

University of Groningen

Peer influence in clinical workplace learning

Raat, Adriana

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

2015

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Raat, A. (2015). *Peer influence in clinical workplace learning: A study of medical students' use of social comparison in clinical practice*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Peer influence in clinical workplace learning
A study of medical students' use of social comparison in clinical practice

Dissertation for the University of Groningen, the Netherlands, with references and summary in Dutch. The study presented in this thesis was carried out at the Graduate School for Health Research, SHARE, of the University of Groningen.

Address for correspondence

Janet Raat

University of Groningen / University Medical Center Groningen
Center for Education Development and Research in Health Professions (CEDAR)
A. Deusinglaan 1, 9713 AV Groningen, the Netherlands.
a.n.raat@umcg.nl

Design and layout Aly Pepping, grafisch ontwerp, Thesinge

Cover illustration Janet Raat, Schouwerzijl

Press Van Gorcum, Assen

© Raat A.N., 2015

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the author.

ISBN 978 90 367 7791 9



rijksuniversiteit
groningen

Peer influence in clinical workplace learning

A study of medical students' use of social comparison in clinical practice

Proefschrift

ter verkrijging van de graad van doctor aan de
Rijksuniversiteit Groningen
op gezag van de
rector magnificus prof. dr. E. Sterken
en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op
maandag 1 juni 2015 om 11.00 uur

door

Adriana Nannetta Raat

geboren op 2 september 1960
te Alkmaar

Promotores

Prof. dr. J. Cohen-Schotanus

Prof. dr. J.B.M. Kuks

Beoordelingscommissie

Prof. dr. J.C.C. Borleffs

Prof. dr. T.J. ten Cate

Prof. dr. J. de Graaf

Table of contents

| | | |
|-----------|---|-----|
| Chapter 1 | Introduction | 7 |
| Chapter 2 | Learning in clinical practice: Stimulating and discouraging response to social comparison <i>Medical Teacher 2010;32:899–904</i> | 19 |
| Chapter 3 | Peer influence on students' estimates of performance: social comparison in clinical rotations <i>Medical Education 2013;47:190–197</i> | 35 |
| Chapter 4 | Social comparison: peer influences on students' trajectories towards becoming doctors | 53 |
| Chapter 5 | Student distress in clinical workplace learning: Differences in social comparison behaviours <i>Advances in Health Sciences Education 2015;20:101–111</i> | 71 |
| Chapter 6 | Dyad practice and the inevitability of social comparison <i>Medical Education 2014;48:652–654</i> | 89 |
| Chapter 7 | General discussion | 95 |
| Chapter 8 | Summary | 105 |
| | Samenvatting | 111 |
| | Dankwoord | 119 |



Chapter 1

Introduction

During lunch, when we meet each other... everybody always talks about what they did that day. And I noticed [laughs]... that I am eager to find out what the others are doing... I really pay attention to that bit, as though it is very important, because... I measure myself against them... And I think, the others are doing this too, because... otherwise they would not talk about it that much, discussing it every day.

Tjitske, student

The above quote from an undergraduate medical student illustrates the tendency of students in clinical practice to compare themselves with peers. By saying 'I measure myself against them', the student also reveals some of their reasons for doing so. Students' use of social comparison is studied in this thesis about peer influence in clinical workplace learning. Before presenting the main argument and research questions, this chapter provides information about significant developments in clinical workplace learning to contextualize this research, and explains some of the main topics of social comparison theory.

Clinical workplace learning

Students in clinical practice have to learn, apply and develop their professional competences in a real-life clinical context. This essential part of their training towards becoming doctors is deeply rooted in medical education. The current system can be traced back to the early twentieth century, when Flexner presented his critical report about medical training.¹ His recommendations inspired the organization of medical education into two main periods, a preclinical and a clinical one. The preclinical period was designed to ground medical practice in science and to teach students the scientific basis of medicine prior to its practice. The following clinical period was meant to demonstrate the art of medicine and to teach students how they could master their knowledge to the benefit of real patients.^{2,3}

Today's clinical workplace learning is still based on the principle that the student has to spend time in a practice to become a competent doctor. However, views and understandings of this period have undergone significant shifts. One of the major changes in clinical workplace learning is the introduction of competency-based education. Many clinical programmes implemented this type of education to meet the standards of modern society for accountability and professionalism in healthcare professionals.⁴⁻⁷ Competency-based

programmes are driven by defined outcomes which have to be mastered by the end of the programme. The emphasis on learning outcomes has increased interest in student learning activities.⁸ Modern perspectives on clinical workplace learning, therefore, not only think about learning as the primary outcome of teaching but consider student learning experiences as a whole.^{9,10}

The attention to the students' actual experiences opened up the sheer complexity of clinical workplace learning.¹¹ In medical education research, several social learning theories are introduced to frame this comprehensive learning process, such as the ideas of situated learning,¹² communities of practice¹³ and other models of learning at work.¹⁴ Within these views, student learning is inextricably tied to its context and occurs through active participation in clinical activities like patient care. Newly introduced qualitative research methods expanded the possibilities for studying all aspects of students' learning. Several studies using these techniques provided detailed descriptions of how students' learning is shaped by their interactions with patients, residents and staff.^{10,15-17} However, little is known about the influence of student interactions with fellow students, or peers.

Students engaged in clinical practice frequently exchange their experiences with one another, as is illustrated in the quotation at the beginning of this introduction. These exchanges can be relevant to the students' learning because the acquired information can be used to evaluate their own activities or estimate their future performance. A better understanding of this use of one another's experience could reveal the influence of peers in clinical workplace learning.

Social comparison

In most clinical practices, students frequently meet each other: on the ward, during handovers, in the corridors, in the clerks' rooms etc. They tend to observe each other, exchange experiences and relate their own performance to that of their peers. This common behaviour is known as 'social comparison'. The concept of social comparison has its origins in Festinger's 'A theory of social comparison processes'.¹⁸ His work and that of other theorists who contributed to his ideas is used to explore and explain the influence of peers on student learning in clinical practice. Some of the main topics of the theory are outlined below with respect to a better understanding of social comparison.

Definition of social comparison: the definition used in this thesis is provided by Wood, who described social comparison as ‘the process in which people think about information about the other person in relation to the self by looking for and pointing out similarities and differences between themselves and the other’.¹⁹ Social comparison is widely acknowledged as a central feature of human social life.²⁰ People in all kinds of situations tend to pick up on information about how others are, or what others do or do not do.²¹ In the social sciences, this natural tendency to compare oneself with others is generally considered to play an important role in evaluating and constructing a person’s social reality.²⁰

Similarity: The idea of ‘similarity’ is vital in the field of social comparison. In general, people compare themselves to a great variety of other people. Festinger himself, however, already hypothesized a similar other, or someone close to oneself, as the most preferred other to compare oneself with.¹⁸ He considered such others to be the most informative to a person’s own position and abilities to perform. Later on, the notion of similarity was redefined in terms of related attributes, characteristics which contribute to position and performance, such as age and experience.²² Therefore, the research in this thesis focused on comparisons with peers.

Social Comparison Orientation: Almost all people engage in comparison with one or more others in all kinds of social situations. Some people, however, tend to compare themselves more often than others do.²³ These differences in a person’s tendency to compare are labelled as ‘social comparison orientation’, or SCO.²⁴ People with a high SCO compare themselves more frequently and are more affected by their comparisons. Research has shown that people with a high SCO are characterized by three particular features. They seem to have a high activation of the self (related to ambition); a keen interest in what others feel (related to empathy); and some degree of personal uncertainty.²⁰

Motives for comparison: People have different motives underlying their comparisons. In this thesis, three main motives are elaborated: self-evaluation, self-enhancement and self-improvement. These motives can serve different social comparison goals, characterized as cognitive, affective and behavioural goals, respectively.²⁵ The self-evaluation motive is already introduced by Festinger himself.¹⁸ People who turn to others for social information are, in

his view, driven by a desire for self-evaluation, to establish their position. Secondly, the self-enhancement motive is identified in studies addressing the issue of downward comparison.^{26,27} These studies showed that comparisons with others thought to be worse off are used by people to feel better about themselves or their own situation. Thirdly, the self-improvement motive is related to comparisons with other people who are perceived as slightly better off. These upward comparisons are preferred among people who want to improve their own position or abilities to perform.^{28,29} People can use different comparison strategies for different purposes.³⁰ They may seek downward comparisons to feel better about themselves, while they may look for upward comparisons to satisfy their desire for self-improvement.

Responses to comparison: A person's ability to adjust the comparison strategy to his/her own needs does not mean that the response is always positive. Both upward and downward comparisons appear to have their benefits and burdens.²⁹ In this thesis, Buunk and Ybema's³¹ model of identification and contrast is used to explain the processes underlying the responses to upward and downward comparison. People who experience *identification* with the comparison other, or who recognize the other's situation as their own actual or imminent situation, may respond positively to upward comparison and negatively to downward comparison. For example, upward identification can endow a person with a sense of his/her own potential, while downward identification could reveal how a person's own situation can deteriorate. Conversely, people who experience themselves in *contrast* to the comparison other, or who are focussed on differences with the other's situation, can respond negatively to upward comparison and positively to downward comparison. For example, upward contrast could emphasize a person's own sense of inferiority, while downward contrast could strengthen personal self-confidence.

Main argument and research questions

Students in clinical practice are not alone: there are many of them and they tend to share their experiences whenever they meet. In medical education, little is known about the influence of such interactions on student learning or professional development. The research reported in this study aims to fill this gap in the literature and to provide opportunities for helping students enhance their learning. The central research question of this thesis is therefore: what is the influence of students' use of peer comparisons in clinical workplace learning?

The first study, presented in *Chapter 2*, was used to introduce social comparison into the field of medical education. Four hypotheses derived from social comparison theory were used to investigate the relevance of social comparison for clinical workplace learning. Students engaged in nine different hospitals participated in this questionnaire study to examine these hypotheses with respect to their preferred comparison 'other', their preferred direction of comparison, their response to social comparison and the influence of Social Comparison Orientation (SCO).

The study described in *Chapter 3* aimed to determine whether the students' estimates of their future clinical performance are influenced by comparisons with peers. Such estimates are considered relevant to learning because they relate to self-efficacy, aspirations and academic accomplishments. In an experimental study using written comparison situations, participants estimated their future performance after comparison with a peer who had completed the same rotation the participant was expected to undertake next. Students were divided into groups assigned to different conditions in order to investigate whether their estimates are influenced by the performance level and gender of the peers they compared themselves with.

The qualitative study presented in *Chapter 4* was conducted to investigate students' actual use of social comparison in authentic clinical settings. Twelve students who volunteered to participate kept audio diaries in which they recorded their experiences of comparison with peers over a four-week period. This relatively new data-gathering technique of audio diaries provided the opportunity to examine these students' proximate experiences of social comparison and investigate the nature of the comparisons, their mechanisms and perceived effects.

Chapter 5 reports a questionnaire study which unravelled the relationship between social comparison and student distress in clinical workplaces. Social comparison could affect distress both positively and negatively. Because distress is known to hamper learning, the study aimed to find characteristics of a beneficial use of social comparison. Participants completed questionnaires measuring several aspects of their social comparison behaviours and levels of distress to contrast the comparison behaviours of low-distress students with those of high-distress students.

Chapter 6 was written by invitation and presents a commentary on a study of dyad practice.³² The authors of this study provided strong evidence that students practising their skills in dyads learn as much as students practising the same skills individually. The focus of their work is expanded in this commentary with some insights from social comparison theory, because dyad practice inevitably entails social comparison. In conclusion, educators are urged to be aware of the students' tendency to compare themselves with peers and of the consequences of them doing so.

Finally, *Chapter 7* provides a general discussion of the research in this thesis. The discussion includes a summary of the main findings, weighs up the strengths and limitations, considers future research, and reflects on some implications for educational practice.

Note: Chapters 2–6 could be read separately because this thesis is based on submitted and published journal articles. Some repetition across these chapters was inevitable.

REFERENCES

- 1 Flexner A. *Medical Education in the United States and Canada: A report to the Carnegie Foundation for the Advancement of Teaching* (Carnegie Foundation Bulletin No. 4) New York, NY: Carnegie Foundation for the Advancement of Teaching 1910.
- 2 Mann KV. Theoretical perspectives in medical education: past experience and future possibilities. *Med Educ* 2011;45:60–68.
- 3 Holmboe E, Ginsburg S, Bernabeo E. The rotational approach to medical education: time to confront our assumptions? *Med Educ* 2011;45:69–80.
- 4 Carraccio C, Wolfsthal SD, Englander R, Ferentz K, Martin C. Shifting paradigms: from Flexner to competencies. *Acad Med* 2002;77:361–367.
- 5 Frank JR, Snell LS, ten Cate O, Holmboe ES, Carraccio C, Swing SR, et al. Competency-based medical education: theory to practice. *Med Teach* 2010;32:638–645.
- 6 Albanese MA, Mejicano G, Anderson WM, Gruppen L. Building a competency-based curriculum: the agony and the ecstasy. *Adv Health Sci Educ* 2010;15:439–454.
- 7 Harden RM. Outcomes-based education: the future is today. *Med Teach* 2007; 29:625–9.
- 8 ten Cate O. What happens to the student? The neglected variable in educational outcome research. *Adv Health Sci Educ* 2001;6:81–88.
- 9 Dornan T, Boshuizen H, King N, Scherpbier A. Experienced based learning: A model linking the processes and outcomes of medical students' workplace learning. *Med Educ* 2007;41:84–91.
- 10 Steven K, Wenger E, Boshuizen H, Scherpbier A, Dornan T. How clerkship students learn from real patients in practice settings. *Acad Med* 2014;89:469–476.
- 11 Shipengrover JA, James PA. Measuring instructional quality in community-oriented medical education: Looking into the black box. *Med Educ* 1999;33:846–853.
- 12 Lave J, Wenger E. *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press 1991.
- 13 Wenger E. *Communities of Practice. Learning, Meaning and Identity*. Cambridge, Mass: Cambridge University Press 1998.
- 14 Eraut M. Learning from other people in the workplace. *Oxford Rev Educ* 2007;33:403–22.

- 15 Monrouxe LV, Rees CE, Bradley P. The construction of patients involvement in hospital bedside teaching encounters. *Qual Health Res* 2009;19:918–930.
- 16 Weaver R, Peters K, Koch J, Wilson I. ‘Part of the team’: professional identity and social exclusivity in medical students. *Med Educ*. 2011;45:1220–1229.
- 17 van der Zwet J, Dornan T, Teunissen PW, de Jonge LPJWM, Scherpbier AJJA. Making sense of how physician preceptors interact with medical students: discourses of dialogue, good medical practice, and relationship trajectories. *Adv Health Sci Educ*. 2014;19:85–98.
- 18 Festinger L. A theory of social comparison processes. *Human Relat* 1954;7:117–140.
- 19 Wood JV. What is social comparison and how should we study it? *Pers Soc Psychol Bull* 1996;22:520–537.
- 20 Buunk AP, Gibbons FX. Social comparison: The end of a theory and the emergence of a field. *Org Beh Hum Dec Process* 2007;102:3–21.
- 21 Mussweiler T, Ruter K, Epstude K. The why, who, and how of social comparison: a social-cognitive perspective. In: S. Guimond, ed. *Social Comparison and Social Psychology: Understanding Cognition, Intergroup Relations and Culture*. Cambridge: Cambridge University Press 2006; 33–54.
- 22 Goethals RL, Darley JM. 1977. Social comparison theory: An attributional approach. In: J Suls, RL Miller, editors. *Social comparison processes: Theoretical and empirical perspectives*. Washington DC: Hemisphere 1977;259–278.
- 23 Buunk AP, Gibbons FX. Social comparison orientation: A new perspective on those who do and those who don’t compare with others. In: S Guimond, editor. *Social comparison and social psychology: Understanding cognition, intergroup relations and culture*. Cambridge: Cambridge University Press 2006;15–32.
- 24 Gibbons FX, Buunk AP. Individual differences in social comparison: Development of a scale of social comparison orientation. *J Pers Soc Psychol* 1999;76:129–142.
- 25 Groothof HAK. 2004. The influence of individual differences in social comparison orientation: On reactions to upward and downward comparison. In: HAK Groothof. *When others are doing better or worse: Responses from the heart and the head*. Dissertation University of Groningen 2004;8–23.

- 26 Thornton DA, Arrowood AJ. Self-evaluation, self-enhancement, and the locus of social comparison. *J Exp Soc Psychol Supp* 1966;1:40–48.
- 27 Hakmiller KL. Threat as a determinant of downward comparison. *J Exp Soc Psychol Supp* 1966;1:32–39.
- 28 Wood JV. Theory and research concerning social comparison of personal attributes. *Psychol Bull* 1989;106:231–248.
- 29 Brickman P, Bulman RJ. Pleasure and pain in social comparison. In: J Suls, RL Miller, editors. *Social comparison processes: Theoretical and empirical perspectives*. Washington DC: Hemisphere 1977;149–186.
- 30 Taylor SE, Lobel M. Social comparison activity under threat: Downward evaluation and upward contacts. *Psychol Rev* 1989;96:569–575.
- 31 Buunk BP, Ybema JF. Social comparison and occupational stress: The identification-contrast model. In: BP Buunk, FX Gibbons, editors. *Health coping and well-being: Perspectives from social comparison theory*. Mahwah, NJ: Erlbaum Associates 1997; 359–388.
- 32 Bjerrum AS, Eika B, Charles P, Hilberg O. Dyad practice is efficient practice. A randomized bronchoscopy simulation study. *Med Educ* 2014;48:705–712.



Chapter 2

Learning in clinical practice: stimulating and discouraging response to social comparison

A.N. (Janet) Raat

Jan B.M. Kuks

Janke Cohen-Schotanus

ABSTRACT

Background Social comparison theory is relevant for learning in general. In a clinical context, we examined four hypotheses concerning: preferred other to compare with, preferred direction of comparison, response to social comparison and influence of personal Social Comparison Orientation (SCO)

Aim To investigate the relevance of social comparison for clinical workplace learning.

Method Students (n=437) from nine different hospitals completed two questionnaires measuring their SCO and the direction of and response to their comparisons. *t*-tests were used to analyse the data.

Results Students substantially did compare. They preferred to compare with peer students more than with residents or staff, and with peers doing better more than with peers doing worse. Their response to social comparison was more often stimulating for learning than discouraging. Students high in SCO reported a stronger stimulating *and* discouraging response to their comparisons than students low in SCO.

Conclusion Social comparison does play a role in clinical workplace learning. The mainly stimulating response to social comparison indicates a positive learning influence. The preferred comparison with peers emphasizes the role of peers in the learning process. Further research should focus on student comparison behaviour and on situations that strengthen the positive effects of social comparison and reduce the negative or obstructing ones.

INTRODUCTION

Learning in clinical practice is an essential part of medical education. Students have to learn, apply and develop their competencies in a real-life clinical context. In medical education research, different social-psychological theories – such as social learning theory, situated learning theory and the ideas of cognitive apprenticeship – are used to frame this comprehensive learning process.¹⁻³ In addition to these concepts, we will put forward social comparison theory as a potential part of this theoretical framework. Although social comparison theory is not developed as a specific learning theory, it does affect the learning process and is confirmed to be relevant for learning in general.⁴⁻⁶ In this study, we wanted to investigate its relevance for learning in clinical practice.

Social comparison theory has its origin in Festinger's: 'A theory of social comparison processes'.⁷ More recently, social comparison is defined by Wood as 'the process of thinking about information of one or more other people in relation to the self'.⁸ Social comparison could be seen as a strategy to cope with all kinds of social situations, used by almost all people to make sense of themselves and their social surrounding.⁹ In clinical practice, the transition from medical student to medical doctor is described as a critical period for learning. In their first confrontations with real patients, demanding staff and institutional rules students often report difficulties with the application of their knowledge and feelings of insecurity and embarrassment.^{10,11} Under these circumstances it is likely to suppose that they will get engaged in social comparison, the use of others to make sense of themselves in their new social or professional surrounding. The comparison of their own performance with the performance of peers, residents, staff and other health care workers, could help them to get an impression of their own capabilities, limitations, opportunities and threats. These perceptions may conceivably influence, stimulate or discourage, their learning and professional development.

To verify this apparent relevance of social comparison for learning in clinical practice, we will discuss some prominent parts of social comparison theory, proven to be relevant for learning in general. We first investigated the so-called 'social comparison orientation' (SCO) and questioned this orientation for students in clinical practice.

Social Comparison Orientation (SCO)

Almost everybody is – from time to time – involved in a comparison of oneself with others. Despite this omnipresence, people vary in the extent to which and the frequency with which they compare themselves and their performances.^{12,13}

Gibbons and Buunk developed a scale to measure these individual differences which were labelled as ‘SCO’.¹⁴ In general, people high in SCO do compare themselves more frequently *and* are more affected by their comparisons.¹⁵⁻¹⁶ Just like other people, students may vary in SCO. Consequently, our first research question concerned the SCO of students in clinical practice: how much do they compare themselves and their performances and to which extent?

Subsequently, we investigated four hypotheses all based on social comparison theory and related to learning in clinical practice. They concerned: the preferred other to compare with, the preferred direction of comparison, the response to social comparison and the influence of individual SCO.

Preferred other to compare with

Students in clinical practice are surrounded by various other health care workers to compare themselves with. Festinger, already theorized the most preferred comparison other as someone close to one’s own ability or opinion.⁷ He suggested a similar other to compare with as most informative to evaluate one’s own position or abilities. In a reformulation of classic social comparison theory, similarity was redefined in terms of related attributes.¹⁷ Rather than performance outcomes, these attributes are characteristics that contribute to performance, such as age or experience. For example, a student who wants to evaluate (or predict) his first patient history might prefer to compare with an unskilled peer student who is still struggling with time and structure. A comparison with a resident or excellent skilled staff member might be considered as less informative. To explore this preference for peers to compare with, we hypothesized:

H1 Students in clinical practice prefer to compare themselves with peer students more than with residents or staff.

Preferred direction of comparison

Due to different situations, students may seek comparison with others performing better (upward comparison) and with others performing worse (downward comparison) as people can alter their comparison strategies to serve

different purposes. They may prefer upward comparison if they are motivated by self-improvement, whereas they may choose downward comparison if they are motivated by self-enhancement, the desire to feel or do better than others.¹⁸ In the context of learning, upward comparison is preferred because students are predominantly interested in doing better.^{4,5} For example, in a study among high school students the most frequently mentioned goal of students' upward comparison was the hope to receive future grades similar to those of students currently performing better.⁶ Students in clinical practice are in a learning situation as well. Therefore, we expect them to be mostly motivated by self-improvement and, consequently, do prefer upward comparison. To provide empirical evidence for this expectation we hypothesized:

H2 Students in clinical practice prefer to compare their clinical performance with peer students performing better more than with peers performing worse.

Response to social comparison

Social comparison may lead to positive and negative responses, both after comparison up and down. During the development of social comparison theory, it was acknowledged that these responses are influenced by identification and contrast.¹⁹ People who experience *identification* with the compared other may respond positive to upward comparison and negative to downward comparison. For example, students may feel stimulated to reach the same level as better performing peers if they think they could become like them, whereas students may feel discouraged if they think their own situation might worsen like the situation of the worse off other did. On the contrary, people who evaluate themselves in *contrast* to the compared other may respond positively to downward comparison and negative to upward comparison. For example, students may feel stimulated to outperform peers doing worse if they evaluate themselves as more competent, whereas students may feel discouraged if they evaluate themselves as inferior to better performing peers. In learning situations, both the tendency to identify with others performing better as the tendency to evaluate the self in contrast to others performing worse is linked to improved performance.⁴ Therefore, we expected students – mainly interested in doing better – to benefit from both comparison strategies, and hypothesized:

H3 In response to social comparison, students feel more stimulated than discouraged after both upward and downward comparison.

Influence of individual SCO

People high in SCO, are more inclined to compare themselves, regardless of direction, and are also more affected by their comparisons.⁹ Therefore, the stimulating and discouraging response to social comparison should be most evident among students who frequently compare. To put it differently, the relevance of social comparison theory for learning in clinical practice should be most obvious among students high in SCO. Consequently, we expected to find a stronger stimulating and discouraging response to the comparison process among students high in SCO.

H4 Stimulating and discouraging response to social comparison is stronger among students high in SCO after both upward and downward comparison.

METHODS

Context and participants

This study was conducted in the Netherlands at the University of Groningen. The 6-year medical curriculum of this university is problem-based and patient-centred. During the last 2 years, students participate in clinical practice. They rotate in a variety of disciplines in the University Medical Center Groningen or in one of its eight affiliated hospitals. In this study, participants (n=437) were all students in the last 2 years of the curriculum, participating in one of the hospitals mentioned above.

Instruments

We used two questionnaires. The first one, the Iowa-Netherlands Comparison Orientation Measure, INCOM, was used to measure the SCO of the students. The INCOM is developed by Gibbons and Buunk¹⁴ and consists of 11 items such as 'I always like to know what others in a similar situation would do' and 'I often compare myself with others with respect to what I have accomplished'. All questions are Likert-type (1=strongly disagree, 5=strongly agree). The second questionnaire, also containing 11 Likert-type questions, concerns the preferred other to compare with, the preferred direction of comparison and the response to social comparison. For the preferred other to compare with, we asked three similar questions, each of them ending differently: 'I like to know how I am performing in clinical practise compared to peer students', '...to residents' and '...to staff'. For the direction of comparison we used two

questions from the comparison subscale of the INCOM, developed to measure upward and downward comparisons:¹⁴ ‘When I wonder how good I am at something, I compare myself with others who are better at it than I am’, for upward comparison, and ‘When I wonder how good I am at something, I compare myself with others who are worse at it than I am’, for downward comparison. For the response to social comparison, we adopted four questions used in a study among members of health care teams.¹⁶ Instead of the words ‘good’ and ‘bad’ in questions like: ‘How often do you feel *good* when you see others perform worse than you do’ we used the words ‘stimulated’ and ‘discouraged’.

Analysis

Differences between the mean item scores of all respondents, concerning preferred comparison other, preferred direction of comparison and response to social comparison (hypotheses 1–3), were tested with a paired *t*-test. Differences between the scores of respondents high and low in SCO, highest and lowest quartile (hypothesis 4) were tested with an unpaired *t*-test.

RESULTS

Both questionnaires were completed by 437 students (67%), 290 females (66%) and 140 males (32%), 7 students did not fill in their gender. This gender distribution is representative for the population of undergraduate clinical students in the Netherlands. The mean SCO of our participants was 3.43 (SE=0.58). Female students had a higher mean SCO than male students ($t=3.62$, $df=428$, $p<0.001$).

H1 Students preferred to compare themselves with peer students ($M=3.64$, $SD=0.80$) more than with residents ($M=3.40$, $SD=1.05$), ($t(436)=5.4$, $p<0.001$) or with staff ($M=2.84$, $SD=0.57$), ($t(436)=14.4$, $p<0.001$).

H2 Students preferred to compare themselves with peers performing better, upward comparison ($M=2.98$, $SD=0.80$), more than with peers performing worse, downward comparison ($M=2.43$, $SD=0.84$), ($t(436)=11.2$, $p<0.001$).

H3 Students reported more often a stimulating response to social comparison than a discouraging one, after comparison with peers performing better ($p < 0.001$) as well as after comparison with peers performing worse ($p < 0.001$). The results are shown in Table 1.

Table 1 Student's stimulating and discouraging responses to upward and downward comparisons, $n=437$

| Direction | Response | M (SD) | t | df | p |
|---------------------|--------------|-------------|-------|-----|--------|
| Upward comparison | Stimulating | 3.61 (0.86) | 18.98 | 434 | <0.001 |
| | Discouraging | 2.33 (0.89) | | | |
| Downward comparison | Stimulating | 2.80 (0.99) | 16.42 | 431 | <0.001 |
| | Discouraging | 1.87 (0.78) | | | |

H4 As shown in Table 2, the reported responses to social comparison were stronger among students high in SCO, except for the stimulating responses to upward comparison, which did not differ for students high and low in SCO ($p=0.277$). Students high in SCO reported a stronger discouraging response to upward comparison than students low in SCO ($p < 0.001$). They also reported a stronger stimulating ($p < 0.001$) and discouraging ($p < 0.005$) response to downward comparison.

Table 2 Influence of students' SCO (the tendency to compare) to direction of and response to comparison, lowest ($n=98$) and highest ($n=124$) quartile

| Direction | Response | SCO $<25\%$ M (SD) | SCO $>75\%$ M (SD) | t | df | p |
|---------------------|--------------|-----------------------|-----------------------|-------|-----|--------|
| Upward comparison | Stimulating | 3.54 (0.95) | 3.67 (0.84) | -1.09 | 221 | =0.277 |
| | Discouraging | 1.99 (0.74) | 2.74 (0.96) | -6.57 | 220 | <0.001 |
| Downward comparison | Stimulating | 2.45 (1.01) | 3.06 (0.90) | -4.73 | 220 | <0.001 |
| | Discouraging | 1.72 (0.76) | 2.04 (0.78) | -3.04 | 220 | <0.005 |

DISCUSSION

As was to be expected undergraduate students in clinical practice frequently compared themselves with others. Their mean SCO is consistent with the reported mean SCO of other students as is the modest but significantly higher SCO for females.¹⁴ Students in clinical practice preferred to compare themselves with peer students (hypothesis 1). They also compared themselves more upward, with peers doing better, than downward, with peers doing worse (hypothesis 2), and their responses to social comparison were more often stimulating for learning than discouraging (hypothesis 3). Stimulating and discouraging responses were most eminent among students high in SCO, except for the stimulating responses to upward comparison which were the same for students high and students low in SCO (hypothesis 4).

Students preferred to compare themselves with peer students more than with residents and staff. This finding confirms the theory that related attributed others are considered to be most informative for the evaluation of one's own current position and abilities.¹⁷ A comparison with peers, similar advantaged or disadvantaged on related attributes such as level of experience and hierarchical position, could provide students with useful information of their own abilities in context. This apparent preference for peers to compare with emphasizes the distinctive role of peers in the comprehensive process of workplace learning and offers opportunities to connect social comparison theory with peer group assessment and peer-to-peer learning.

Workplace learning is grounded in different social-psychological theories like situated learning theory,²⁰ the ideas of communities of practice,²¹ and cognitive apprenticeship.²² In these theories, students are assumed to learn and develop their competences in the domain-specific way of thinking and acting from medical experts, such as staff and residents. Role modelling with these experts is acknowledged as one of the most powerful forces in the transmission of technical skills, relevant knowledge, attitudes and values.²³ This process of role modelling must be distinguished from the process of social comparison, in which people use others to make sense of themselves in their social surrounding.⁹ Social comparison may provide students with useful information about their current selves, present opportunities and threats. In addition to the essential role of medical experts in the process of

role modelling, peer students seem to be in a key position in the process of social comparison.

2
28

The reported preference for peers to compare with, does not put residents or staff aside the comparing process. Students did report comparisons with residents and staff as well, especially with residents. Their preference to compare with residents above staff, strengthens the assumption that related attributed others are considered to be most informative to compare with. Further research is needed to determine in which clinical situations students will seek for residents and staff to compare themselves with and how this preference may change over time.

Students preferred upward comparison, with peers performing better. This favoured comparison strategy is linked to increased learning outcomes, especially among students who *identify* themselves with better performing peers.⁴ There are a number of reasons why upward comparison can result in improved performances. First, it may provide useful information about how to improve. Second, it may increase the motivation to improve as it could endow a sense of one's own potential and raise self-confidence. Finally, it may lead to higher personal standards for evaluating one's own success. To encourage this preferred comparison strategy, students in clinical practice need to have enough encounters with better performing peers to be able to compare themselves upward. These encounters could be structured, for instance by peer-to-peer learning and interactive group learning.

Students reported to compare themselves downward as well, with peers performing worse. This finding is not necessarily problematic as it is also linked to improved performance.⁴ An explanation of this downward strategy leads back to its underlying motive: a comparison with worse performing others is mostly motivated by self-enhancement, the desire to feel or do better.¹⁸ Downward comparison can become a positive learning experience for students who evaluate themselves *in contrast* to peers doing worse. It could be attractive for students who feel insecure as this may raise their self-confidence and stimulate the learning of students motivated by the desire to outperform others. Downward comparison may inform students about unfavourable situations and ineffective strategies. We determined that students did not just benefit from upward comparison, but from downward comparison as well, since the responses to the latter were also more stimulating for learning than discouraging.

On the other hand, we should take notice of the reported discouraging responses to social comparison after comparison with both peers performing better and peers performing worse. Upward comparison could emphasize a student's own inferior position, especially when the compared performance is evaluated in contrast to one's own capacities and considered too far out of reach. Downward comparison might show students – who identify themselves with worse performing peers – how their own situation might deteriorate, which could even lead to lowering personal standards.²⁴ Both kinds of discouraging experiences could hamper the learning process. A better understanding of this part of the comparison process might offer opportunities to reduce or prevent such effects.

Finally, the positive and often reported stimulating response to upward comparison did not differ for students high and students low in SCO. This partial outcome of our last hypothesis was unpredicted, as students high in SCO were assumed to be more affected by the comparison process. Consequently, we expected them to report more stimulating responses to upward comparison than students low in SCO. In a study with fictitious upward interviews, students high and students low in SCO did not differ in their responses either.²⁵ Further research is recommended to examine the relation between differences in SCO and similar responses to upward comparison.

A strength of this study is the participation of a relatively large and diverse group of students, which increased the generalizability of the findings. Students participated in different disciplines within nine different hospitals, both university and affiliated. Their responses provided unique empirical evidence of students' comparison behaviour in clinical practice. The study was embedded in social comparison literature and all findings were related to previous social comparison research which improved the reliability of our results.

Our findings are indicative for a positive influence of social comparison on clinical performance, especially the preferred upward comparison strategy and mainly stimulating responses to social comparison. A limitation of this study is that we did not yet examine the actual influence itself. However, previous research among students, in general, showed a significant positive effect on learning outcomes.⁵ Social comparison was mentioned as a determinant

of performance level. Students improved their grades if they identified themselves with peers doing better *and* if they viewed themselves in contrast to peers doing worse.⁴

The study provided empirical evidence of the relevance of social comparison theory for clinical workplace learning. Students frequently compare themselves and these comparisons influence their learning. A better understanding of students' comparison behaviour, their use of others to make sense of themselves in their new social or professional surrounding, might be relevant to contemporary social learning theories. Further research is needed to investigate conceptual possibilities and translate social comparison theory into the field of clinical workplace learning.

Future studies should focus on more in-depth analysis of student comparison behaviour. It should explore and specify circumstances and situations in which students do benefit from their comparisons with better *and* worse performing peers. Furthermore, it should examine the influence of social comparison on clinical performance and professional development.

REFERENCES

- 1 Bleakley A. Pre-registration house officers and ward-based learning: A 'new apprenticeship' model. *Med Educ* 2002;36:9–15.
- 2 Dolmans DHJM, Wolfhagen HAP, Gerver WJ, de Grave W, Scherpbier AJJA. Providing physicians with feedback on how they supervise students during patient contacts. *Med Teach* 2004;25:409–414.
- 3 Dornan T, Boshuizen H, King N, Scherpbier A. Experience-based learning: A model linking the processes and outcomes of medical students' workplace learning. *Med Educ* 2007; 41:84–91.
- 4 Blanton H, Buunk BP, Gibbons FX. When better-than-others compare upward: Choice of comparison and comparative evaluation as independent predictors of academic performance. *J Pers Soc Psychol* 1999;76:420–430.
- 5 Huguet P, Dumas F, Monteil JM. Social comparison choices in the classroom: Further evidence for students' upward comparison tendency and its beneficial impact on performance. *Eur J Soc Psychol* 2001;31:557–578.
- 6 Buunk BP, Kuyper H, van der Zee YG. Affective response to social comparison in the classroom. *Basic Applied Soc Psychol* 2005;27:229–237.
- 7 Festinger L. A theory of social comparison processes. *Human Relat* 1954;7:117–140.
- 8 Wood JV. What is social comparison and how should we study it? *Pers Soc Psychol Bull* 1996;22:520–537.
- 9 Buunk AP, Gibbons FX. Social comparison orientation: A new perspective on those who do and those who don't compare with others. In: S Guimond, editor. *Social comparison and social psychology: Understanding cognition, intergroup relations and culture*. Cambridge: Cambridge University Press. 2006;15–32.
- 10 Prince KJAH, van de Wiel MWJ, Scherpbier AJJA, van der Vleuten CPM, Boshuizen HPA. A qualitative analysis of the transition from theory to practice in undergraduate training in a PBL medical school. *Adv Health Sci Educ* 2000;5:105–116.
- 11 Radcliffe C, Lester H. Perceived stress during undergraduate medical training: A qualitative study. *Med Educ* 2003;37:32–38.
- 12 Hemphill KJ, Lehman DR. Social comparisons and their affective consequences: The importance of comparison dimension and individual difference variables. *J Soc Clin Psychol* 1991;10:372–394.

- 13 Diener E, Fujita F. Social comparisons and subjective wellbeing. In: BP Buunk, FX Gibbons, editors. *Health coping and well-being: Perspectives from social comparison Theory*. Mahwah, NJ: Erlbaum Associates 1997;329–358.
- 14 Gibbons FX, Buunk AP. Individual differences in social comparison: Development of a scale of social comparison orientation. *J Pers Soc Psychol* 1999;76:129–142.
- 15 Buunk BP, Ybema JF, Gibbons FX, Ipenburg M. The affective consequences of social comparison as related to professional burnout and social comparison orientation. *Eur J Soc Psychol* 2001;31:337–351.
- 16 Buunk BP, Zurriaga R, Peiró JM, Nauta A., Gonsalvez I. Social comparison at work as related to a cooperative social climate and to individual differences in social comparison orientation. *Applied Psychol* 2005;54:61–80.
- 17 Goethals RL, Darley JM. Social comparison theory: An attributional approach. In: J Suls, RL Miller, editors. *Social comparison processes: Theoretical and empirical perspectives*. Washington DC: Hemisphere 1977;259–278.
- 18 Taylor SE, Lobel M. Social comparison activity under threat: Downward evaluation and upward contacts. *Psychol Rev* 1989;96:569–575.
- 19 Buunk BP, Ybema JF. Social comparison and occupational stress: The identification-contrast model. In: BP Buunk, FX Gibbons, editors. *Health coping and well-being: Perspectives from social comparison theory*. Mahwah, NJ: Erlbaum Associates 1997; 359–388.
- 20 Lave J, Wenger E. *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press 1991.
- 21 Wenger E. *Communities of Practice: Learning, meaning and identity*. Cambridge, UK: Cambridge University Press 1998.
- 22 Brown JS, Collins A, Duguid S. Situated cognition and the culture of learning. *Educ Researcher* 1989;18:32–42.
- 23 Elzubeir MA, Rizk DEE. Identifying characteristics that students, interns and residents look for in their role models. *Med Educ* 2001;35:272–277.
- 24 Lockwood P. Could it happen to you? Predicting the impact of downward comparisons on the self. *J Pers Soc Psychol* 2002;82:343–358.
- 25 Groothof HAK. The influence of individual differences in social comparison orientation: On reactions to upward and downward comparison. In: HAK Groothof. *When others are doing better or worse: Responses from the heart and the head*. Dissertation University of Groningen 2004;64–79.



Chapter 3

Peer influence on students' estimates of performance: social comparison in clinical rotations

A. N. (Janet) Raat

Jan B. M. Kuks

Elizabeth A. van Hell

Janke Cohen-Schotanus

ABSTRACT

Context During clinical rotations, students move from one clinical situation to another. Questions exist about students' strategies for coping with these transitions. These strategies may include a process of social comparison because in this context it offers the student an opportunity to estimate his or her abilities to master a novel rotation. These estimates are relevant for learning and performance because they are related to self-efficacy. We investigated whether student estimates of their own future performance are influenced by the performance level and gender of the peer with whom the student compares him- or herself.

Methods We designed an experimental study in which participating students ($n = 321$) were divided into groups assigned to 12 different conditions. Each condition entailed a written comparison situation in which a peer student had completed the rotation the participant was required to undertake next. Differences between conditions were determined by the performance level (worse, similar or better) and gender of the comparison peer. The overall grade achieved by the comparison peer remained the same in all conditions. We asked participants to estimate their own future performance in that novel rotation. Differences between their estimates were analysed using analysis of variance (ANOVA).

Results Students' estimates of their future performance were highest when the comparison peer was presented as performing less well and lowest when the comparison peer was presented as performing better ($p < 0.001$). Estimates of male and female students in same-gender comparison conditions did not differ. In two of three opposite-gender conditions, male students' estimates were higher than those of females ($p < 0.001$ and $p < 0.05$, respectively).

Conclusions Social comparison influences students' estimates of their future performance in a novel rotation. The effect depends on the performance level and gender of the comparison peer. This indicates that comparisons against particular peers may strengthen or diminish a student's self-efficacy, which, in turn, may ease or hamper the students learning during clinical rotations. The study is limited by its experimental design. Future research should focus on students' comparison behaviour in real transitions.

INTRODUCTION

There is a strong interest in how students learn and perform during clinical rotations, within a context of real-life patients, surrounding staff and institutional rules.¹⁻³ As a result, clinical workplace learning is explained by a diversity of learning theories, such as those of situated learning,⁴ communities of practice,⁵ and cognitive apprenticeship.⁶ Recently, several authors have indicated that transitions, in which students move from one clinical rotation to another, represent a rather unexplained part of clinical workplace learning.^{7,8} During transitions, students experience difficulties in adapting to new roles, responsibilities and supervisor relationships.⁹⁻¹¹ Questions exist about the strategies students may use to cope with these transitions and their consequences for learning. A study among residents coping with frequent transitions revealed that they primarily relied on one another by talking and exchanging experiences, as well as self-study and the developing of relationships with helpful others.⁷ In this context, social comparison may also be used to cope with transitions, because people who enter a novel situation often use this strategy to estimate their abilities to master that particular situation.¹²

As they enter a novel clinical rotation, students may wonder whether they fit into the new team and meet the expected level of performance.⁹ In general, people tend to estimate their abilities to master a situation before they enter the situation itself.¹² Such estimates or ideas of one's own abilities to master a specific task or situation are defined as self-efficacy.¹³ Self-efficacy affects people's aspirations, goal setting, selection of activities and perseverance during difficulties.¹⁴ In learning situations, self-efficacy is positively related to learning and performance.¹⁵ Self-efficacy is mainly based on one's own former experiences.¹⁶ However, when the situation is novel or unfamiliar, people are inclined to rely on the experiences of others and to do this by making social comparisons.¹⁷ Therefore, social comparison is acknowledged by Bandura as a main source of self-efficacy.¹⁶ We wondered whether social comparison influences student estimates of their own performance in a novel rotation and whether the process of social comparison, in turn, might strengthen or diminish students' self-efficacy during that rotation.

Social comparison is defined as the process of thinking about one or more others in relation to the self.¹⁸ Social comparison can be seen as a strategy for coping with all kinds of social situations and is used by almost all people to make sense of themselves in an actual or future position.¹⁹ Previous research among medical students in clinical workplace learning revealed that students also frequently compared themselves.²⁰ Students were found to prefer to compare themselves with peer students who were similarly situated in a clinical hierarchy and equally experienced in clinical practice. In a transition to a novel rotation, peer students who have already completed that rotation are of special interest as comparators. The process of thinking about a peer's performance, in terms of his or her efforts, successes and failures during that rotation, in relation to a student's own abilities, offers that student the opportunity to estimate his or her own future performance during that rotation. If social comparison has an effect on students' estimates of performance, the perceived performance level of the comparison peer might be of influence. Therefore, we included the comparison peer's performance level in our experimental study and asked:

What is the influence of social comparison on a student's estimate of his or her performance in a novel rotation after comparison with a peer student – known to be better, similar or worse – who has completed that particular rotation?

In social comparison theory, similar others are considered the most informative comparators because they most reliably reflect one's own position and opportunities.¹² Similarity is described in terms of factors such as experience, intelligence, age and gender, which may influence an individual's position and opportunities.²¹ In clinical rotations, most undergraduate medical students share the same history of education, are similarly equipped for clinical practice and are about the same age. Therefore, they are quite homogeneous on most of these aspects. However, in a learning environment that includes both male and female students, comparisons in opposite-gender situations may occur. We wondered whether students' estimates of their future performance are influenced differently by comparisons with peer students of the same or the opposite sex. To investigate this influence of gender, we formulated the following research question:

Are there differences between: (i) estimates of female and male students; (ii) estimates in female–female and male–male comparisons, and (iii) estimates in female–male and male–female comparisons?

METHODS

According to social comparison theory, the preferred comparison other depends on situational circumstances and personal preferences.¹⁹ In clinical rotations, there are many situations in which students can compare themselves with all kinds of peers. The perceived performance level of these peer(s) may vary on different aspects of performance. The great variety of possible comparison situations may obscure effects measured in an authentic setting. To control for this variety, we designed an experimental study in which we used a written comparison situation and controlled for the performance level and gender of the comparison peer.

Context and participants

Participants were a cohort of students ($n=321$, 67% female) in the first year of the Master's programme of the University Medical Center Groningen, Groningen, the Netherlands. This study year includes four clinical rotations. At the time of the study, all participants had completed two rotations and were required to start their next rotation within 2 weeks. The study was introduced by a teacher of the pre-clinical Bachelor's programme and all students were given a written explanation. Participation was voluntary and anonymous and was expected to take approximately 10 minutes. All students decided to participate and gave their consent. The study was approved by the Ethical Review Board of the Netherlands Association of Medical Education, (Nederlandse Vereniging voor Medisch Onderwijs [NVMO]).

Procedure

We presented the participants a written comparison situation (Fig. 1). In this situation, each participant was asked to imagine that he or she met a comparison peer known from a skills training course they had both completed. During that course, the participant had become familiar with the performance level of the comparison peer (variable: 'peer's performance'; values: 'better', 'similar' or 'worse') and the comparison peer's gender (variable: 'peer's gender';

values: 'male' or 'female'). At the time of their meeting, the comparison peer had already completed the rotation the participant was scheduled to undertake next. The comparison peer told the participant about his or her experiences and mentioned the overall grade (7.5 on a 10-point scale) he or she obtained in that particular rotation. This grade was the same in all conditions and is representative of the average performance grade in first-year rotations. The participant was asked to estimate his or her own performance in the forthcoming rotation using a 5-point scale (variable: 'student's estimate'; values: 1=much worse to 5=much better).

Box 1 Instruction to participants

Imagine: Prior to your next clinical rotation you meet one of your fellow students. You know him* from the skills training center, where you both attended a skills training course. During that course you noticed that his* performances were better** than yours. You also know that he* performed better** than you did on the final assessment of that training period.

He* tells you about his most recent clinical rotation, the one you are going to do next: 'They have an attractive program and provide good supervision. If they know your capabilities, you are allowed to do a lot. When discussing a patient you have seen, they are generous with their compliments when satisfied, but also very critical about things you did not do or ask. They always want to know why you do or ask something. Assessment is taken very seriously as well and, as a consequence, your overall grade really corresponds to your capabilities.'

He* had received a 7.5

| Estimate your own performance | much worse | | | | much better |
|---|-------------------|---|---|---|--------------------|
| My overall grade in this rotation will be | 1 | 2 | 3 | 4 | 5 |

* These words were expressed in male or female forms (he/she, him/her, his/her) according to the comparison condition;
 ** These words were expressed as better, similar or worse according to the comparison condition.

In a pilot study (n=8), we tested the instruction for participants in several conditions and adjusted the situation in accordance with their constructive comments.

Design

The combination of participant gender with all values of the variables ‘peer’s performance’ and ‘peer’s gender’ resulted in 12 conditions, which are presented in Figure 2. Each condition represents the participant’s gender (female [$F_{part.}$] or male [$M_{part.}$]), the comparison peer’s gender (female [F] or male [M]), and the comparison peer’s performance level (worse [W], similar [S] or better [B]). For example, the condition $F_{part.}$ -FW means that the participant is a female student who compared herself with a female peer introduced as performing worse. To guarantee enough statistical power in each condition, male ($n=107$) and female ($n=214$) participants were evenly distributed across the variables ‘peer’s gender’ and ‘peer’s performance’. This resulted in at least 35 female and 17 male students per condition.

| Participant's gender | Peer's gender | Peer's performance | Conditions | n |
|----------------------|---------------|--------------------|-----------------|----|
| Female | Female | Worse | $F_{part.}$ -FW | 36 |
| | | Similar | $F_{part.}$ -FS | 36 |
| | | Better | $F_{part.}$ -FB | 36 |
| | Male | Worse | $F_{part.}$ -MW | 35 |
| | | Similar | $F_{part.}$ -MS | 35 |
| | | Better | $F_{part.}$ -MB | 36 |
| Male | Female | Worse | $M_{part.}$ -MW | 18 |
| | | Similar | $M_{part.}$ -MS | 18 |
| | | Better | $M_{part.}$ -MB | 18 |
| | Male | Worse | $M_{part.}$ -FW | 17 |
| | | Similar | $M_{part.}$ -FS | 18 |
| | | Better | $M_{part.}$ -FB | 18 |

Figure 2 Study design, schematic illustration about the distribution of female and male participants across the variables ‘peer’s gender’ and ‘peer’s performance’. $F_{part.}$ =female participant; $M_{part.}$ =male participant; FW=female, worse; MW=male, worse; FS=female, similar; MS=male, similar; FB=female, better; MB=male, better

Analysis

To distinguish between estimates that were worse or better than the comparison peer's performance level, participants' estimates of their own performance were recoded from the scale of 1–5 to a scale of –2 to 2, on which –2 = much worse, –1 = worse, 0 = similar, 1 = better and 2 = much better.

Differences between participants' average estimates based on the comparison peer's performance level (worse, similar or better) were assessed by means of analysis of variance (ANOVA) with post hoc Bonferroni tests. Gender differences were analyzed using unpaired *t*-tests.

RESULTS

The highest estimates of performance in a novel rotation were made by participants who compared themselves with a peer student introduced as performing worse (mean = 0.60, standard deviation [SD] = 0.58), followed by estimates made by participants who compared themselves with a peer introduced as performing similarly (mean = 0.13, SD = 0.69). The lowest estimates were made by participants who compared themselves with a peer introduced as performing better (mean = -0.30, SD = 0.81). Differences between these average estimates assigned to the comparison peers' performance level were all significant ($F_{(2,318)} = 44.184, p < 0.001$) (Fig. 3).

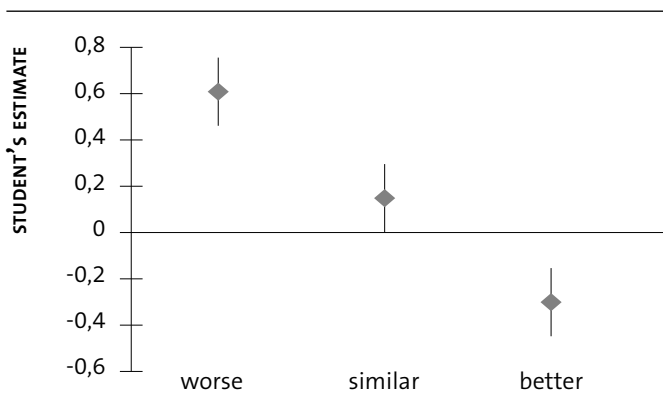


Figure 3 Students' estimates of their own future performance according to the comparison peer's performance level (worse, similar or better), shown as means with 95% confidence intervals

The average estimate of performance of all female students (mean = 0.04, SD = 0.77) was significantly lower than the average estimate of all male students (mean = 0.35, SD = 0.79) ($t_{(207)} = 3.35, p < 0.001$).

In all same-gender conditions – in which female students compared themselves with female peers and male students with male peers – female students' average estimates of performance did not differ significantly from those of male students (Table 1).

Table 1 Same-gender comparisons showing differences between students' estimates of their own performance according to the comparison peer's performance level (worse, similar or better) in female-female and male-male comparisons.

| Condition | n | Mean | SD | t | df | p |
|------------------------|----|-------|------|-------|----|-------|
| F _{part.} -FW | 36 | 0.51 | 0.55 | 1.922 | 52 | 0.060 |
| M _{part.} -MW | 18 | 0.83 | 0.62 | | | |
| F _{part.} -FS | 36 | 0.14 | 0.64 | 0.741 | 52 | 0.462 |
| M _{part.} -MS | 18 | 0.28 | 0.67 | | | |
| F _{part.} -FB | 36 | -0.44 | 0.88 | 0.878 | 52 | 0.384 |
| M _{part.} -MB | 18 | -0.22 | 0.88 | | | |

SD = standard deviation; Fpart. = female participant; Mpart. = male participant; FW = female, worse; MW = male, worse; FS = female, similar; MS = male, similar; FB = female, better; MB = male, better

In opposite-gender conditions – in which female students compared themselves with male peers and male students compared themselves with female peers – female and male students' average estimates of performance were equally high when the comparison peer's performance level was known to be worse. The average performance estimates of female students were significantly lower than those of male students when the comparison peer's performance level was known to be similar or better (Table 2).

Table 2 Opposite-gender comparisons showing differences between students' estimates of their own performance according to the comparison peer's performance level (worse, similar or better) in female-male and male-female comparisons.

| Condition | n | Mean | SD | t | df | p |
|------------------------|----|--------|------|---------|----|-------|
| F _{part.} -MW | 35 | 0.60 | 0.55 | - 0.244 | 50 | 0.809 |
| M _{part.} -FW | 17 | 0.56 | 0.61 | | | |
| F _{part.} -MS | 35 | - 0.17 | 0.62 | 3.868 | 51 | 0.000 |
| M _{part.} -FS | 18 | 0.56 | 0.70 | | | |
| F _{part.} -MB | 36 | - 0.39 | 0.66 | 2.411 | 52 | 0.019 |
| M _{part.} -FB | 18 | 0.11 | 0.83 | | | |

SD = standard deviation; F_{part.} = female participant; M_{part.} = male participant; FW = female, worse; MW = male, worse; FS = female, similar; MS = male, similar; FB = female, better; MB = male, better

DISCUSSION

In this experimental study, we analysed the influence of social comparison on students' estimates of their performance in a novel rotation. These estimates were highest in conditions in which students compared themselves with a peer student known to be performing less well. Male students' estimates of their own performance were higher than those of female students in opposite-gender conditions. These findings imply that student estimates of their own performance in a novel rotation are influenced by the performance level and gender of the comparison peer.

Estimates of future performance are strongly related to self-efficacy.¹⁶ The findings of our experimental study indicate that students' self-efficacy is strengthened by comparisons with peers who are known to be performing less well and diminished by comparisons with peers known to be performing better. This peer influence in the process of social comparison is of potential educational relevance as self-efficacy affects students' learning and is positively related to performance.¹⁵ Given our results, the benefit to be derived

by students of their use of social comparison depends on the performance level of the peer student against whom they compare themselves. This raises questions about which performance level is preferable in actual transitions, when students are free to choose their own comparison peers.

According to social comparison theory, the preferred direction of comparison – with others doing better or with others doing worse – depends on the underlying motive for making the comparison.²² People motivated by the desire to enhance their self-confidence are known to prefer downward comparisons in which they compare themselves with others who are known to be doing less well. Therefore, students who are uncertain about their abilities to master a novel rotation may prefer to compare themselves with a peer student perceived to be doing less well. Such a downward comparison may be beneficial to these students' learning as it may strengthen their self-efficacy. A study among high school students showed improved performance after downward comparison across a range of educational courses.²³ By contrast, people motivated by self-improvement mainly prefer to make upward comparisons in which they compare themselves with others known to be doing better.²² For that reason, students motivated by self-improvement may prefer to compare themselves with a peer student perceived as doing better. Several studies outwith the field of medical education have shown that upward comparisons are also related to performance improvement, particularly when student is able to identify him- or herself with the better- performing peer.²³⁻²⁵ These comparisons are considered to endow a sense of one's own potential.²³ However, upward comparison may also emphasize someone's inferior position, especially when the performance of the comparison other is considered to be out of reach.²⁶ In learning situations, such an upward comparison may lead to the lowering of personal standards.²⁵ This may have happened to our participants in the conditions that included a better-performing peer and may explain their lowest estimates of performance in a novel rotation. Further research should include the great variety of comparison situations possible in an authentic setting and investigate the motives that encourage students to compare themselves, the factors that determine which peers they choose to compare themselves against and which contexts of comparison contribute to students' learning and performance.

In an authentic setting, students in transition to a novel rotation may compare themselves with peers of the same and of the opposite sex. Overall, our study revealed that male students' average estimate of their future performance was above that of females. However, when we analysed the outcomes per condition, we found no significant differences between male and female students' estimates in same-gender conditions. In other words, male students were as influenced by the performance level of a male comparison peer as female students were by the performance level of a female peer. This equal influence can be explained by social comparison theory, in which comparators with the most similarity are considered to reflect one's own (future) position most reliably.²¹

In opposite-gender conditions, male and female students' average estimates of their future performance did not differ when the comparison peer was presented as performing less well. However, in opposite-gender conditions, in which the comparison peer was introduced as performing better or similarly, the average estimate of male students of their own performance was significantly higher than that of females. A possible explanation is offered in studies on gender and self-efficacy, in which gender differences in estimates of performance were related to domains stereotyped as male or female.¹⁵ Estimates of males were highest in male-specific domains, like mathematics and information and communication technology (ICT). Medicine was traditionally labelled as a male-specific domain and it may still be so because women are still underrepresented at higher levels of the profession.^{27,28} Furthermore, female students in clinical practice still report gender-associated barriers to their progression, such as those imposed by male supervisors' lower expectations of female students' performance and possibilities for specialization.^{29,30} Students who compare themselves with a peer student of the opposite sex may be more influenced by stereotyped differences than students who compare themselves with a peer of the same sex.

In recent years, the number of female students has increased significantly.²⁹ In the context of social comparison, we might reason that female students' learning in clinical rotations will benefit from this 'feminisation' in medicine. Given females students' higher estimates of their performance in same-gender comparisons, their average self-efficacy in a novel rotation may increase. Male students may also benefit from this because their estimates of their own

performance were highest after comparison with a female peer. However, in social comparison theory the most similar other is the preferred comparator.¹² Therefore, male students may require to compare themselves with male peers because only male peers can provide information about their future *male* position in a novel rotation. Further research in actual practice is needed to fully elucidate the impact of gender on students' use of the comparison strategy. Similar research is required for factors that may cause a comparison to involve dissimilar comparators, such as ethnicity and socio economic background. Like gender, the impact of these factors may also influence the comparison process.

In this experimental study, we used 12 different comparison situations in which we controlled for the comparison peer's performance level and gender. We included a large enough number of students, especially male students, to ensure sufficient statistical power in every condition. However, the experimental nature of the study is a limitation that restricts the generalizability of our findings. In actual clinical practice, students are free to choose the performance level and gender of their own comparison peer or peers, in a great variety of circumstances. Therefore, further research in an authentic setting is required. Another limitation of our study might be that the outcome measure – the estimate of future performance – is based on self-reported data. The use of self-perceptions is inevitable because social comparison is an internal process that takes place in people's minds and cannot be measured otherwise. Because of the experimental nature of our study, we were unable to relate estimates of future performance to actual performance. However, the relevance of those estimates to actual performance can be derived from the literature, which shows that estimates of future performance are related to self-efficacy, which, in turn, is positively related to performance.¹⁶

CONCLUSIONS

The outcomes of this experimental study showed that the use of social comparison influences students' estimates of their future performance. The effect depends on the comparison peer's performance level and is affected by gender. This may be of educational relevance because it indicates that the characteristics of the peer student chosen for comparison will strengthen or diminish a students' self-efficacy in a novel rotation. A deeper understanding

of students' comparison behaviour during transitions might contribute to understandings of this part of clinical workplace learning. Therefore, future research in an authentic setting should focus on how students actually use social comparison to cope with transitions.

REFERENCES

- 1 Bleakley A. Broadening conceptions of learning in medical education: the message from teamworking. *Med Educ* 2006;40:150–157.
- 2 Dornan T, Boshuizen H, King N, Scherpbier A. Experience-based learning: a model linking the processes and outcomes of medical students' workplace learning. *Med Educ* 2007;41:84–91.
- 3 Mann KV. Theoretical perspectives in medical education: past experience and future possibilities. *Med Educ* 2011;45:60–68.
- 4 Lave J, Wenger E. *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press 1991.
- 5 Wenger E. *Communities of Practice: Learning Meaning and Identity*. Cambridge: Cambridge University Press 1998.
- 6 Guile D, Young M. Apprenticeship as a conceptual basis for a social theory of learning. In: Paechter C, Preedy M, Scott D, Soler J, eds. *Knowledge, Power and Learning*. London: Paul Chapman 2001;56–73.
- 7 Bernabeo E, Holtman M, Ginsburg S, Rosenbaum J, Holboe E. Lost in transition: the experience and impact of frequent changes in the inpatient learning environment. *Acad Med* 2011;86:591–598.
- 8 Holmboe E, Ginsburg S, Bernabeo E. The rotational approach to medical education: time to confront our assumptions? *Med Educ* 2011;45:69–80.
- 9 O'Brien B, Cooke M, Irby DM. Perceptions and attributions of third-year student struggles in clerkships: do students and clerkship directors agree? *Acad Med* 2007;82:970–978.
- 10 Hell EA, Kuks JBM, Borleffs JCC, Cohen-Schotanus J. Alternating skills training and clerkships to ease the transition from preclinical to clinical training. *Med Teach* 2011;33:689–696.
- 11 Prince KJAH, van der Wiel MWJ, Scherpbier AJJA, van der Vleuten CPM, Boshuizen HPA. A qualitative analysis of the transition from theory to practice in undergraduate training in a PBL-medical school. *Adv Health Sci Educ* 2000;5:105–116.
- 12 Festinger L. A theory of social comparison processes. *Hum Relat* 1954;7:117–140.
- 13 Bandura A. Self-efficacy: toward a unifying theory of behavioural change. *Psychol Rev* 1977;84:191–215.
- 14 Bandura A. *Self-efficacy: the Exercise of Control*. New York: Freeman 1997.

- 15 Pajares F. Gender and perceived self-efficacy in self-regulated learning. *Theory Into Practice*. 2002;41:116–125.
- 16 Bandura A. Self-Efficacy. In: Ramachaudran V.S., ed. *Encyclopedia of Human Behaviour*, vol. 4. New York: Academic Press 1994;71–81.
- 17 Martin R. Can I do X?: using the proxy comparison model to predict performance. In: Suls J, Wheeler L, eds. *Handbook of Social Comparison: Theory and Research*. New York: Plenum Publishers 2000;67–80.
- 18 Wood JV. What is social comparison and how should we study it? *Pers Soc Psychol Bull* 1996;22:520–537.
- 19 Buunk AP, Gibbons FX. Social comparison orientation: a new perspective on those who do and those who don't compare with others. In: Guimond S ed. *Social Comparison and Social Psychology: Understanding Cognition, Intergroup Relations and Culture*. Cambridge: Cambridge University Press 2006;15–32.
- 20 Raat AN, Kuks JBM, Cohen-Schotanus J. Learning in clinical practice: stimulating and discouraging response to social comparison. *Med Teach* 2010;32:899–904.
- 21 Goethals RL, Darley JM. Social comparison theory: an attributional approach. In: Suls J, Miller RL, eds. *Social Comparison Processes: Theoretical and Empirical Perspectives*. Washington DC: Hemisphere 1977;259–78.
- 22 Taylor SE, Lobel M. Social comparison activity under threat: downward evaluation and upward contacts. *Psychol Rev*, 1989;96:569–575.
- 23 Blanton H, Buunk BP, Gibbons FX. When better-than-others compare upward: Choice of comparison and comparative evaluation as independent predictors of academic performance. *J Pers Soc Psychol*, 1999;76:420–430
- 24 Huguet P, Dumas F, Monteil JM. Social comparison choices in the classroom: Further evidence for students' upward comparison tendency and its beneficial impact on performance. *Eur J Soc Psychol* 2001;31:557–578.
- 25 Groothof HAK. The influence of individual differences in social comparison orientation: on reactions to upward and downward comparison. In: Groothof HAK. *When Others are Doing Better or Worse: Responses from the Heart and the Head*. Dissertation (PhD) University of Groningen 2004:64–79.
- 26 Lockwood P. Could it happen to you? Predicting the impact of downward comparisons on the self. *J Pers Soc Psychol*, 2002;82:343–58.

- 27 Kilminster S, Downes J, Gough B, Murdoch-Eaton D, Roberts T. Women in medicine – is there a problem? A literature review of the changing gender composition, structures and occupational cultures in medicine. *Med Educ* 2007;41:39–49.
- 28 Bakken LL, Sheridan J, Carnes M. Gender differences among physician-scientists in self-assessed abilities to perform clinical research. *Acad Med* 2003;78:1281–1286.
- 29 Babaria P, Bernheim S, Nunez-Smith M. Gender and the pre-clinical experiences of female medical students: a taxonomy. *Med Educ* 2011;45:249–260.
- 30 Babaria P, Abedin S, Nunez-Smith M. The effect of gender on the clinical clerkship experiences of female medical students: results from a qualitative study. *Acad Med* 2009;84:859–866.



Chapter 4

Social comparison: peer influences on students' trajectories towards becoming doctors

A.N. (Janet) Raat

Jan B.M. Kuks

Nienke Renting

Tim Dornan

Janke Cohen-Schotanus

ABSTRACT

Purpose Students training together to become doctors inevitably make so-called social comparisons with one another. To understand the process, we investigated the nature of the comparisons and their mechanisms and effects.

Method The research used constructivist grounded theory methodology, drawing sensitising insights from social comparison theory. Six male and 6 female medical students in the first clerkship year of a Dutch undergraduate medical program, kept audio diaries in which they recounted 74 instances of social comparison. All data were transcribed verbatim and analysed, constantly comparing the evolving interpretation against the original transcripts.

Results Participants' comparisons with peers gave meaning to their clerkship experiences. The comparisons were in three domains: participants' ability to perform medical tasks; their interactions with others; and their selves. The most common net effects were reassurance, self-affirmation and motivation to make further progress. The extent to which participants identified with or contrasted themselves against peers' levels of performance and experience influenced the outcome of the comparisons.

Conclusions Peer comparison had an important place in participants' professional development. They provided benchmarks against which participants appraise their current position and the progress they had yet to make. Educators should be aware of this important influence on medical students' practice-based learning. Future research could usefully explore how social comparison contributes, over time, to students' identity development.

INTRODUCTION

When the supervisor told her to be more brief and to the point ... I related this to my own performance, which is also lengthy... The next morning, I tried to be more succinct...

Ineke (P1,3.2)

Modern conceptualisations of workplace education see learning as not just an outcome of teaching but of students' complex experiences as a whole.¹⁻³ Many different people including staff, residents, patients, and peers make important contributions to this comprehensive process. Lave and Wenger coined the term 'Communities of Practice'⁴ to describe the social contexts in which those people contribute to individuals' learning. A 'community', according to the theory, is a group of practitioners who are mutually engaged in a 'practice', which comprises a set of shared skills and ways of addressing problems. Novices in a community are described to start in a peripheral position in which they observe and perform basic tasks. They travel more centrally as they become more skilled and experienced. Communities that interconnect with each other constitute a 'landscape of practices'.⁵ Novices in such landscapes – like medical students – develop their professional identities by crossing boundaries and experiencing multiple different communities, a trajectory that requires sustained participation over time. Social interaction is central to this type of learning. Steven et al.¹ showed how students' interactions with doctors are particularly important because they provide access to the practice of patient care and help students learn from that practice. Other researchers have drawn attention to the relevance of interactions with patients^{3,6-7} and staff.⁸⁻¹⁰ It seems logical that interactions with peers are also important but surprisingly little is known about the impact they have on students' development.

In earlier work, we showed that clerkship students frequently compared their own position and performance with those of peers.¹¹ Festinger's 'Theory of social comparison processes'¹² describes these processes as thinking about information concerning one or more others in relation to the self.¹³ People commonly use social comparison to make sense of themselves in relation to their social surroundings.¹⁴ They prefer to compare themselves with others close to their own position or level of competence because 'similar others' are most relevant to their own situation.¹² In the context of medical education,

students compared themselves with peers more often than with residents and staff.¹¹ Peers have comparable levels of experience and are similarly situated in the clinical hierarchy so they were best able to inform students about opportunities and threats in their current situations. A later experimental study of students' estimates of performance showed that comparison with a peer who had already completed a novel clinical situation affected students' perception that they could master that situation.¹⁵ Such views about one's own ability to fulfil a task or situation are in line with Bandura's concept of self-efficacy.¹⁶ Thinking 'I can do it as well' strengthens a person's self-efficacy whereas thinking 'I will also have difficulty' diminishes it.¹⁵ Self-efficacy is known to affect people's aspirations, selection of activities, and perseverance during difficulties.¹⁷ Therefore, students' use of social comparison affects their engagement in clinical practice.

The aim of the current study was to help medical students benefit from comparison processes by investigating how they use social comparison in authentic clinical settings. The data gathering technique of solicited audio diaries¹⁸ provided a means of examining students' experiences of social comparison close to the event, in order to establish the nature of the comparisons and their mechanisms and effects.

METHODS

Conceptual orientation

We took a constructivist epistemological stance, which holds that knowledge is constructed by human interpretation and, therefore, shaped by social, cultural and personal factors.¹⁹ A constructivist orientation assumes that research processes are influenced by researchers' disciplinary perspectives and background assumptions. This project was informed by our previous work in the domain^{11,15,20} and conceptual orientation towards social comparison theory,^{12,21-22} which provided sensitising insights for constructivist analysis.

Context

The setting was the University Medical Center, Groningen, The Netherlands, whose undergraduate curriculum includes six years of training: a three-year pre-clinical Bachelor's programme, followed by a three-year clinical Master's

programme. The first year of the latter includes four twelve-week rotations, each of which has a six-week period of skills training, followed by a six-week period of full-time engagement in clinical practice. During these clinical periods, students meet each other once a week for coach-group sessions.

Participants and Research team

Participants were undergraduate medical students in the first year of their Master's programme recruited from 189 students who were attending tutorials during the skills training periods. They were informed about the aims of the study and told that participation was voluntary and confidential. Since the gender distribution in our institution is 70:30 in favour of female students, we explicitly encouraged male students to participate. Students who considered participating were invited to send an email with the text 'I am interested' to the first researcher (ANJR). In reply, they were given further information and asked to sign the informed consent form and collect an audio recorder. The research team, consisted of: a first researcher and medical sociologist/ethicist (ANJR), an education researcher and medical doctor (TD), an education researcher and educationalist (NR), a medical doctor and curriculum leader of the Master's programme (JBMK), and a psychologist and head of the Center for Research and Innovation in Medical Education (JCS). The Ethical Review Board of the Netherlands Association of Medical Education, NVMO-ERB,²³ approved this study. To maintain confidentiality, pseudonyms are used to identify participants.

Procedures

Participants kept audio diaries recounting their experiences of social comparison over a 4-week period, following instructions shown in Box 1. The first two weeks, in which participants completed their skills training, were used for familiarisation. The second two weeks, in which participants were engaged in clinical practice, were used for analysis. ANJR listened to the recordings and clarified her interpretation with participants if necessary. All recordings were transcribed verbatim and anonymized.

Box 1 Audio diary instructions

Please record experiences of comparing yourself with one or more peer students. The nature of these comparisons is up to you. There are no good or bad comparisons. Comparisons can be based on conversations or on observed situations or performances. Comparisons can just pass by or can be experienced rather intensely. Some comparisons are forgotten almost immediately while others will be remembered for a long time. Do not make choices; all comparisons are relevant to this study.

When you make your recordings, please think about these things:

- Give some background information, like where and when the comparison happened.
 - Give some information about the comparison peer(s) and your relation to that/those peer(s)
 - Recount the comparison as clearly as possible
 - Try to explain the effect of the comparison, such as how it influenced your feelings or (intended) behaviour.
-

Analysis

Two of us (ANJR, NR) read all transcribed recordings closely and independently and discussed their first impressions with the rest of the team (TD, JCS and JBMK). ANJR open-coded all data, using the constant comparative method,²⁴ and selected a diversity of transcripts for TD to read and reread. In the meantime, ANJR developed a preliminary interpretative model, which she discussed with TD and NR. Subsequently, ANJR performed axial and selective coding of all data in close consultation with TD, critiqued by NR. This exercise resulted in an initial answer to the research questions, which was commented on by the whole team. Then, we prepared a condensed narrative of results for the present report. Quotations presented in this report were chosen for their ability to illustrate findings that were strongly represented in the whole dataset.

RESULTS

Participants

Six male and 6 female students recorded an average of 6 (range 4-11) entries in their diaries, totalling 74 entries. Demographic details of participants are shown in Table 1. Sixty-one percent of comparisons were made on the ward, 16% during coach-group sessions, and the remainder in informal places like

clerks' rooms, hospital restaurants, corridors, and while travelling together to and from the hospital. Seventy three percent of comparisons were with one other peer and the remainder with more than one peer. Participants recorded more comparisons with women than men, as would be predicted from the excess of female students in the program.

Table 1 Characteristics of participants

| Participant (pseudonym) | Gender | Age | Number of prior rotations completed | Discipline at time of study | Number of diary entries |
|--------------------------------|---------------|------------|--|------------------------------------|--------------------------------|
| Ineke | F | 25 | 3 | Orthopedics | 4 |
| Annemarie | F | 24 | 3 | Psychiatry | 10 |
| Henk | M | 23 | 2 | Pediatrics | 7 |
| Pieter-Jan | M | 24 | 2 | Cardiology | 4 |
| Anneke | F | 25 | 1 | Internal Medicine | 4 |
| Jeroen | M | 24 | 3 | Orthopedics | 5 |
| Jolanda | F | 22 | 2 | Pediatrics (oncology) | 6 |
| Tjitske | F | 22 | 2 | Gynecology | 11 |
| Frank | M | 22 | 2 | Urology | 5 |
| Jelle | M | 25 | 3 | Pediatrics (surgery) | 5 |
| Saskia | F | 25 | 1 | Dermatology | 6 |
| Maarten | M | 22 | 0 | Pediatrics | 3 |

Processes of comparison

Three successive stages could be identified in participants' diary entries: observation, reflection, and response. These phases are summarized in table 2 and explained here.

Observation

Participants observed similarities and differences between themselves and peers regarding: their ability to perform clinical tasks; how they interacted with patients, residents, and staff; and their selves.

Ability to perform tasks. Peer comparison helped participants judge what clinical tasks they should be capable of at their current level of experience:

Example 1

He seems to be far more assertive and experienced than I am. (...) he immediately offered his help, while I was still wondering if I was up to it. He had already inserted several cannulas. (...) I had not inserted one yet (...) He made me think... Of course... he is in his fourth rotation, but that is not so far ahead. He is just one block further on...

Frank (P9,4.2)

Interactions with others. Some comparisons concerned how participants connected emotionally with patients:

Example 2

In pediatric oncology (...) I am more touched than I expected. (...) Some peers told me not to take these stories with me. It made me think... is it better not to become a pediatrician? (...) I decided to watch myself on this.

-

Today, I met a very nice peer, who I knew from former rotations (...) She told me that she is seriously moved by some children; she thinks about them at night ... Then, I thought, well ..., I am not the only one, and ... this is probably something that is part of the rotation. At the moment, I think this is all part of learning how to balance.

Jolanda (P7,3.3)

Other comparisons concerned participants' ability to interact with residents and staff, get access to patient care activities, and show what they had done:

Example 3

She told me that she did not do any pelvic exam herself yet. That surprised me because I did many. When we talked about it, I noticed that she is much more reserved, not asking questions or offering help (...) I always ask them if I could perform some acts (...) The comparison confirmed me in my own approach... I will continue with it.

Saskia(P11,3.3)

Table 2 Coding template

| First level code | Second level code | Third level code |
|--------------------------------|----------------------------------|--|
| Phase I Observation | Ability to perform tasks (doing) | Compile records Insert a cannula Handover Admit a patient etc. |
| | Interactions with others | Staff/trainees Patients Others (parents/nurses etc.) |
| | The 'self' (being) | Feelings / uncertainties Assertiveness Self-assurance Self-presentation etc. |
| Phase II Reflection | Identification | Expressing similarities (‘like me’, ‘he/she also’ etc.) |
| | Contrast | Expressing differences (‘much more’, ‘less experienced’ etc.) |
| Phase III Response | Awareness of position | Understanding / insight |
| | Motivates to progress | Confidence in own approach Motivates to progress further Motivates to catch up |
| | Self-enhancement | Self-confirmation Relief / reassured Opposite: distress / insecure |

Their selves. The most frequent topic of comparison was participants’ *selves*. They compared their own behaviours, uncertainties, expectations and self-presentation with peers:

Example 4

White coats are not allowed in psychiatry (...) I was really puzzled about what to wear, because I do not know how to look professional without one (...) When I arrived, a peer who also started today, immediately asked if I also had difficulties deciding what to wear (...) It somehow confirms me... it is not silly to be uncertain about this.

Annemarie(P2,3.1)

Reflection

All comparisons contained reflective phrases in which participants gave meaning to the similarities and differences they had observed between themselves and their peer(s). Participants used expressions like *'he is not that far ahead'* or *'she just started, while I ...'* to locate themselves in relation to peers in the education continuum. Likewise, they evaluated comparison peers' performance; *'she is much faster than I am'*, *'she did exactly the same'*. In all reflections, participants expressed signs of *identification* or *contrast*, weighing the impact of the comparison. In Example 1, above, the contrast made by Frank with a peer - *'Of course, I can say he is in his fourth rotation...'* - provided a reason for not yet being able to insert a cannula. But he went on to identify with his peer, when he said he himself would be in that position rather soon - *'... but that is not that far ahead. He is just one block further on...'* He appreciated that he had to step forward and offer to insert cannulas in order to make progress.

Response

In the third phase of comparison, participants responded to the comparison information by expressing a clearer understanding of the progress they had already made:

Example 5

When I tried to help him, I noticed how much trouble he had, doing that admission which was rather straightforward (...). And then, well... I thought it was special... Of course he is in his first rotation and I am in my fourth, but... I did not realize before that I had grown that much. Yeah, I liked it. I really progressed this year.

Jeroen (P6,4.1)

They also saw what they could aspire to in the near future:

Example 6

Today I just followed the others, a student who is already in her third year, and two trainees (...) I compared myself mainly with the other student... because, as a student myself, I know exactly how far ahead she is (...) I really admire her performance (...) I hope I can also reach that level.

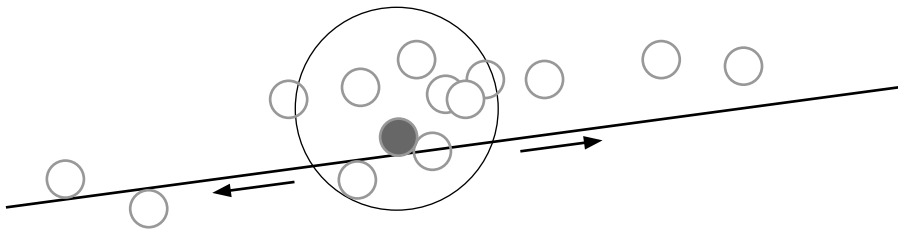
Maarten (P12,4.3)

Participants spoke of how their feelings of self-esteem and self-efficacy had been enhanced and how they felt motivated to progress further. Reports of negative responses, like feeling insecure or distressed, were few and, when present, often accompanied by another comparison with a more positive outcome, as in Example 3.

Theoretical interpretation

Figure 1 shows schematically how, as predicted by social comparison theory,²⁵ participants identified with, or contrasted themselves against, ‘comparison other(s)’.

Figure 1 A model of peer comparison



Legend A student (filled circle) uses downwards (down arrow) and upwards (up arrow) comparisons with peers to give meaning to his/her current stage of development.

Upward comparison: Reflective comparisons with more experienced or successful peers, as represented by the upward arrow in Figure 1, showed what could be reached in the near future and how: what level a participant had reached, what was yet possible, and what needed to be done to reach that higher level of performance. **Upward identification** with a higher-performing peer motivated participants to strive to improve their own performance. But if the comparison peer’s performance seemed too far out of reach to be achievable, **upward contrast** was discouraging or less relevant to a participant’s current situation, as in the case of Maarten, Example 7.

Downward comparison: Comparisons with peers who were less experienced or successful, illustrated by Jeroen, Example 5, is represented by the downward arrow in Figure 1. **Downward contrast** made participants aware of the progress they had made and increased their self-esteem and confidence. **Downward identification** as in: ‘then I noticed ...she is also having difficulties with that’, helped them understand and accept their current stage of development.

DISCUSSION

Principal findings and meaning

Peers had a central place in participants' learning. They provided benchmarks against which participants compared their ability to perform clinical tasks and interact with others, and their feelings and attitudes towards themselves. Participants identified and/or contrasted themselves with peers and it was the balance between these reflections, which determined the effect of peer comparison. The most common net effect was reassurance, self-affirmation and motivation to progress. Peer comparison, we can conclude, helps medical students understand their current position and determine what they can aspire to. The way they check and recheck their learning experiences against one another indicates that thinking about students in isolation from their peers would only tell part of the story of clinical learning.

Strengths and limitations

A strength of this study was the use of an established social psychological theory as an a priori theoretical stance to provide sensitizing insights for the qualitative analysis. The use of qualitative methodology was both a strength and a limitation. Audio dairies, as has been reported previously,¹⁸ allowed participants to provide rich, contemporaneous accounts of their peer comparisons. Using a constructivist analytical method, we were able to provide a thick description of the process of comparison. But, as is typical of qualitative research, we obtained our data from an opportunity sample of students, who were eager to participate. Whilst their eagerness made it possible to do the study, it may have introduced a bias towards more positive findings. That does not invalidate what we found because qualitative methodology does not claim to produce generalizable findings but it does seek to produce transferable ones.²⁶ Whilst urging caution in transferring the results to other students in other contexts, we note that a tendency towards positive comparisons has been recognized in the research literature.²⁷ Most people tend to avoid painful comparisons and couple negative comparisons with more positive ones or adjust their comparison level, as in the saying 'there's always someone worse off than yourself'. There may not, we suggest, be so much of a bias as at first appears. The theoretical model in Figure 1 equates to a 'mid-range theory', which educators could easily transfer to their interactions with students and researchers could test, as suggested below.

Relationship to prior research and theory

This investigation was part of a novel programme of research into social comparison in medical education. The findings support our previous observations that medical students made social comparisons in clinical workplaces. The findings strengthen our theory that comparisons with peers may be beneficial to students' learning and professional development,¹¹ and that students use such comparisons to estimate their abilities to master clinical situations.¹⁵ Likewise, they are consistent with our suggestion that peer comparisons could play a role in preventing distress because they provide students something to grasp hold of.²⁰ We suggested, at the start of this article, that it is useful to think of social comparisons, as first described by Festinger¹² and elaborated by other theorists,^{21,22,28,29} as taking place within Communities of Practice. Participants' comparisons with congruent others evaluated identity issues such as the wearing of a white coat and the use of medical terminology. These can be related to dimensions of a practice, which, according to Wenger, are vital to the peripheral participation of newcomers to a community: mutual engagement with the actions and 'repertoire in use' of other people.⁵ According to social comparison theory, reflections on similarities and differences between oneself and others help to make sense of oneself in one's current situation.²⁹ In the context of COP, such a weighing of differences and similarities could be interpreted as the negotiation of meaning, the interplay between participation and reification that makes us who and what we are.⁵ Peers, therefore, seem to play a pivotal role in the identity formation of students in clinical practice. Travelling on similar trajectories, they provide reference points that help individuals precede along their own trajectories and shape their identities as (proto)professionals.

Implications for practice and research

Box 2 suggests some implications for educational practice. First, we should not overlook the existence of peers when we think about learning in clinical practice alongside practitioners and patients. We should be aware that students perpetually compare themselves with their peers, which increases the number of important players on the field of medical education.

Box 2 Implications for practice

- Do not overlook the existence of peers
 - Be conscious of students' tendency to compare themselves with peers
 - Be conscious of the vital role of such comparisons in students' professional development
 - Promote peer comparisons by facilitating student encounters in coach groups, joint lunches, clerks' rooms
 - Talk with students about their comparison behaviour
 - Keep an eye on possible negative effects of peer comparisons
-

Having recognised that peer comparisons play an important part in students' development, it seems wise to support such comparisons. Interactions with a diversity of peers will increase students' opportunities to make comparisons according to their personal needs. Talking with students about their comparisons might reveal assumptions, which are worth encouraging or challenging. Besides that, mentoring conversations provide opportunities to watch for negative comparison outcomes, like insecurity or distress.

This research has implications that go beyond students' individual development because it provides an explanation for how clinical communities are changed by new generations. When students check their own experiences with those of peers at similar stages of development, they also give a contemporary meaning to these experiences, which may differ from how they would have been experienced in earlier times. We propose, therefore, that future research could usefully seek to understand students' use of social comparison over time as their professional identities mature. We also advocate research to explore and specify how organizational situations and personal circumstances interact to influence comparison processes.

REFERENCES

- 1 Steven K, Wenger E, Boshuizen H, Scherpbier A, Dornan T. How clerkship students learn from real patients in practice settings. *Acad Med* 2014;89:469–476.
- 2 Dornan T, Boshuizen H, King N, Scherpbier A. Experienced based learning: A model linking the processes and outcomes of medical students' workplace learning. *Med Educ* 2007;41:84–91.
- 3 Bleakley A, Bligh J. Students learning from patients: Let's get real in medical education. *Adv Health Sci Educ* 2008;13:89–107.
- 4 Lave J, Wenger E. *Situated learning. Legitimate Peripheral Participation.* Cambridge, Mass: Cambridge University Press; 1991.
- 5 Wenger E. *Communities of Practice. Learning, Meaning and Identity.* Cambridge, Mass: Cambridge University Press; 1998.
- 6 Monrouxe LV, Rees CE, Bradley P. The construction of patients involvement in hospital bedside teaching encounters. *Qual Health Res* 2009;19:918–930.
- 7 Bell K, Boshuizen HP, Scherpbier A, Dornan T. When only the real thing will do: Junior medical students' learning from real patients. *Med Educ* 2009;43:1036–1043.
- 8 Elzubeir MA, Risk DEE. Identifying characteristics that students, interns and residents look for in their role models. *Med Educ* 2001;35:272–277.
- 9 Weaver R, Peters K, Koch J, Wilson I. 'Part of the team': professional identity and social exclusivity in medical students. *Med Educ* 2011;45:1220–1229.
- 10 van der Zwet J, Dornan T, Teunissen PW, de Jonge LPJWM, Scherpbier AJJA. Making sense of how physician preceptors interact with medical students: discourses of dialogue, good medical practice, and relationship trajectories. *Adv Health Sci Educ* 2014;19:85–98.
- 11 Raat AN, Kuks JBM, Cohen-Schotanus J. Learning in clinical practice: stimulating and discouraging response to social comparison. *Med Teach* 2010;32:899–904.
- 12 Festinger L. A theory of Social Comparison Processes. *Hum Relat* 1954;7:117–140.
- 13 Wood JV. What is social comparison and how should we study it? *Pers Soc Psychol Bull* 1996;22:520–37.

- 14 Buunk AP, Gibbons FX. Social comparison orientation: a new perspective on those who do and those who don't compare with others. In: S Guimond, ed. *Social Comparison and Social Psychology: Understanding Cognition, Intergroup Relations and Culture*. Cambridge: Cambridge University Press 2006;15–32.
- 15 Raat AN, Kuks JBM, van Hell EA, Cohen-Schotanus J. Peer influence on students' estimates of performance: social comparison in clinical rotations. *Med Educ* 2013;47:190–197.
- 16 Bandura A. Self-efficacy: toward a unifying theory of behavioural change. *Psychol Rev* 1977;84:191–215.
- 17 Bandura A. *Self-efficacy: the Exercise of Control*. New York: Freeman 1997.
- 18 Monroux LV Solicited audio diaries in longitudinal narrative research: a view from inside. *Qual Res* 2009;9:81–103.
- 19 Crotty MJ. *The foundations of social research: Meaning and perspective in the research process*. Sage publications Ltd. 1998.
- 20 Raat AN, Schönrock-Adema J, van Hell EA, Kuks JBM, Cohen-Schotanus J. Student distress in clinical workplace learning: differences in social comparison behaviours. *Adv Health Sci Educ* 2015;20:101–111.
- 21 Suls J, Wheeler L, eds. *Handbook of Social Comparison: Theory and Research*. New York: Plenum Publishers 2000.
- 22 Guimond S, ed. *Social Comparison and Social Psychology: Understanding Cognition, Intergroup Relations and Culture*. Cambridge: Cambridge University Press 2006.
- 23 Eikelboom JI, ten Cate OTHJ, Jaarsma D., Raat AN, Schuwirth L, van Delden JJM. A framework for the ethics review of education research. *Med Educ* 2012;46:728–37.
- 24 Thomas G, James D. Re-inventing grounded theory: some questions about theory, ground and discovery. *Br Educ Res J* 2006;32:767–795.
- 25 Buunk BP, Ybema JF. Social comparison and occupational stress: The identification-contrast model. In: BP Buunk & FX Gibbons, eds. *Health Coping and Well-being: Perspectives from Social Comparison Theory*. Mahwah, NJ: Erlbaum Associates 1997;359–388.
- 26 Kuper A, Lingard L, Levinson W. Critically appraising qualitative research. *BMJ* 2008;337:a1035.
- 27 Buunk AP, Gibbons FX. Social comparison: The end of a theory and the emergence of a field. *Organizational Behavior and Human Decision Processes* 2007;102:3–21.

- 28 Goethals FX, Darley JM. Social comparison theory: An attributional approach. In: J. Suls & RL Miller, eds. *Social comparison processes: Theoretical and empirical perspectives*. Washington DC: Hemisphere 1977; 259–27.
- 29 Buunk AP, Gibbons FX. Social comparison orientation: A new perspective on those who do and those who don't compare with others. In: S. Guimond, ed. *Social Comparison and Social Psychology: Understanding Cognition, Intergroup Relations and Culture*. Cambridge: Cambridge University Press 2006;15–32.



Chapter 5

Student distress in clinical workplace learning: differences in social comparison behaviours

A.N. (Janet) Raat

Johanna Schönrock-Adema

Elizabeth A van Hell

Jan B.M. Kuks

Janke Cohen-Schotanus

ABSTRACT

In medical education, student distress is known to hamper learning and professional development. To address this problem, recent studies aimed at helping students cope with stressful situations. Undergraduate students in clinical practice frequently use experiences of surrounding peers to estimate their abilities to master such challenging situations. This use of the experiences of others, known as social comparison, may affect student distress both positively and negatively. To find characteristics of a beneficial use of social comparison, we examined differences in comparison behaviours between students expressing low and high levels of distress.

The participants in our study, response rate 93% (N=301/321), were all medical students in their first year in clinical practice. They completed the General Health Questionnaire (GHQ-12) to measure distress, and three separate questionnaires to measure: (1) orientation to comparison, (2) motive for comparison, and (3) interpretation of comparison. Differences were analysed using multivariate analysis of variance.

Although all students were oriented towards social comparison, the analyses showed that this orientation was less apparent among low-distress students. Besides, the low-distress students were less inclined to use motives indicative for comparisons with peers perceived as performing worse and were less negative in the interpretations of their comparisons.

As social comparison is frequently used among all students, we recommend to make them aware of their comparison behaviours and inform them about the pros and cons of the distinguished aspects of the comparison process.

INTRODUCTION

In clinical workplace learning, undergraduate medical students have to learn, apply and develop their professional competences in a dynamic, real-life clinical context. Throughout this period, they will meet a variety of stress provoking challenges, like entering a novel rotation, with new tasks and unfamiliar supervisor relationships.^{1,2} Previous research has shown that students often use the experiences of surrounding peers to estimate their abilities to master such challenges.³ The use of the experiences of similar others to estimate one's own opportunities to succeed, is known as social comparison.⁴ Social comparison is a main source of self-efficacy and, as such, contributes to people's self-confidence.⁵ However, the use of social comparison can also cause distress,⁶ which is a considerable problem in medical education.⁷ The aim of this study is to investigate whether the comparison behaviours of students expressing low levels of distress differ from those of students expressing high levels of distress. Finding such differences might offer opportunities to help distressed students apply social comparison to their benefit.

Positive aspects of the challenges presented by undergraduate clinical workplace learning pertain to increased motivation and rapid personal and professional development.^{1,8} However, the same challenges are also known to cause distress.^{1,9,10} Student distress hampers learning and interferes with professional development.¹¹ In the long run, distress is even acknowledged to affect personal well-being and patient care.¹² Despite these serious consequences, the problem of student distress is still difficult to address. In psychological literature, the focus is more and more on gaining a scientific understanding of the positive and adaptive strategies of human behaviour.^{13,14} Also in medical education, there seems to be a shift towards helping students cope with stressors that arise throughout their medical training and future careers,¹⁵ such as supporting students' self-care,¹⁶ and nurturing students' resilience.¹⁷ Finding differences between more and less favourable comparison strategies may add to these attempts to enable students to cope with stressful situations because it might offer opportunities to encourage them using social comparison to their benefit.

Social comparison is defined as the process of thinking about information of one or more others in relation to the self.¹⁸ These others are preferably so-called 'similar others' – like peer students¹⁹ – because their positions,

successes and failures are considered most informative to estimate one's own current position and abilities to succeed.⁴ Social comparison is frequently used to estimate one's own abilities to master a novel situation.²⁰ When the outcome is positive, such a comparison will be stimulating and raise self-confidence.⁵ However, estimating one's own abilities to master the demands of a situation also comes to the initial cause of psychological distress.²¹ When these demands are estimated as outweighing one's abilities, the situation will be perceived as threatening and raise feelings of distress.¹² For example, a student, who has lost some of his/her self-confidence after a rather critical encounter with a new supervisor may compare this experience with those of peer students who had the same supervisor. Such a comparison can ease the student's conscience as it provides the opportunity to put the incident into perspective. However, when a negative interpretation of the comparison emphasizes his/her alarming position, it can also increase his/her distress. Since the process of social comparison is at the basis of the development of distress, we might learn from the comparison behaviours of students with low levels of distress. Therefore, we contrasted the social comparison behaviours of low-distress students with those of high-distress students on three aspects of the comparison process, as explained below.

Orientation to comparison

Confronted with information about what similar others can or cannot do, almost all people are inclined to relate this information to themselves.²² Despite this general use of the comparison strategy, some people are more inclined to compare themselves than others. These individual differences are labelled as *social comparison orientation*, SCO.²³ People high in SCO are known to compare themselves more frequently *and* to be more affected by their comparisons.²⁴ Students in clinical workplace learning are known to vary in their individual SCO as well.¹⁹ Our first question relates to this variance and addresses whether students expressing low levels of distress differ in their orientation to compare from students expressing high levels of distress.

Motive for comparison

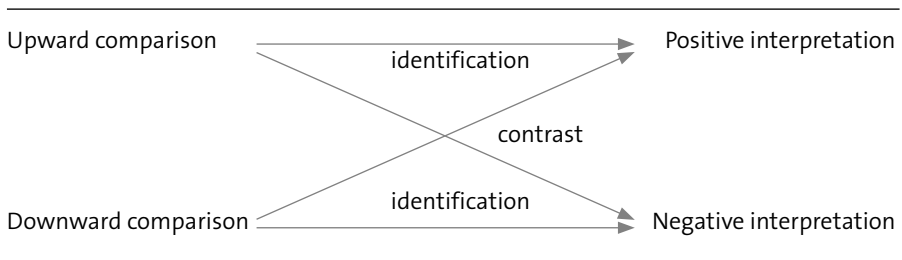
In social comparison literature, three main motives for the use of social comparison are distinguished: *self-evaluation*, to evaluate one's own position, *self-improvement*, to improve oneself, and *self-enhancement*, to feel better about oneself.²⁵ The last two motives are known to guide the direction of a

comparison. People who use the motive self-improvement are more inclined to compare themselves upward, with others perceived as performing better. Alternatively, people who use the motive self-enhancement are found to prefer downward comparisons, with others perceived as performing less good.²⁶ Our second question addresses whether students expressing low levels of distress use different motives for their comparisons than students expressing high levels of distress.

Interpretation of comparison

The interpretation of a comparison can be either positive or negative, in both upward and downward comparison situations. In social comparison theory, the interpretation of a comparison is explained by the model of *identification* and *contrast*, see Figure 1.²⁷ In upward comparison situations, people who identify themselves with a better performing other – like ‘I can do it as well’ – tend to give a positive interpretation. On the other hand, people who contrast themselves to a more successful other – like ‘I will never be that good’ – will be inclined to give a negative interpretation.

Figure 1. Schematic illustration of the interpretation of upward and downward comparison through identification and contrast.



In downward comparison situations, however, people who identify themselves with a less successful other – like ‘I will not succeed either’ – tend to give a negative interpretation. Alternatively, people who contrast themselves with a worse performing other – like ‘I can do it better’ – will be inclined to give a positive interpretation.²⁷ Our third question addresses whether there are differences in the interpretation of comparison between students expressing low and high levels of distress.

Summarizing, in this study we investigated if students expressing low levels of distress differ in their use of social comparison from students expressing high levels of distress. Therefore, we examined three main aspects of their comparison behaviours: (1) orientation to comparison, (2) motive for comparison, and (3) interpretation of comparison.

METHODS

Context and population

Participants were all undergraduate medical students at the University of Groningen, The Netherlands. The undergraduate curriculum of this University consists of 6 years of medical training: a three-year (pre-clinical) Bachelor's degree program followed by a three-year Master's degree program. The Master's degree program is a clinical program, except for 20 weeks of scientific research. All participating students were in their first year of this Master's degree program and had completed at least two fulltime clinical rotations of 6 weeks each, in which they participated in the activities of the practice concerned. The study was introduced on paper. All students who decided to participate gave their informed consent. Participation was voluntary and anonymous and took approximately 10 minutes of their time. The study was approved by the Ethical Review Board of the Netherlands Association of Medical Education, NVMO-ERB.²⁸

Measures

Student distress was measured with the Dutch version of the General Health Questionnaire, GHQ-12.²⁹ We selected this validated questionnaire because it is widely used and explicitly focusses on distress as a short-term episode (i.e. state variable). The questionnaire consists of 12 items starting with 'Have you recently' followed by, for example '... been able to concentrate on whatever you are doing? ... lost much sleep over worry?' and '... felt constantly under strain?'. All items are Likert-type ranging from 1 (indicating lower distress) to 4 (indicating higher distress). The outcome measure as used, is the sum score, which allows a minimum score of 12 and a maximum score of 48, with higher scores indicating higher levels of distress.

Orientation to comparison was measured with the Iowa-Netherlands Comparison Orientation Measure, INCOM.²³ This questionnaire was specifically developed to measure the tendency to engage in social comparison and is the only validated questionnaire available. The questionnaire consists of 11 items like 'I always like to know what others in a similar situation would do' and 'I often compare myself with others with respect to what I have accomplished'. All items are Likert-type (1=strongly disagree; 5=strongly agree). The mean score represents students' social comparison orientation, SCO. The higher the score, the higher students' orientation to compare themselves.

Motive for comparison was measured by 18 items addressing the three main motives for comparison, adopted from social comparison research measuring a variety of motives for comparison.³⁰ Both for upward and for downward comparison, we used 9 items. Items aimed at measuring motives for upward comparison were introduced by 'It is likely that you compared yourself, at times, with a peer student whose performances are perceived as *better* than yours...'. Items aimed at measuring motives for downward comparison were introduced similarly but this sentence ended with '*... as less good* than yours'. Per direction, the three main motives for comparison: self-evaluation, self-improvement and self-enhancement, were represented by 3 items each. These items ended like '*...to evaluate my own performances*', '*...to improve myself*' and '*...to feel better*'. All 18 items were Likert-type (1=strongly disagree; 5=strongly agree). Per direction, we calculated for each of the three motives the mean score. The higher the score, the more the specific motive was used. To control for sequence effects, half of the participants started with the 9 items on upward comparison and the other half with the 9 items on downward comparison.

Interpretation of comparison was measured with the same instrument that was specifically developed to measure medical students' interpretation of comparison while learning social skills in groups.⁶ This instrument consists of 8 items, 4 for upward and 4 for downward comparison. For upward comparison, 2 items were aimed at measuring *identification*, like 'If you compare yourself with a peer student whose performances are perceived as better than yours. How often do you think "I can do it as well"'. The other 2 items were aimed at measuring *contrast* and started similarly, but ended like 'How often do you think "I will never be that good"'. For downward comparison, also 2 items were aimed at measuring *identification*, like 'If you compare yourself with a

peer student whose performances are perceived as less good than yours. How often do you think “Next time, I could be less good as well”’. The other 2 items were aimed at measuring *contrast*. These items started similarly but ended like ‘How often do you think “I can do it better”’. Per direction, we calculated for each interpretation the mean score. The higher the score, the more the specific interpretation is given. To control for sequence effects, half of the participants started with the 4 items on upward comparison and the other half with the 4 items on downward comparison.

Analysis

To contrast students expressing low and high levels of distress, we composed two groups based on respondents’ lowest and highest GHQ-12 sum scores. Each group included around 30% of the respondents. We used MANOVA to examine differences between low and high-distress students in: (1) orientation to comparison, (2) motives for comparison, and (3) interpretation of comparison.

RESULTS

All questionnaires were completed by 301 out of 321 students (93%). Of these respondents, 34% were male, which is representative of the gender distribution of medical students in the university under study. The mean sum score for the GHQ-12 was 22.33 (SD=4.46) on a scale ranging from 12 (lowest on distress) to 48 (highest on distress). No significant differences were found between the mean sum scores of male and female students ($t(299)=0.142$, $p=0.887$).

The MANOVA revealed a significant multivariate effect for distress on social comparison behaviour ($F(11,171)=2.44$, $p<.01$), see Table 1. Inspection of the between-subjects effects for each of the dependent variables showed that this overall effect was attributable to differences on all three aspects of students’ comparison behaviours (orientation to comparison, motives for comparison, and interpretation of comparison).

Table 1 Multivariate Analysis of Variance Results, means (M) and standard deviations (SD), for low and high-distress students on three aspects of their comparison behaviour in clinical workplace learning: orientation to comparison (SCO), motive for comparison and interpretation of comparison.

| Comparison behaviour | Low distress n=88 | | High distress n=95 | |
|-------------------------------------|----------------------|--------|-----------------------|-------|
| | M | (SD) | M | (SD) |
| Orientation to comparison | 3.47 | (.54) | 3.66 | (.54) |
| Social Comparison Orientation, SCO* | | | | |
| Motives for comparison | | | | |
| - self-evaluation (upward) | 3.71 | (.75) | 3.82 | (.69) |
| - self-improvement (upward) | 3.62 | (.85) | 3.70 | (.86) |
| - self-enhancement (upward) | 2.55 | (.78) | 2.46 | (.77) |
| - self-evaluation (downward) | 3.15 | (.91) | 3.29 | (.87) |
| - self-improvement (downward)* | 2.31 | (.82) | 2.62 | (.91) |
| - self-enhancement (downward)** | 3.05 | (1.04) | 3.46 | (.83) |
| Interpretation of comparison | | | | |
| - identification (upward) | 3.47 | (.71) | 3.33 | (.72) |
| - contrast (upward)*** | 2.31 | (.89) | 2.82 | (.92) |
| - identification (downward)** | 2.72 | (1.02) | 3.16 | (.91) |
| - contrast (downward) | 3.55 | (.76) | 3.73 | (.60) |

Multivariate test

| | Value | F | Hypothesis df | Error df | p |
|----------------|-------|------|---------------|----------|------|
| Pillai's Trace | .136 | 2.44 | 11 | 171 | .112 |

Tests of between-subject effects

| Source | Dependent variable | Type III sum of squares | df | F | p |
|----------------------|-------------------------------------|-------------------------|----|-------|------|
| low/high distress | Social Comparison Orientation, SCO* | 1.55 | 1 | 5.39 | .021 |
| | Self-improvement (downward)* | 4.40 | 1 | 5.85 | .017 |
| | Self-enhancement (downward)** | 7.84 | 1 | 8.94 | .003 |
| | Contrast (upward)*** | 11.94 | 1 | 14.60 | .000 |
| | Identification (downward)** | 8.94 | 1 | 9.55 | .002 |

*p<.05; **p<.01; ***p<.001

Orientation to comparison

Both groups showed an orientation towards social comparison, however, low-distress students scored significantly lower on SCO than high-distress students ($F=5.39, p<.05$).

Motive for comparison

In upward comparison situations, no differences were found between low and high-distress students and their motives used for comparisons with peers perceived as performing better. In downward comparison situations, with peers perceived as performing worse, low-distress students used the motives self-improvement and self-enhancement less often than high-distress students ($F=5.85, p<.05$, and $F=8.94, p<.01$, respectively).

Interpretation of comparison

No differences were found between low and high-distress students and positive interpretations of comparison. They all showed identification with peers perceived as performing better, like: 'I can do it as well', and contrast with peers perceived as performing worse, like: 'I can do it better'. However, low-distress students interpreted their comparisons less often negatively. High-distress students contrasted themselves more with peers perceived as performing better, like: 'I will never be that good' and identified themselves more with peers perceived as performing worse, like: 'I will not succeed either' ($F=14.60, p<.001$ and $F=9.55, p<.01$, respectively).

DISCUSSION

This study revealed that the comparison behaviours of students expressing low distress differ from those of students expressing high distress, on all distinguished aspects of the comparison process. Low-distress students were less orientated to social comparison. They less frequently used the motives self-enhancement and self-improvement for comparisons with peers perceived as performing worse. Furthermore, they interpreted their comparisons less negatively in both directions of comparison, with peers perceived as performing better and worse.

Our first finding was that low-distress students were relatively low in social comparison orientation, SCO. This means that their use of social comparison is more selective or limited than that of high-distress students, who were higher in SCO. Given this result, one might question if low-distress students with a low comparison orientation are type A high achievers and perhaps more autonomous, while high-distress students with a high comparison orientation, are more socially-oriented. However, people high in SCO have been found to differ on three features: ambitiousness, empathy and uncertainty.²⁴ Therefore, both high achievers (being ambitious: 'Am I still on top?') and more socially oriented people (being able to put themselves in the position of others) are seen among people, or students, high in SCO.

In general, people high in SCO share the high inclination to compare themselves more frequently and to pay more attention to their comparisons.²⁴ The high extent with which they think and rethink a comparison outcome enlarges its impact. This will be advantageous when the comparison outcome is *positive*, for example, when a student who worries about his/her performance in the next rotation gains more self-confidence by comparing with a similarly performing peer who has successfully completed that rotation. However, in performance and work-related contexts, it was repeatedly found that most people high in SCO tend to focus on the *negative* comparison outcomes.^{31,32} Consequently, the high-distress students in our study seem to be at risk of pondering about negative comparison outcomes. Our findings about low-distress students' relatively lower SCO indicate that a more selective use of social comparison may prevent such a risk.

Second, if comparing themselves with a peer perceived as performing worse, low-distress students were less inclined to use the motives self-enhancement and self-improvement than high-distress students. Particularly, the use of the motive self-enhancement – or need to feel better – is related to a preference for downward comparisons.³³ Consequently, the little use of this motive by low-distress students indicates that they are not particularly interested in comparisons with others perceived as performing less good. In contrast, the frequent use of the motive self-enhancement by high-distress students suggests a preference to this downward direction of comparison. Such a preference is understandable as downward comparisons are known to enhance self-confidence,³³ which in turn may contribute to improved performance.^{5,34}

For example, a student experiencing some difficulties mastering his/her first patient history may gain self-confidence by observing a peer who has more difficulties with the time and structure of taking a patient history. However, downward comparison has its drawbacks as well. In the long run, a preference for downward comparison may lead to lowering of personal standards, in particular if someone identifies himself with the less performing other.³³ This line of reasoning implies that the comparison behaviours of high-distress students may negatively affect their own performance over time. Students low on distress seem to remain free from this long-term risk of downward comparison.

Third, we did not find differences between low and high-distress students and positive interpretations of comparison. Such interpretations like 'I can do it as well' and 'I can do it better' are known to strengthen self-efficacy.⁵ So far, the use of social comparison is rewarding and, therefore, attractive to all students. However, high-distress students seem to counterbalance the positive interpretations by negative ones. Such negative interpretations of one's own abilities to master a situation – like 'I can't do that' and 'I will not succeed either' – are known to raise distress.²¹ Given the negative impact of distress on students' learning and personal development,¹¹ it could be argued that such interpretations may also affect their learning. In other words, high-distress students are at risk of boosting their own distress by negatively interpreting their comparisons, and hampering their performances, especially when they also tend to ponder about these negative outcomes. Further research is recommended to investigate the relation between students' levels of distress, their more or less beneficial comparison behaviours and clinical performances.

So what can we learn from these findings to help students cope with stressors in clinical practice? The comparison behaviours of low-distress students can be characterized by: limited comparisons, less use of motives indicative for comparisons with peers perceived as performing worse, and less negative interpretations of the comparisons they make. Therefore, the use of social comparison seems to be more effective for these students on all distinguished aspects of the comparison process. As such, low-distress students' comparison behaviours may also support resilience. The concept of resilience includes: being in control, having self-confidence, and being committed to the idea that one's own efforts are worthwhile, and that potential threatening events

are manageable.¹⁷ In medical training, resilience is considered essential for coping with stressful situations in clinical practice.⁷ To reduce distress and support resilience, it seems advisable to take the use of social comparison into account. Our study seem to offer starting points to help students develop better comparison strategies. For instance, they can be *made aware* of their own comparison behaviours by asking them to reflect on the comparisons they make prior to a stressful activity, like entering a novel rotation. They can be *informed* about separate aspects of the comparison process by explaining the pros and cons of the orientation to comparison, motives for comparison and interpretations of comparison. They can also be explicitly *warned* for ruminating on negative comparison outcomes and for long-term effects of identifying themselves with peers performing worse. Further research should focus on attempts to adjust students' use of social comparison.

The findings of our study may also provoke thoughts about what this means for theories on student learning in clinical practice and what students may achieve throughout their future health care careers. Particularly, since modern medicine moves into a more collaborative, team-based approach.³⁵ Collaboration almost inevitably involves social comparison.³⁶ Students who share the idea of becoming full members of future health care teams, will compare themselves with one another to estimate their current position and opportunities to master the challenges of active engagement, which is in line with Wenger's explanation of learning in communities of practice.³⁷ Given the risks of a disadvantageous comparison strategy, we urge supervisors to be aware of students' inclination to compare and of the positive *and* negative consequences of them doing so.

Some strengths of our study include the refined measurement of comparison behaviours, a high response rate, and the use of multivariate analysis. A first limitation is the use of self-reported data, which carry the risk of bias. However, the use of self-perceptions is inevitable since social comparison is an internal process that takes place in people's minds and, therefore, cannot be measured otherwise. Second, we limited our study to investigating stress as a state variable. This implies that the outcomes of this study cannot be generalized to distress as a trait variable (i.e. distress as an individual's long-term predisposition). A third limitation is that our study included only one site. This limitation can best be overcome by performing similar studies at other sites.

Conclusion

The outcomes of this study showed relevant differences between the comparison behaviours of students expressing low and high levels of distress. The more selective and positive use of social comparison by low-distress students may strengthen their resilience. The comparison behaviours of high-distress students, on the other hand, bears the risk of increased distress. Therefore, we recommend to take students' comparison behaviours into account when helping them learn how to cope with stressors in clinical practice. We advise to make students aware of their use of social comparison and to inform them about the pros and cons of the distinguished aspects of the comparison process.

REFERENCES

- 1 O'Brien B, Cooke M, Irby DM. Perceptions and attributions of third-year student struggles in clerkships: Do students and clerkship directors agree? *Acad Med* 2007;82:970–978.
- 2 Bernabeo EC, Holtman MC, Ginsburg S, Rosenbaum JR, Holmboe ES. Lost in transition: The experience and impact of frequent changes in the inpatient learning environment. *Acad Med* 2011;86:591–598.
- 3 Raat AN, Kuks JBM, van Hell EA, Cohen-Schotanus J. Peer influence on students' estimates of performance: Social comparison in clinical rotations. *Med Educ* 2013;47:190–197.
- 4 Festinger L. A theory of social comparison processes. *Hum Relat* 1954;7:117–140.
- 5 Bandura A. Self-efficacy. In: VS Ramachaudran. ed. *Encyclopedia of Human Behaviour* New York: Academic Press 1994;4:71–81.
- 6 Buunk AP, Cohen-Schotanus J, van Nek RJ. Why and how people engage in social comparison while learning social skills in groups. *Group Dynamics: Theory, Research and Practice* 2007;11:140–152.
- 7 Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med* 2006;81:354–373.
- 8 Prince KJ, van der Wiel M, Scherpbier AJ, van der Vleuten CPM, Boshuizen HP. A qualitative analysis of the transition from theory to practice in undergraduate training in a PBL-medical school. *Adv Health Sci Educ* 2000;5:105–116.
- 9 Van Hell EA, Kuks JBM, Borleffs JCC, Cohen-Schotanus J. Alternating skills training and clerkships to ease the transition from preclinical to clinical training. *Med Teach* 2011;33: e689–e696.
- 10 Babaria P, Abedin S, Nunez-Smith M. The effect of gender on the clinical clerkship experiences of female medical students: Results from a qualitative study. *Acad Med* 2009;84:859–866.
- 11 Dyrbye LN, Massie FS, Eacker A, Harper W, Power D, Durning SJ, Thomas MR, Moutier C, Satele D. Relationship between burnout and professional conduct and attitudes among US medical students. *JAMA* 2010;304:1173–1180.
- 12 LeBlanc VR. The effects of acute stress on performance: implications for health professions education. *Acad Med* 2009;84:s25–s33.

- 13 Seligman MEP, Csikszentmihalyi M. Positive psychology: An introduction. *American Psychol* 2000;55:5–14.
- 14 Linley PA, Joseph S. Applied positive psychology: A new perspective for professional practice. In: PA Linley, S Joseph. eds. *Positive psychology in practice*. New Jersey: John Wiley & Sons, Inc. 2004;3–12.
- 15 Dyrbye LN, Shanafelt TD. Medical student distress: a call to action. *Acad Med* 2011;86:801–903.
- 16 Kushner RF, Kessler S, McCaghie WC. Using behavior change plans to improve medical student self-care. *Acad Med* 2011;86:901–906.
- 17 Howe A, Smajdor A, Stöckl A. Towards an understanding of resilience and its relevance to medical training. *Med Educ* 2012;46:349–356.
- 18 Wood JV. What is social comparison and how should we study it? *Pers Soc Psychol Bull* 1996;22:520–537.
- 19 Raat AN, Kuks JBM, Cohen-Schotanus J. Learning in clinical practice: Stimulating and discouraging response to social comparison. *Med Teach* 2010;32:899–904.
- 20 Martin R. Can I do X?: using the proxy comparison model to predict performance. In: J. Suls, L Wheeler, eds. *Handbook of Social Comparison: Theory and Research*. New York, NY: Plenum Publishers 2000;67–80.
- 21 Tomaka J, Blascovich J, Kelsy RM, Leitten CL. Subjective, physiological, and behavioral effects of threat and challenge appraisal. *J Pers Soc Psychol* 1993;65:248–260.
- 22 Mussweiler T, Rüter K, Epstude K. The why, who, and how of social comparison: A social-cognitive perspective. In: S Guimond, ed. *Social Comparison and Social and Social Psychology: Understanding Cognition, Intergroup Relations and Culture*. Cambridge: Cambridge University Press 2006;33–54.
- 23 Gibbons FX, Buunk AP. Individual differences in social comparison: Development of a scale of social comparison orientation. *J Pers Soc Psychol* 1999;76:129–142.
- 24 Buunk AP, Gibbons FX. Social comparison orientation: A new perspective on those who do and those who don't compare with others. In: S. Guimond, ed. *Social Comparison and Social Psychology: Understanding Cognition, Intergroup Relations and Culture*. Cambridge: Cambridge University Press 2006;15–32.

- 25 Suls J, Wheeler L. A selective history of classic and neo-social comparison theory. In: J Suls, L Wheeler, eds. *Handbook of Social Comparison: Theory and Research*. New York: Plenum Publishers 2000;3–19.
- 26 Taylor SE, Lobel M. Social comparison activity under threat: downward evaluation and upward contacts. *Psychol Rev* 1989;96:569–575.
- 27 Buunk BP, Ybema JF. Social comparison and occupational stress: The identification-contrast model. In: BP Buunk, FX Gibbons, eds. *Health Coping and Well-being: Perspectives from Social Comparison Theory*. Mahwah, NJ: Erlbaum Associates 1997; 359–388.
- 28 Eikelboom JI, ten Cate OThJ, Jaarsma D, Raat AN, Schuwirth L, van Delden JJM. A framework for the ethics review of education research. *Med Educ* 2012;46:731–733.
- 29 Koeter MWJ, Ormel J General Health Questionnaire [in Dutch]. Lisse: Swets and Zeitinger 1991.
- 30 Helgeson VS, Mickelson KD. Motives for social comparison. *Pers Soc Psychol Bull* 1995;21:1200–1209.
- 31 Buunk BP, Ybema JF, Gibbons FX, Ipenburg ML. The affective consequences of social comparison as related to professional burnout and social comparison orientation. *Eur J Soc Psychol* 2001;31:337–51.
- 32 Buunk BP, Nauta A, Molleman E. In search of the true group animal: The effects of affiliation orientation and social comparison orientation upon group satisfaction. *Eur J of Pers* 2005;18:69–81.
- 33 Lockwood P. Could it happen to you? Predicting the impact of downward comparisons on the self. *J Pers Soc Psychol* 2002;82:343–358.
- 34 Blanton H, Buunk BP, Gibbons FX. When better-than-others compare upward: Choice of comparison and comparative evaluation as independent predictors of academic performance. *J Pers Soc Psychol* 1999;76:420–430.
- 35 Bleakley A, Bligh J. Students learning from patients: Let's get real in medical education. *Adv Health Sci Educ* 2008;13:89–107.
- 36 Raat AN, Cohen-Schotanus J. Dyad practice and the inevitability of social comparison. *Med Educ* 2014;48:652–654.
- 37 Wenger E. *Communities of Practice. Learning, Meaning and Identity*. Cambridge: Cambridge University Press 1998;3–15.



Chapter 6

Dyad practice and the inevitability of social comparison

A.N. (Janet) Raat

Janke Cohen-Schotanus

In dyad practice, two students collaborate on a learning task that would normally be mastered individually; this is attractive because it makes lesser demands on instructors and cuts costs. Dyad practice, however, might be seen as second best on the basis that students deserve individual tuition. In this issue of *Medical Education*, Bjerrum et al.¹ present a well-designed, randomized simulation study which addresses this matter. The authors show clearly that students practising bronchoscopy skills in dyads learn as much as students practising the same skills individually, without taking up more time or instructor resources.¹ These findings offer instructors greater efficiency without detriment to students' learning.

To explain these results, Bjerrum et al.¹ invoke both psychomotor and cognitive factors. There is a psychomotor effect because students practising bronchoscopy skills in dyads have some physical and mental rest between attempts at handling the bronchoscope. The cognitive effect is that dyad practice provides opportunities to learn from observing the performance of a peer. From a sociological perspective, the fundamental difference between dyad and individual practice is that the former is social practice. The authors¹ suggest further research into how a dyad can form a well-functioning team. We would like to offer some insights from social comparison theory,² which could help frame such research because dyad practice entails social comparison.

Whenever people are confronted with information about the abilities of similar others – like peer students – they tend to relate this information to themselves, which is known as social comparison.³ Dyad learning, in which students alternate between practice and observation, almost inevitably leads to social comparison. For example, a student practising bronchoscopy motor skills might notice that the instrument comes into contact with the bronchial epithelium more often in his hands than in his peer's. The experience may go beyond a purely technical one and feed a desire to be as good as the peer or arouse a fear of lagging behind. Either way, the comparison makes the student take a closer look at the peer's manual performance or ask questions such as: 'How do you manage to avoid the wall?'

Seeing a peer succeed or fail at a clinical task influences a student's own idea of mastering that task.⁴ Such ideas about one's own abilities to perform meets Bandura's description of self-efficacy.⁵ In learning situations, self-

efficacy is positively related to learning outcomes because it has an effect on students' aspirations, goal setting, selection of activities, and perseverance during difficulties. Students estimating their ability to master a clinical task frequently compare themselves with their peers.⁴ These peers are the most useful others for the purposes of comparison because they are equally experienced practitioners at a similar level in the clinical hierarchy. Thus peer comparison plays an important role in guiding the student along the trajectory of becoming a doctor.

Students' use of social comparison is in line with Wenger's explanation of learning in communities of practice.⁶ Students who share the idea of becoming well skilled professionals compare themselves with one another in order to appraise their progress and find out what brings them closer to the centre of the community. The preferred comparator is a peer who is perceived as doing slightly better.⁷ Such so-called upward comparisons are beneficial for several reasons: they provide useful information about how to improve, give people a sense of their own potential, and may lead to higher personal standards. Downward comparisons, with peers perceived as doing less well, may also be valuable because they strengthen self-confidence and motivation. Therefore, a joint activity like dyad practice, which tacitly stimulates students' use of social comparison, seems worth encouraging.

Still, students' comparison behaviour is a relatively unknown component in medical education, which may have some hidden risks and benefits. Previous research leads us to suppose that students practising skills in dyads vary in their individual inclinations to compare.⁶ Such variance is explained by individual differences in characteristics such as ambition, empathy and uncertainty,⁸ which make the outcomes of comparisons more or less positive.

Comparison outcomes are also influenced by both similarities and dissimilarities between the student and his or her comparator peer.⁴ We note that Bjerrum et al.¹ barely comment on the constitution of their dyads, although this is pivotal to the comparison process. The extent to which a student experiences identification with the comparison peer, or evaluates him/herself by contrast with that peer affects the comparison outcome. For example, a comparison with a peer perceived as performing slightly better is generally valued positively. However, the comparison becomes risky if the

peer's level of performance is too far out of reach. In that case, the comparison may arouse feelings of inferiority and distress, which hamper learning. Likewise dissimilarities on factors such as gender, age and experience affect comparison outcomes.⁴

In conclusion, Bjerrum et al.¹ provide strong evidence that dyad practice is as effective as individual practice and more efficient. When we think of dyad practice in terms of social comparison, we think of students monitoring their own progress by comparing themselves with a peer. We urge educators to be aware of students' tendencies to make comparisons with their peers and the consequences of them doing so. A better understanding of this process may be relevant to contemporary social learning theories and the development of professionalism.

REFERENCES

- 1 Bjerrum AS, Eika B, Charles P, Hilberg O. Dyad practice is efficient practice. A randomized bronchoscopy simulation study. *Med Educ* 2014;48:705–12
- 2 Festinger L. A theory of social comparison processes. *Hum Relat* 1954;7:117–40.
- 3 Wood JV. What is social comparison and how should we study it? *Pers Soc Psychol Bull* 1996;22:520–37.
- 4 Raat AN, Kuks JBM, van Hell EA, Cohen-Schotanus J. Peer influence on students' estimates of performance: social comparison in clinical rotations. *Med Educ* 2013;47:190–7.
- 5 Bandura A. *Self-efficacy: the Exercise of Control*. New York: Freeman 1997.
- 6 Raat AN, Kuks JBM, Cohen-Schotanus J. Learning in clinical practice: stimulating and discouraging response to social comparison. *Med Teach* 2010;32:899–904.
- 7 Wenger E. *Communities of Practice. Learning, Meaning and Identity*. Cambridge: Cambridge University Press 1998;3-15.
- 8 Buunk AP, Gibbons FX. Social comparison: the end of a theory and the emergence of a field. *Organ Behav Hum Dec* 2007;102:3-21.



Chapter 7

General discussion

This thesis, about the use of social comparison in clinical workplace learning, started with a quote illustrating students' tendency to compare themselves with peers. Their everyday discussions about what they did that day and to what consequences are part of the great wealth of experience which promotes and at times discourages learning. Research has already demonstrated how students' learning in clinical practice is influenced by their interactions with patients, residents and staff.¹⁻⁶ The findings of the studies presented in this thesis revealed that students' learning is substantially influenced by the comparisons of themselves with their peers.

Main findings

The outcomes of the first questionnaire study in Chapter 2 confirmed the relevance of social comparison for clinical workplace learning. In line with social comparison theory,⁷ the students reported comparing themselves with others frequently, usually with peers. As predicted, they showed a preference for upward comparison with peers who were perceived as doing better, rather than for downward comparison with peers doing less well. Their responses to the comparisons in either direction more often stimulated learning than discouraged it. Even though students appeared to differ in their comparison behaviours, these first findings indicated a mainly positive influence of social comparison on student learning in clinical practices.

Evidence of the influence of social comparison on students' estimates of their performance was provided in the experimental study reported in Chapter 3. The findings of this study showed that students' estimates of their performance were affected by the performance level and gender of the comparison peer. This peer influence was considered of relevance to clinical workplace learning because students' beliefs about their abilities to perform are related to Bandura's concept of self-efficacy.⁸ The outcomes of this study, therefore, indicated that the characteristics of the peer chosen for comparison will strengthen or diminish a student's self-efficacy which, consequently, will ease or hamper that student's learning.

Students' actual use of social comparison in authentic clinical settings was revealed in the qualitative study presented in Chapter 4. The students compared themselves with peers on their ability to perform clinical tasks and to interact with patients, residents and staff. They also compared themselves

on issues of the self, such as personal behaviours, feelings and attitudes. The most common net effect was reassurance, self-affirmation and motivation to progress. These findings emphasized the vital role of peers in clinical workplace learning in providing benchmarks which helped students appraise their current position, and revealed to them what they had already achieved and could achieve in the near future.

The last questionnaire study, Chapter 5, unravelled the relationship between the use of social comparison and student distress. Relevant differences were found between the comparison behaviours of students expressing low and high levels of distress. The more selective and positive use of social comparison by low-distress students could strengthen their resilience, while the more frequent and less beneficial use of social comparison by high-distress students carries the risk of increased distress. In order to help distressed students cope with stressors in clinical practice, we recommend to take their comparison behaviours into account and help them develop better comparison strategies.

Methodological considerations

The strengths of this thesis are its relevance, its consistent use of an established theory and its methodological rigour. The research presented in this thesis is relevant because it identified and explained the rather neglected role of peers in clinical workplace learning. Four coherent studies of students' use of social comparison revealed the vital influence of peers on their learning. The presented research about students' tendencies to make comparisons with peers and the consequences of them doing so adds to the theoretical understanding of clinical workplace learning and provides opportunities to improve this type of learning, as is recommended in Chapters 4 and 5. Another strength of this thesis is the consistent use of an established social psychological theory. All the studies were rooted in the social comparison literature and all the findings were related to previous social comparison research, which enhanced the reliability of this thesis' outcomes. The use of social comparison theory⁷ also broadened the view on clinical workplace learning, as the theory is relatively unknown in the field of medical education. This thesis therefore contributes to the medical education literature, which has been critiqued for its limited use of theory to frame research and for accepting a restricted view on learning.^{9,10} A third strength of this thesis is the deliberate use of different methodologies which reflected its methodological rigour. Quantitative research methods

were used in three studies. Two of these studies (Chapters 2 and 5), used a questionnaire design, and one study (Chapter 3), used an experimental design. These studies' analysis techniques ranged from t-tests to analysis of variance and to multivariate analysis of variance. Qualitative research methods were used in the study presented in Chapter 4. This study used the data gathering technique of solicited audio diaries. Constructivist analysis was performed on all the entries in students' diaries using a grounded theory approach.¹¹ The application of different methodologies, research designs and analysis techniques adds to the reliability of this thesis' research outcomes.

The limitations of this thesis are related to the generalizability of the results and to potential sources of bias. The generalizability of the results is compromised because the participants in all the studies presented were recruited from one medical school, the University Medical Center Groningen in the Netherlands. All the participants, however, were in their clinical period, which means that they were engaged in a great variety of disciplines in different hospitals: the university hospital, one of its eight affiliated teaching hospitals or one of its smaller satellite hospitals. Despite this great variety of clinical settings, the fact that the participants were from one medical school warrants caution in claiming that the results will hold for students in other medical schools and for students outside the Netherlands. Another limitation of the research in this thesis is the use of self-reported data, which carries the risk of bias. In social comparison research, however, the use of self-perceptions is inevitable. Social comparison is defined as the process by which a person thinks about information of one or more others in relation to the self.¹² Such a process is internal, occurring in people's minds, and is immeasurable without using self-reported perceptions. Other sources of potential bias are from the experimental nature of the quantitative study in Chapter 3 in which a written comparison situation was used, and from the qualitative study in Chapter 4 which used data obtained from an opportunity sample of students who were eager to participate. These potential sources of bias do not invalidate the results but do give us pause when generalizing the results to other students in other contexts.

Peer comparison and collective learning

This thesis' research outcomes showed how students contributed to one another's learning. Travelling on similar trajectories, they all have to develop the same competences, skills and attitudes. Their active engagement in real practices involves socialisation into the appropriate role of medical doctors. In medical education, this process is described as challenging, specifically to those who had just entered clinical practice.¹³⁻¹⁵ Given their early stage of development, they are considered to be 'literally unable to understand' what issues, symptoms and signs of real practice are relevant in the eyes of a skilled practitioner.¹⁶ This lack of understanding hampers their conversations with residents and staff, and their dealings with patients, which could easily cause feelings of insecurity and embarrassment. This thesis' research outcomes showed the vital role peers play in coping with this challenging learning situation. Students tend to exchange experiences whenever they meet because peers are so close to their own stage of development, Chapter 2. The comparisons help them estimate their own abilities to master clinical situations, Chapter 3, and to understand their current position and learning experiences related to that position, Chapter 4. To prevent distress, peer comparisons are also used to place these experiences in perspective, Chapter 5. Students' frequent use of social comparison revealed a quite collective way of learning and understanding in clinical practice.

To get a better insight into this collective learning, future research is recommended to specify the impact of the students' use of social comparison on their clinical performance and professional development. Future research is also required to fully elucidate the impact of individual differences in comparison behaviours and in organisational and personal circumstances which influence the comparison process.

Peer comparison and individual development

Students' use of peer comparison does not mean that their trajectories are identical or that they will become identical doctors. Individual differences, situations and circumstances can lead to different outcomes, even though the use of one another's experiences brings them together. To begin with, peer comparisons such as those about their clinical activities, the wearing of the white coat and the use of medical terminology (Chapter 4), helped students develop a shared sense of identity.¹⁷ This is in line with the work of Weaver et

al.,¹⁸ who described a sense of peer unity amongst students in clinical practice, and of Jarvis Selinger et al.,¹⁹ who explained how novice students develop the identity of a clerk alongside their clinical competencies. However, despite these shared identities, students' use of social comparison could also reveal relevant differences between themselves and their peers of influence to their self-concept.²⁰

Future research is needed to understand how students' use of social comparison affects their identity development over time. Peer comparison is assumed to help them develop the shared identities of young professionals meeting the standards of modern society. However, peer comparison could also reveal individual strengths and weakness, interests and capabilities of influence to personal choices. Peer comparison is therefore worth considering in future research on student career choices and selection of medical specialties.

Implications for practice

This thesis about students' use of social comparison provides some clear recommendations for educational practice. Its research outcomes revealed a specific and vital role of peers in clinical workplace learning. The existence of *peers should not be overlooked* in the field of relevant players in medical education. Students in clinical practice frequently check their learning experiences against one another. Supervisors should *be conscious of students' tendency to compare themselves with peers*. Performing at a similar stage of development, comparison peers are used as reference points. Supervisors should also *be conscious of the vital role of peer comparison in students' professional development*. Peer comparison appeared to be mainly positive for learning as it helped students understand their current level of development, and showed them what they had already achieved and could achieve in the near future. It is therefore recommended to *promote peer comparisons and facilitate student encounters*, for example through dyad practice, coaching groups and joint lunches. Having recognised the important role of peer comparisons in students' development, it seems wise to *talk with students about their comparison behaviour* as part of their education. Such attention to the students' use of social comparison could reveal beliefs about their own potential which are worth encouraging. Likewise, it provides the opportunity to *be attentive to possible negative comparison outcomes* such as insecurity or distress. Where students are hampered by their own comparison behaviours,

this thesis also offers some starting points to *help students develop better comparison strategies*. Since most comparisons are implicitly made, it is recommended that these students are helped to become aware of their individual use of social comparison and informed about the pros and cons of various aspects of the comparison process.

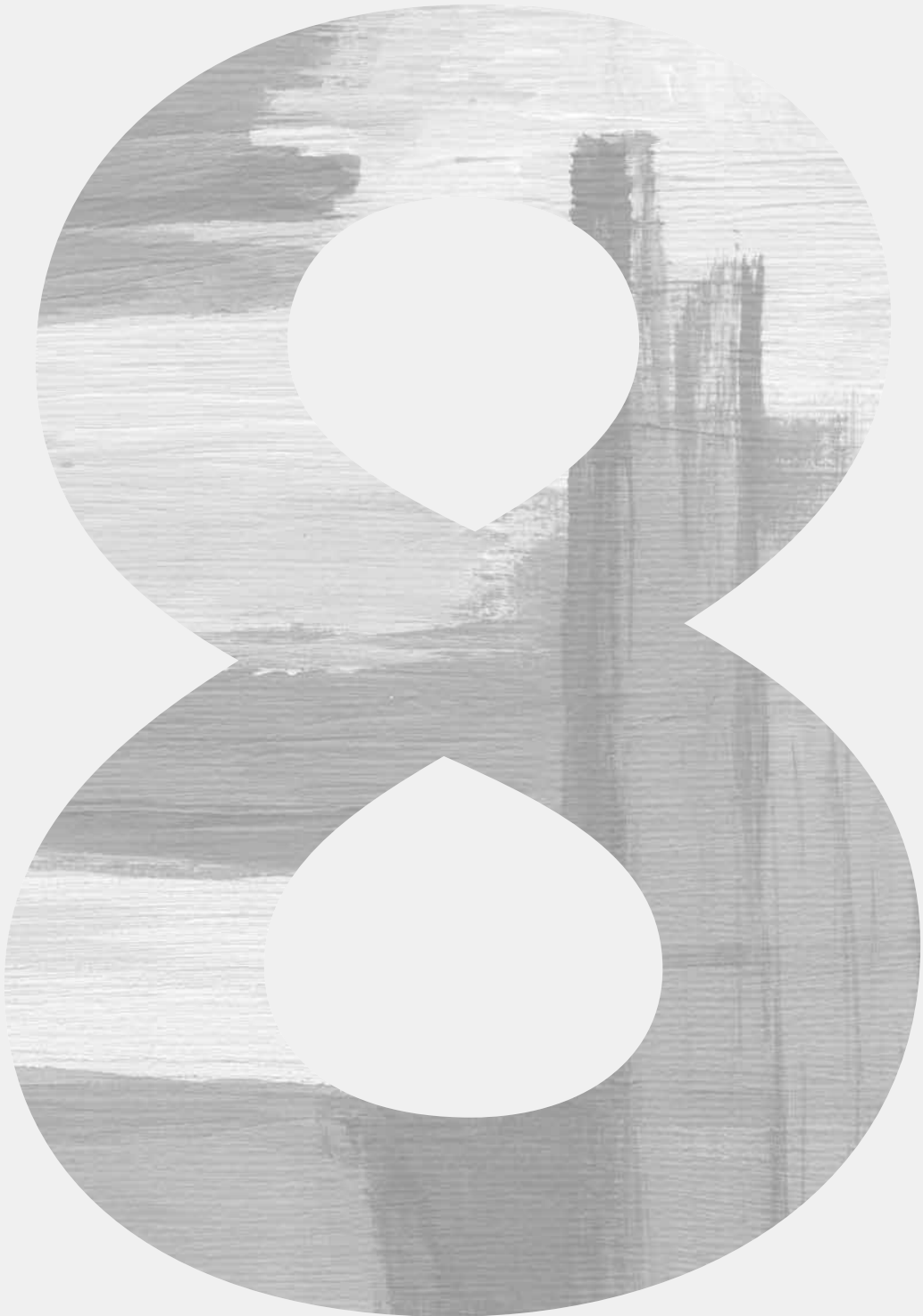
Conclusion

Four coherent studies on students' use of social comparison identified the vital influence of peers in clinical workplace learning. First, evidence was provided of students' frequent use of peer comparison. Second, peer comparisons were shown to influence students estimates of performance. Third, students' use of social comparison in authentic settings revealed how comparison peers were used as benchmarks which helped students to progress into the medical domain and shape their professional identities. Fourth, relevant differences between the comparison strategies of students expressing low and high levels of distress revealed some characteristics of beneficial comparison behaviour. Together, these studies provided strong evidence of the central place of peers in clinical workplace learning. This thesis, therefore, contributes to the literature and to contemporary insights into learning and professional development.

REFERENCES

- 1 Bleakley A, Bligh J. Students learning from patients: Let's get real in medical education. *Adv Health Sci Educ* 2008;13:89–107.
- 2 Monrouxe LV, Rees CE, Bradley P. The construction of patients involvement in hospital bedside teaching encounters. *Qual Health Res* 2009;19:918–930.
- 3 Bell K, Boshuizen HP, Scherpbier A, Dornan T. When only the real thing will do: Junior medical students' learning from real patients. *Med Educ* 2009;43:1036–1043.
- 4 Elzubeir MA, Risk DEE. Identifying characteristics that students, interns and residents look for in their role models. *Med Educ* 2001;35:272–277.
- 5 Weaver R, Peters K, Koch J, Wilson I. 'Part of the team': professional identity and social exclusivity in medical students. *Med Educ* 2011;45:1220–1229.
- 6 van der Zwet J, Dornan T, Teunissen PW, de Jonge LPJWM, Scherpbier AJJA. Making sense of how physician preceptors interact with medical students: discourses of dialogue, good medical practice, and relationship trajectories. *Adv Health Sci Educ* 2014;19:85–98.
- 7 Festinger LA theory of Social Comparison Processes. *Hum Relat* 1954;7:117–140.
- 8 Bandura A. Self-efficacy: toward a unifying theory of behavioural change. *Psychol Rev* 1977;84:191–215.
- 9 Cook DA, Bordage G, Schmidt HG. Description, justification and clarification: a framework for classifying the purposes of research in medical education. *Med Educ* 2008;42:128–133.
- 10 Albert M, Hodges B, Regehr G. Research in medical education: balancing service and science. *Adv Health Sci Educ* 2007;12:103–115.
- 11 Thomas G, James D. Re-inventing grounded theory: some questions about theory, ground and discovery. *Br Educ Res J*. 2006;32:767–795.
- 12 Wood JV. What is social comparison and how should we study it? *Pers Soc Psychol Bull* 1996;22:520–537.
- 13 Prince KJAH, van de Wiel MWJ, Scherpbier AJJA, van der Vleuten CPM, Boshuizen HPA. A qualitative analysis of the transition from theory to practice in undergraduate training in a PBL medical school. *Adv Health Sci Educ* 2000;5:105–116.

- 14 Radcliffe C, Lester H. Perceived stress during undergraduate medical training: A qualitative study. *Med Educ* 2003;37:32–38.
- 15 Hell EA, Kuks JBM, Borleffs JCC, Cohen-Schotanus J. Alternating skills training and clerkships to ease the transition from preclinical to clinical training. *Med Teach* 2011;33:689–696.
- 16 Lingard L, Garwood K, Schryer CF, Spafford MM. A certain art of uncertainty: case presentation and the development of professional identity. *Soc Sci Med* 2003;56:603–616.
- 17 Tajfel H, Turner JC. The social identity theory of intergroup behavior. In: S Worchel & WG Austin, eds. *Psychology of intergroup relations*. Chicago: Nelson Hall 1986;7–24.
- 18 Weaver R, Peters K, Koch J, Wilson I. ‘Part of the team’: professional identity and social exclusivity in medical students. *Med Educ* 2011;45:1220–1229.
- 19 Jarvis-Selinger S, Pratt DD, Regehr G. Competency is not enough: integrating identity formation into the medical education discourse. *Acad Med* 2012;87:1185–1190.
- 20 Zagefka H, Brown R. Predicting comparison choices in intergroup settings: a new look. In: Guimond S ed. *Social Comparison and Social Psychology: Understanding Cognition, Intergroup Relations and Culture*. Cambridge: Cambridge University Press 2006;15–32.



Chapter 8

Summary

Samenvatting

Dankwoord

Undergraduate students in clinical workplace learning have to develop their professional competences in a real-life clinical context. Different people such as patients, residents, and staff are known to make important contributions to their learning. Students in clinical practice, however, are rarely alone: there are many of them, and they frequently compare themselves and their performances with one another. In medical education literature, little is known about the influence of these encounters with peers on student learning. The research reported in this thesis seeks to address this gap in the literature, and provide opportunities to support student learning and development in clinical practice.

Chapter 1 begins with a quotation that illustrates students' tendency to relate their own activities to those of their peers which is known as social comparison. After that, the first part of the introduction provides a brief overview of developments in clinical workplace learning. It explains how the implementation of competency-based education has increased the interest in students' actual learning experiences, and describes how the complexity of their learning is framed by several social learning theories. Today's clinical workplace learning is understood as inextricably tied to its context, which implies an influence of many different others. The introduction continues with an explanation of social comparison and an outline of some of the main topics of social comparison theory. Social comparison is explained as a strategy to cope with all kinds of situations, used by almost all people to make sense of themselves and their social surrounding. It is likely to suppose that students in clinical practice use peer comparison to make sense of themselves in their new social surrounding. Such comparisons could help them to get an impression of their own capabilities which may conceivably influence their learning. The research in this thesis aims to reveal this influence to add to the understanding of student learning in clinical practice. The central research question of this thesis is therefore: what is the influence of students' use of peer comparisons in clinical workplace learning?

Chapter 2 reports on a questionnaire study that introduces social comparison into the field of medical education. Four hypotheses derived from social comparison theory are used to investigate the relevance of social comparison for clinical workplace learning. Students engaged in nine different hospitals completed two questionnaires to examine these hypotheses concerning: their preferred other to compare with, their preferred direction of comparison, their response to social comparison, and the influence of their personal tendency to compare Social Comparison Orientation (SCO). The findings of this first study confirms the relevance of social comparison for clinical workplace learning. In line with social comparison theory, students substantially do compare, usually with peers. As predicted, they show a preference for upward comparison with peers who are perceived as doing better, rather than for downward comparison with peers doing not as well. In either direction, their responses to the comparisons more often stimulate than discourage learning. These findings indicated a mainly positive influence of social comparison on student learning in clinical practice and inspired further research.

Chapter 3 describes an experimental study that investigates whether students' estimates of their future clinical performance are influenced by comparisons with peers. Participants in this study, are asked to estimate their future performance in a novel rotation after comparison – in a written comparison situation – with a peer who has already completed that rotation. The participating students are divided into groups assigned to different conditions which are determined by the performance level and gender of the comparison peer. Differences between the conditions are analysed using analysis of variance. The results show that the use of social comparison influences students' estimates of their future performance. The effect depends on the comparison peer's performance level and was affected by gender. These outcomes are of relevance to clinical workplace learning because estimates of performance are related to self-efficacy which is known to affect goal setting, perseverance during difficulties, and academic accomplishments. This indicates that the characteristics of the peer chosen for comparison may strengthen or diminish a student's self-efficacy which, consequently, will ease or hamper that student's learning. The generalizability of the outcomes of this study is limited by its experimental design and, therefore, needs further research in an authentic setting.

Chapter 4 presents the qualitative study conducted to investigate students' use of social comparison in authentic clinical settings. Twelve students kept audio diaries in which they recorded their experiences of comparison with peers over a four-week period. To analyse the transcribed experiences, a constructivist grounded theory approach was used. The outcomes show that the students compare themselves with peers on their abilities to perform clinical tasks and interact with others such as patients, residents, and staff. They also compare on issues of the self, such as personal behaviours, feelings, and attitudes. In every comparison, they identify and/or contrast themselves with the comparison peer. It seems to be the balance between these reflections that determines the effect of the comparisons. The study reveals that comparison peers are used as benchmarks against which students appraise themselves at their current stage of development and determine what they can aspire to in the near future. Having recognized this vital influence of peers on students' learning in clinical practice, it seems wise to support peer encounters and, at times, talk with students about their comparison behaviours. Such mentoring conversations might reveal assumptions which are worth encouraging and can be used to watch for less positive comparison outcomes, like distress.

Chapter 5 therefore, continues with a quantitative study that unravels the relationship between social comparison and student distress. Social comparison can affect distress both positively and negatively. This study aims to find characteristics of a beneficial use of social comparison by investigating differences in comparison behaviours between students expressing low and high levels of distress. Participants completed several questionnaires to measure levels of distress and different aspects of their comparison behaviours. Multivariate analysis of variance were used to analyse the data. Findings reveals relevant differences between the comparison behaviours of students expressing low and high levels of distress. The more selective and positive use of social comparison by low-distress students seem to offer starting points to help high-distress students develop better comparison strategies. For instance, they can be *made aware* of their own comparison behaviours by asking them to reflect on the comparisons they make prior to a stressful activity, like entering a novel rotation. They can be *informed* about the pros and cons of the separate aspects of the comparison process. They can also be explicitly *warned* for ruminating on negative comparison outcomes and for long-term effects of identifying themselves with peers performing worse.

Chapter 6 is written by invitation of the journal of 'Medical Education' and concerns a commentary on a study of dyad practice. The authors of this study provided strong evidence that students practising bronchoscopy motor skills in dyads learn as much, in the same time, as students practising identical skills individually. This outcome is of relevance to educational practice as dyad practice makes lesser demands on instructors' time and, therefore, cuts costs. The authors invoked both psychomotor and cognitive factors to explain their positive results. In the commentary, their work is expanded with insights from social comparison theory because dyad practice, in which students alternate between practice and observation, almost inevitably leads to social comparison. These comparisons may have contributed to the positive outcomes of the study. The social experience of seeing a peer doing better could have fed a desire to be as good as that peer, while the experience of seeing a peer doing less good could have strengthened self-confidence. Both these effects are known to be positive for learning and learning outcomes. Therefore, a joint learning activity like dyad practice, which tacitly stimulates students' use of social comparison, seems worth encouraging.

Chapter 7 provides a general discussion in which the main findings of this thesis are summarized and evaluated, starting with some methodological considerations. It discusses the strengths which are its relevance, its consistent use of an established theory, and its rigour as reflected in the deliberate use of different methodologies. It also discusses the limitations which are all related to the generalizability of the results and, therefore, have to be taken into account when transferring the results to students in other contexts. Subsequently, students' frequent use of peer comparisons is discussed as a rather collective way of learning and understanding in clinical practice. However, this does not imply that students who use peer comparisons will become identical medical doctors because students' use of peer comparisons could also reveal relevant differences between themselves and peers. Students' awareness of these differences are of influence to their self-concept and identity development over time. Future research is therefore recommended to fully elucidate the impact of social comparison on students' professional development in clinical practice and on their individual career choices.

The discussion continues with a short overview of the suggested implications for educational practice:

- *Peers are vital for learning in clinical practice*
- *Students frequently compare themselves with peers*
- *These comparisons play an important part in students' professional development*
- *It is therefore recommended to promote peer comparisons and facilitate student encounters*
- *It seems wise to talk with students about their comparison behaviours in mentoring conversations*
- *Such conversations provide opportunities to watch for possible negative comparison outcomes*
- *and, if necessary, to help students develop more beneficial comparison strategies*

All these implications are derived from this thesis' conclusion and demonstrate that peers have a central place in clinical workplace learning because of the vital influence of peer comparisons on students' development towards becoming doctors.

Samenvatting

In de klinische fase van de opleiding tot basisarts, de coschappen, wordt van coassistenten verwacht dat zij hun professionele competenties ontwikkelen in de praktijk. Het is bekend dat patiënten, arts-assistenten en medisch specialisten een belangrijke bijdrage leveren aan dit leerproces. Coassistenten zijn echter zelden alleen, er zijn veel medestudenten om hen heen en zij vergelijken zichzelf en hun prestaties regelmatig met elkaar. In de medisch onderwijskundige literatuur is weinig bekend over de invloed van deze onderlinge vergelijkingen. De studies in dit proefschrift zijn erop gericht de literatuur op dit punt aan te vullen en waar mogelijk aanknopingspunten te bieden om het leren tijdens de coschappen te bevorderen.

Hoofdstuk 1 begint met een citaat dat illustratief is voor de neiging van coassistenten om hun eigen activiteiten te relateren aan die van hun medestudenten. Dit staat bekend als sociale vergelijking. Het eerste deel van de introductie geeft een kort overzicht van recente ontwikkelingen binnen de coschappen. Zo heeft de implementatie van het competentie gerichte leren de belangstelling vergroot voor de concrete leerervaringen van coassistenten en zijn verschillende sociale leertheorieën geïntroduceerd om de complexiteit van het leren in de coschappen te beschrijven. Op dit moment wordt het leren van coassistenten gezien als onlosmakelijk verbonden met de klinische context waarin het plaatsvindt. Dit impliceert dat hun leerproces door veel verschillende mensen wordt beïnvloed. De introductie vervolgt met een uitleg over sociale vergelijking en een overzicht van kernbegrippen in de sociale vergelijkingstheorie. Sociale vergelijking wordt gezien als een coping strategie die in allerlei verschillende situaties door bijna iedereen wordt gebruikt om betekenis te geven aan zichzelf en aan de eigen sociale omgeving. Het ligt voor de hand om te denken dat ook coassistenten de vergelijkingen met medestudenten gebruiken om betekenis te geven aan zichzelf en aan hun nieuwe sociale omgeving. Dergelijke vergelijkingen kunnen hen helpen om een idee te krijgen van de eigen mogelijkheden in de klinische praktijk en het is goed denkbaar dat dit hun leren beïnvloedt. De studies in dit proefschrift hebben als doel deze invloed bloot te leggen om de kennis over het leren in de coschappen te vergroten. De centrale onderzoeksvraag is daarom: wat is de invloed van de sociale vergelijkingen die coassistenten maken tussen zichzelf en medestudenten op het leren in de klinische praktijk.

Hoofdstuk 2 presenteert een vragenlijstonderzoek dat sociale vergelijking introduceert in het medisch onderwijskundig domein. Aan de hand van vier hypothesen, ontleent aan de sociale vergelijkingstheorie, is onderzocht of sociale vergelijking relevant is voor het leren in de coschappen. Coassistenten uit negen verschillende ziekenhuizen hebben twee vragenlijsten ingevuld over: hun voorkeur voor een bepaalde vergelijkingsander, hun voorkeur voor een bepaalde vergelijkingsrichting, hun reactie op sociale vergelijking, en de invloed van hun persoonlijke geneigdheid tot vergelijken. De bevindingen van deze eerste studie bevestigen de relevantie van sociale vergelijkingen voor het leren in de coschappen. Overeenkomstig de sociale vergelijkingstheorie blijken de coassistenten zichzelf veelvuldig te vergelijken, bij voorkeur met medestudenten. Als verwacht, laten zij een voorkeur zien voor opwaarts vergelijken met medestudenten die iets beter presteren dan zichzelf, meer dan voor neerwaarts vergelijken met medestudenten die iets slechter presteren. In beide richtingen zijn hun reacties op de vergelijkingen vaker stimulerend voor het leren dan ontmoedigend. Deze eerste bevindingen duiden op een voornamelijk positieve invloed van sociale vergelijking op het leerproces van coassistenten en inspireerden vervolgonderzoek.

Hoofdstuk 3 beschrijft een experimentele studie waarin wordt onderzocht of de inschattingen die coassistenten maken van hun toekomstige klinische prestaties worden beïnvloed door vergelijkingen met medestudenten. In deze studie is aan de deelnemende coassistenten gevraagd om een inschatting te maken van hun prestaties in een volgend coschap nadat zij zich hadden vergeleken – in een schriftelijke vergelijkingssituatie – met een medestudent die dat coschap al had gedaan. De deelnemers werden verdeeld over verschillende groepen, condities, die waren samengesteld op basis van het prestatieniveau en geslacht van de medestudent waarmee zij zich moesten vergelijken. Verschillen tussen de condities zijn geanalyseerd met behulp van eenvoudige variantieanalyses. De resultaten laten zien dat sociale vergelijking van invloed is op de inschattingen die coassistenten maken van hun toekomstige prestaties. Het effect is afhankelijk van het prestatieniveau van de medestudent waarmee zij zich hadden vergeleken en is beïnvloed door het geslacht van die medestudent. Deze uitkomsten zijn relevant voor het leren tijdens de coschappen omdat het inschatten van eigen prestaties gerelateerd is aan het vertrouwen dat iemand heeft in zijn/haar eigen kunnen. Dit vertrouwen in eigen kunnen is medebepalend voor de doelen die iemand zichzelf stelt, voor

het doorzettingsvermogen ten tijde van problemen, en voor de uiteindelijke prestaties. Dit betekent dat de kenmerken van de medestudent waarmee een coassistent zich vergelijkt het vertrouwen in eigen kunnen kan versterken of verzwakken waardoor het leren van de betreffende coassistent wordt vergemakkelijkt of bemoeilijkt. Door het experimentele ontwerp van deze studie is de generaliseerbaarheid van de uitkomsten beperkt, en dat zette aan tot het doen van vervolgonderzoek in de praktijk.

Hoofdstuk 4 presenteert de kwalitatieve studie die is uitgevoerd om het gebruik van sociale vergelijking in de praktijk van de coschappen te onderzoeken. Twaalf coassistenten hebben gedurende vier weken hun vergelijkingservaringen met één of meer medestudenten ingesproken in een zogenaamd geluidsdagboek. De uitgeschreven opnames van deze dagboeken zijn geanalyseerd volgens de 'grounded theory', een methode waarbij gezocht wordt naar terugkerende thema's en patronen. De uitkomsten laten zien dat de sociale vergelijkingen van deze coassistenten gaan over: het uitvoeren van klinische taken, en over het omgaan met anderen, zoals met patiënten, arts-assistenten en medisch specialisten. Daarnaast gaan de vergelijkingen ook over persoonlijke zaken zoals gevoelens, houding en gedrag. Bij iedere vergelijking was er een moment van reflectie waarbij de student zichzelf identificeert en/of contrasteert met de betreffende medestudent. De balans in deze reflectie, het evenwicht tussen identificatie en contrast, is bepalend voor het effect van de vergelijking. De studie toont aan dat coassistenten hun medestudenten gebruiken als toetssteen, waardoor ze betekenis geven aan zichzelf in hun huidige positie, aan wat ze al kunnen en aan wat ze binnenkort denken te bereiken. Deze bevindingen wijzen op een centrale rol van medestudenten in het leerproces van coassistenten. Het lijkt daarom verstandig om tijdens de coschappen de onderlinge contacten tussen coassistenten te faciliteren en tijdens mentor- of coachgesprekken aandacht te besteden aan het vergelijkingsgedrag van coassistenten. Dergelijke gesprekken kunnen veronderstellingen naar voren brengen die de het verdienen om te worden aangemoedigd, en bieden tevens de gelegenheid om minder positieve uitkomsten van vergelijking te onderscheppen, zoals stress.

Hoofdstuk 5 vervolgt daarom met een kwantitatieve studie waarin de relatie tussen sociale vergelijking en coassistenten met stress wordt ontrafeld. Van sociale vergelijking is bekend dat het stress zowel positief als negatief kan beïnvloeden. Het doel van deze studie is om kenmerken te vinden van een gunstige manier van vergelijken door te onderzoeken of er verschillen bestaan tussen het vergelijkingsgedrag van coassistenten met veel en met weinig stress. Deelnemende coassistenten hebben een aantal vragenlijsten ingevuld waarmee hun stressniveau werd gemeten en verschillende aspecten van hun vergelijkingsgedrag. Voor de analyse van de verkregen data zijn multivariate variantieanalyses gebruikt. De resultaten hiervan laten belangrijke verschillen zien tussen het vergelijkingsgedrag van coassistenten met veel en met weinig stress. Het meer selectieve en positieve gebruik van sociale vergelijking door coassistenten met weinig stress biedt aanknopingspunten om coassistenten met veel stress te helpen met het ontwikkelen van een gunstiger vergelijkingsstrategie. Bijvoorbeeld door hen *bewust te maken* van hun eigen vergelijkingsgedrag en te vragen naar reflectie op de vergelijkingen die ze maken voorafgaand aan een stressvolle activiteit, zoals beginnen in een nieuw coschap, door hen *te informeren* over de voor en nadelen van de verschillende aspecten van het vergelijkingsproces, en door hen expliciet *te waarschuwen* voor piekeren over negatieve vergelijkingsuitkomsten en voor de lange termijn effecten van het identificeren met medestudenten die minder goed presteren.

Hoofdstuk 6 is geschreven op uitnodiging van het tijdschrift 'Medical Education' en betreft het commentaar op een studie over het leren van vaardigheden in tweetallen. De auteurs van deze studie hebben overtuigend aangetoond dat studenten die in tweetallen oefenen met het hanteren van een bronchoscoop, in dezelfde tijd net zo veel leren als studenten die deze vaardigheid individueel oefenen. Deze uitkomst is relevant voor de onderwijskundige praktijk daar het leren in tweetallen een minder groot beroep doet op instructeurs, en daardoor kosten efficiënter is. Als verklaring voor hun positieve resultaten doen de auteurs een beroep op zowel motorische als cognitieve factoren. In het commentaar wordt hun werk uitgebreid met inzichten vanuit de sociale vergelijkingstheorie omdat het werken in tweetallen, waarbij studenten afwisselen tussen oefenen en observeren, bijna onontkoombaar leidt tot sociale vergelijking. Het is heel goed mogelijk dat deze vergelijkingen hebben bijgedragen aan de positieve uitkomsten van de studie. De sociale beleving van het observeren van een beter presterende medestudent kan de wens oproepen

het zelf ook beter te doen, zoals observaties van een slechter presterende medestudent het zelfvertrouwen kan versterken. Van beide reacties is bekend dat zij positief bijdragen aan het leerproces en de resultaten daarvan. Gezamenlijke leeractiviteiten die impliciet aanzetten tot sociale vergelijking, zoals het oefenen van vaardigheden in tweetallen, worden daarom aanbevolen.

Hoofdstuk 7 betreft de algemene discussie waarin de belangrijkste bevindingen van dit proefschrift worden samengevat en besproken, beginnend bij enkele methodologische overwegingen. Er wordt ingegaan op de kracht van dit proefschrift zoals de relevantie, het consistente gebruik van een gevestigde theorie en de gedegenheid waarmee het onderzoek is uitgevoerd onder meer door gebruik te maken van verschillende onderzoeksmethoden. Er wordt tevens ingegaan op de beperkingen van dit proefschrift ten aanzien van de generaliseerbaarheid en potentiële bronnen van bias waarmee men rekening moet houden bij het vertalen van de resultaten naar studenten in een andere context. Vervolgens wordt het gegeven dat coassistenten zichzelf veelvuldig vergelijken met hun medestudenten bediscussieerd als een collectieve manier van leren en begrijpen in de klinische praktijk. Deze collectieve manier van leren betekent echter niet dat coassistenten identieke artsen worden. Het vergelijken met medestudenten kan juist ook relevante verschillen naar voren brengen van invloed op het zelfbeeld van de betreffende coassistent en op zijn/haar identiteitsontwikkeling. Vervolgonderzoek wordt daarom aanbevolen om volledig te kunnen doorgronden wat de impact van sociale vergelijking is op de algemene ontwikkeling van coassistenten en op de individuele keuzen die zij tijdens hun carrière maken.

De discussie vervolgt met een kort overzicht van implicaties voor de onderwijskundige praktijk.

- *Medestudenten zijn een essentiële factor in de opleiding*
- *Coassistenten zijn strek geneigd zich met elkaar te vergelijken*
- *Deze vergelijkingen zijn van belang voor de professionele ontwikkeling*
- *Het verdient daarom aanbeveling om onderlinge vergelijkingen te promoten en ontmoetingen tussen coassistenten te faciliteren*
- *Het lijkt verstandig om met coassistenten in gesprek gaan over hun vergelijkingsgedrag, in mentor- of coaching gesprekken*

- *Sociale vergelijking kan negatieve gevolgen hebben, het is van belang hier alert op te zijn*
- *Coassistenten kunnen ondersteuning nodig hebben bij het ontwikkelen van een gunstiger vergelijkingstrategie*

Al deze implicaties komen voort uit de conclusie van dit proefschrift, dat medestudenten een centrale rol spelen in het leren van coassistenten doordat de onderlinge vergelijkingen van essentieel belang zijn voor de ontwikkeling tot basisarts.

Dankwoord

Ook het schrijven van een proefschrift vindt gelukkig plaats in een sociale context. Veel mensen om mij heen hebben dan ook bijgedragen aan de inhoud van dit proefschrift en aan het plezier dat ik beleefd heb aan het proces. Op deze plaats wil ik iedereen bedanken die mij op een of andere wijze heeft geholpen, door belangstelling te tonen, te luisteren, mee te denken en goede raad te geven.

Tot een aantal van hen wil ik mij graag persoonlijk richten.

Janke Cohen-Schotanus, als vanzelfsprekend ben je van het begin af aan nauw betrokken geweest bij dit project. Destijds, toen ik vertelde onderzoek te willen doen naar de sociale interacties tussen coassistenten en een voorbeeld gaf van wat ik bedoelde, noemde jij het begrip 'sociale vergelijking' en reikte daarmee de rode draad aan van dit proefschrift. De afgelopen jaren hebben we intensief samengewerkt en heb je me veel geleerd over de praktijk van het doen van onderzoek naar onderwijs, daar zaten vele gouden momenten tussen die ik blijvend zal koesteren en waar ik je hartelijk voor wil danken.

Jan Kuks, ook jij hebt aan de basis gestaan van dit proefschrift, onder meer door mij toegang te verschaffen tot je werkkamer, de plek waar ik fantastisch heb gewerkt en de eerste studies heb uitgedacht. In de jaren daarna bewaakte je het perspectief van de medisch specialist en was je op de achtergrond steeds aanwezig, een belangrijke zekerheid in mijn rug. Dank daarvoor. Maar er was meer, ooit gaf je mij een CD van Saint-Saëns, 'Music for Violin'. Dit proefschrift is grotendeels op deze klanken geschreven, heel zacht en op repeat, dat werkte goed.

Tim Dornan, I feel privileged to have met you and to have witnessed your enthusiasm, understanding of medical education, and great ability to share. You really helped me as a 'good critical friend', guided me through the qualitative study, and thoroughly introduced me into the world of Social Theories of Learning. Visiting Manchester, I enjoyed you and Ceri's hospitality, and will never forget that long, inspiring eve with you, Etienne, Peter, and Nienke. Many, many thanks.

Debbie Jaarsma, positief, energiek en enthousiast, midden vorig jaar werd je hoofd van onze onderzoeksgroep, nu 'Center for Education Development and Research in Health Professions' en raakte je betrokken bij de laatste loodjes van dit proefschrift. Dank voor je positieve insteek, pragmatische tips en vooral dank voor de gelegenheid die je mij hebt geboden om te schakelen tussen pre en post.

Johanna Schönrock-Adema, de afgelopen jaren was je mijn kamergenote en hebben we heel wat lief en leed gedeeld. In roerige tijden bleek je een betrouwbaar bakken. Dank daarvoor! Daarnaast heb ik door ons kamergenootschap mogen ervaren hoe waardevol het is om dagelijks op te trekken met een goede, statistisch getalenteerde onderzoeker. Met plezier denk ik terug aan de dagen van doorwerken, met af en toe een nuttige opmerking of raak commentaar. Dat ene artikel samen, wat ging dat mooi!

Tineke Bouwkamp-Timmer, bij de meeste artikelen sta je in de acknowledgements, dat is niet voor niets! Je hebt de lat hoog en vindt altijd wel iets dat nog beter kan, of moet. Het is een plezier om samen met jou te slijpen aan de laatste zinnen, te zoeken naar het juiste woord, en dan de kick van het vinden! En ook, vrijdagmorgen even koffie, als het kan, want je bent zoveel meer dan de rijke informatiebron waar ik vaak uit heb mogen putten. Dank!

Alle (oud) promovendi van de onderzoeksgroep. Peer influence, jazekeer! Ally van Hell en Mirjam van Lohuizen, samen zaten we ooit ijverig gebogen over 'het tijdschrijfschema' en proefde ik aan het doen van onderzoek. Net als Marjolein Heijne-Penninga en Hanke Dekker sprongen jullie weg, mijn peers van het eerste uur. Voor mij liep het anders, maar ik was blijvend beïnvloed, de geest was voorgoed uit de fles. Dank.

Later, toen ik mijzelf ook echt promovendus kon noemen, was de groep vernieuwd en waren het vooral Dario Fernandez, Wouter Kerdijk, Nienke Renting, Nienke Schripsema, en Martha van der Wal, op de voet gevolgd door Ids Dijkstra, Fundhy Prihatanto en Yoyo Suhoyo, die mij lieten delen in het wel en wee van de promovendus. De groep is hecht, coöperatief, gezellig en altijd bereid om te helpen. Wat heb ik enorm veel van jullie geleerd, gezien en genoten. Dank.

Inmiddels is de PhD-groep zich opnieuw aan het vernieuwen. Marieke Adema, Floor Velthuis, Tamara Koehler, Petra van Heugten en Nico Leenstra. Het is bijzonder stimulerend om getuige te zijn van de stappen die jullie zetten. De komende jaren hoop ik door te geven wat ik zelf heb geleerd en gekregen. Heel veel succes met jullie project!!

Op deze plaats wil ik ook de vele coassistenten bedanken voor het invullen van de verschillende vragenlijsten en voor het meedoen aan het experiment. Met name de deelnemers aan de kwalitatieve studie hebben een bijzondere inspanning geleverd. Dank voor jullie inzet en persoonlijke ervaringen!

En zeker ook de studentassistenten die hebben geholpen bij het invoeren van de data (Mariska de Groot, Nienke Boendermaker, Tessa Waslander) en het uitschrijven van de opnames (Elske Harbers). Dank voor jullie bijdrage!

Buiten het Onderwijsinstituut zijn ook veel mensen van invloed geweest op de wording van dit proefschrift. Zo dank ik de collega leden van verschillende ethische commissies voor de rijke discussies, het onderling vertrouwen, respect én humor. Dit heeft zeker positief bijgedragen aan het dagelijkse denkwerk! Ook Kunsthuis Noordwaarts wil ik hier noemen, waar Margreet Doornbos mijn creativiteit deed opbloeien en daarmee ook mijn schrijven heeft beïnvloed. Heel veel dank!

Voor hun belangstelling en relativering wil ik ook mijn vrienden bedanken, in het bijzonder; Liesbeth, Louis, Geke, Brigitte, Rik, Birgit, Irene, Petra, Jacqueline, Loek, Marie-Jose, Annet, Abe, Frouwkje en Symen, alsook Michael en Martin, de partners van mijn paranimfen.

Jessica, al onze afspraakjes 'bij de dames' ... even kort, soms lang. Je bent de best ingevoerde paranimf die ik mij kan wensen. Daarbij trekken we er met enige regelmaat ook nog eens een volle dag op uit, om echt helemaal bij te praten. Ik stel voor dat we dit allemaal blijven doen; tenslotte is alléén het proefschrift af.

Dineke, bijna 37 jaar geleden leerden we elkaar kennen in de eerste klas van het VWO; samen schoolgaan, wadlopen, kamperen, uitgaan, en door donker terugfietsen naar jouw huis, of het mijne. De liefde bracht je naar Amerika. Ik vind het bijzonder dat jullie samen overkomen, zodat je me tijdens de promotie terzijde kunt staan.

Pap en mam, terwijl ik dit schrijf richt ik me tot jullie beide, en is 1 juni nog ver. Wat is het mooi dat jullie mij tot hier hebben kunnen volgen op mijn pad. Mijn zussen en grote broer, hun partners en kinderen. Duizend herinneringen schieten door mij heen die alle op een of andere manier hebben bijgedragen aan dit proefschrift, en verder. En dan de kinderen die op ons pad zijn gekomen, ons leven verrijken en als geen ander laten zien dat er meer is dan 'schrijven'.

Tot slot wil ik Nyske bedanken voor het samenleven en het er zijn, iedere dag weer. Tijdens het schrijven heb ik zeker geprofiteerd van je haarscherpe analyses, je kennis, begrip, geduld en vertrouwen maar misschien nog wel meer van je eigenheid, gevoel voor rechtvaardigheid en ondernemingszin. Samen met jou is een zee niet snel te hoog, en is het goed thuiskomen.

RESEARCH INSTITUTE SHARE

This thesis is published within the **Research Institute SHARE** (Science in Healthy Ageing and healthcaRE) of the University Medical Center Groningen / University of Groningen.

Further information regarding the institute and its research can be obtained from our internetsite: www.share.umcg.nl

More recent theses can be found in the list below.

(Co-) supervisors are between brackets.

2015

Mutsaerts M Lifestyle and reproduction
(prof JA Land, prof BW Mol, dr A Hoek, dr H Groen)

Sulkers E Psychological adaptation to childhood cancer
(prof R Sanderma, prof PF Roodbol, prof ESJM de Bont, dr J Fleeer, dr WJE Tissing)

Febrianna SA Skin problems related to Indonesian leather & shoe production and the use of footwear in Indonesia
(prof PJ Coenraads, prof H Soebono, dr MLA Schuttelaar)

2014

Schneeberger C Asymptomatic bacteriuria and urinary tract infections in women: focus on diabetes mellitus and pregnancy
(prof RP Stolk, prof JJHM Erwich, dr SE Geerlings)

Skorvanek, M Fatigue, apathy and quality of life in patients with Parkinson's disease
(prof JW Groothoff, prof Z Gdovinova, dr JP van Dijk, dr J Rosenberger)

Kolvek G Etiology and prognosis of chronic kidney disease in children: Roma ethnicity and other risk factors
(prof SA Reijneveld, prof L Podracka, dr JP van Dijk, dr J Rosenberger)

Mikula P Health related quality of life in people with multiple sclerosis; the role of coping, social participation and self-esteem
(*prof JW Groothoff, prof Z Gdovinova, dr JP van Dijk, dr I Nagyova*)

Amalia R Improving a school-based dental programme through a sociodental risk group approach
(*prof RMH Schaub, prof JW Groothoff, prof N Widyanti*)

Christoffers WA Hand eczema; interventions and contact allergies
(*prof PJ Coenraads, dr MLA Schuttelaar*)

Troquete NAC START-ing risk assessment and shared care planning in out-patient forensic psychiatry; results from a cluster randomized controlled trial
(*prof D Wiersma, prof RA Schoevers, dr RHS van den Brink*)

Golea E Functioning of young individuals with upper limb reduction deficiencies
(*prof CK van der Sluis, dr RM Bongers, dr HA Reinders-Messelink*)

Nguyen HT Medication safety in Vietnamese hospitals; a focus on medication errors and safety culture
(*prof K Taxis, prof FM Haaijer-Ruskamp, prof JRBJ Brouwers, dr TD Nguyen*)

Lehmann V Singlehood and partnerships in healthy people and childhood cancer survivors; a focus on satisfaction
(*prof M hagedoorn, prof R Sanderman, dr MA Tuinman*)

Jaarsma EA

Sports participation and physical disabilities: taking the hurdle?!
(*prof JHB Geertzen, prof PU Dijkstra, dr R Dekker*)

Ockenburg SL van

Psychological states and physical fates; studying the role of psychosocial stress in the etiology of cardiovascular disease: a nomothetic versus an idiographic approach
(*prof JGM Rosmalen, prof P de Jonge, prof ROB Gans*)

Beijers CGHM Unhealthy behaviors during pregnancy; who continues to smoke and consume alcohol, and is treatment of anxiety and depressive symptoms effective?

(prof J Ormel, prof CLH Bockting, dr H Burger)

Kerdijk W Strategic choices in curriculum design to facilitate knowledge and competency development

(prof J Cohen-Schotanus, prof JW Snoek, dr R Tio)

Spaans F Hemopexin activity and extracellular ATP in the pathogenesis of preeclampsia

(prof H van Goor, dr MM Faas, dr WW Bakker)

Brinksma A Nutritional status in children with cancer

(prof PF Roodbol, prof R Sanderman, prof ESJM de Bont, dr WJE Tissing)

Prihodova L Psychological and medical determinants of long-term patient outcomes; a specific focus on patients after kidney transplantation and with haemophilia

(prof JW Groothoff, dr JP van Dijk, dr I Rajnicova-Nagyova, dr J Rosenberger)

Snippe E Understanding change in psychological treatments for depressive symptoms; the individual matters

(prof R Sanderman, prof PMG Emmelkamp, dr MJ Schroevers, dr J Fleer)

Groen B Complications in diabetic pregnancy; role of immunology and Advanced Glycation End products

(prof TP Links, prof PP van den Berg, dr MM Faas)

Visser L Early detection and prevention of adolescent alcohol use; parenting and psychosocial factors

(prof SA Reijneveld, dr AF de Winter)

Tovote KA Acceptance or challenge? Psychological treatments for depressive symptoms in patients with diabetes

(prof R Sanderman, prof PMG Emmelkamp, prof TP Links)

Trippolini M Evaluation of functioning in workers with whiplash-associated disorders and back pain

(prof MF Reneman, prof PU Dijkstra, prof JHB Geertzen)

Eriks-Hoogland IE Shoulder impairment in persons with a spinal cord injury & associations with activities and participation

(prof LHV van der Woude, prof G Stucki, prof MWM Post, dr S de Groot)

Suwantika AA Economic evaluations of non-traditional vaccinations in middle-income countries: Indonesia as a reference case

(prof MJ Postma, dr K Lestari)

Behanova M Area- and individual-level socioeconomic differences in health and health-risk behaviours; a comparison of Slovak and Dutch cities

(prof SA Reijneveld, dr JP van Dijk, dr I Rajnicova-Nagyova, dr Z Katreniakova)

Dekker H Teaching and learning professionalism in medical education

(prof J Cohen-Schotanus, prof T van der Molen, prof JW Snoek)

Dontje ML Daily physical activity in patients with a chronic disease

(prof CP van der Schans, prof RP Stolk)

For more 2014 and earlier theses visit our website.