of Agricultural Sciences  
 Global Journal of Community Medicine  
 Global Journal of Educational Research  
 Global Journal of Engineering Research  
 Global Journal of Environmental Sciences  
 Global Journal of Geological Sciences  
 Global Journal of Humanities  
 Global Journal of Mathematical Sciences  
 Global Journal of Medical Sciences  
 Global Journal of Pure and Applied Sciences  
 Global Journal of Social Sciences  
 Health SA Gesondheid  
 Highland Medical Research Journal  
**HTS Theological Studies/Teologiese Studies**  
 Humanities Review Journal  
 Huria: Journal of the Open University of Tanzania  
 Ibadan Journal of Humanistic Studies  
 Ife Journal of Science  
 IFE PsychologIA

Ilorin Journal of Religious Studies  
IMTU Medical Journal  
Indilinga: African Journal of Indigenous Knowledge Systems  
Indo-Pacific Journal of Phenomenology  
Information Manager (The)  
Information Technologist (The)  
Inkanyiso: Journal of Humanities and Social Sciences  
Innovation  
International Journal of Agriculture and Rural Development  
International Journal of Applied Agriculture and Apiculture Research  
International Journal of Biological and Chemical Sciences  
International Journal of Development and Management Review  
International Journal of Development and Policy Studies  
International Journal of Educational Research  
International Journal of Emotional Psychology and Sport Ethics  
International Journal of Engineering, Science and Technology  
International Journal of Health Research  
International Journal of Malaria and Tropical Diseases (IJMTD)  
International Journal of Modern Anthropology  
International Journal of Natural and Applied Sciences  
International Journal of Pedagogy, Policy and ICT in Education  
International Journal of Tropical Agriculture and Food Systems  
Internet Journal of Medical Update – EJOURNAL  
Italian Studies in Southern Africa/Studio Italiano nell'Africa Australe  
JASSA: Journal of Applied Science in Southern Africa  
Jos Journal of Medicine  
Journal de la Recherche Scientifique de l'Université de Lomé  
Journal des Sciences Pour l'Ingénieur  
Journal for Islamic Studies  
Journal for Juridical Science  
Journal for Language Teaching  
Journal for the Study of Religion  
Journal of Agricultural Extension  
Journal of Agricultural Research and Development

Journal of Agriculture and Food Sciences  
 Journal of Agriculture and Social Research (JASR)  
 Journal of Agriculture, Forestry and the Social Sciences  
 Journal of Agriculture, Science and Technology  
 Journal of Applied Biosciences  
 Journal of Applied Chemistry and Agricultural Research  
 Journal of Applied Science and Technology  
 Journal of Applied Science, Engineering and Technology  
 Journal of Applied Sciences and Environmental Management  
 Journal of Aquatic Sciences  
 Journal of Biomedical Investigation  
 Journal of Building and Land Development  
 Journal of Business and Administrative Studies  
 Journal of Business Research  
 Journal of Child and Adolescent Mental Health  
 Journal of Civil Engineering Research and Practice  
 Journal of Civil Engineering, JKUAT  
 Journal of College of Medicine  
 Journal of Community Medicine and Primary Health Care  
 Journal of Computer Science and Its Application  
 Journal of Cultural Studies  
 Journal of East African Natural History  
 Journal of Endocrinology, Metabolism and Diabetes of South Africa  
 Journal of Environmental Extension  
 Journal of Ethiopian Medical Practice  
 Journal of Experimental and Clinical Anatomy  
 Journal of Family Ecology and Consumer Sciences/Tydskrif vir Gesinsekologie en  
 Verbruikerswetenskappe  
 Journal of Food Technology in Africa  
 Journal of Health and Visual Sciences  
 Journal of History and Diplomatic Studies  
 Journal of Humanities  
 Journal of Language, Technology & Entrepreneurship in Africa  
 Journal of Librarianship and Information Science in Africa



Journal of Medical and Biomedical Sciences  
Journal of Medical Investigation and Practice  
Journal of Medical Laboratory Science  
Journal of Medicine and Biomedical Research  
Journal of Medicine and Medical Sciences  
Journal of Medicine in the Tropics  
Journal of Meteorology and Climate Science  
Journal of Mining and Geology  
Journal of Modeling, Design and Management of Engineering Systems  
Journal of Pharmaceutical and Allied Sciences  
Journal of Pharmacy & Bioresources  
Journal of Philosophy and Culture  
Journal of Phytomedicine and Therapeutics  
Journal of Psychology in Africa  
Journal of Religion and Human Relations  
Journal of Research in Forestry, Wildlife and Environment  
Journal of Research in National Development  
Journal of Science and Sustainable Development  
Journal of Science and Technology (Ghana)  
Journal of Science and Technology (Zambia)  
Journal of Social Development in Africa  
Journal of Surgical Technique and Case Report  
Journal of Technology and Education in Nigeria  
Journal of the Association of Nigerian Musicologists  
Journal of the Cameroon Academy of Sciences  
Journal of the Eritrean Medical Association  
Journal of the Ghana Institution of Engineers  
Journal of the Ghana Science Association  
Journal of the Musical Arts in Africa  
Journal of the Nigerian Association of Mathematical Physics  
Journal of the Nigerian Infection Control Association  
Journal of the Nigerian Optometric Association  
Journal of the Obafemi Awolowo University Medical Student's Association (IFEMED)  
Journal of the South African Society of Archivists

Journal of Tropical Microbiology and Biotechnology  
 Journal Tunisiend'ORLet de Chirurgie Cervico-Faciale  
 KCA Journal of Business Management  
 Kenya Veterinarian  
 Kioo cha Lugha  
 Kiswahili  
 Lagos Historical Review  
 Lagos Journal of Library and Information Science  
 Lagos Notes and Records  
 Law, Democracy & Development  
 LBS Management Review  
 Legon Journal of the Humanities

**Lexikos**

**Libyan Journal of Medicine**

Lwati: A Journal of Contemporary Research  
 Madagascar Conservation & Development  
 Makerere Journal of Higher Education  
 Malawi Journal of Science and Technology  
**Malawi Medical Journal**  
 Marang: Journal of Language and Literature  
 Mary Slessor Journal of Medicine  
 Mathematics Connection  
 Medical Journal of Zambia  
 Mizan Law Review  
 Momona Ethiopian Journal of Science  
 Moor Journal of Agricultural Research  
 Mtafiti Mwafrika (African Researcher)  
 New Egyptian Journal of Microbiology  
 Nigeria Agricultural Journal  
 Nigeria Journal of Business Administration  
 Nigeria Journal of Pure and Applied Physics  
 Nigerian Dental Journal  
 Nigerian Endocrine Practice  
 Nigerian Food Journal

Nigerian Health Journal  
Nigerian Hospital Practice  
Nigerian Journal of Animal Production  
Nigerian Journal of Animal Science  
Nigerian Journal of Basic and Applied Sciences  
Nigerian Journal of Chemical Research  
Nigerian Journal of Clinical and Counselling Psychology  
Nigerian Journal of Clinical Medicine  
**Nigerian Journal of Clinical Practice**  
Nigerian Journal of Economic History  
Nigerian Journal of Fisheries  
Nigerian Journal of Gastroenterology and Hepatology  
Nigerian Journal of General Practice  
Nigerian Journal of Genetics  
Nigerian Journal of Guidance and Counselling  
Nigerian Journal of Health and Biomedical Sciences  
Nigerian Journal of Horticultural Science  
Nigerian Journal of Medicine  
Nigerian Journal of Natural Products and Medicine  
Nigerian Journal of Nutritional Sciences  
Nigerian Journal of Ophthalmology  
Nigerian Journal of Orthopaedics and Trauma  
Nigerian Journal of Otorhinolaryngology  
Nigerian Journal of Paediatrics  
Nigerian Journal of Parasitology  
Nigerian Journal of Pharmaceutical Research  
Nigerian Journal of Physics  
Nigerian Journal of Physiological Sciences  
Nigerian Journal of Plastic Surgery  
Nigerian Journal of Postgraduate Medicine  
Nigerian Journal of Psychiatry  
Nigerian Journal of Soil and Environmental Research  
Nigerian Journal of Soil Science  
Nigerian Journal of Surgery

Nigerian Journal of Surgical Research  
 Nigerian Journal of Surgical Sciences  
 Nigerian Journal of Technological Research  
 Nigerian Journal of Technology  
 Nigerian Libraries  
 Nigerian Medical Journal  
 Nigerian Medical Practitioner  
 Nigerian Music Review  
 Nigerian Quarterly Journal of Hospital Medicine  
 Nigerian School Library Journal  
 Nigerian Veterinary Journal  
 Nnamdi Azikiwe University Journal of International Law and Jurisprudence  
 Obstetrics and Gynaecology Forum  
 OGIRISI: A New Journal of African Studies  
 Orient Journal of Medicine  
 ORiON: The Journal of ORSSA  
 Oromia Law Journal  
 Ostrich: Journal of African Ornithology  
 OYE: Ogun Journal of Arts  
 Pan African Medical Journal  
**Perspectives in Education**  
**Philosophical Papers**  
 Plant Products Research Journal  
 Port Harcourt Medical Journal  
 Potchefstroom Electronic Law Journal/Potchefstroomse Elektroniese Regsblad  
**Quaestiones Mathematicae**  
 Research in Hospitality Management  
 Research Review of the Institute of African Studies  
 Review of Southern African Studies  
 Revue Africaine de Chirurgieet Spécialités  
 Revue Burkinabè de droit  
 Revue d'Information Scientifiqueet Technique  
 Revue de Médecineet de Pharmacie  
 Rwanda Journal

Rwanda Journal of Health Sciences  
 SAFERE: Southern African Feminist Review  
**SAHARA J (Journal of Social Aspects of HIV/AIDS Research Alliance)**  
 Sahel Journal of Veterinary Sciences  
 Sahel Medical Journal  
 Samaru Journal of Information Studies  
 Savannah Journal of Medical Research and Practice  
 Science et Technique, Sciences de la Santé  
 Science World Journal  
 Sciences & Nature  
 Scientia Africana  
 Scientia Militaria: South African Journal of Military Studies  
 Scientific Medical Journal  
 Securities Market Journal  
 Shakespeare in Southern Africa  
 Sierra Leone Journal of Biomedical Research  
 SINET: Ethiopian Journal of Science  
 Sokoto Journal of Veterinary Sciences  
 Sophia: An African Journal of Philosophy  
 South African Actuarial Journal  
 South African Family Practice  
 South African Gastroenterology Review  
**South African Journal for Research in Sport, Physical Education and Recreation**  
 South African Journal of African Languages  
 South African Journal of Agricultural Extension  
**South African Journal of Animal Science**  
 South African Journal of Bioethics and Law  
**South African Journal of Botany**  
 South African Journal of Child Health  
 South African Journal of Clinical Nutrition  
 South African Journal of Cultural History  
**South African Journal of Education**  
 South African Journal of Higher Education  
 South African Journal of Obstetrics and Gynaecology

**South African Journal of Philosophy**

South African Journal of Plant and Soil

**South African Journal of Psychiatry**

South African Journal of Radiology

South African Journal of Sports Medicine

**South African Journal of Surgery**

**South African Medical Journal**

South African Music Studies

Southern Africa Journal of Education, Science and Technology

Southern African Business Review

Southern African Journal of Anaesthesia and Analgesia

Southern African Journal of Critical Care

**Southern African Journal of HIV Medicine**

**Southern African Linguistics and Applied Language Studies**

**Southern Forests: a Journal of Forest Science**

Studies in Gender and Development in Africa

Sud Sciences et Technologies

Sudan Journal of Medical Sciences

Sudanese Journal of Dermatology

Tanzania Dental Journal

Tanzania Journal of Development Studies

Tanzania Journal of Forestry and Nature Conservation

Tanzania Journal of Health Research

Tanzania Journal of Science

Tanzania Medical Journal

Tanzania Veterinary Journal

Technologies Avancées

Thought and Practice: A Journal of the Philosophical Association of Kenya

Town and Regional Planning

Transactions of the Zimbabwe Scientific Association

Tropical Freshwater Biology

Tropical Journal of Health Sciences

Tropical Journal of Medical Research

Tropical Journal of Obstetrics and Gynaecology

**Tropical Journal of Pharmaceutical Research**

Tropical Veterinarian

**Tydskrif vir Letterkunde**

Uganda Journal

UJAH: Unizik Journal of Arts and Humanities

UNISWA Journal of Agriculture

UNISWA Research Journal of Agriculture, Science and Technology

University of Dar es Salaam Library Journal

University of Mauritius Research Journal

Vulture News

**Water SA**

West African Journal of Applied Ecology

West African Journal of Industrial and Academic Research

West African Journal of Medicine

West African Journal of Pharmacology and Drug Research

West African Journal of Radiology

Western Indian Ocean Journal of Marine Science

Zagazig Journal of Occupational Health and Safety

Zambezia: The Journal of Humanities of the University of Zimbabwe

Zede Journal

Zimbabwe Journal of Educational Research

Zimbabwe Journal of Technological Sciences

Zimbabwe Science News

Zimbabwe Veterinary Journal

Zoologist (The)

## Appendix E

*List of 44 African journals included in the Thomson Reuters Web of Science database but not included in the African Journals Online (AJOL) database. Country of journal publication is followed by the journal name in parentheses.*

African Entomology (SA)

African Invertebrates (SA)

African Journal of Herpetology (SA)

African Journalism Studies (SA)

African Natural History (SA)

African Zoology (SA)

Agrekon (SA)

Anthropology Southern Africa (South Africa)

Bothalia (SA)

Cardiovascular Journal of Africa (SA)

Current Allergy and Clinical Immunology (SA)

Eastern Mediterranean Health Journal (Egypt)

Education as Change (SA)

Egyptian Journal of Biological Pest Control (Egypt)

International Journal of Photoenergy (Egypt)

Investment Analyst Journal (SA)

Journal of Energy in Southern Africa (SA)

Journal of Musical Arts in Africa (SA)

Journal of the South African Institute of Civil Engineering (SA)

Journal of the South African Veterinary Association (SA)

Journal of the Southern African Institute of Mining and Metallurgy (SA)

KOEDOE (SA)

Onderstepoort Journal of Veterinary Research (SA)

Ostrich (SA)

Pachyderm (Kenya)

Politikon (SA)

Social Dynamics – A Journal of the Centre for African Studies UCT (SA)

South African Archaeological Bulletin (SA)

South African Geographic Journal (SA)



South African Historical Journal (SA)  
South African Journal of Business Management (SA)  
South African Journal of Chemistry (SA)  
South African Journal of Economic and Management Science (SA)  
South African Journal of Economics (SA)  
South African Journal of Enology and Viticulture (SA)  
South African Journal of Geology (SA)  
South African Journal of Human Rights (SA)  
South African Journal of Industrial Engineering (SA)  
South African Journal of Psychology (SA)  
South African Journal of Science (SA)  
South African Journal of Wildlife Research (SA)  
Southern African Humanities (SA)  
Tydskrif vir die Suid-Afrikaanse Reg (SA)  
Tydskrif vir Geesteswetenskappe (SA)